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A	SOCIAL SCIENCES
B	PHYSICS AND MATHEMATICS
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D	EARTH SCIENCE
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A SOCIAL SCIENCES

AA	PHILOSOPHY AND RELIGION
AB	HISTORY
AC	ARCHAEOLOGY, ANTHROPOLOGY, ETHNOLOGY
AD	POLITICAL SCIENCES
AE	MANAGEMENT, ADMINISTRATION AND CLERICAL WORK
AF	DOCUMENTATION, LIBRARIANSHIP, WORK WITH INFORMATION
AG	LEGAL SCIENCES
AH	ECONOMICS
AI	LINGUISTICS
AJ	LITERATURE, MASS MEDIA, AUDIO-VISUAL ACTIVITIES
AK	SPORT AND LEISURE TIME ACTIVITIES
AL	ART, ARCHITECTURE, CULTURAL HERITAGE
AM	PEDAGOGY AND EDUCATION
AN	PSYCHOLOGY
AO	SOCIOLOGY, DEMOGRAPHY
AP	MUNICIPAL, REGIONAL AND TRANSPORTATION PLANNING
AQ	SAFETY AND HEALTH PROTECTION, SAFETY IN OPERATING MACHINERY

CORPORATE TAX RATES IN THE CONTEXT OF MACROECONOMIC DETERMINANTS AS CRUCIAL ASPECTS OF EFFECTIVE CORPORATE TAXATION IN THE VISEGRAD GROUP COUNTRIES

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Abstract: The study examines the relationship between the effective tax rate, the nominal rate, and selected macroeconomic determinants. Correlation and regression analysis were used to analyze the impact of individual determinants and the nominal tax rate on the effective rate in the Visegrad Group countries from 2004 to 2022. The results of the analysis suggest different development directions of the standard tax rate in the Visegrad Group countries. While it decreased in the Czech Republic, the decline in Hungary and Slovakia was followed by an increase. In Poland, the standard tax rate remained almost unchanged. The results of linear regression demonstrated that in Slovakia, the Czech Republic, and Hungary the standard rate has a statistically significant impact on the effective tax rate. The result was not confirmed for Poland, where the standard rate was removed from the model due to the singularity problem.

Keywords: corporate tax rate, effective tax rate, Visegrad Group, regression analysis, least squares method.

1 Introduction

In most countries, corporate tax rates are set at relatively high levels. Such setting of tax rates goes hand in hand with a particularly complex tax system. Therefore, it is not surprising, that the issue of effective corporate taxation is quite debated, either in general or with regard to the effective collection of revenues related to this tax, as well as the simplification of the mentioned complex tax systems. On one hand, there are policymakers who argue in favor of reducing corporate tax rates to enable businesses become both more competitive and innovative. However, there are also opponents, who express concerns associated with the negative impact of potentially lower tax revenues on the state budget, which could lead to a disruption of balance and increased inequality. It remains questionable, how reducing corporate tax rates leads to an improvement in competitive advantage compared to other economies.

2 Theoretical overview

In most countries, corporate tax rates are very high and tax laws are designed intricately. These two factors lead to discussions on how to rationalize these systems. Representatives of government policies hold dual views. Some argue in favor of lower tax rates, as lower tax rates can make businesses more innovative and thus more competitive. However, on the other hand, there are opponents, who argue that reducing corporate tax rates would disrupt the balance of government budgets, which would have a negative impact and increase inequality. The key question, therefore, is whether corporate taxes do or do not have a real impact on the competitiveness of individual economies (Mukherjee, 2017). Tax policy is an integral part of a state's economic policy and has a significant impact on macroeconomic indicators. The corporate tax rate can influence indicators such as inflation, GDP, unemployment, exports and others. According to Slemrod (2004), foreign tax rates have a significant impact on the corporate tax of a given state. Clausing (2007) examines the factors influencing corporate taxation. These factors are related to macroeconomic conditions and may indicate the level of tax competition between countries. The study emphasizes that national companies may respond to tax burdens by shifting income to countries with lower taxes. As Segal (2022) states, investors use effective tax rates for their decisions and investments abroad, which express the actual taxation rate. Effective and statutory tax rates differ significantly. The effective tax rate is a stricter expression of the company's overall

tax liability. It is also usually lower. Considering that effective rates are one of the most important factors in the decision-making of foreign investors regarding investments and locations, it is not surprising that the discussion in the scientific sphere on this topic is extensive (Gupta, 2007; Lietz, 2013; Lopo Martinez, 2017; Wilde and Wilson, 2018; Weybourne, 2021). (Mankiw, 2015), McNabb (2018), Delgado et al (2014) in their studies mention many arguments for and against increasing tax burdens and their subsequent impact on GDP growth/decline. A fundamental argument against is that higher tax burdens do not stimulate individuals to provide labor capital or firms to produce more. However, on the other hand, higher tax rates and the associated higher tax revenues provide individual governments with the potential to invest these resources, whether in improving education, infrastructure or science and research. This ultimately leads to increased production capacity in the economy. Empirical evidence obtained in recent years confirms the close connection between tax rates, tax revenues, and economic growth, thus refuting doubts about the existence of this relationship formulated by Easterly & Rebelo (1993) in their work. Their claims about the absence of this relationship are directly refuted by Arnold et al. (2011), who found that increasing corporate tax rates and the subsequent increase in corporate revenues lead to a reduction in GDP growth, pointing to a negative relationship between taxation, tax revenues and GDP growth. Lee and Gordon (2005) reached the same conclusion. On the other hand, reducing tax rates can stimulate investment and business expansion, increasing demand for goods and services and potentially causing short-term inflationary pressures due to supply exceeding demand. Previous studies have shown, that inflation increases the real corporate tax burden because the value of tax deductions decreases due to inflation. This increases taxable corporate income faster than inflation, leading to a higher tax burden (Gravelle, 1994). Lowering tax rates can encourage businesses to expand and hire new employees, potentially reducing unemployment rates. Companies would have more financial resources for expansion and new projects, requiring additional labor. On the contrary, tax increases may limit business development and lead to layoffs, as companies reduce costs, including labor costs, which may increase unemployment (Fedeli and Forte, 2012). Research shows, that lower corporate tax rates make EU countries more attractive for foreign direct investment. In addition, market size, market potential, access to the European single market, common language and neighboring relations are other factors that increase the attractiveness of these countries for investment (Delgado et al., 2014). A significant amount of literature shows, that lower corporate tax rates improve the attractiveness of countries and regions for foreign direct investment, especially in smaller and peripheral countries, that do not have other advantages such as location, market size or market access (Feld and Heckemeyer, 2011). Becker et al. (2012) examined the qualitative and quantitative effects of corporate tax on foreign direct investment and concluded, that corporate taxation has a negative impact on these investments. Due to factors such as globalization, tax competition between states or each country's simple internal tax strategy Slemrod, (2004) ; Mutti et al., (2019) ; Deveruex and Sorensen (2006) nominal rates have decreased significantly since the early 1980s, but the pace of decline has varied over the years and they also indicate that the decline will continue. New EU regulations, which set a minimum effective tax rate of 15%, have been in effect since February 1, 2024. The rate is intended for multinational companies operating in EU member states. This framework aims to bring greater fairness and stability to the tax environment in the EU and the world. The European Commission argues, that these rules represent a modern and better-adapted framework for today's globalized and digital world. The entry into force of the minimum tax rules, which member states unanimously agreed in 2022, formalizes the implementation of the so-called "2nd pillar" rules, which the EU approved as part of a global agreement on international tax

reform in 2021. Although, almost 140 jurisdictions worldwide have subscribed to these rules, only the EU has anchored them in legal norms (European Commission, 2024).

3 Methodology

The aim of this study was to analyze and evaluate the relationship between corporate tax rates (effective and nominal tax rates) and selected macroeconomic determinants in the Visegrad Group countries. Through our analysis, we aimed to answer the following research question: "Are corporate tax rates decisive in effective taxation?" The first part of the study tracks and evaluates the development of corporate tax rates (both nominal and effective) and corporate tax revenues. The second part focuses on compiling a correlation matrix and estimating econometric models for each Visegrad Group country separately. The goal of modeling and subsequent testing of the estimated models was to identify and quantify the statistical significance of selected macroeconomic determinants and the nominal corporate tax rate in relation to the effective corporate tax rate through regression analysis, specifically the method of least squares. Each model was tested to meet the basic assumptions of linear regression models. We tested residual normality (Jarque-Bera test, Shapiro-Wilk test, Shapiro-Francia test), heteroskedasticity (Breusch-Pagan test), autocorrelation (Breusch-Godfrey test, Box-Ljung test, and Box-Pierce test), multicollinearity (VIF factor), and model specification (Ramsey RESET test). The modeling and testing of regression analysis parameters were conducted using the RStudio program environment.

The presented study complements existing studies wrote by authors such as Andrejovská (2019), Puliková (2019), Kotlana et al. (2011), Arnold et al. (2011), Wahyuningsih et al. (2020), Mazák (2018), Zirgulus and Šarapovas (2016), Mateu et al. (2009), and Fernández-Rodriquer et al. (2023), who examined macroeconomic determinants in EU countries, while in our study, we supplemented the analysis with the annual change in GDP%, foreign direct investment as a percentage of GDP and used the GDP deflator % to express inflation. In our analyses, we focus on four countries, namely the Slovak Republic, the Czech Republic, Hungary and Poland, in the time interval from 2004 to 2022. The data necessary to perform these analyzes were obtained from the Eurostat, World Bank, and OECD databases.

After implementing the above-mentioned correlation and regression analysis, we will evaluate the results and the impact

of individual variables on effective corporate tax rates. When evaluating the results, we will try to confirm or refute the following hypotheses:

Hypothesis 1: Corporate tax revenues had a decreasing trend during the COVID-19 pandemic.

Hypothesis 2: The effective tax rate positively correlates with corporate tax revenues.

Hypothesis 3: The effective tax rate is mainly influenced by the nominal tax rate.

Through regression analysis we analyzed the impact of selected macroeconomic determinants we chose and the standard corporate tax rate on effective corporate tax rates in the V4 countries individually. We worked with an econometric model in the following form:

$$EF_{it} = \beta_0 + \beta_1 * NOM_{it} + \beta_2 * GDP_{it} + \beta_3 * INF_{it} + \beta_4 * TAX_{it} + \beta_5 * FDI_{it} + \beta_6 * UN_{it} + \varepsilon_{it}$$

where the dependent variable is:

▪ EF_{it} = effective tax rate of state i in year t (in %),

and the independent variables are:

- NOM_{it} = nominal tax rate of state i in year t (in %),
- GDP_{it} = annual growth rate of gross domestic product of state i in year t (in %),
- INF_{it} = $INF_{i,t}$ = inflation of state i in year t (in % - annual growth rate of GDP deflator),
- TAX_{it} = corporate tax revenues of state i in year t (in % - as a share of GDP),
- FDI_{it} = foreign direct investment of state i in year t (in % - as a share of GDP),
- UN_{it} = unemployment in state i in year t (in % - as a share of the unemployed to the total labor force).
- Other variables:
- β_0 = intercept (constant)
- β_1, \dots, β_6 = regression coefficients of the model, indicating the sensitivity of the change in the explanatory variable x to the explained variable y ,
- ε_{it} = random error of the model.

Table 1. illustrates the impact of selected determinants and the standard tax rate on the effective rate in selected studies compared to our assumptions.

Table 1 Comparison of results from conducted studies

	Author	Year	Results of the study	Our assumptions
Interannual change of GDP	Andrejovská	2019	+	
	Kotlan et al.	2011	+	
	Clausing	2007	+	+
Foreign direct investment	Benassy-Quéré	2005	+	
	Arnold et al.	2011	-	+
Inflation	Wahyuningsih et al.	2020	+	
	Saibu et al.	2013	+	
	Koraus et al.	2018	-	-
Unemployment	Zirgulus and Šarapovas	2016	+	
	Bettendorf et al.	2009	+	
	Fedeli et al.	2012	-	-
Tax revenues	Markusen	1995	+	
	Matei et al.	2009	-	
	Devereux et al.	2007	-	+
Standard rate	Fernández-Rodriquer et al.	2023	+	
	Puliková	2019	+	+

4 Results of study and discussion

4.1 Analysis of the standard (nominal) corporate tax rate progress in the V4 countries from 2004 to 2022

In Slovak legislation, the area of corporate taxation is regulated by Act No. 595/2003 Coll. on income tax as amended. The tax

rate is currently set at 15% for taxpayers who have not exceeded taxable income of €50,000 for the relevant tax period and 21% for taxpayers whose income exceeds this amount. In Czech Republic, this tax is regulated by Act No. 586/1992 Coll. on income tax as amended for the relevant tax period. According to this law, all companies with headquarters in Czech Republic, as well as foreign companies, are required to pay tax on their

profits. Resident companies are required to pay corporate tax not only on income acquired within the Czech territory but also on income from worldwide sources. The rate for the tax period starting in 2024 is 21%, while for the previous period, it was 19%. The corporate tax rate in Poland is currently set at 19%. Taxpayers can also apply a reduced rate of 9%, but only for income other than capital gains and under the condition that they are considered small taxpayers. Residents are subject to worldwide taxation of their income unless there is a treaty between Poland and the respective country to prevent double taxation. Act No. 81/1996 Coll. on income tax for legal entities regulates the area of corporate taxation in Hungary. Taxpayers with permanent residence in Hungary are obliged to tax and pay

corporate tax on their worldwide income. This represents the first type of unlimited tax liability. Conversely, limited tax liability applies to legal entities that are not residents. The law imposes an obligation on them to pay corporate tax on activities acquired within the state. The corporate tax rate in Hungary is currently set at 9%. Standard rates themselves do not have significant explanatory value. On the other hand, it is one of the simplest and most common ways of comparing taxation, whether of legal or natural persons. In general, it plays an important role in deciding on new investments in a given country. They are a key indicators that helps investors decide how to allocate their financial resources to develop their further business activities.

Table 1 Illustrates standard and effective corporate tax rates progress in V4 countries from 2004 to 2022.

	Slovak republic		Czech republic		Hungary		Poland	
	STR	ETR	STR	ETR	STR	ETR	STR	ETR
2004	19	16,5	28	24,6	16	17,7	19	17,1
2005	19	16,8	26	22,7	16	17,7	19	17,1
2006	19	16,8	24	21	17,33	17,7	19	17,1
2007	19	16,8	24	21	20	17,7	19	17,4
2008	19	16,8	21	18,4	20	17,7	19	17,4
2009	19	16,8	20	17,5	20	19,5	19	17,5
2010	19	16,8	19	16,7	19	19,1	19	17,5
2011	19	16,8	19	16,7	19	19,3	19	17,5
2012	19	16,8	19	16,7	19	19,3	19	17,5
2013	23	20,3	19	16,7	19	19,3	19	17,5
2014	22	19,4	19	16,7	19	19,3	19	17,5
2015	22	19,6	19	16,7	19	19,3	19	17,5
2016	22	19,6	19	16,7	19	19,3	19	17,5
2017	21	18,7	19	16,7	9	11,1	19	17,5
2018	21	18,7	19	16,7	9	11,1	19	17,5
2019	21	18,7	19	16,7	9	11,1	19	16
2020	21	18,7	19	16,7	9	11,1	19	16
2021	21	18,7	19	17	9	11,1	19	16,1
2022	21	18,7	19	17	9	11,1	19	16,1

Source: Own processing based on Eurostat data

In Table 2, we can see the development of the nominal corporate tax rate in the V4 countries during the observed period. The individual rates vary, as evident at first glance. A constant tax rate of 19% throughout the observed period can be seen in Poland. In the Czech Republic, we can see a declining trend. However, the development of the standard rate was not as clear in Slovakia and Hungary. Regarding Slovakia, in the first nine years, it remained constant at 19%. The following year, 2013, it increased of 4% and the standard rate was at 23%. This sharp increase aimed to compensate for the long-term declining trend of the clean effective tax rate. In 2014, there was a decrease back to 22%. This level remained unchanged until 2017, when there was a 1% decrease. The nominal rate was at 21%, which remained unchanged until the end of the observed period. In Hungary, the nominal rate was 16% in 2004 and 2005. It then increased to 17.33% in 2006, and subsequently to 20% in the following three years. In 2017, it decreased for the last time to 9%. It remained constant at this level until the end of the observed period. The standard corporate tax rate in the Czech Republic was 28% at the beginning of the observed period in 2004 and 26% in 2005. In the following years, the rate decreased by 2% annually. In 2006 and 2007, it was 24%. In 2008, there was another 3% decrease, specifically to 21%. From this year on, the rate changed twice. In 2009, it decreased to 20%. The following year, it decreased by another 1% to 19%. It remained constant at this level until the end of the observed period.

As we can see with the standard tax rate, with the effective rate, we can observe significant diversity at first glance. The highest effective rate in 2004 was achieved by the Czech Republic, at 24.6%. In 2005 it was at 22.7%. In the following two years, it decreased by 2.7%, to 21%. In the next year, 2008, there was a decrease back to 18.4%. From 2010 to 2020, the rate was constant at 16.7%. At the end of the observed period, in 2022 and the year before, 2021, it was at 17%. Hungary achieved the second highest effective rate in 2004, at 17.7% among the V4

countries. Its value changed in 2009, when we can observe an increase to 19.5%. A year later, there was a slight decrease to 19.1%. From 2011 to 2016, it remained constant, specifically at 19.3%. In all remaining observed years, the rate changed only once, in 2017, when it decreased by 8.2% to 11.1%. In third place, with the third highest rate in the first observed year and only 0.6 percentage points lower than Hungary, Poland achieved 17.1%. In the following years, the rate changed three more times, in 2009, when it slightly increased again to 17.5%. It remained at this level until 2019. That year marked a turning point and the rate started to decline. We can see an interannually decrease of 1.5% to 16%. The last change we can observe in 2021, a slight increase, specifically by 0.1%. The effective tax rate during the mentioned period was at 16.1%, the same value it achieved in 2022. The lowest effective tax rate in 2004 was achieved by Slovakia, at 16.5%. It increased annually to 16.8%, where it remained until 2012. In 2013, the largest increase in the rate occurred, by 3.5 percentage points. The following year brought a turning point, and the tax rate gradually started to decline. In the first year, in 2014, it decreased to 19.4%. In 2015 and 2016, there was a slight increase of 0.2 percentage points to 19.6%. This was followed by another decrease of 0.9%. As we can see, the rate reached 18.7%. It remained constant at this level from 2017 until the end of the observed period.

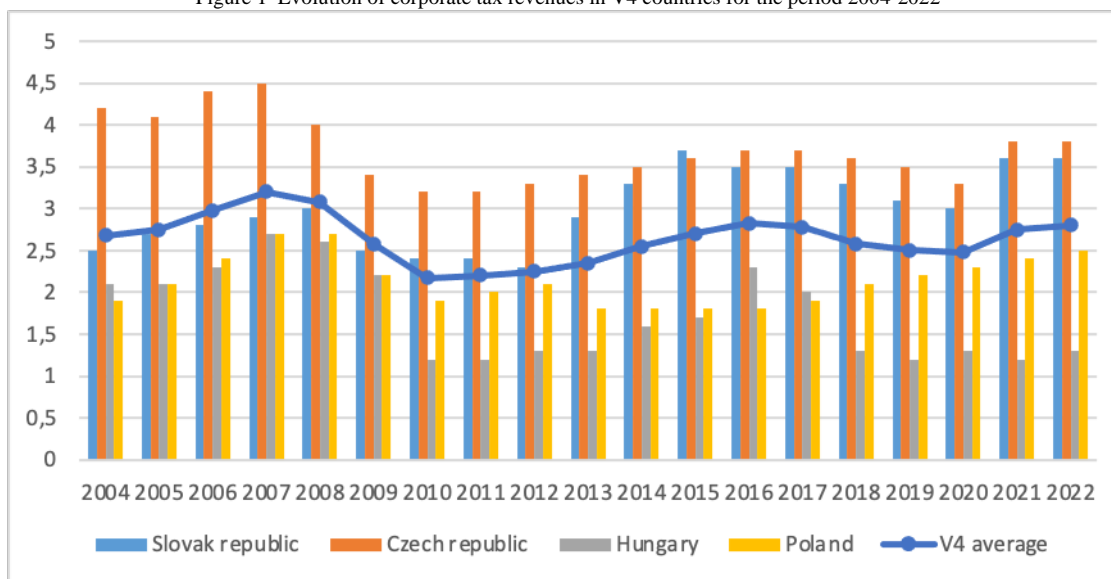
4.2 Analysis of corporate tax revenues in V4 countries from 2004 to 2022

One of the most important indicators in the field of taxation is tax revenues flowing into the state budget. Fig. 1 Revenues are expressed as a percentage of GDP in the respective year. Corporate tax revenues in Slovakia during the observed period ranged from 2.5% to 3.6% of the country's GDP. In general, we could say that the level of tax revenues is above the V4 country average. The most significant drop was recorded between 2008

and 2009 when revenues decreased by 0.5 percentage point, what was caused by the economic crisis, which also affected Slovakia. The most significant increasing trend can be observed

between 2012 and 2015. In these years, there was an average annual increase in tax revenues by 0.4 percentage points. In 2022, the level of tax revenues was at 3.6% of GDP.

Figure 1 Evolution of corporate tax revenues in V4 countries for the period 2004-2022



Source: Own processing based on Eurostat data

In Czech Republic, the average development most reliably copies the trends in the V4 countries. Additionally, these revenues have consistently remained well above the average level of the observed countries. They peaked in 2007, before the mentioned economic crisis, reaching 4.5% of the country's total GDP. In 2008 and 2009, there was a repeated decline of 0.5 percentage points. From 2018 to 2020, a renewed downward trend was noted, primarily due to the COVID-19 pandemic, especially in 2020. However, it is important to say, that although the Czech Republic has been above the average of the V4 countries for a long time, as mentioned earlier, it has not managed to exceed the 4% level after the economic crisis, as it did in 2007 when corporate tax revenues accounted for up to 4.5% of the total Czech GDP for that year.

In Poland, an unexpected fact can be noted, that throughout the entire observed period revenues were below the average of our observed countries. However, it can be said that the development was quite similar until 2013, when a turning point occurred. Instead of the expected growth based on the average development of our sample, tax revenues stagnated at the level of 1.8%. They remained constant until 2018, when they slightly increased. This upward trend continued until the end of the observed period, with revenues reaching 2.5% of the country's total GDP.

Hungary, like Poland, has been below the average level of V4 countries for a long time in terms of corporate tax revenues. The most significant decline in this indicator, by one percentage point, can be observed between 2009 and 2010, when its level fell from 2.2% to 1.2% of the country's total GDP. From 2018

until the end of the observed period, we can observe recurrent increases and decreases within the range of 0.1 percentage points.

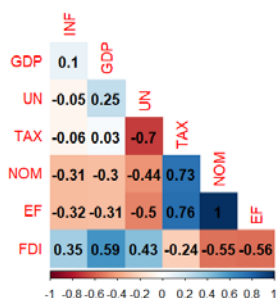
4.3 Analysis of relationships between the effective rate and selected determinants

Correlation Analysis of V4 Countries

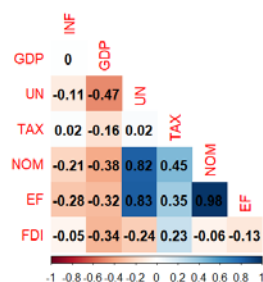
The correlation analysis shown in Figure 2, implemented for each country, reveals similar results to those we found in the development. A strong positive correlation is observed particularly between corporate tax revenues and both the standard and effective tax rates. A perfect, unitary correlation can be seen in all states between the standard tax rate and the effective tax rate. On the other hand, the results are not as similar in cases of negative dependence. The highest negative dependence in Slovakia is observed between the variables of unemployment and corporate tax revenues. In the Czech Republic, the highest negative correlation coefficient is between the variables of inflation and unemployment. In Hungary, the highest negative correlation is recorded between GDP and unemployment, while in Poland, it is between the effective tax rate and inflation.

Figure 2 Correlation Analysis of V4 Countries

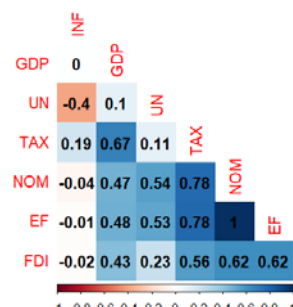
Correlation analysis – Slovakia



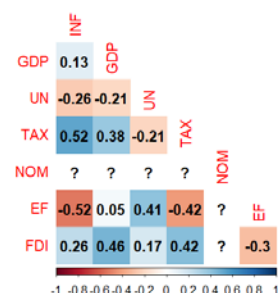
Correlation analysis – Hungary



Correlation analysis – Czech Republic



Correlation analysis – Poland



Source: Own processing based on Eurostat data

4.4 Regression analysis of the effective rate and selected determinants in V4 countries

Slovak Republic

The results of the regression analysis, through which we attempted to determine the impact of selected macroeconomic determinants and the nominal corporate tax rate on the effective corporate tax rate under the conditions of the Slovak Republic are presented in Figure 3.

Figure 3 Regression Analysis Results - Slovak Republic

	Estimate	Std. Error	t-Value	Pr(> t)	
(Intercept)	0,291818	0,357671	0,816	0,430	
GDP	-0,002101	0,005956	-0,353	0,730	
FDI	0,004464	0,0100121	0,441	0,667	
Inflation	-0,010775	0,00605	-1,781	0,100	
Unemployment	-0,022	0,007857	-2,800	0,016	*
Tax revenues	0,052525	0,087318	0,602	0,559	
Standard rate	0,877067	0,025104	34,937	1,93E-13	***
F - test	p value = 1,464E-15				
Normality of residuals	Jarque - Bera test normality, p-value= 0,548 Shapiro - Wilk normality test, p-value= 0,3188				
Heteroskedasticity	Breusch - Pagan test, p-value= 0,08968				
Autocorrelation	Breusch - Godfrey test, p-value= 0,4005 Box- Ljung test, p-value= 0,5058 Box- Pierce test, p-value= 0,5378				
Multicollinearity	VIF value < 10 for all variables				
Specification of the model	Ramsey RESET test, p-value= 0,8946				
Coefficient of determination	$R^2 = 0,9981$				
Significance level	0 ' *** ' 0,001 ' ** ' 0,01 ' * ' 0,05 ' . ' 0,1 ' ' 1				

Source: Own processing from RStudio software

When closely analyzing the model for Slovak Republic shown above, we firstly focused on whether it can be considered significant entirely. The p-value of the F-test was 1.46E-15, which is lower than the significance level we set at $\alpha = 0.05$. All subsequent tests and results were compared to this established significance level. After testing the basic assumptions of the model, we can conclude that the residuals come from a normal distribution and we do not observe problems with heteroskedasticity or autocorrelation. Since the VIF values for all

variables were less than 10, we also excluded the presence of multicollinearity. The p-value of the Ramsey RESET test confirmed that the model is correctly specified.

The results of the regression analysis confirmed the significant impact of two variables: unemployment and the standard tax rate expressed as a percentage. The beta coefficients quantify that if unemployment in Slovakia increased by 1%, the effective corporate tax rate would decrease by 0.022%. If the standard

corporate tax rate in Slovakia increased by 1%, the effective corporate tax rate would increase by 0.877067%.

Czech Republic

The second model (Figure 4) was created for the Czech Republic. Based on the relevant tests, it can be concluded that

the residuals do not come from a normal distribution. However, since normality is one of the least critical assumptions, we decided to ignore this fact. The problem of heteroskedasticity and autocorrelation was not confirmed in the model. Based on the VIF factor values, we can conclude that the model does not have a problem with multicollinearity and the Ramsey RESET test confirmed the correct specification of the model.

Figure 4 Regression Analysis Results - Czech Republic

	<i>Estimate</i>	<i>Std. Error</i>	<i>t-Value</i>	<i>Pr (> t)</i>	
(Intercept)	0,392074	0,277104	1,415	0,1825	
GDP	0,007478	0,008995	0,831	0,4220	
FDI	-0,00496	0,014206	-0,347	0,7348	
Inflation	0,02007	0,007498	2,677	0,0202	*
Unemployment	-0,008219	0,015359	-0,535	0,6023	
Tax revenues	-0,059412	0,128938	-0,461	0,6532	
Standard rate	0,870116	0,018993	45,812	7,64E-15	***
F - test	<i>p value = 2,2E-16</i>				
Normality of residuals	<i>Jarque - Bera normality test, p- value= 2,2E-16</i> <i>Shapiro - Wilk normality test, p- value= 0,001044</i>				
Heteroskedasticity	<i>Breusch - Pagan test, p- value= 0,9223</i>				
Autocorrelation	<i>Breusch - Godfrey test, p- value= 0,4939</i> <i>Box- Ljung test, p- value= 0,7135</i> <i>Box- Pierce test, p- value= 0,734</i>				
Multicollinearity	<i>VIF value < 10 for all variables</i>				
Specification of the model	<i>Ramsey RESET test, p- value= 0,1358</i>				
Coefficient of determination	<i>R² = 0,9991</i>				
Significance level	<i>0 ' *** ' 0,001 ' ** ' 0,01 ' * ' 0,05 ' . ' 0,1 ' ' 1</i>				

Source: Own processing from RStudio software

According to the results of the regression analysis, which are displayed in Figure 4, we can observe a statistically significant impact of two variables: inflation and the nominal tax rate. In this case, the beta coefficient defines that if inflation in the

Czech Republic increased by 1%, the effective tax rate would increase by 0.02007%. Similarly, if the nominal tax rate in the Czech Republic increased by 1%, the effective tax rate would rise by 0.870116%.

Figure 5 Regression Analysis Results - Hungary

	<i>Estimate</i>	<i>Std. Error</i>	<i>t-Value</i>	<i>Pr (> t)</i>	
(Intercept)	5,347894	1,086235	4,923	0,000352	***
GDP	0,034731	0,076204	0,456	0,656699	
FDI	-0,004284	0,007024	-0,61	0,553269	
Inflation	-0,070183	0,059671	-1,176	0,262336	
Unemployment	-0,003372	0,197524	-0,017	0,986659	
Tax revenues	-0,592255	0,573563	-1,033	0,322159	
Standard rate	0,787409	0,114692	6,865	1,73E-05	***
F - test	<i>p value = 2,15E-08</i>				
Normality of residuals	<i>Jarque - Bera normality test, p- value= 0,907</i> <i>Shapiro - Wilk normality test, p- value= 0,4234</i>				
Heteroskedasticity	<i>Breusch - Pagan test, p- value= 0,1569</i>				
Autocorrelation	<i>Breusch - Godfrey test, p- value= 0,05257</i> <i>Box- Ljung test, p- value= 0,1288</i> <i>Box- Pierce test, p- value= 0,1597</i>				
Multicollinearity	<i>VIF value < 10 for all variables</i>				
Specification of the model	<i>Ramsey RESET test, p- value= 0,2564</i>				
Coefficient of determination	<i>R² = 0,9695</i>				
Significance level	<i>0 ' *** ' 0,001 ' ** ' 0,01 ' * ' 0,05 ' . ' 0,1 ' ' 1</i>				

Source: Own processing from RStudio software

Hungary

The third in line was the model created for Hungary (Figure 5). Based on the comparison of the p-value of the F-test, we concluded, that the model is statistically significant. When testing the basic assumptions of the linear regression model we found, that the residuals come from normal distribution, the model does not show heteroskedasticity, autocorrelation or multicollinearity. Finally, we performed the Ramsey RESET test to confirm the correct specification of the model.

From the results of the regression analysis we can observe a significant impact of only one variable, which is the standard tax rate. The interpretation of the beta coefficient is as follows. If the nominal tax rate in Hungary increase by 1%, the effective rate would increase by 0.787409%.

Poland

The last model was made for Poland. Based on the assumption testing we identified a singularity problem, indicating perfect

multicollinearity in the original model. We observed this issue during the correlation analysis. To address the problem, we decided to remove the standard tax rate variable from the model. After this adjustment we subjected the modified model to tests for normality, heteroskedasticity, autocorrelation, multicollinearity and the RESET test, which serves to verify the

correct functional form of the model. After removing the variable all assumptions of the model, except for the normality of residuals, were met. The results of the correctly specified model are provided in Figure 6.

Figure 6 Regression Analysis Results - Poland

	<i>Estimate</i>	<i>Std. Error</i>	<i>t-Value</i>	<i>Pr(> t)</i>	
(Intercept)	17,66291	0,93796	18,831	8,11E-11	***
GDP	0,11385	0,05711	1,994	0,068	.
FDI	-0,17806	0,09338	-1,907	0,0789	.
Inflation	-0,04646	0,04102	-1,133	0,278	
Unemployment	0,06008	0,02668	2,252	0,0423	*
Tax revenues	-0,3214	0,47779	-0,673	0,5129	
F - test	<i>p value = 0,04021</i>				
Normality of residuals	<i>Jarque - Bera normality test, p- value= 0,111</i>				
	<i>Shapiro - Wilk normality test, p- value= 0,0396</i>				
	<i>Shapiro - Francia normality test, p- value= 0,03699</i>				
Heteroskedasticity	<i>Breusch - Pagan test, p- value= 0,8493</i>				
Autocorrelation	<i>Breusch - Godfrey test, p- value= 0,2146</i>				
	<i>Box- Ljung test, p- value= 0,3408</i>				
	<i>Box- Pierce test, p- value= 0,3778</i>				
Multicollinearity	<i>VIF value < 10 for all variables</i>				
Specification of the model	<i>Ramsey RESET test, p- value= 0,1034</i>				
Coefficient of determination	<i>R² = 0,5556</i>				
Significance level	<i>0 ' *** ' 0,001 ' ** ' 0,01 ' * ' 0,05 ' . ' 0,1 ' ' 1</i>				

Source: Own processing from RStudio software

Results of the regression analysis confirmed the significant impact of three variables: GDP, FDI, and unemployment. However, we will not consider the GDP and FDI variables since

they are significant at the significance level of $\alpha = 0.1$, which is higher than our predetermined significance level of $\alpha = 0.05$. The interpretation of the beta coefficient is as follows. If unemployment in Poland increase by 1%, the effective tax rate would increase by 0.06008%.

Evaluation of results and discussion

In conclusion, the analysis of corporate tax rates showed different trends in the observed countries. Throughout the entire period Slovakia had an increasing trend, Poland remained constant, the Czech Republic showed a decreasing trend, and Hungary had an increasing trend until 2007, followed by a decreasing trend from 2008 to the present. Hungary has the lowest statutory tax rate at 9% and an effective tax rate of 11.1%, among the countries we observed. When comparing the development of corporate tax revenues in the V4 countries

before and during the COVID-19 pandemic (years 2020 to 2022), we observed a decreasing trend in three out of the four countries. Conversely, Poland showed an increasing trend. This phenomenon may be associated with above the average government support for companies during the pandemic years. The validity of hypothesis H1 "Corporate tax revenues had a decreasing trend during the COVID-19 pandemic" was confirmed for Slovakia, the Czech Republic and Hungary. However, we cannot claim this in relation to Poland.

The second analysis performed was a correlation analysis, which confirmed hypothesis H2 "Effective tax rate positively correlates with corporate tax revenues." Based on the correlation coefficients (Table 3), we can conclude that the validity was confirmed in three out of the four observed countries, specifically in the Czech Republic, Slovakia and Hungary. The positive impact of corporate tax revenues on the effective tax rate was confirmed in the study by Markusen (1995), contradicting studies by Matei et al. (2009) and Devereux et al. (2007).

Table 3 Correlation coefficients of the effective tax rate and corporate tax revenues of the V4 countries

	Slovak Republic	Czech Republic	Hungary	Poland
Corporate tax revenues	0,76	0,78	0,35	-0,42

Source: Own processing from RStudio software

The final part of the analysis involved modeling using regression analysis conducted through the method of least squares to identify the statistical significance of selected macroeconomic determinants and the nominal corporate tax rate in relation to the

effective corporate tax rate in the Visegrad Group countries during the period from 2004 to 2022. Here, we can note that hypothesis H3 "The effective tax rate is mainly influenced by the nominal tax rate" is also confirmed (Table 4).

Table 4 Results of regression analysis of V4 countries

Estimate	Slovak Republic	Czech Republic	Hungary	Poland
GDP	insignificant	insignificant	insignificant	insignificant
FDI	insignificant	insignificant	insignificant	insignificant
Inflation	insignificant	significant	insignificant	insignificant
Unemployment	significant	insignificant	insignificant	significant
Tax revenues	insignificant	insignificant	insignificant	insignificant
Standard rate	significant	significant	significant	NA

Source: Own processing from RStudio software

All of the models mentioned above, except for the model based on data from Poland, examine the relationship between the standard tax rate and selected determinants, including the year-on-year change in gross domestic product, corporate tax revenues, unemployment, inflation rate, foreign direct investment and the effective tax rate. In each of these models, except for the Polish model, the standard tax rate appears to be significant. Puliková (2019) arrived at similar results regarding the nominal tax rate. Her study suggests, that the effective tax rate is most influenced by the nominal tax rate, although the dependency is smaller than expected. Fernández – Rodríguez et al. (2023) reached similar conclusions. Conversely, completely insignificant variables in all four models are the year-on-year change in gross domestic product, foreign direct investment and corporate tax revenues. In contrast to our results, the findings of Andrejovská (2019) are in contradictory. In her study she confirmed GDP as the most significant variable with a positive relationship. Several authors, such as Kotlan et al. (2011) and Clausing (2007) demonstrated the same positive relationship between effective tax rates and GDP. The results of our analyses regarding the negligible impact of corporate tax revenues confirm the claims of Markusen (1995), Matei et al. (2009), and Devereux et al. (2007). As mentioned earlier, another statistically insignificant variable is foreign direct investment. This assertion was also confirmed by Benassy-Quéré et al. (2005) in their study. The inflation rate is significant for the model based on data from the Czech Republic. The significance of this variable in relation to effective taxation was confirmed by Wahyuningsih et al. (2020) in their work. They concluded that the relationship between the inflation rate and effective taxation is positive. Each increase or decrease in inflation causes an increase or decrease in taxation. Inflation and tax burden move

in the same direction but to different extents. This assertion was also confirmed by Saibu et al. (2013) in their study. Korauš et al. (2018), however, arrived at opposite conclusions. The last macroeconomic indicator entering the model is unemployment, which is statistically significant for models based on data from Slovakia and Poland. Our results confirm the conclusions of Fedeli et al. (2012) and Andrejovská (2019).

5 Conclusion

There is a significant debate surrounding the issue of the positive or negative impact of corporate tax on the economy, whether in general or concerning the effective tax rates, as they express the actual taxation level. Based on our analysis, we can observe three different trends in the development of the standard tax rate. In Poland, the level remained constant at 19% throughout the observed years. In the Czech Republic, there was a gradual annual decrease from 28% in 2004 to 19% by 2022, while in Slovakia and Hungary, the development was less clear-cut, with alternating increases and decreases. In Slovakia, there was an increase from 19% in 2004 to 23% by 2012, followed by a decrease to 21% by 2022. In Hungary, there was an increase from 16% in 2004 to 20% by 2009 followed by a subsequent decrease to 9% from 2017 to the present. Such ambiguous developments were also characteristic for effective tax rates (ETRs). Interestingly, despite the constant standard tax rate in Poland, its ETR decreased by 1 percentage point over the

observed period. In other countries, ETRs mirrored STRs. The highest level of ETR among the observed countries was in the Czech Republic in 2004 at 24.6% and the lowest level, as with STRs, was in Hungary from 2017 at 11.1%.

Regarding corporate tax revenues, they exhibited a declining trend during the COVID-19 pandemic. Evaluating the effective tax rate and its relationship with the nominal rate and the macroeconomic determinants mentioned above through regression analysis, specifically the least squares method, revealed that in Slovakia two variables significantly impacted the effective tax rate, unemployment and the nominal tax rate. For the model created in the Czech Republic it was the inflation rate and the nominal rate. The nominal rate was the only significant variable identified for the model compiled from data

in Hungary. For the model made for Poland we had to remove this variable due to multicollinearity issues. The only significant variable concerning the effective tax rate was the unemployment rate. The differences found in the analysis of the Visegrad Group countries also speak to the existence of tax competition among them. Each of these analyzed countries strives to attract foreign investors, thereby creating more jobs, reducing unemployment and increasing economic growth and prosperity in the country.

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Primary Paper Section: A

Secondary Paper Section: AH

THE IMPACT OF DIGITAL STRATEGY ON E-COMMERCE SERVICES: ANALYSIS AND PERSPECTIVES IN ONLINE SMALL AND MEDIUM ENTERPRISES (SMES)

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Abstract: This article focuses on analyzing the impact of digital strategy on e-commerce services, with an emphasis on online small and medium enterprises (SMEs), through expert systematic literature review. In the context of the growing e-commerce environment, the study aims to explore how digital strategy shapes service provision and transforms customer experiences. The main focus is on the analysis of specific aspects, including the use of artificial intelligence (AI) for personalizing customer experiences, the effectiveness of these personalization strategies, and their impact on purchasing behavior. Finally, the article looks towards the future, predicting possible trends in the field of service personalization using digital strategy. This scientific article provides a fresh perspective on the digital transformation of e-commerce and offers valuable insights for future innovations in online small and medium enterprises.

Keywords: Digital strategy, e-commerce, online SMEs, artificial intelligence, personalization, sustainability, shopping behavior.

1 Introduction

Digital technologies are rapidly transforming both businesses and society as a whole. The way companies harness these technologies significantly influences their ability to innovate and grow. Over the past decade, there has been significant progress in the field of digital technologies and infrastructure, leading to substantial changes in business processes, organizational structure, and corporate culture. This transformation has brought about innovative processes, new marketing models, and diverse types of products and services. The ongoing Covid-19 pandemic itself has had a significant impact on this development (Dallocchio et al., 2024; Tekic et al., 2019).

The effective use of information and communication technology (ICT) has long been recognized as a key factor for corporate performance, especially for small and medium-sized enterprises (SMEs) (Ivanova & Castellano, 2012; Santoro et al., 2019). The integration of these technologies can bring many benefits to small businesses, including increased efficiency, enhanced competitiveness, and expanded market reach (Rahayu & Day, 2015). Digital technologies have the potential to optimize process management, increase market orientation through advanced market knowledge, and thereby improve the operational efficiency of SMEs (Cenamor et al., 2019; Dallocchio et al., 2024; Matt et al., 2015).

These technologies can also enhance the efficiency of various business operations, strengthen an organization's ability to adapt to dynamic market conditions, and transform fundamental aspects such as value proposition, value creation and value capture. Companies are empowered to define the scope and nature of the digital transformation they want to achieve. The advent of digitalisation has also changed the way consumers and firms interact (Taiminen & Karjaluoto, 2015).

Electronic commerce (e-commerce) represents the most prominent example of how information and communication technologies (ICT) are transforming business and contributing to economic growth. E-commerce involves trading products and services over the Internet, enabling online transactions including payments and eliminating the need for face-to-face meetings between buyer and seller. In a broader context, e-commerce can be defined as any business activity where electronic communication replaces direct physical contact and there is no need for physical exchange (Caputo et al., 2021; Liu et al., 2021; Santos-jaén et al., 2023).

The global emergence of the COVID-19 pandemic has led to an exponential growth of e-commerce as an alternative to traditional commerce (Nanda et al., 2021). Despite an expected 3% decline in global retail sales in 2020, retail e-commerce sales are projected to grow by 28%. The reduction in social interactions during this time has highlighted the importance of e-commerce transactions, becoming essential for a wide range of businesses (Radosavljevic, 2023; Santos-jaén et al., 2023).

The development of a company's capabilities, including the implementation of e-commerce, contributes significantly to increasing the efficiency of a company's distribution and communication, as well as to increasing the level of digitalization of the entire enterprise. In this context, operational efficiency is defined as "operating cost efficiency", which is closely related to the operational expenses of a company, such as wages, rent, advertising and other costs. In general, the lower the operating expenses compared to sales volume, the better the operational cost efficiency (Alazzam et al., 2023; Santos-jaén et al., 2023).

In general, there is a growing emphasis on personalisation of services, where there is scope for deeper analysis of specific strategies implemented online by SMEs, with a focus on the use of artificial intelligence (AI).

2 Methodology

The methodology was developed to achieve objectivity and reliability in scientific research. The approach to research is based on a combination of in-house professional practice and systematic analysis of relevant professional sources, which include peer-reviewed articles, professional websites and thoroughly developed case studies. The research findings are based on a systematic review of the professional literature.

The primary dimension of the methodology lies in the researcher's own experience in the industry, which provides context and a deeper understanding of the phenomena under investigation. At the same time, relevant scholarly articles and web sources were carefully researched and used to provide a solid theoretical basis for the analysis.

Secondary sources, such as scholarly articles and websites, provided the necessary framework to compare and validate our own observations. In addition, a systematic analysis of selected case studies was conducted, which provided deeper insights into specific situations and contexts related to the research topic.

This integrated approach to primary research based on secondary sources aimed to achieve scientific rigor and contribute to the development of knowledge in the field.

Based on the literature review, the following **main research question** emerges:

How do digital strategies and service personalisation affect the delivery of e-commerce services in online SMEs, and what are their implications for customer experience and purchase behaviour?

The sub-research questions (SRQs) are:

- (SRQ1) What specific service personalisation strategies are being implemented by online SMEs, especially using AI, and what is the outlook for their future development?
- (SRQ2) What is the impact of implemented personalization strategies on the current customer experience in online SMEs?
- (SRQ3) How does service personalisation affect customer purchase behaviour in online SMEs, especially in terms of purchase frequency, average purchase value and repeat business, with respect to future trends?

3 Results

The research results are divided into three main areas:

- Personalisation strategies for online SME services using artificial intelligence (AI),
- The impact of implemented strategies on the current customer experience,
- The impact of service personalisation on customer purchasing behaviour with respect to future trends.

3.1 Personalisation strategies for online SME services using artificial intelligence (AI)

In today's digital environment, artificial intelligence (AI) is becoming a key tool for personalizing services and streamlining business processes for online small and medium-sized enterprises (SMEs). It helps in several key areas, including:

- **Predicting behavior and buying tendencies:**
Artificial intelligence uses data about customers' past behavior to predict their future actions and preferences. This helps MSPs tailor their offers and strategies to better match customer expectations. One of the main tools are Chatbots and virtual assistants. These apps are revolutionizing the way users interact with their customers, making customer support easier and creating room for more efficient shopping transactions (Generali Ceska Profi, 2023; Chatify, 2024).
- **Marketing automation:**
AI makes it easy to automate marketing processes, including segmenting target audiences, creating personalized campaigns and analyzing their success. This allows SMEs to use their marketing resources efficiently (Jiri Franek, 2023; Chatify, 2024).
- **Personalizing the customer experience:**
Personalizing services using AI allows SMEs to dynamically tailor content and recommendations for each customer based on their past behavior, preferences, and predictions of future behavior. This creates unique and personalized customer experiences (Jiri Franek, 2023; Chatify, 2024).

In this context, the integration of personalisation and artificial intelligence is a key element of success. SMEs that effectively combine these strategies are better able to respond to market dynamics and provide a competitive advantage. The following aspects of this integration are important:

- **Audience segmentation and targeting:**
AI identifies specific customer segments, allowing SMEs to target their audiences with more personalized content. This effectively optimises marketing spend and increases ROI.
- **Monitoring and responding to feedback:**
Monitoring online reputation and responding quickly to customer feedback are key to improving an SME's overall brand image. AI analyzes sentiment analysis of feedback, allowing businesses to respond immediately to criticism and provide personalized responses.
- **Integrating offline and online experiences:**
AI connects offline and online customer experiences, providing SMEs with valuable insights to create a seamless customer experience across all channels (Chatify, 2024; Jiri Franek, 2023; Generali Ceska Profi, 2023).

With the growing importance of digital strategy and personalisation of services, this integration is becoming not only a trend but also a key element for the future success of SMEs in the digital e-commerce environment (Generali Ceska Profi, 2023).

3.2 The impact of implemented strategies on the current customer experience

The impact of implemented strategies on the actual customer experience is a key aspect for evaluating the effectiveness of digital transformation in the e-commerce environment of small and medium-sized enterprises (SMEs). Here, it is important to focus on the specific strategies that SMEs implement using artificial intelligence and service personalisation, and then examine how these strategies shape the overall nature and perception of the customer experience (Targito, 2024). Key aspects include:

1. Content personalization.
2. Dynamic price optimization.
3. Integration of online and offline experiences (Targito, 2024).

Ad 1) Content personalisation

In the digital environment of small and medium-sized enterprises (SMEs), content personalisation strategies are evolving to create individually tailored customer experiences. The implementation of these strategies involves analysing customer behaviour, creating personalised product offers, segmenting customers and using artificial intelligence. The key objective is to create relevant and engaging content based on individual customer preferences and behaviour (Abrokwah-larbi, 2024, Targito, 2024).

Content personalisation, especially in SME online stores, is a crucial factor in increasing conversions. Traditional methods such as product recommendations are important, but only one element of a comprehensive strategy to optimise conversions (Abrokwah-larbi, 2024, Targito, 2024).

This concept of content personalisation transforms the customer experience by personalising offers, products, notifications and other communication tools to respond to unique customer preferences and behaviours. SMEs' content personalization implementation includes dynamic content, pop-ups, banners, discount apps, web push notifications and more. These elements are applicable across different stages of the customer journey, from homepage to product pages to emails. By leveraging rules, triggers and intelligent algorithms, SMEs are able to effectively personalize content, respond to customer behavior and fully leverage the potential of digital transformation in e-commerce (Abrokwah-larbi, 2024, Targito, 2024).

Ad 2) Dynamic price optimization

Dynamic price optimization is an increasingly important tool for online SMEs, with an emphasis on maximizing profits. It has been found that tools for this optimization, such as Dealavo, Price2spy, Competera Pricing Platform, Feedvisor, etc., allow for rapid price adjustments in real time, which significantly increases competitiveness and attracts more customers. There is great effectiveness of dynamic pricing in building customer trust and increasing customer loyalty through machine learning algorithms (Targito, 2024; Huang & Liu, 2015).

Time-based pricing, peak pricing and penetration strategies are key approaches to increase revenue and maintain competitiveness. The analysis found benefits such as instant price updates, time savings, and profit increases through dynamic pricing. There are also opportunities to increase customer satisfaction and reduce costs through flexible price management (Targito, 2024; Huang & Liu, 2015).

However, the analysis also highlighted disadvantages of dynamic price optimization such as price discrimination, increase in competition and complex database management. Overall, the findings show that dynamic price optimization brings significant benefits but requires careful attention to the challenges faced by e-commerce retailers (Targito, 2024; Huang & Liu, 2015).

Ad 3) Integration of online and offline experiences

The integration of online and offline experiences represents a synergy between digital and physical environments to provide the most comprehensive and seamless experience for users. This integration has wide application across industries and opens up new opportunities for interaction between businesses and customers (Targito, 2024; Gao et al., 2022).

The basic tools of this integration include:

- Customer Relationship Management (CRM) systems - CRM systems integrate information from online and offline customer interactions. They allow tracking customer transaction history, preferences and communication.
- Unified Commerce Platforms - These platforms unify online and offline sales channels into a single entity. They provide a unified view of inventory, orders and customer data.
- Marketing Automation Tools - Automation tools enable personalization of marketing campaigns through the integration of online and offline data. They analyze customer behavior and automatically generate targeted offers.
- Beacon Technology - Beacons in offline spaces communicate with customers' mobile devices. This enables personalized offers, navigation and data collection on customer behavior in brick-and-mortar stores.
- Integrated Payment Gateways - Payment gateways that connect online and offline payments allow customers to shop conveniently across all channels and simplify transaction tracking for businesses (Targito, 2024; Gao et al., 2022).

The integration of online and offline experiences is a key element of modern commerce, responding to changes in customer behaviour and creating a harmonious environment for the shopping process, no matter where customers are located (Targito, 2024; Gao et al., 2022).

Integrating online and offline experiences brings a number of benefits to businesses and customers. One of the key benefits is a more comprehensive customer experience that relies on seamlessness and consistency in the shopping experience regardless of channel. This unification leads to higher customer satisfaction as businesses can better personalize offers based on customer behavior in both environments (Targito, 2024).

Within marketing strategies, integrating data from online and offline channels brings greater efficiency. Businesses can better target advertising campaigns and marketing activities, which contributes to increased customer loyalty. Providing a seamless and comprehensive experience can create stronger bonds and encourage repeat purchases, which is key in today's competitive era (Targito, 2024).

However, integrating online and offline experiences also has its drawbacks. More complex technology implementation, higher costs associated with financial investment in integrated systems, and staff training challenges present practical difficulties. Data privacy becomes a sensitive issue as sharing and linking data can raise concerns about customer privacy (Targito, 2024; Gao et al., 2022).

Some customers may experience queasiness or lack of trust when sharing personal information or changing established purchasing practices (Targito, 2024).

Overall, careful planning is required to implement a strategy for integrating online and offline experiences to effectively leverage all benefits while minimizing potential drawbacks (Targito, 2024; Gao et al., 2022).

3.3 The impact of service personalisation on customer purchasing behaviour with regard to future trends

The impact of personalisation of services on customer purchasing behaviour in the context of future trends is a key aspect in the business environment. Service personalisation, as a strategic approach to customer experience, has a significant impact on consumer decision-making processes and shapes future trends in purchasing behaviour (Dealavo, 2024).

In today's digital age, where the availability of information is vast and customers are increasingly engaged online, they expect unique and personalised experiences. Personalisation of services creates an environment where offers, advertising and communication are tailored to individual customer preferences and needs (Dealavo, 2024).

One important element of personalisation is customer behaviour analytics, which uses advanced technology and algorithms to collect and interpret data. This data provides marketers with deeper insights into individual preferences, purchase history and customer behavior. Based on this information, companies can offer targeted products and services, which greatly influences customer decision-making processes (Dealavo, 2024).

Given future trends, we can expect further development of service personalisation through the implementation of artificial intelligence and machine learning. These technologies will enable even more sophisticated data analysis and faster response to actual customer needs. In addition, personalised experiences are likely to be integrated across different channels, both online and offline, to achieve maximum consistency and seamlessness (Dealavo, 2024).

Overall, the impact of service personalisation on customer buying behaviour will continue to be a growing trend that will shape the dynamics of the current and future business environment. It is crucial for companies to not only monitor these trends, but also to proactively respond and adapt their strategies to the expectations and needs of increasingly demanding customers (Dealavo, 2024).

4 Conclusion

This research has shown that digital strategy and service personalisation have a significant impact on the delivery of e-commerce services in online small and medium-sized enterprises (SMEs). The use of artificial intelligence (AI) to personalise customer experiences, the effectiveness of these personalisation strategies and the impact on purchasing behaviour were key areas of analysis. At the same time, future perspectives and trends in service personalisation using digital strategies were explored.

The results showed that the implementation of artificial intelligence brings benefits in predicting customer behaviour, marketing automation and personalisation of customer experience. A key success factor is the integration of these strategies, particularly in audience segmentation and targeting, feedback monitoring and the linking of offline and online experiences.

Content personalisation strategies, dynamic price optimisation and integration of online and offline experiences have been identified as key factors influencing the current customer experience in online SMEs. These strategies have led to significant improvements in the fluidity of the purchase process, increased customer satisfaction and competitive advantage.

Based on the research questions, it was confirmed that personalisation of services has a significant impact on customer purchasing behaviour, including purchase frequency, average purchase value and repeat business. Trends show that further developments in service personalisation will be linked to the increasing use of artificial intelligence and the integration of experiences across different channels.

5 Discussion

The digital transformation of e-commerce is an inevitable trend affecting small and medium-sized businesses. The implementation of a digital strategy and the personalisation of services are key to the success of businesses in a competitive environment. At the same time, it is important to consider the challenges associated with these strategies, including data protection and the cost of implementing integrated systems.

Future prospects suggest further developments in artificial intelligence and machine learning, which will enable even more sophisticated personalisation of services. The integration of online and offline experiences will become a key element in delivering a consistent customer experience. At the same time, however, the implementation of these strategies needs to be carefully planned and the challenges met to achieve maximum benefits.

Overall, digital strategies and service personalisation are inextricably linked to the future of e-commerce and can provide online SMEs with a key competitive advantage in an increasingly digital environment.

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Primary Paper Section: A

Secondary Paper Section: AH

SENTIMENTAL CONCEPTUALISM OF TIMUR KIBIROV'S EARLY POETRY ("A MESSAGE TO L. S. RUBINSTEIN")

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Abstract: The purpose of the work is to analyze the early texts of Timur Kibirov and determine his involvement in the group "Moscow romantic conceptualism" (B. Groys). The article shows that personal friendship with D. A. Prigov, L. Rubinstein, D. Novikov, M. Eisenberg and other conceptualists and soc-artists does not make Kibirov a conceptualist in the exact sense of the word. It is demonstrated that already in the early poems Kibirov overcomes the limited framework of conceptual art, following the path of perception of the tradition of Russian classical literature, inheriting its best examples. During the analysis, the sentimental components of Kibirov's early poetry are shown using the example of the poem "A Message to L. S. Rubinstein" (1989).

Keywords: Timur Kibirov; Moscow conceptualism; tradition and innovation; sentimentality and sensitivity; "A Message to L. S. Rubinstein".

1 Introduction

Timur Kibirov's poetic work is attributed to Moscow conceptualism (Arkhangelsky 1991, Bogdanova 2023, Those who overcame socialist realism 2023, Epstein 2000, etc.). Indeed, at the external level, Kibirov widely uses those characteristic techniques that can be qualified as techniques of conceptual art: quotability (from verbal, semantic, syntactic or rhythmic up to centonic), allusiveness, intertextuality, metatextuality, parody, "mechanistic" reception, blurring of boundaries in the position of the author and the hero, a cynical perspective of perception of the past, formal and stylistic proximity to soc-art, rhyme-rhythmic negligence, linguistic rudeness, obscenity, etc. However, Kibirov's inner content turns out to be different: unlike conceptual poets, he emphasizes not the formal, but the semantic side of the reception. Therefore, the task of this study is to analyze the poet's early work not only from the point of view of formal expression, but also its substantive side.

2 Literature Review

Unlike conceptualists, Kibirov's citation is not ambiguous, but direct, it is colored by the subjectivity of his memories and the lyricism of his perception: "Quotations and icons of various semantic layers, allusive references, garbage of trampled speech are combined by a through lyrical melody" (Eisenberg 1991, 12).

It is obvious that Kibirov "sings over" the popular song and verse repertoire of the Soviet years. But while conceptualism asserts the falsity of the socio-formational structure by denying the primitive and clichés of socialist realist art, Kibirov ignores the phenomenon of "Sovietism" and looks deeper into the soul of homo sapiens, and not homo soveticus. Allusion or quotation, as well as the language of the 1960s — 1970s, are used in his poetry not in a figurative sense (for the purpose of ridicule, denial, parody or reduction), but in a direct way — as direct signs representing their time.

Kibirov's poetic lines dedicated to childhood show beauty and sublimity, lyricism and nostalgic sadness, regret for the lost and

an attempt to return to the past at least mentally. It is obvious that Kibirov's "admiring" is not actually connected with the Soviet past, a bygone system or an outdated ideology, but with individual objective realities that have concentrated the memory of a carefree childhood and a happy early youth. Lyrically nostalgic mood-motifs allow the poet to overcome the denial of the superficially Soviet features of the past, to focus not on Sovietism, but to "get to the very essence" of childhood memories. As a result, the arbitrarily whimsical logic of memory allows the poet to talk about the past not from the perspective of negative denial of the USSR (traditionally a postmodern plan), but love for his past and his homeland of Russia (the traditional plan of Russian literature), Russian culture and literature. Thus, the theme of childhood, which happened to fall on the Soviet period of the country's development, merges with the theme of the beloved past of the motherland, which for Kibirov was primarily reflected and concentrated in the true samples of Russian culture and Russian literature, which are outside the ideological censorship of a particular socio-political system. There is an uncharacteristic fusion of the temporal and the eternal for modern conceptual poetry based on the separation of the 'native'. The theme of childhood is firmly linked with the theme of the motherland, its fate, its history, its present and future, outlining the poet's dependence not so much on modern traditions of conceptual art, as on the traditions of classical Russian literature.

Feelings-memories of childhood provoke the beginning of a lyrical conversation about the motherland, the image of which emerges in Kibirov in the context of all Russian literature: from the "strange" love of Lermontov's "Homeland", through the "wretched" and "all-powerful" mother-Russia of Nekrasov, through Tyutchev's "mind cannot understand Russia" up to the "loose track" by Blok (the poem "The Return from Shilkovo to Kon'kovo").

The image of the motherland created by Kibirov absorbs the high and the low, pleasing and disgusting, natural and urban, attractive and frightening. The image of Russia is being born, in an outsider's opinion, "a so-so country". However, it is he who serves as a support for the poet in his hope of "defeating death". According to Kibirov, the means of overcoming death is not just a "strange" love for the motherland, but its ethical and aesthetic potential, its culture and literature ("A Message to the artist Semyon Faibisovich").

In Kibirov's poems (Kibirov 1998, 2000, 2001), the image of Russia is not the most seductive and attractive. This is not a "wife" (Blok 1989), not a "mother" (Isakovsky 1980), for Kibirov she is a "mother-in-law", "aunt", "woman", "mother-drunk" ("Well if only you were smaller...") (Kibirov 2001, 484). However, even in these verses, behind the external rudeness and sharpness, behind the primitive rhymes, we can again distinguish the motive of sharing a common fate ("you and me"), a filial feeling of empathy for "parental shame" is palpable, words of love for the motherland sound (...I love you...).

The three-fold "higher" essence in Kibirov's poetry is demonstrated by the concepts of childhood, homeland, literature, which to a certain extent exist among themselves in the relations of non-strict synonymy and metonymy.

Already in Kibirov's early poems, one of the most important and very revealing themes for him was reflected — the theme of creativity, the theme of the poet's destiny, which absorbed many different angles and aspects of other poetic themes. It turned out to be connected with all the variety of problems touched upon by the poet in his work. That is why the poems are messages to friends-poets L. Rubinstein ("A Message to L. S. Rubinstein", 1987), D. Prigov ("Love, Komsomol and Spring. D. A. Prigov", 1987), M. Eisenberg ("Misha Eisenberg. Epistle on poetry", 1989), S. Gandlevsky ("Serezha Gandlevsky. On some aspects

of the current socio-cultural situation", 1990), D. Novikov ("Denis Novikov. Conspiracy", 1990), I. Pomerantsev ("To Igor Pomerantsev. Summer reflections on the fate of fine literature", 1992) and others took a special place among Kibirov's texts (Kibirov 1998).

3 The entropy motif in the early poem "A Message to L. S. Rubinstein"

The poem "A Message to L. S. Rubinstein" became one of the most popular ("sensational") poems by Kibirov, had its own special publishing fate and an extensive critical press. The poem was first published in the Samizdat magazine *Third Modernization* in 1988 (No. 7). In 1989 — in *Syntax* (1989, No. 26). Almost simultaneously, an excerpt from it was published in *Atmoda* (Riga, 1989, Aug. 21). In January 1990, lines from Kibirov's poem were quoted by M. Chudakova and published in the *Literary Review* (Chudakova 1990, 35–36). In September 1990, the poem was published in the newspaper of the Union of Journalists *Rush Hour* (Leningrad). A separate edition is *Selected Messages* (Kibirov 1998).

In all cases, the poem "A Message to L. S. Rubinstein" did not go unnoticed. The main and almost the only question was to what extent Kibirov "destroys the norm of the image of reality" and how he "disguised the destruction of the norm" (Zolotonosov 1991, 78), where "destruction" primarily refers to the use of swear words in the poem.

Thus, as a result of the publication of the poem in *Atmoda*, its editor A. Grigoriev was threatened with conviction "for a committed act of hooliganism", Kibirov was fined, and the outcome of the case was decided by the "literary expertise" of E. Toddes, which should establish the artistic nature of the use of obscene vocabulary (see: *Rodnik*. 1990, No. 4). And the editor-in-chief of *Rush Hour*, N. Chaplina, received (and subsequently selectively published) a stormy stream of mail from readers indignant about the same thing (Readers' responses 1990).

It was the form of the essay that attracted the most attention from critics and readers. Responding to the logic of the time (the beginning of Gorbachev's perestroika), critics did not analyze the poem, but tried to convince readers of the legitimacy of this kind of form and justified the author in his desire to use one or another "unusual" trope. M. Zolotonosov: "The hierarchy of former times collapsed, everything fell out of its former hierarchical nests, everything equalized in rights, 'words' ... became just words, a thicket of symbols. Profanation in the world of 'things' has led to the restoration of the iconic nature of words. The latter is emphasized by the use of obscene vocabulary. This is not an end in itself blasphemy, but a reflection of the most important shift in the World" (Zolotonosov 1991, 79).

The priority key of the analysis in this regard is the appeal to the formal side of the poem, the discussion of "its complex, inaccessible constructive principle for the majority" (Zolotonosov 1991, 79) (meaning "the game of quotations"). And the main pathos of the poem has been recognized more than once as the emphasized "destruction": "the life-affirming, joyous Renaissance principle is already missing, it has dried up, the irreversible decline of the sacred into the profane, into the dull and meaningless is recorded in the poem ... this is also one of the signs of the destruction of culture and the onset of entropy" (Zolotonosov 1991, 79). The style and style of the poem, according to critics, "serves as a sign of irreparable loss" (Arkhangelsky 1991, 210).

Without dwelling on the very extensive "near-literary" emotional background of the poem's appearance, we note that with all the variety of professional and non-professional responses to it, the analysis of the ideological content and artistic originality of the text still remained outside the scope of critical research.

As for the poem itself, as it appears from the text, the reason for its writing was a dispute that arose during a friendly feast

between the author and the addressee of the message, the subject of which in the broadest sense can be defined as the current state of the world. "The feast is over", but the argument is not over. Therefore, from the point of view of the plot development, the poem is structured as an ongoing dispute with an interlocutor who has already left for Lyubertsy.

The poem is written in four-stop chorus and, according to the intonation pattern, is clearly oriented towards a significant layer of folklore and Russian poetry from G. Derzhavin and A. Pushkin to O. Mandelstam and A. Tvardovsky, preserving not only the "warmth of folk intonations", but also adopting the form of intimate cheerful conversation.

The main theme of the poem is the entropy of the modern world, the entropy of culture, the entropy of ethical and aesthetic values.

The "main word" of the poem was obviously set by the opponent of the lyrical hero (i.e., it was originally "Rubinstein's word"), which explains the unexpressed dialogism of the very first lines of the message. It is with this "hidden quote" that the poem begins: *Leva darling, entropy! Entropy, my friend!..*

The presence of counterpoint already in the first lines, not quite perceptible at once, becomes obvious when the lyrical hero of the poem (the author's character) turns again and again to the main concept of entropy in all the subsequent 24 chapters of the poem and seems to agree with the interlocutor, provides evidence and arguments in favor of the original statement: *Everything passes. It's not forever. Entropy, my friend! Like consumption, fleeting and funny, like hemorrhoids...*

As the plot of the "conversation" develops, the feeling of the entropic nature of modern reality increases. From chapter to chapter, gloomy pictures of the life surrounding the heroes thicken ("drunk girls", etc.), the image of the Devil "in black calico" appears, a reference appears — "today the Scriptures come true...", reminiscent of the coming end of the world, the depressing impression of the decline of modern culture, in particular, literature, grows (*oh... a literature...*). And accordingly, the stylistically neutral word *entropy* is gradually overgrown and replaced by more modern and less traditional, emotionally and stylistically labeled synonyms-substitutes — *shit, bullshit, emptiness, rotting, shit* and author's phrases close to them — *bitch louse, wolf's udder, fish skin*, and even *wooden mackintosh*. The natural and psychological parallelism — an autumn landscape with falling leaves, rain, and piercing wind — reinforces the impression of the approaching end of the world.

At the level of the poetic thesis, the lyrical hero generally agrees with Rubinstein and recognizes entropy everywhere. However, very soon the antithesis begins to sound between the lines (at first imperceptibly) — the theme of disagreement with the addressee of the message, which, at first, reveals itself only at the formal level: *Rage, Leva, noble, but meaningless, apparently...*

The hero is faced with a traditional existential, cultural and literary question not about death, but about overcoming: *What should we do? How to escape?..*

Russian classics have repeatedly raised such questions in the traditions of national culture and literature: *What should we do?, Who is to blame?*, etc. But unlike tendentious democratic writers, Kibirov's speech is "not programmatic and not rationalistic, but organic, its origins are entirely lyrical" (Toddes 1990, 67).

Russian classics and the tradition of Russian life, the hero of the poem seeks and finds the answer to the eternal question: it becomes the *Word* (Gandlevsky 1994, 5).

In this part of the discussion, it is necessary to stop and once again recall that Kibirov is close to conceptual poetry and, therefore, his poems are quotable and intertextual. It was the

poet's belonging to a certain trend in literature, and not the logic of the development of the artistic text of the poem, that made critics, as noted above, talk about the citation of the message as a literary game and literary device. E. Toddes: "The brilliant quoting technique of the author provides strength, game saturation and subtlety of the poetic fabric" (Toddes 1990, 5).

At the most superficial level, it is true: the quote is a sign of Kibirov's poetic manner. However, in the analyzed message, the appeal to literature and literary tradition is dictated, in our opinion, not by the peculiarities of the form, but by the content. Russian literature becomes a question of the existence of Russia (Toddes 1990, 69), hence the logical and natural transition from the problems of Russian literature to the problems of Russian life, where the quote is a sign of the merging of the fate of Russian literature with the fate of Russia, a sign of literary existence and everyday life: *...Why are we crying indecently over our Russia?*

In search of an answer to this question, the hero mentally "weeps" over the fiction of Russian literature, over the "word" of Lomonosov, Pushkin, Dostoevsky, Chekhov, Nabokov, Blok, Khlebnikov, Mandel'stam, Tsvetaeva. But following the literary names in the poem, the image of not a literary, but a "living" life arises. The basis of optimism (*entropy in spite of*) are the nostalgic childhood memories, very characteristic for Kibirov, full of purity and light.

It is noteworthy that the text, written on behalf of the lyrical hero and permeated with the subjectivism of personal memories, leaves the impression not just of uniquely specific insights into the memory of an individual, but a sense of community of memories, perhaps of an entire generation. Starting his memories with the word *remember*, and subsequently repeating it again in the form of a question, the author-hero introduces his interlocutor to these memories, makes him revive the impressions of the past, join him. The plural forms serve to strengthen generalization, allow you to overcome personal subjectivity and give an installation for similarity, typicality, universality of the memory of an entire generation.

Warm childhood memories (*mine and yours*), flavored with quotes from forgotten songs, naive rhymes, children's jokes and phraseologems preserved by memory, give rise to an aura of tenderness and charm in the poem, softening adult ideas about the rough and cruel entropic modernity. The memories of the interlocutor and the lyrical hero form the foundation of the belief that it is possible to overcome decay and emptiness. Therefore, it is difficult to agree with M. Zolotonosov, who believes that the quoted lines (chapter 18) are a kind of "very short course ... of the realities of a bygone era" and "signs of the fundamental lexicon of the 1950s–1980s" (Zolotonosov 1991, 79). These memories not only did not "weaken" or "disembodied", as the critic claims, but they are alive in the soul of the lyrical hero and should stir up the soul of his interlocutor: *What, Semenyeh? Don't you like it? Love is expensive, understand! Let your lips tremble with fear — talk to people!*

The last lines add to the already well-known "embittered" image of the "poetic" Rubinstein, who proclaimed "universal entropy" and "senseless rage", also "curses" and "accusations". That is why the following is an appeal to him: *With belated love, warm them on your chest!..*

The call to a fellow writer to "be kinder, pity and forgive" sounds somewhat pompous and, in fact, excessively serious, which is unacceptable for ironic postmodern poets "by definition", therefore, the following lines of the poem acquire a chastushky color, and now in the guise of a joke sounds "a fraction of the truth": *Lev Semyonich! Be a man — don't shy away from tears!*

4 The Biblical as a way to overcome entropy in a poem

It is in this folklore form that a return to the conversation about the Word that has already begun is indicated. And if earlier we

were talking about the literary word, which in the context of Russian culture outgrows the framework of literature, then in this case we are talking about the divine, biblical Word: *After all, in the beginning there was a Word...*

Images of a *quiet angel*, a *bright tear*, a *crimson Caen moisture*, a *bright lamb* are woven into the sphere of popular folklore images, and the names of Judas, Thomas, Gethsemane, and Holy Easter emerge from the darkness of atheistic memory.

Such lofty and unexpectedly pathetic images seem to be alien to conceptual writing, but at the same time they are like the first words that come across and the last remaining words that, according to Kibirov, there is nothing to replace. "The value of these words is so self-evident that it is already irreducible to irony, but suggests their further lyrical development" (Epstein 2000, 277).

That is why the gentle, compassionate, patient soul of the poet (and the lyrical hero) becomes the key to the future (non-ironic) Resurrections: *We are lumps of evil dust, but the soul is warm-warm! Easter, Lev Semyonich, Easter! Leva, spread your wings!*

In a very uncanonical way, Kibirov has a fusion of the literary word and the Word of God. In the traditions of the Russian mentality, Kibirov's salvation of the world will be served not only by ethics — Soul ("soul of warmth"), but also by aesthetics (culture, literature). Beauty, according to F. Dostoevsky: *Overshadowed by foliage, you and I are small. But you and I will be saved by Beauty, by Beauty...*

The result of this merger is the overcoming of entropy and the salvation of the Universe: the sign of which is the change of features of the autumn landscape with paintings of the first spring greenery: *Easter, Easter, Lev Semenyeh! Listen to the light news! Levushka, repeat the canons of the sticky greenery of the earth!*

According to Kibirov, entropy, which Rubinstein insisted on, turns out to be only one of the life cycles of dying and birth. In full accordance with the traditions of Russian classical literature, the modern postmodern poet asserts not the coming end, but the inevitable rebirth, thereby demonstrating a distinct author's position almost not characteristic of modern poetry. "Thanks to Kibirov, it begins to seem that the cultural instinct is as indestructible and capable as the instinct of life" (Toddes 1990, 70).

The epigraph from Chekhov's short story "The Student", prefixed to the poem, makes one think about the involvement of the dialogue of the characters in all people. The epigraph sets a certain universality to the message, reinforces the seriousness of the meaning with all the superficial buffoonery of the poem's form.

In this regard, M. Zolotonosov's observation is interesting. According to his calculations, "in the poem 666 + 1 = 667 lines: a number that is one symbolic unit larger than the apocalyptic 'number of the beast' ... the 'number of Chaos', which contains entropy" (Zolotonosov 1991, 80). It is difficult to say whether this number of lines in the poem is accidental or conscious, but in any case it is significant, because the addition of one means overcoming the Beast, overcoming emptiness and decomposition, i.e. the affirmation of faith and hope, it seems, so uncharacteristic of modern poetic worldview. This is where one can see the connection between Timur Kibirov's poetry and the classical tradition of Russian literature.

Russian critics and readers' mail have repeatedly raised the question that a person who is not Russian by birth is talking about the fate of Russia and his interlocutor is also not Russian: *At least I am an ordinary chuchmek, you are, sorry, a Jew!..*

Some perceived this fact as an insult (Readers' responses 1990), others defined it as deliberate blasphemy: behind the premeditation there is a "skillfully organized provocation" and

“an attempt to understand Russia with the mind, being outside faith and love for Russia” (Zolotonosov 1991).

However, it seems to us that both statements, which have the right to exist, have nothing to do with Kibirov’s poem. Even in this case, the author does not rely on speculative conclusions about Russianness or non-Russianness, about involvement or non-involvement in the fate of Russia, but continues the long tradition of Russian culture to make a foreign-born artist involved in itself, sincerely imbued with the fate of Russia, concerned about its future and imagining it as his homeland. Non-Russian artists are known by their roots: from A. Pushkin and N. Gogol’ to B. Pasternak and J. Brodsky.

In the case of Kibirov, the voice of his lyrical hero sounds profoundly Russian, and despite the ironically mocking tone, the content plan is quite serious and balanced. In the conditions of modern reality, cynical and disbelieving in ideals, when it is not customary to talk seriously about serious things, the poet chose the most appropriate form of naive simplicity in order not to be accused of following the canons of socialist realist (or simply — traditionally realistic) literature. The chosen form of the naive fool reflected the following of the primordial tradition of Russian classics as accurately as possible. The poem turned out to be “built on the foundation of a universal theme and a classical meter of witticisms, quotations, curses and sentiments” (Toddes 1990, 70).

5 Results and prospects

On an ideological and aesthetic level, the “well-forgotten old” became the “new” in Kibirov’s poem. The meaning and main idea of the poem are not reducible to the recognition by the lyrical hero of the poem of the entropic character of the development of modernity set by the opponent, but end with his acceptance of the past, an optimistic statement of hope and hope for the resurrection of man, culture, and the Universe.

Kibirov accepts reality (high and low), accepts the past (his own and the country’s), takes on faith the idea of the future of the motherland. That is why I. Falikov’s ironic assumption — “if Kibirov had started in the sixties, none other than he would have stood in a large luxurious hat with a group of comrades on the famous *Ogonyok* photo cover” (Falikov 1995, 67) — may not be meaningless.

Kibirov’s poem, tinged with vulgar intonations and containing expletive-obscene expressions, ultimately turns out to be a “lyrical confession” of the “best talented poet” of the post-socialist era (Vsevolod Nekrasov).

S. Gandlevsky wrote: “Both Kibirov’s love and hatred are directed at the same subject” (Gandlevsky 1994, 9), at the blasphemous and beloved Russia-the motherland. Ossetian by origin, Kibirov says of himself: *And Russian — or not Russian — I do not know, / But I will die here.*

Thus, it can be concluded that Timur Kibirov’s early poems can only be considered conceptual at the formal level. In fact, the poet goes far from the limitations of conceptualism and, most importantly, follows the tradition of Russian classical and world literature.

However, the opposite opinion may also be expressed: in later poems, Timur Kibirov will manifest himself more vividly as a conceptual poet.

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THE MONSTROUS PLOT IN VLADIMIR SOROKIN'S NOVEL "THE QUEUE"

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Abstract: The article offers an interpretation of the earliest conceptual novel by the famous Russian novelist Vladimir Sorokin "The Queue" (1985). The authors of the article have implemented a new approach to the text of a modern conceptual novelist. If traditionally V. Sorokin's novel was perceived by critics mainly from the side of the originality of its form, with the actualization of the author's appeal to the pictorial art objects of conceptual artists (I. Kabakov, V. Pivovarov, D. Prigov et al.), then in this article a different research perspective is justified — the need to look at the Sorokin text as a creative realization of a capacious speech metaphor, as the embodiment of the image of a "language monster" — the hydro-like essence of a "living" queue.

Keywords: Vladimir Sorokin; novel "The Queue"; figurative-linguistic integrity; symbolic-metaphorical plan; linguistic perspective of "monstrous" perception.

1 Introduction

Conceptualism as a literary trend in Russian literature of the 1970s and 1980s is undoubtedly a bright, original and integral phenomenon, which at a certain stage objectively marked the dynamic trends of literature emerging from the underground and beyond the strict limits of "samizdat" and "tamizdat".

Describing the phenomenon of "Moscow romantic conceptualism", Boris Groys wrote: "The word conceptualism can be understood quite narrowly as the name of a certain artistic direction, limited by the place and time of appearance and the number of participants, and it can be understood more broadly. In a broad sense, conceptualism will mean any attempt to move away from making art objects as material objects intended for contemplation and aesthetic evaluation and move on to identifying and forming those conditions that dictate the perception of works of art by the viewer, the procedure for their generation by the artist, their relationship with environmental elements, their temporary status, etc." (Groys 1993, 138–139).

Meanwhile, deliberately simplifying the content of a heterogeneous and ambiguous phenomenon, it can be stated that the poetical strategies and tactics of Moscow conceptualism were based primarily on the total playing of the techniques of socialist realist art, in fact — on overcoming the pervasive stylistics of socialist realism. Speaking about the institutional trends of the 1970s, L. Rubinstein explicated "the aspiration of that time to overcome the inertia and gravity of a flat sheet", "a distinct desire to transfer the situation <...>, which by that time had hardened and seemed eternal, from a socio-cultural dimension to a purely aesthetic one" (Rubinstein 1996, 6).

A group of artists and writers of Moscow conceptualism deliberately and manifestationally repelled from stable and established concepts (ideas — stamps, ultimately) of Soviet art and fundamentally distanced themselves from the canons of socialist realism, beating them, deconstructing, thereby actualizing the "fatigue" of culture from the dominance of ideological dogmas. Conceptualism (and especially social art) aestheticized and metaphorized the stamps of socialist realism, placed them in a new context, giving rise to axiological rethinking and radical rejection.

Overcoming socialist realism in the most general terms was the fundamental and dominant intention of conceptualism, its ideological core.

During the period of the greatest rise in conceptual art practices, the bright Moscow association was joined by the young Vladimir Sorokin, who began among conceptualists as an artist, but soon determined himself as a writer, the first and essentially the only conceptual writer. Among avant-garde artists, Sorokin soon realized that "the Soviet world has its own unique aesthetics, which is very interesting to develop, which lives by its own laws and is absolutely equal in the chain of the cultural process" (Sorokin 1992, 119). It is the aesthetics of socialist realism that becomes the "foundation stone" of his own — Sorokin's — aesthetics and poetics, the material of artistic deconstruction and creative reinterpretation, when "the typical socialist realist consciousness is transferred to new planes" (Novokhatsky 2010). On this path, Sorokin's first and most expressive experience as a prose writer was the novel "The Queue", which to this day is recognized by many researchers as the writer's highest achievement.

2 Literature Review

V. Sorokin's novel "The Queue" was written in 1983. For the first time an excerpt from it was published in the Paris edition of the magazine "A-Ya" (No 1), by the end of 1985 the novel was published in Syntax in a separate edition (Sorokin 1985). In Russia, for the first time, a small fragment from "The Queue" appeared in 1991 in the magazine *Ogonyok* (Sorokin 1991). During the Perestroika period, the novel was published in Russia and abroad repeatedly and in significant editions.

Literary critics and literary scholars, when referring to "The Queue", primarily and invariably qualify it as a "novel of direct speech" (Dobrenko 1990, 175). This is exactly how Sorokin's text is constructed — as a lengthy polylogue of unconstructed and non-personalized voices of characters not displayed in the text space. It is no coincidence that many critics speak of the novel's proximity to the dramatic rather than to the epic — "a play pretending to be a novel..." (see: Bogdanova 2005, Andreeva 2010, Bibergan 2011, Petrochenkov 2021, Uffelman 2022, Levotina 2023).

The novel is really written exclusively in direct speech, there are no author's remarks or comments. Sorokin, on the one hand, seems to follow M. Bakhtin's position about the dominant presence of the author "in the whole work", "in the very form" (Bakhtin 1978, 362), but, on the other hand, his strategy is no less correlated with R. Barth's postmodern thesis about the "death of the author" (Barth 1994, 384–392) in contemporary art. Be that as it may, only the form of "The Queue" explicates the "non-textual" presence of the author, the very voice of the artist-creator (narrator) in Sorokin's conceptualist text is annihilated.

Sorokin's comments on the novel "The Queue" are, as is customary among conceptualists, of a multidirectional nature. In targeting the foreign reader, who is little familiar with Soviet life, Sorokin emphasizes the "economic" content of the concept of "queue". So, in the afterword "Farewell to the Queue" (Sorokin 2008, 253–304) in the American edition of the novel in 2008, Sorokin offers the Western recipient a discussion about the three stages of the Soviet queue, stating that up to the 1960s Soviet citizens stood in queues for food — "for butter and sugar" (stage I). In the era of Brezhnev's stagnation, the object of Soviet lust was imported industrial goods — American jeans, German shoes, Czech tableware, Polish perfumes, Scandinavian cigarettes, etc. (stage II). During Gorbachev's "perestroika", according to the writer's observations, queues began to form again "for sausage and butter" (stage III). In order to disavow the main novel metaphor in the minds of foreign readers, the novelist deliberately straightforwardly compares the life of Soviet citizens with eternal standing in line, in general, the life of the Soviet state with a deficit life.

Meanwhile, in focusing on the Soviet reader, a living witness and direct participant in the circumstances of the Soviet food and industrial deficit, Sorokin emphasizes a completely different perspective. Sorokin, familiar with the Soviet realities of the domestic perceiving subject, turns to a deeper aspect of reception — according to the writer, in “The Queue” he was primarily interested in the effect of the birth of a “language monster” (Sorokin 1992, 121), that is, not economics and everyday life, but conceptual speech phantasmagoria.

Critics, most of whom are familiar with the Sorokin quote above, nevertheless rarely turn to the “monstrous” perspective of the narrative. As a rule, researchers are interested in the form of the novel “The Queue” — first of all, its connection with the painting practices of conceptualists (Bogdanova 2005, Bibergan 2011, Andreeva 2010), the construction of a text dialogue/polylogue and ways of imitating oral speech (Petrochenkov 2021), less often their linguistic exponents (Levontina 2023).

The question of explication of the monster queue image in Sorokin’s text was casually touched upon only by N. Andreeva: “... the main thing <...> in the novel is the process of the birth of the monster image” (Andreeva 2010, 5). But even in her view, the plot of “The Queue” appears in complete isolation from the image of the monster: “A plot is born and develops from the replicas of the dialogue — recognizable voices of the characters — Vadim and Lena begin to sound. The characters get acquainted, stand in line, talk, drink kvass, they spend the night in the park with the whole queue, have breakfast in the dining room, finally Lena leaves, having met another man. Vadim stays in line, drinks vodka with random acquaintances, gets drunk, falls asleep in the yard, wakes up, at this time it starts to rain, Vadim enters the entrance, where he meets a young woman, Luda, who invites him to enter the apartment. Then dinner, wine, dance, intimacy — and in the morning Vadim finds out that Luda works in a department store that sells the very coveted item for which he stood in line for two days. Thus, in the finale, the hero not only acquires what he wants, but also gets access to power, which distributes objects of desire” (Andreeva 2010, 4).

In our opinion, such a perception of the text of “The Queue” has an external, superficial character, partly consciously modeled/imitated by the author. From our point of view, the inner essence of the novel’s narrative lies in something else — in the process of generating the “monster” that the writer was talking about. We will be primarily interested in this narrative plan.

3 The semantic essence of the monster queue image

According to N. Andreeva’s correct observation, “as we read, the queue appears before our eyes as a kind of body — it gradually acquires its outlines, localizing itself in the space of city streets, just as a line outlines the contour of the surface of an object on a white background of a sheet of paper” (Andreeva 2010, 5).

N. Andreeva’s observation is true, but it is necessary to clarify that the outline of the queue, its contour and image (“body”) are born in Sorokin’s text not gradually, but literally from the first lines. In focusing on the objects of fellow conceptual artists (I. Kabakov, V. Pivovarov, A. Sundukov, V. Kolotev, etc.), Sorokin forms the visualized appearance of the queue with the first lines, building the text of the polylogue novel in such a way that it is accessible to visual perception. The prose writer uses short phrases, replicas, which are arranged harmoniously one after another, not growing into long maxims of invisible characters, but by their conciseness and brevity contouring the visible image of the queue, which gradually acquires details, qualities, characteristics, clarifying and “individualizing” the aggregate essence of the monster text (see: Sorokin 2002, 16).

Note that the text opens with a precedent phrase — “... who is the last?”, familiar to every Soviet (and Russian) citizen. Thus, the subject of perception immediately plunges into the atmosphere of a social phenomenon — queues, and each subsequent replica-response complements and concretizes

familiar realities, not allowing the boundaries of the recognizable visible image to be blurred.

The collective closeness and cohesion within the queue is marked by Sorokin by the ease with which people (characters) enter into communication. The initial address “comrade” does not explicate an ideological subtext (D. Uffelmann’s point of view: Uffelmann 2022), but generates an idea of camaraderie, as if opening the character’s entrance to some future fraternity-community.

The ease of communication very soon outgrows the scope of the external community of characters. Already on the first pages of the text, the self-determination of those standing in line appears — “we” (“us”), which are a priori opposed to a certain “they” (“them”).

Semantically, it is expected that some “they” are alien and even hostile to the queue. And in this confrontation, the unity (including psychological) of the people-characters standing in line turns out to be even more pronounced and significant — as a result, the integrity and physicality of the queue is represented more and more thickly and in relief.

Visual examples of building an organized queue at Sorokin are actively accompanied and clarified by details of the psychological warehouse. From the very first lines, a certain mental community of those characters who are already standing in line and who are just getting attached to it is noticeable. Strangers demonstrate empathy and altruism, experience feelings of mutual help and mutual support: “Stand behind me for now. <...> She said that she would return quickly...” (Sorokin 2002, 316). The heroine of “in a blue coat” who has left the queue seems to be under the protection of the male hero remaining in the queue, as obviously unknown to her. As a result, the characters are perceived (and realize themselves) as if they are interchangeable: I = she. There are many similar mini-situations in the Sorokin queue.

The heroes of the queue in the course of communication most often express themselves not in the forms of the 1st person singular (I), but in the plural forms (we) with the appropriate predicative expression (Sorokin 2002, 318–319), in any case, they are all included in the paradigm of impersonality and self-centricity, of the queues.

Personal names flashing in the text (their vocative truncated forms) — Fed’, Serzh, Mish, Valer, Pash, Zin — do not change the meaning of formal depersonalization. There is no real zoning of individual voices in the text of the novel. Even when using proper names, the latter are either shortened, “reduced” (as if they are subject to “collective” compression), or dissolved in speech formulas, explicating not so much the personality of the named character, as generating allusions to precedent texts of the Soviet era (for example, to popular songs by V. Vysotsky).

Apparently, only the names of the “love triangle” Vadim, Lena, Luda have a stable fixation, and next to them is Volodya, a little boy who echoes the name of the author, probably once also stood with his mother in long queues. However, the presence of other names flashing in the queue next to Vadim-Lena-Luda removes the halo of their exclusivity and primacy. These three characters can hardly be called “main” characters and even only the hero Vadim, as critics often claim (for example, Andreeva 2010, 5). Sorokin’s central character is undoubtedly a queue.

The image of the “thousand-mouthed hydra” (I. Levontina) clearly demonstrates its signs, conditionally “body parts”. For example, the homonymous “tail” appears in the text already on the first pages, growing and lengthening from episode to episode. At first, “there is no end to the tail” (Sorokin 2002, 324), later — about him almost admiringly: “Wow... what a tail...” (Sorokin 2002, 338). Formally, the linguistic signs of queue hyperbolization are increasing.

The “body” of a long queue, possessing an expressive “phraseologized” tail (compare: the paremic “head of the queue”), inevitably gives rise to the idea of a serpentine creature, perhaps dragon-like or hydro-like. In any case, this “monster” is so material that its body can be stretched or compressed, it can be aligned or straightened, bent or folded. “And here you can bend... <...> Bend, bend here, comrades...” (Sorokin 2002, 338). Comrades and Sorokin’s queue are synonymous. The real and the phantasmagoric, the animate and the inanimate, the subjective and the objective incorporate, diffuse.

4 The process of depersonalization inside the queue

Meanwhile, the process of depersonalization inside the queue, in fact its dehumanization, reveals a downside: it does not mortify the essence (body) of the human queue, rather on the contrary — the monster queue comes to life, reincarnates, is filled with tangible physicality. Despite the already mentioned individual Fed’, Serzh, Valer, Zin, the turn acquires the characteristics of nameless personal unity and its own fullness, the status of independence and viability, independence from single “compressed” human components. The elimination of multi-subjectivity is compensated by an (almost Kantian) totality.

If the initially incarnating queue demonstrates certain properties and qualities of a being capable of action: “Why, back away again?”, “Or maybe it’s better to bend <...>?”, “Well, let’s turn off, right?” (Sorokin 2002, 345), then with the accumulation of maturity, the queue reaches genuine vitality. The queue acquires the outlines and vitality of a visualized monster creature, embodied and independent, endowed with its own essence and already contoured physicality.

Sorokin literally timesheets the process of maturation of the creature of the queue. The author introduces signals into the text-markers of queue maturation. The human components of the queue are first called the morning (“I’m standing in the morning”), then they mention the lunch break (in the USSR, strictly from 14 to 15 o’clock), later it comes to five in the evening (in Russia 17 o’clock), then it’s called 8 pm (“Wow, the eighth hour is already...”), it is expected the extension of trading until 11 pm (23 o’clock), etc. The queue is growing and gaining strength “by leaps and bounds”, the image is saturated with additional connotations.

Having gained cohesion and power, the queue reaches the ability not only to self-regulate, but also to self-awareness. The queue develops and formulates its own — collective — desires and discovers the ability to implement them. Her behavioral impulses vary.

At first, the queue “bends” to reach the barrel of kvass, and thus quenches its monstrous thirst. “Let’s move over and get drunk on kvass” (Sorokin 2002, 337).

Next, the queue decides to settle down in the shade of the trees of the city courtyards: “How nice it is here. I love such alleys <...> Move into the alley...” (Sorokin 2002, 346-348). “Yes, we bend into the yard, we bend!” (Sorokin 2002, 375).

Next, there is a need to rest, sit down on the benches: “Yes, there are plenty of shops nearby, why suffer?” (Sorokin 2002, 353). “Comrades, are we taking turns sitting?” (Sorokin 2002, 357). As evening falls and night approaches, the queue monster has the idea of spending the night on the street: “What’s there, just think — to spend the night. But in the morning we’ll get one or two” (Sorokin 2002, 353).

The queue implements its own monstrous (biological) instincts, needs. It behaves like a living organism endowed with consciousness, needs, desires. This living and full-fledged subject wants to eat, drink, defecate, wash, relax, hide from the rain, get the desired and coveted product. The queue formed and took shape, became stronger and gained its own shape, and therefore existence (“We live!”). The amphiboly of the text, its ambiguity and ambiguity are increasing.

5 The plot twist of the narrative

Gradually, it seems that the result of the writer’s aspirations (the effect of the birth of a language monster) has been achieved. Regardless of what the product is, “how much” it is given, who gets it, the finale of the novel narrative has matured: the metamorphoses have happened, the queue has been nurtured, it is endowed with an independent and full-fledged life. But this is where the counterpoint turn of events takes place.

The final episode of the novel, when Vadim gets into Lyudmila’s apartment and where it turns out that the heroine works in the very store “Moscow”, near which street trading is carried out, on the one hand, can qualify as a climax, on the other hand, generates the need for a special comment.

If we appeal to the superficial plot layer of the novel, then the plot line seems to be really resolved by ridding the hero of all the next hardships that fell to his lot. Thanks to Lyudmila, Vadim can now get what he wanted himself and what Luda’s house is already filled with without waiting in line (out of turn). All the coveted products and things can now become his property, since Lyudmila, a commodity expert, will easily provide her lover with everything necessary and desirable.

However, within the framework of the monstrous internal plot, the final episodes with Lyudmila seem to us, firstly, ironically and anecdotally lightened, and secondly, superfluous and conceptually insignificant. The hero left the queue, but at the same time acquired all the coveted goods. Meanwhile, the plot of the monster queue in a similar happy-end context “freezes”, appears incomplete, torn off, not brought to a logical end.

The further fate of the revived monster queue remains unknown, and readers’ “fears” arise for its continued existence and survival. The plot of the monster was stated and partially embodied by the novelist, but in the end it turned out to be incomplete. If at the surface level the plot received a dynamic conclusion, then at the internal level the finale turned out to be “open”, and not in a scientific sense, but in a literal sense. The gifted novelist, as if carried away by the idea of a monster, simplified and missed the moment of completion of the phantasmagoric narrative, leaving an already formed, vital being outside the plot perspective. Vadim’s plot turned out to be simpler and more accessible to pragmatic perception, whereas the monster’s plot hung in space, got lost on one of the Moscow streets.

6 Results and prospects

The question remains: why did Sorokin build the image of a monster queue, which was his author’s intention? Did Sorokin intend to discover a negative attitude towards the peculiarities of social life in the USSR, or was the artist’s task different?

It is hardly possible to assume that the face trend was led by the conceptualist Sorokin. The founders and theorists of conceptualism demonstrated the absence of the idea and purpose of the created literary text. Russian conceptualism, in contrast to Western conceptualism, played with concepts, built new structures from Soviet Socialist-realistic cubes-stamps, offered unexpected and, as a rule, far from reality (and from realism) objects. In this sense, Sorokin’s statements about economic content “The Queues” addressed to a foreign reader are just a tribute to a Western Research view (for example, the works of H. Gunther (Gunther 2000), K. Clark (Clark 2000), L. Geller (Geller 2014), D. Uffelmann (Uffelmann 2022), E. Dobrenko (Dobrenko 2000, 2007) and others).

Who learned the laws of the special poetics of Soviet literature (and more broadly, the Soviet reality, into which he inevitably remained immersed) Sorokin created “The Queue” not as an accusatory hyperbole of Soviet reality, but as an experiment in language play, which was preached and represented in his painting practices by his fellow conceptualists (see verbal experiments inside the visual art of I. Kabakov or V. Pivovarov

and, conversely, visual practices inside the verbal art of D. A. Prigov, L. Rubinstein, etc.). Fascinated by conceptual strategies, Sorokin played with language, like conceptual painters, and the material (not the object) of this game became the realities of the life of a Soviet person, a Soviet country, familiar and understandable to a prose writer. The most important thing for the writer was the game experiment, and not a marked socio-ideological evaluation. The ironic mode of narrative did not include a pronounced axiology.

It is noteworthy that in the body of the Sorokin queue, a special place is occupied by the image of the boy Volodya, who found himself in a monstrous chain of people with his mother. Like Vadim, the voice of the boy character is recognizable, the replicas of the characters addressed to him are specifically targeted and accurate. The author's namesake — Volodya/Vladimir — lives organically inside the queue, without experiencing serious discomfort, excluding the childish desire to jump, make noise, play on the nearest playground or drink three glasses of sparkling water, eat ice cream. The child Volodya is an organic and far from tragic figure of the queue ("The Queue"). Sorokin's young hero lives in a natural environment that does not injure his childish consciousness. The monster queue kindly accepts the boy's mischief, providing him with an atmosphere of comfort and happiness. The social motive of exposing and overthrowing the Soviet order was neutralized in Sorokin's text. His novel is a language game, a speech experiment, a gesture of an avant-garde conceptualist.

Let us repeat, however, that this is why, from our point of view, the novel about the monster turned out to be unfinished to the end, left by the writer without a final accent and a non-textual perspective. Note at the same time that, probably, for Sorokin himself, as time passed, it became obvious that the fate of the queue in "The Queue" was not spelled out and was not completed. Maybe that's why a fragment from the novel "The Queue" a quarter of a century later was transferred by the already mature Sorokin to the text of the novel "Sugar Kremlin" (2008), as if realizing the previously unfulfilled fate of the queue-hero and ensuring the continuation of the life of the monster phenomenon (see more details: Bibergan 2011). The existential present of the monster queue seems to be "prolonged" in the "Sugar Kremlin".

Anyway, concluding the discussion about the "monstrous" subtext of the novel, we can say that the then young and talented Vladimir Sorokin in "The Queue" carried out the first literary experience of implementing conceptual strategies and tactics previously exploited and represented only at the level of painting practices. Sorokin's first conceptualist novel became a serious achievement of both the prose writer himself and the entire conceptual art in general, especially during the heyday of postmodern trends at the turn of XX and XXI centuries (see: Bogdanova 2004, Bibergan 2011).

It cannot be said that Moscow conceptualism and Vladimir Sorokin's texts themselves really "overcame socialist realism" and "cleared the way" for new Russian literature. Upon closer examination, it is obvious that the artists and writers of Moscow conceptualism in practice tried at a new stage to revive the traditions of avant-garde trends artificially interrupted in the 30s of the last century. However, by the beginning of XXI century, this role of Moscow conceptualism had been played out, the conceptual experiment had exhausted itself, remaining a special page in the history of Russian literature.

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SELECTED ASPECTS OF REGIONAL DEVELOPMENT OF INTERREG CROSS-BORDER PROJECT MANAGEMENT INFLUENCING DISPARITIES

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Abstract: This article focuses on the analysis of cross-border project areas located in the border regions around Bratislava mapping the disparities of Slovakia. It analyses their regional development possibilities provided by specific INTERREG projects in the frame of the European Regional Development Fund. Special attention is devoted to economic project indicators, programme-specific indicators, demographic processes and phenomena related to official programme priorities pandemic caused. Besides generally acceptable statistical data representing quantitative research other data collected via analysis of databases and project communities provides insight into cross-border project expectation survey. It focuses on regional policy effects of cross-border projects, analysing best practices and its impact on the inhabitants of the regions of Slovakia. There is a comparison between cross-border project impact aspects predicting current trends influenced by the thematic of programmes in Hungary and Czech Republic. Added value can be the results of measuring expectations in economic and demographic development in the cross-border regions mainly between Hungary, Czech Republic and Slovakia after COVID-19 pandemic in the era of new programme period of the EU 2021-2027 with wide potential of INTERREG HU SK cross-border project developments through innovation and green project initiatives.

Keywords: cross-border cooperation, interregional projects, EU funds, project development, disparities, INTERREG

1 Introduction

The choice of research topic is justified since cross-border regions are involved in INTERREG project development, whereas both sides of the territory is implementing and development best practices for the new programme period. Best practice coming from the previous programme period providing higher impact on region, development and disparities, which is a common phenomenon of current globalization, is multifaceted and highly relevant today.

European Cohesion Policy, Territorial Cohesion and Cross-border cooperation principles will be defined in this literature review and further analysed if their impact on regional development is sustainable.¹

2 Literature Review

Cross Border Cooperation (CBC) is a fundamental component of the European Union's (EU) policy towards its neighbouring countries. The CBC aims to achieve sustainable development along the external borders of the EU, as well as to address common challenges and reduce disparities in living standards across these borders. CBC fosters cooperation between EU countries and their neighbouring countries sharing a land border or sea crossing. The funding provided can support programmes between several EU and neighbourhood countries which, for example, are part of the same sea basin. The CBC is based on the EU's territorial cooperation model and is adapted to the specificities of external cooperation².

The foundation for the emergence of the EU regional policy is linked to several aspects such as economic, social, political and

ecological, which are part of the EU regional policy in the later period.³

However, what was the main objective of the establishment of the EU regional policy was to achieve an increase in economic and social cohesion, resulting in the blurring of the differences between the regions of the member countries. In other words, regional policy support means public support for companies and business sector who decide to locate their production, enterprise in the selected area. This stimulates economic activity on the one hand and, on the other hand, reduces unemployment and social expenditure.⁴

An invaluable factor or reason is the actual convergence of the economies of the individual EU members, which results in the necessity of a functioning monetary economy.⁵

In this context, cross-border cooperation has become an essential aspect of territorial cooperation that takes place between regions or cities located on either side of a border. The primary goal of cross-border cooperation is to address common challenges that transcend national boundaries, such as environmental protection, cultural exchange, or economic development.⁶

Cross-border cooperation aims to promote sustainable development and address the common challenges faced by border regions. It seeks to reduce disparities in living standards, improve the quality of life of citizens in border regions, and address common challenges such as environmental protection, cultural exchange, or economic development.⁷

Furthermore, cross-border cooperation helps to strengthen the relationships between regions and cities, which can lead to more comprehensive and sustainable cooperation in the future.⁸ The establishment of cross-border cooperation agreements and partnerships can help promote trust, mutual understanding, and collaboration between regions and cities, thus creating an environment that is conducive to regional integration and development.⁹

Established in 1990 and funded by the European Regional Development Fund (ERDF), Interreg is the EU's primary tool for supporting cross-border partner cooperation. It aims to eliminate development common obstacles and foster the implementation of joint strategies to address shared challenges.¹⁰

Cross-border cooperation (CBC) projects are crucial for achieving sustainable development and fostering a climate conducive to entrepreneurship and investment.¹¹

³ Dobřík, M., Rysová, L. Implementácia štrukturálnej a kohéznej politiky Európskej únie v podmienkach Slovenskej republiky v období 2004 - 2014 a finančná perspektíva 2020. In: TEREM, P., LENČ, M. Desať rokov Slovenskej republiky v Európskej únii: zborník vedeckých prác - 1. vyd. - Banská Bystrica: Vydavateľstvo Univerzity Mateja Bela v Banskej Bystrici - Belianum, 2014. p. 93-102. ISBN 978-80-557-0816-4.

⁴ KAPOŠVÁRYOVÁ, D., KREUZBERGEROVÁ, E. Regionálna politika v Európskej únii a jej dôsledky pre Českou republiku. In: Integrace, Praha. [online]. Retrieved from: <http://natura.baf.cz/natura/2000/6/20000600.html>

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⁶ Brunet-Jailly, E.: Cross-border cooperation: a global overview. Alternatives. 47(1). New York: NYC Brothers, 2022. 15 p. DOI: 10.1177/03043754211073463.

⁷ European Commission: Neighbourhood enlargement. 2024. Retrieved from: https://neighbourhood-enlargement.ec.europa.eu/european-neighbourhood-policy/cross-border-cooperation_en

⁸ Beer, A., Clower, T.L., eds. *Globalization, Planning and Local Economic Development*. London: Routledge, 2020. Retrieved from: <https://www.routeledge.com/Globalization-Planning-and-Local-Economic-Development/Beer-Clower/p/book/9781138810310>

⁹ Kurowska-Pysz, J., Castanho, R. A., Loures, L. Sustainable Planning of Cross-Border Cooperation: A Strategy for Alliances in Border Cities. Sustainability. MDPI, 2018. vol. 10(5), pp. 1-26, May.

¹⁰ European Parliamentary Research Service: *Interreg: Supporting cooperation across borders*. 2018. Brussels: European Parliament, 2018. 20 p. Retrieved from European Parliament.

¹¹ Vaňková, L., Kocourková, G., Krejza, Z.: *Cross-border Cooperation in the Field of Investment Activity with Regional Development Implications*. IOP Conference Series:

¹ Petit Y., Drotár, M. – Delaneuville, F., Zummerová, L.: Cohesion Policy in the Service of European Integration: The Example of Slovakia. Springer Nature Switzerland AG 2022. N. Kryvinska and M. Greguš (eds.), IN: Developments in Information & Knowledge Management for Business Applications, Studies in Systems, Decision and Control 420, https://doi.org/10.1007/978-3-030-95813-8_14 295-296 Y. Petit et al.

² Chamusca, P. Territorial Cooperation and Cross-Border Development: The Portuguese Dynamics. Social Sciences. 13. New York: NYC Brothers, 2024. 10.3390/socsci13020108.

Since its inception, the European Union (EU) has advocated that significantly supporting cross-border cooperation (CBC) "enhances European integration," "promotes sustainable development" along borders, and "helps reduce disparities in living standards".¹² Over one-third of EU citizens reside and work in border regions, where borders significantly influence their daily lives both directly and indirectly.¹³

European Territorial Cooperation (INTERREG programs) is crucial for eliminating barriers and fostering sustainable collaboration across borders. European researchers emphasise a significant link between executed projects and the sustainable advancement of border regions.¹⁴

Analysing successful examples of cross-border cooperation (CBC) projects is essential for grasping their impact on regional development and for constructing a model of success based on gathered data. As highlighted by Joanna Kurowska-Pysz,¹⁵ cross-border initiatives foster partnerships and aim to achieve common goals that are vital for both collaborating organizations and the development of border regions. Analysing all factors impacting the outcomes of these projects is essential for achieving sustainable territorial development in the long term.¹⁶ Simultaneously, Liu et al.¹⁷ emphasize the significance of establishing "institutions to facilitate efficient cross-border governance," with a strong focus on advancing CBC in technological innovation. The process of economic integration has led to an increasing number of such projects being planned or already in progress. Sanotska et al.¹⁸ argue that addressing market failures in border regions should be a state-level priority. They emphasize that cross-border cooperation programs initiated by neighbouring governments should serve as the main strategy to promote economic parity across both countries' regions. According to sources, the growth of the innovation-entrepreneurial ecosystem stems from internal and external developmental factors. External factors encompass a proactive innovation policy at the regional level, supported by science-intensive industries.

The Asian Development Bank's Regional Cooperation and Integration Strategy misses a clear definition of "cross-border infrastructure," but its notable aspect lies in generating cross-border externalities that are not produced by national projects alone. This infrastructure yields "additional" advantages that impact the involved countries. This implies that the overall benefits from cross-border initiatives surpass those achievable through purely national projects.¹⁹ Infrastructure plays a crucial role in facilitating international trade across borders. The development of transport infrastructure is widely recognized for its enduring positive influence on economic growth.²⁰ At the same time, cross-border projects are "accompanied by high complexity, difficulty, and uncertainty"²¹.

The study referenced²² reveals that cross-border projects have not received adequate attention in research, and there is a lack of systematic examination of management models essential for successful preparation and implementation of cross-border infrastructure projects.

They emphasise the following priorities: ensuring a clear justification and formulation of the corridor's concept; utilizing distribution analysis to guide mutually beneficial outcomes, integrated within situational and SWOT analyses; promoting fair public-private partnerships; and addressing transport infrastructure limitations. While acknowledging these factors' importance in enhancing external project impacts and fostering stable cross-border cooperation, they propose a model for successful cross-border project management. In project management, two main concepts prevail: achieving project success, which focuses on the product's quality, timely delivery, and public perception; and ensuring project management success, which centres on meeting project parameters, professionalism, team skills, and stakeholder engagement capabilities.²³

Cross-border regional development within the EU's cohesion policy framework is strategically aligned with the environmental priorities of "Green Europe" and the European Green Deal. These initiatives emphasize sustainability, climate action, and inclusive growth across neighbouring regions. Cohesion policy funds support projects that promote environmental sustainability through cross-border cooperation, including renewable energy infrastructure, shared conservation efforts, and climate-friendly technologies. These initiatives not only enhance regional economic development but also contribute to EU-wide goals of carbon neutrality, innovation, social inclusion, and policy integration in tackling environmental challenges collectively across borders.²⁴

3 Research problems and goals

The goal of this article is to comparatively analyse the two specific calls of INTERREG HU SK and INTERREG CZ SK with evidence-based list of approved projects and from filtered data of the already submitted and approved projects in the first two calls of the programme. We can find the source data for the Czech Slovak cooperation online from the programme period webpage, <https://14-20.sk-cz.eu/sk/projekty/zoznam-projektov>, <https://www.skhu.eu/funded-projects/infographics> as well as to select from the infographics of the KEEP.eu data from INTERREG HU SK programme page.

After a short descriptive analysis of the priority axis, we can see that the number of projects in the divided forms are. Table 1 states a distribution between the Priority Axis, which are the most important topics for the previous programme period. From 47 % of interest dedicated to "Nature and Culture" topics we can assume that Green elements of a project are generally present.²⁵ In very short characteristic it is Climate action, Clean energy, Sustainable industry, Buildings and renovations, Sustainable mobility, Eliminating pollution, Farm to Fork and Preserving biodiversity, which can be present in the topic, goal and aim of projects developed under Priority Axis 1 where 59 projects were financed for 68,22 million EUR.

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¹² Grad-Rusu, E.: Exploring cross-border cooperation in Eastern Europe: What kind of initiatives have developed in the Romanian-Hungarian border area? *Észak-magyarországi Stratégiai Füzetek*. 18. 35-43. 2021. 10.32976/stratfuz.2021.33.

¹³ European Commission: *Cross-border healthcare - Evaluation study*. Brussels: European Union, 2017. Retrieved from: EUR-Lex.

¹⁴ Vaňková, L., Kocourková, G., Krejza, Z. Cross-border Cooperation in the Field of Investment Activity with Regional Development Implications. IOP Conference Series: Earth and Environmental Science. 656. DOI: 10.1088/1755-1315/656/1/012009.

¹⁵ Pysz, J.: *The process of joint learning as a determinant of cross-border project management*. 2020. New York: NYC Brothers, 2020.

¹⁶ Brunet-Jailly, E.: Cross-border cooperation: a global overview. *Alternatives*. 47(1). New York: NYC Brothers, 2022. 15 p. DOI: 10.1177/030437542111073463.

¹⁷ Liu, J., Lo, K., Mah, D., Guo, M.: *Cross-Border Governance and Sustainable Energy Transition: The Case of the Guangdong-Hong Kong-Macao Greater Bay Area*. Current Sustainable/Renewable Energy Reports. 8. 2021. 10.1007/s40518-021-00178-4.

¹⁸ Sanotska, C., Saienko, O., & Ilyk, R.: *UKRAINIAN-POLAND CROSS-BORDER COOPERATION: CURRENT SITUATION*. Scientific Journal of Yuriy Fedkovich Chernivtsi National University. Economics. 2020. 10.31861/ecovis/2019-820-5.

¹⁹ Asian Development Bank. Future Regional Cooperation in the Asia-Pacific. Manila: Asian Development Bank, 2020. 63 p. Retrieved from: Asian Development Bank.

²⁰ Inshakova, E.I., Inshakova, A.O.: *New Technology for Inclusive and Sustainable Growth*. Springer Singapore, April 2022. DOI 10.1007/978-981-16-9804-0. ISBNs 978-981-169803-3, 978-981-169804-0.

²¹ Li, J., Zhang, J., Suo, W. Risk assessment in cross-border transport infrastructure projects: A fuzzy hybrid method considering dual interdependent effects. *Information Sciences*. 488. 2019. DOI: 10.1016/j.ins.2019.03.028.

²² Fujimura, M., Adhikari, R. Critical Evaluation of Cross-Border Infrastructure Projects in Asia. ADBI Working Papers. Asian Development Bank Institute. 2010. DOI: 10.2139/ssrn.1653699.

²³ Venczel, B., Berényi, L., Hriczó, K. Project Management Success Factors. *Journal of Physics: Conference Series*. 1935, 012005. 2021. <https://doi.org/10.1088/1742-6596/1935/1/012005>

²⁴ European Commission. Cohesion Policy and Climate Change. 2021. Retrieved from https://ec.europa.eu/regional_policy/en/policy/themes/climate-change

²⁵ Elements of a European Green Fiscal Policy. 2024. Review of European Economic Policy Volume 58, 2023 · Number 6 · pp. 300–304. Retrieved from <https://www.intereconomics.eu/contents/year/2023/number/6/article/elements-of-a-european-green-fiscal-policy.html>

Table 1: Number of projects divided by their Priority Axis INTERREG HU-SK in 2014-2020

Priority Axis of INTERREG HU SK	Amount in Million EUR	Percentage	Number of projects
Nature and Culture	68,22	47%	59
Mobility	22,48	15%	7
Employment	32,04	22%	46
Institutional cooperation	22,45	15%	55

Source: Own processing for the research based on <https://www.skuh.eu/funded-projects/infographics>

The research problem is grounded between the disparities and differences Czech- Slovak Interreg and Hungarian-Slovak INTERREG in terms of the priorities and new focus on green elements in cohesion policy as one of the most prior selected aspects of the new programmed period. This article has stated three general hypotheses based on data and survey. We defined green elements as per the Green Deal in terms of sustainability and ESG reporting.

H1) In the programme period 2014-2020 there is a correlation between Czech (Interreg CZ-SK) and Hungarian Green project elements.

H2) In new programme period 2021-2027 green elements in projects are influenced in Green Deal sustainability.

H3) Based on the profiles of the applicants there are new regional economic policy tools for disparities opened.

We start to investigate the research programme statistics in terms of sustainability of the projects.

Table 2: Comparison of Green projects element's frequency in Hungary and Czech Republic in 2014-2020

INTERREG Country	Hungary	Czech Republic	Project Total
Frequency- no	160	150	310
Frequency- yes	7	8	15
All group- frequency	167	158	325
Frequency	52%	48%	100%

Source: own collaboration based on data <https://www.skuh.eu/funded-> from Hungarian CBC and Czech Slovak <https://14-20.sk-cz.eu/sk/projekty/zoznam-projektovprojects/infographics> <https://keep.eu/programmes/18/2014-2020-Slovakia-Czech-Republic/>

It is important firstly calculate the chi-square statistic, p-value, and expected frequencies manually to ensure accuracy. Calculating the chi-square statistic:

$$\chi^2 = \sum (O_{ij} - E_{ij})^2 / E_{ij} \quad \chi^2 = \sum E_{ij} (O_{ij} - E_{ij})^2$$

where O_{ij} are the observed frequencies and E_{ij} are the expected frequencies. P-value Calculation is using the chi-square distribution table or a statistical software to find the p-value for $\chi^2 = 0.179$ with 1 degree of freedom. From this calculation, the chi-square statistic is approximately 0.179, and the degrees of freedom are 1. The p-value can be obtained from the chi-square distribution table corresponding to this chi-square value and degrees of freedom. Given the low chi-square statistic value, it is likely that the p-value will be higher than 0.05, suggesting that there is no significant association between the country and the response in this data set. Therefore, we have seen other relevant methodology as the comparison method by Pareto effect and existing tools. Before that we have seen if there is a correlation between the data of the green projects in the new programme period, which has not come to the end yet, but in a very short period it has experienced more tools of the green elements as the strategy of EU is heading that way in cohesion polic. Table 3 analyses the current requested, applied and interested numbers of application forms and projects in Hungarian-Slovak and Czech-Slovak INTERREG regions.

Table 3: Requested projects from 2021-2024 including green elements in new programme period

INTERREG Country- Frequency of green projects	Hungary	Czech Republic	Line Total
Frequency- no	67	128	195
Frequency- yes	24	18	42
All group	91	146	237

Source: Own processing for the research based on accurate INTERREG data

The chi-square test of independence on the data, whereby we extracted the counts from the provided table and organized them into a contingency table format showed a stronger correlation in comparison to Table 2. Table 2 demonstrates frequent elements in Hungary with a stronger correlation. This is a two-dimensional array where rows represent different categories of one variable (response: "yes for green elements" or "no") and columns represent different categories of another variable (country: Hungary or Czech Republic). After performing the chi-square test was used for contingency function from module to perform the chi-square test. This function takes the contingency table as input and returns several values, including the chi-square statistic, p-value, degrees of freedom, and expected frequencies. The chi-square statistic (χ^2), p-value, degrees of freedom and expected frequencies are obtained from the chi-square test. Chi-square statistic equals $\chi^2 = 6.65$ by p-value: $p = 0.0099$ with degrees of freedom: 1

Frequency-no: Hungary: 74.87, Czech Republic: 120.13

Frequency-yes: Hungary: 16.13, Czech Republic: 25.87

The p-value (0.0099) is less than the significance level of 0.05, indicating that there is a statistically significant association between the country and the response. According to the results shown in Table 3, it is clear that only less than one fifth of the applicants of the selected INTERREG call, namely by number only 17.55% would like to be further active in sustainable Interreg projects and used them as a priority topic. Although this result is in contradiction with the first analysis presented above regarding the interest in this learning, it can be explained by the fact that the general level of intentionality in project management and willingness is currently lower and therefore further motivation toward projects with green elements is rejected from the applicants' point of view. Furthermore, it can be noted that there is a statistically significant difference between the response rates.

4 Results

An invaluable factor or reason is the actual convergence of the economies of the individual EU members, we resulted in comparing success factors based on literature review, topics of the selected INTERREG programme and project management success factors.

Table 4: Tools of regional economic policy

	IMPACT			
	Information and counselling	Financial motivation	Infrastructure + GREEN element	Administrative challenges
Medium enterprises				
Mobility	Information about locality	Localisation support	Construction of economic infrastructure, supply and waste disposal, transport, telecommunications, education, research facilities, science parks, technology and business centres	Localisation rules
Investment	—	Investment motivation		Regulation of investments
New workplaces		Honors for creating new workplaces		—
Technologies and innovation	Technologies and innovation counselling	Support of new technologies		Regulation of new technologies
Establishment of	Entrepreneurial counselling	Risk capital of establishing help		Regulation of establishing companies
Cooperation	Cooperational partnership	Cooperational motivation		—
CITIZENS				
Education	Information about possibilities of education	Contribution for education	Construction of infrastructure oriented on inhabitants, flats,	Green elements for sustainability
Mobility	Information	Contribution		Green

	about the offer of workplaces	for mobility	education, institutions of social and cultural ensurement	travelling
Supplement	Information about the offer	Subvention for close subcontractors		Green Additional Policy
SETTLEMENTS				
Communal growth	Counselling for settlements and regional institutions	Contributions for communal and regional development projects	Infrastructure help for settlements – GREEN element	Coordination of villages

Source: own preparation based on Textbook Regional economic policy of the EU page 28. Based on Maeier-Tödling²⁶

By selecting the measures tools by disparity improvements based on Maeier-Tödling and the results of survey we defined the followings for project application form requested priorities described in the projects in general. Success factor is a tool, which defines the sustainable and green implementation of the European projects based on tools of regional development. Critical success factors for managing cross-border projects identified using case study analysis of existing projects with a content analysis of the above mentioned all Hungarian and Czech CBC projects in both periods: *Relations between countries (cities), Ensuring quality of life standards, Young and talented people, General goals and plans of projects implemented by countries; Strengthening political commitment, Citizen participation in decision making, Strong territorial strategy, Prevention of duplication of infrastructure, Enhancing a sense of belonging, Availability of diverse infrastructure, Green Europe, Access to investment, A strong economy, Political transparency and commitment, Marketing and advertising.* With these mentioned and selected aspects, we have compared the Czech and Hungarian cross-border region and the most important Pareto effected selected aspects which are common highlighted.

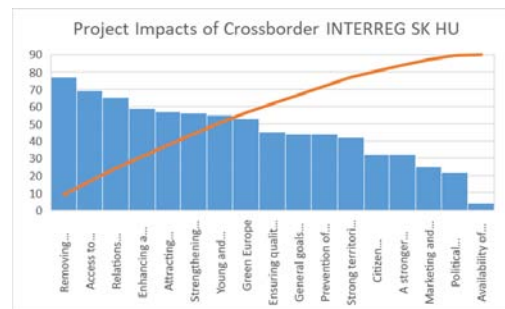
Table 5: Tools of regional economic policy in old and new programme period.

Common Aspects of CBC	Different Aspects of CBC
Relations between countries (cities)	Citizen participation in decision making
Strengthening political commitment	Attracting strong territorial strategy
Ensuring quality of life standards	Green Europe
Young and talented people	Political transparency and commitment
General goals and plans of projects implemented by countries	Marketing and advertising
Enhancing a sense of belonging	Access to green investment

Source: Based on research data INTERREG HU SK CZ project databases

After looking at the data of the testing third hypothesis H3 Based on the profiles of the applicant there are new regional economic policies for disparities opened in projects. Relationship as a diplomatic topic is important for both countries in Pareto dimension, strengthening political commitment, as well as young talented people inclusion is one of the main elements by general goals and plans implementation. As mentioned in theoretic chapter enhancing a sense of belonging means cohesion from perspective of EU and strong correlation and cooperativeness from the citizen's point of view.

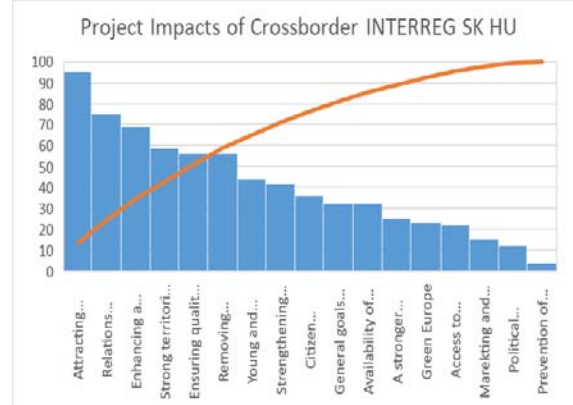
Graph 1: Cross -border project Impact of Interreg SK HU



Graph 2 presents Cross -border project percent of most important things are based on the existing Impact of Interreg SK HU works with Pareto principle where the percentages e In this section we are going to test the hypothesis for the common tools of regional development. The Pareto principle (also known as the 80/20 rule, the law of the vital few and the principle of factor sparsity states that for many outcomes, roughly 80% of consequences come from 20% of causes (the "vital few") will be for guided relevance of the 80 percent most important topics citizens and applicants choose in order to implement greener policies in EU projects of INTERREG borderlands.

Based on the profiles of the applicant there are new regional economic policies for disparities opened, which can be proved via Graph 2 where Attracting strong territorial strategy.

Graph 2 Cross -border project impacts in 2021-2024



Based on the analysis the impact is in infrastructure, financial motivation, and infrastructure. We tested a hypothesis whether settlements and citizens have information in and financial background of Green projects and what this facts means. Based on data from project management of INTERREG projects we found out a very low level of guided information and commitment via Green topics and strong territorial strategy.

Discussing the levels of impact in Pareto graph we can evidence that there are common attractions and motivational factors, however we can see different aspects in new programme period of CBC highlighted by Green Europe and Green Investment.

5 Conclusion

The European Cohesion Policy is a cornerstone of the EU's efforts to ensure balanced and sustainable development across its regions. By addressing economic, social, and territorial disparities, it aims to create a more integrated and harmonious European Union. For scientific studies, this policy provides a rich field of analysis concerning its strategies, implementation, and outcomes in fostering cohesion and development. This paper investigates the efficacy of cross-border cooperation programs in fostering regional development along the Hungarian-Slovak and

²⁶ Pawera at kol.: Regionálna politika a politika súdržnosti Európskej únie, 2013, Univerzita Komenského v Bratislave

Czech-Slovak border. By comparatively analysing the programs implemented in Slovakia, we aim to illuminate their impact and regional outcomes. A mixed-methods approach employing both qualitative and quantitative data analysis will be utilized to assess socio-economic dynamics in these border regions. This includes scrutinizing job creation, population shifts, and investment patterns. We posit that Hungary and Slovakia's cross-border territorial cooperation has significantly contributed to regional development and the mitigation of shared challenges. While these collaborative efforts have yielded positive results in economic growth and employment, they appear insufficient to reverse population decline. Therefore, strengthening cooperation mechanisms, prioritizing human capital investment, and fostering innovation are crucial for the two nations to co-create sustainable and inclusive development across their shared border regions.

The paper compares priority axes, programme indicator impacts as the measure of best practices in cross border area of Bratislava, in Czech and Hungarian border region and hypothesizes that the implemented project has impact on programme development, project development and priority axis. The main findings are correlations between the missing green elements of the projects in the old programme period with regard to the newly established 2020-2024 period, almost the same amount in the half time. It can be interesting to repeat the tool and finish the survey 2027 and see the linear or correlation distribution of the data. In general, we can declare, there is a missing and evited impact of environmental factors, which is now in changing period, due to the priority axis and typical *Green Deal and Green Europe* declaration of values and EU priorities. As this prognosis might continue, we can declare a larger project impact in Citizen contribution, Young and talented people joined and attracting strong territorial strategy, which is the alfa and omega of the EU Cohesion Policy.

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Primary Paper Section: A

Secondary Paper Section: AH, AE, AO, AP

CALCULATING THE PRICE OF COMMERCIAL REAL ESTATE IN THE CZECH REPUBLIC

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Abstract: Property prices have surged recently, mainly due to limited real estate supply amid high demand supported by a large monetary base. This has driven up rental prices, especially in major cities compared to their peripheries. This manuscript examines rental prices in Prague, Brno, Ostrava, Pilsen, and České Budějovice from March to October 2023. It uses distribution functions, correlation coefficients, contour heat maps, and parameterized regression to define a probability price interval for office properties, identify a positive correlation between area and rental prices, and develop an algorithm for setting appropriate rental prices. The findings are useful for practitioners, real estate agents, and government institutions, though they are closely linked to macroeconomic variables. Future potential options are discussed.

Keywords: Rents, office space, agglomeration, distribution function, heat maps, regression, CR

1 Introduction

Before the COVID-19 pandemic, rental prices grew in both the residential and commercial markets. However, after the 2020 pandemic, there was an increase in vacant commercial space and a reduction in rental prices, which indicates a decline in demand for commercial space. Conversely, the residential property market has seen the opposite trend with declining vacancy and rising rental prices (Vigiola et al., 2022). This effect is short-term and the office rent market will return to similar levels after one quarter (Wen et al., 2022). Commercial real estate, and office rental values in particular, have been studied for a long time because of their importance (von Ahlefeldt-Dehn et al., 2023). This makes office rental price forecasting very important in the real estate industry (Mohd et al., 2022).

Property valuation has a significant impact on market economics. However, it is often criticized for its lack of transparency, inaccuracy, and inefficiency (Su et al., 2021). Determining accurately the correct value in complex and increasingly more often high-rise urban environments poses a considerable challenge (El Yamani et al., 2023). The commercial real estate market is largely specific. Compared to demand, supply is quite inelastic and similar to the residential real estate market, commercial properties are location-specific (Hlavacek et al., 2016). Commercial space rent is influenced by various market factors. In addition to the size of the space, other actors play a role (Votava et al., 2021), including location, accessibility, amenities, demand for commercial space, property taxes, and maintenance costs.

According to Abidoye & Chan, (2018), and Kovac et al., (2023) inaccuracy in property valuation represents a worldwide problem. Guijarro (2021) argues that a sales comparison model should be able to minimize the variance of adjusted prices, not their coefficient of variation, as stated in some national and international regulations. Studies show that valuers still largely use traditional valuation methods (R. Abidoye et al., 2021). Nevertheless, determining the exact price of properties using traditional methods is difficult because psychological and behavioural factors play a major role in influencing valuers' judgments, thus affecting the validity, accuracy, and reliability of property values (Ali et al., 2020). It is thus necessary to develop accurate valuation methods for both movable and immovable properties, as traditional methods have often been associated with inaccuracies for decades. There have been many cases of residents dissatisfied with the valuation of their properties in connection with, e.g., compulsory evictions (Paradza et al., 2021).

Objective: The objective of the paper is to analyse the bivariate relationship between the area and the price of commercial real

estate in the major cities of the Czech Republic, specifically Prague, Brno, Ostrava, Pilsen, and České Budějovice. The uncertainty in the real estate market, which was very closely linked to the COVID-19 pandemic, has led the real estate market into a fluctuation phase, both in terms of residential and commercial real estate, with both positive and negative correlations in individual periods. Determining the statistical characteristics of the data and designing an algorithm to identify commercial property prices is still a problem to be solved. In this context, the following research questions are formulated:

RQ1: What were the usual rental prices per m² for office space in the selected cities?

Based on the data available, it is recommended to perform a statistical analysis of the observed variables. This provides the first insight into the development of critical variables in the context of real estate in the selected cities of the Czech Republic. Based on the results of this analysis, it is possible to determine the usual offer prices of commercial real estate.

RQ2: How can rental prices for office space be defined in the selected cities in the range of 1 – 100 m²?

For full coherence, this research question is conceived in terms of establishing an algorithm that would be able to determine an approximate unit price of commercial property in selected urban locations of the Czech Republic.

2 Literary research

According to (Zhou, 2020), the current standardization and legalization of commercial real estate valuation is insufficient and computer technology is increasingly less used. Traditional valuation methods, such as the market-based approach, cost approach method, or the income approach, which focus on market information, often prioritize the total value of the property and do not consider various constraints affecting the price. This hinders the scientific understanding of the factors and mechanisms influencing property prices, which leads to a lack of scientific background for decision-making by governments, developers, and property users.

In property valuation, the role of the expert or valuer is to determine a suitable approach and method in order to achieve the most accurate results possible (Gdakowicz & Putek-Szelag, 2020). As stated by Gruzauskas et al., (2020), there are three main approaches in property valuation, specifically cost, market-based, and income approach. When applying the market-based approach, the adjustment factors are determined on the basis of similar real estate transactions. In practice, the coefficients and similar real estate objects are usually determined using a qualitative (market-based) approach based on the experience of valuers. Determining the effect of individual attributes on the value or price of the property brings many problems (Gdakowicz & Putek-Szelag, 2020). Su et al. (2021) focus on the shortcomings in property valuation and suggest the use of artificial intelligence and valuation models to eliminate them. Combining BIM and machine learning, they found that BIM models can provide partly the necessary information, thus enabling more accurate and efficient property valuation.

In this context, the methodological guidelines specified in the valuation standards allow valuers considerable flexibility when using specific methods (Forys & Gaca, 2018). According to Baranska (2019), it is necessary to consider the effect of other properties' characteristics, which is one of the basic goals of market analysis performed as part of the process of estimating the value of property. The use of statistical mathematics in property valuation and the issue of the role of mathematics in property valuation are addressed by Kucharska-Stasiak (2023), who highlight the difference between quantitative and qualitative models and discuss the role that each can play in property

valuation. Hromada & Krulicky (2021) use descriptive and mathematical statistics to examine the dependencies between selected technical and socio-economic factors in the real estate market that affect the return on investment. However, Cetiner et al. (2020) point to the fact that real estate statistics data need to be pre-processed so that it is possible to identify outliers.

According to Baranska (2019), correlation analysis is a very useful tool for analysing property prices. Kishor (2020) presents a modelling framework for analysing the correlation between public and private commercial real estate market returns. The author uses a correlation model with a general trend and a Markov switching model of heteroskedasticity. The model d a low correlation at short horizons in low-volatility regimes. In their study, Abidoye et al. (2021) examine the barriers, drivers, and perspectives of accepting the valuation methods in practice using artificial intelligence. Ji & Bhandari (2022) highlight the correlation between prices and rents, with non-residential properties, especially office space in inner city areas, showing a leading role compared to other residential buildings in both prices and rents. Garang et al. (2021) analyse the spatial and temporal development of commercial land prices using the methods of multi-regression analysis and ordinary least squares (OLS) models, geographically weighted regressions, time-weighted regressions, and geographic and time-weighted regressions. The results suggest that land prices for financial and commercial use are different. Although various regression models have been developed for predicting property prices, selecting the most appropriate regression model is a challenging task because the performance of different regression models differs for different levels of accuracy (Kumar, 2023).

Wang & Hartzell (2022) examine the volatility of property prices in Hongkong in the period from February 1993 to February 2019. Using volatility clustering analysis in housing, offices, retail, and industrial objects, the authors use the autoregressive conditional heteroskedasticity-Lagrange method. The results obtained suggest that volatility clustering occurs in all property types. In the research by Seger & Pfner (2021), the real estate data of German companies were clustered using a two-stage cluster analysis according to the degree to which they are affected by structural changes. The resulting clusters were then tested for differences in their ownership strategy where it was found that the decline in real estate assets is particularly pronounced in the office segment.

3 Data and methods

Data representing factors influencing the prices of land, including location, degree of development, and distance from important city centres and green areas were collected by Janeczko et al. (2022) using the content analysis of property prices in the years 2011 - 2016 in Poland. Content analysis and fact-finding are used by Phatudi & Okoro (2023) for the analysis of collected secondary data with the aim of identifying factors that have caused a boom and bust of the real estate market.

To achieve the objective of the paper, in the first phase, content analysis will be applied to obtain the corresponding data background. In the second phase, probability Gaussian distribution, correlation, and regression models will be applied. Data and methods

Data for the analysis were obtained from the srealty.cz portal. Specifically, these are data from the segment of commercial space (offices) offered for rent. The range of the time series is from March 2023 to October 2023.

When searching for data, a filter was set out to find office space in the range from 1m² to 100 m². The area of the given office space [m²] and the rent amount [CZK/month], further expressed as a unit price, were entered in the database. In this way, a dataset was compiled for 5 regional cities of the Czech Republic, namely Prague, Brno, Ostrava, Pilsen, and České Budějovice. The data series were adjusted in order to remove outliers that would significantly distort the results, as stated by Cetiner et al.

(2020). Within this paper, rent is classified according to the microeconomic concept as “price”. The number of entries for each of the selected cities is as follows:

- Prague – 743,
- Brno – 297,
- Ostrava – 109,
- Pilsen – 47,
- České Budějovice – 56.

To answer the first research question, simple methods based on data distribution and the resulting probability distribution will be used. Using a system of absolute, or relative distribution, probabilistic unit prices of commercial real estate in the selected cities will be determined on the basis of historical data. The following notation will be used to mathematically express the normal (Gaussian) distribution:

The normal distribution is expressed as follows:

$$h(x)=1/(\sigma\sqrt{2\pi})e^{-(x-\mu)^2/(2\sigma^2)}, \quad (1)$$

where μ is arbitrary mean value, σ is arbitrary standard deviation.

The relationship between area and unit price is further analysed using classic (non-parametric) correlation relationships – Kendall’s tau and Spearman’s rho.

The answer to the second research question will be found using the regression model, which will be created for each of the selected cities. The following mathematical expression holds:

$$y=\beta_0+\beta_1x_{i1}+\dots+\beta_px_{ip}+\varepsilon_i, \quad (2)$$

Where y is a dependent variable, β_0 is a constant, $x_{i1} - x_{ip}$ are independent variables, $\beta_1 - \beta_p$ are coefficients of individual independent variables, n is the number of observations, and ε_i is white noise.

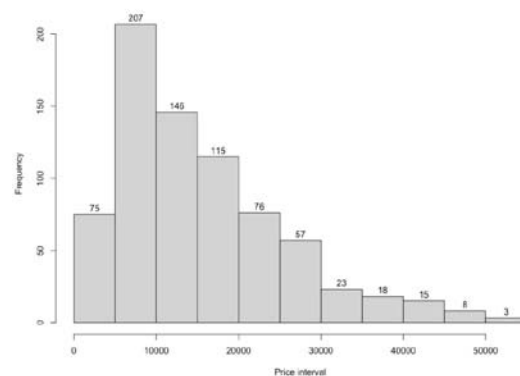
Regression models will be calibrated so that they capture the regression relationships as accurately as possible. This will be done using R Squared and the lowest value of the AIC (Akaike Information Criterion).

Any calculation and construction of models will be performed in the R statistical software.

4 Results

First, the dataset of office space in Prague will be analysed. The histogram of the unit price distribution is presented in Figure 1 (including absolute frequencies). Based on the application of basic descriptive statistics methods, it can be stated that the median value (13000) is lower than the mean value (15530). This indicates right-skewed data distribution, which is clearly seen in the Histogram (see Figure 1). This can be confirmed also based on the calculated skew value (1.12), i.e., $1.12 > 0$.

Figure 1: Histogram of office space unit prices in Prague

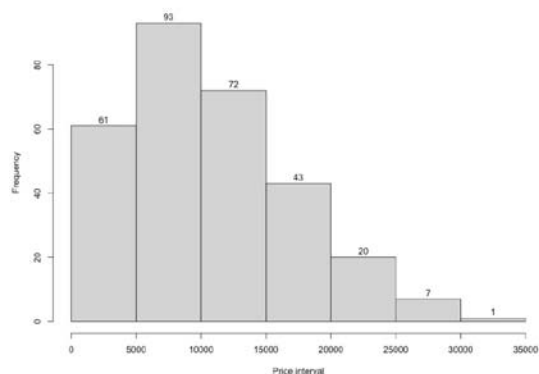


Kurtosis shows a value of 0.96, which is lower than the determined coefficient of 3. This suggests a lower skew and lower concentration of data around the mean value. Another characteristic of the platykurtic distribution is the absence of significant outliers.

The figure shows that most price (unit) distributions in the dataset are in the interval of 5000 - 10000 CZK×m². In absolute terms, this is 207 offices, which accounts for approx. 27.86 %. The second most significant distribution was in the price interval of 10000 – 15000 CZK×m², i.e., 146 offices in absolute terms and 19.65 % in relative terms. The third most significant distribution of the data series is in the price interval of 15000 - 20000 CZK×m². In absolute terms, the subset of this interval is the unit prices of 115 offices in Prague; in relative terms, it accounts for 15.47 %. The sum of these three dominant distributions is approx. 63 %. This is thus a majority representation and with this percentage accuracy, a price trend in the interval of <5000; 20000> CZK×m². can be stated on a demonstrative sample of the collected.

The above statistical methods will now be applied to the dataset of the rental prices of office space in Brno. The histogram can be seen in Figure 2 (including absolute frequencies). A priori view of the data distribution through descriptive statistics indicates that the median is lower than the mean value (9686 <10920); however, it is clear that the difference is small. The right-skewed distribution is confirmed by the calculated skew value of 0.83, which is lower than 1 and thus close to the normal distribution.

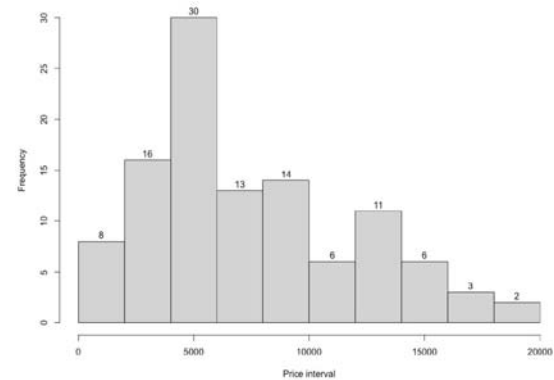
Figure 2: Histogram of office space unit prices in Brno



Kurtosis value is 0.43. The specification of kurtosis for Brno is thus very similar to Prague. The result indicates a very low peak close to the normal distribution. Distributions are not concentrated around the mean value and there are no outliers. outliers can be kurtosis. The visual representation of the distribution is thus confirmed empirically.

As in the case of Prague, most distributions are in the interval of 5000–10000 CZK×m². In absolute terms, it is 93 price entries, while in relative terms, it is 31.31 %. The second most frequent distribution is in the interval of 10000–15000 CZK×m², which is 72 unit prices in absolute terms and 24.24 % in relative terms. However, there is a difference in terms of the third most significant distribution, as 61 unit prices are in the interval of 0–5000 CZK×m²; in relative terms, it is 20.53 %. The sum of the three most significant distributions is approx. 74.1 %. The sum thus indicates a very high probability, with the price trend of office spaces in Brno in the interval of 0–15000 CZK×m².

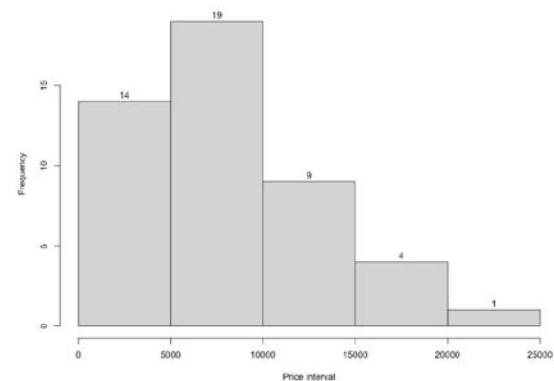
Figure 3: Histogram of office space unit prices in Ostrava



Statistical analysis of the unit prices of office space provides different results for the largest city of the Czech Republic, Ostrava (see Figure 3). The median value is lower than the mean value (6102 <7583), which corresponds to the trends for the above cities. The indicated right-skewed data distribution is confirmed by the calculated skew value of 0.71. The kurtosis shows a negative value of -0.52. This result indicates both the absence of outliers in the data distribution and the rejection of a single peak and very low concentration of the distributions around the mean. Thus, a difference is evident here compared to previous distributions.

There is also a difference in terms of the unit prices of office spaces in Ostrava. The most significant distribution of unit prices is in the interval of 4000–6000 CZK×m². In absolute terms, it is 30 unit prices, which is 27.52 % in relative terms. The second most significant distribution is in the interval of 2000–4000 CZK×m². In this interval, 16 unit prices are distributed, which is 14.67 % in relative terms. The third most significant distribution is in the interval of 8000–10000 CZK×m², with 14 unit prices and 12.84 % in relative terms. The price intervals are thus not connected. Therefore, in this context, it is possible to include the fourth most significant distribution, which contains 13 unit prices in the interval of 6000–8000 CZK×m² (which accounts for 11.92 % of the total distribution). The difference between the third and fourth the most significant distributions is one unit price only. The interval determined based on the four most significant distributions can be defined as 2000–10000 CZK×m². Approximately 67 % of distributions fall within this range. In probabilistic terms, this is a sufficient majority to explain the probability of 67 % of unit prices occurring in the price interval given by the range 2000–10000 CZK×m².

Figure 4: Histogram of office space unit prices in Pilsen

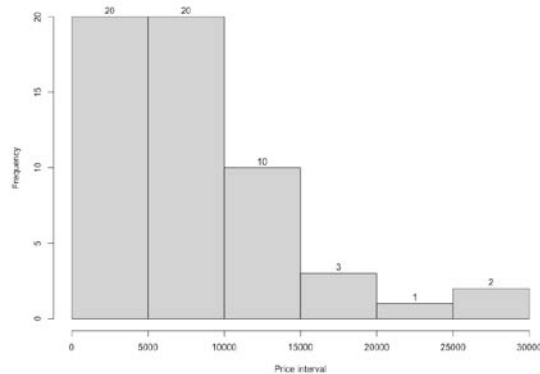


Next, the data distribution of office space unit prices is analysed for Pilsen (see Figure 4). Even in this case, the median is lower than the mean value (8000 <8619). The right-skewed distribution is confirmed by the calculated skew coefficient with a value of 1.027. The kurtosis value is 1.414, which indicates platykurtic

distribution, i.e., a flatter and wider peak. The data distribution is thus not concentrated around the mean value, and it is possible to exclude the existence of extreme values and outliers.

Based on the above, it can be stated that in absolute terms, most distributions fall in the price interval of 5000 - 10000 CZK×m² (19), in the interval of 0 - 5000 CZK×m², and the interval of 10000 - 15000 CZK×m². In relative terms, it accounts for 40.42 %, 29.78 %, and 19.14 %. In total, these three distributions account approximately for 89.8 % of the whole data distribution of the unit prices in the price interval of 0 - 15000 CZK×m².

Figure 5: Histogram of office space unit prices in České Budějovice

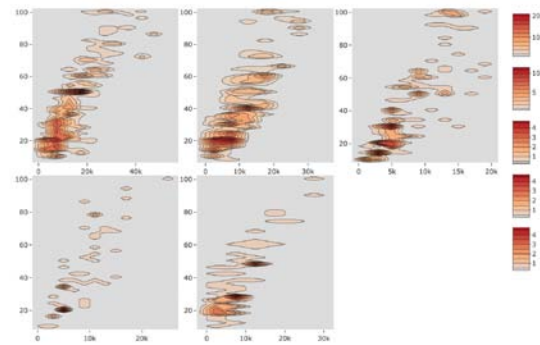


Finally, the dataset of office spaces in České Budějovice is analysed. The median is lower than the mean value (6.415 < 8.515), which suggests a right-skewed distribution. This is confirmed by the skew value of 1.426. The kurtosis shows a value of 2.089, which indicates a lower and wider peak. In this context, it suggests a platykurtic data distribution, without extreme values.

In the interval 0 - 10,000 CZK×m², there are two most significant data distributions. In absolute terms, it is 40 unit prices in total. The third most significant distribution is in the interval 10,000 - 15,000 CZK×m² - 10. In relative terms, the probabilities are 71.4 % and 17.8 %, i.e., 89.2 % of the whole data distribution of the unit prices.

The output of the data distribution analysis is the Count diagram in Figure 6. Based on the frequencies, the contour curves are plotted, forming a peak (i.e., a cluster) at higher concentrations. The warmer colours transitioning to black symbolize the highest concentrations and thus the most significant clusters. The course of the cluster distribution is very similar for all the selected cities, there is only a difference in the price interval and the number of unit prices per office space. As expected, based on the progression, it is possible to see a certain direct proportionality, as the clusters form a diagonal trend direction from the beginning of the graph.

Figure 6: Heat maps illustrating the relationship between the number of units and price intervals. Upper row – Prague, Brno, Ostrava. Lower row – Pilsen, České Budějovice

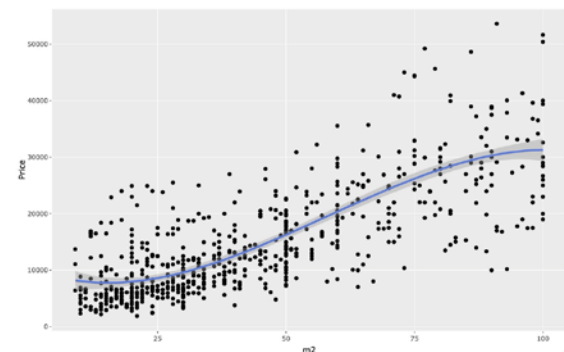


The application of non-parametric correlation tests (Kendall's tau and Spearman's rho) confirms the existence of direct and strong correlation relationships. Kendall's tau for Prague is 0.60, for Brno 0.64, Ostrava – 0.65, Pilsen – 0.67, and České Budějovice – 0.65. All tests are below the 5% significance level. The values of Spearman's rho are as follows: Prague – 0.78, Brno – 0.84, Ostrava – 0.84, Pilsen – 0.83, and České Budějovice – 0.82. In this case, all tests are also below the 5% significance level.

REGRESSION MODEL

At this point, it is possible to address the second research question, where the rental price of office spaces will be optimized in the area interval 0-100 m² in the selected cities of the Czech Republic (the relevant minimal area is 10 m²). The purpose is to find the most suitable regression model while considering the p-value, adjusted R-Squared, and AIC. Figure 7 describes the relationship between the given variables in Prague.

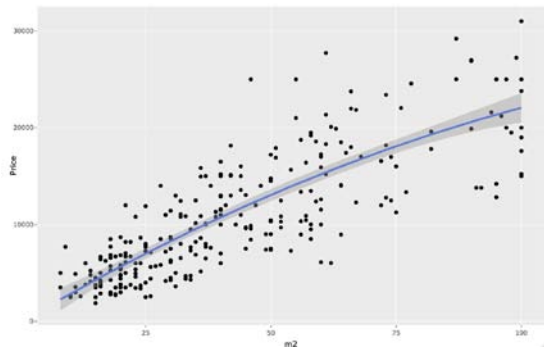
Figure 7: Regression between rental prices of office spaces and area (Prague)



It is a third-order polynomial regression. Equation 3 shows the functional setting of this regression. The p-value < 2.2e-16. Adjusted R-squared explains 61.15% of the statistical significance of the model, with AIC = 15136.83. The model rental price of office spaces with an area of 10 m² in Prague is approx. 8048 CZK.

Next, the relationship between the rental price and office space area in Brno will be determined (see Figure 8).

Figure 8: Regression between rental price of office spaces and area (Brno)

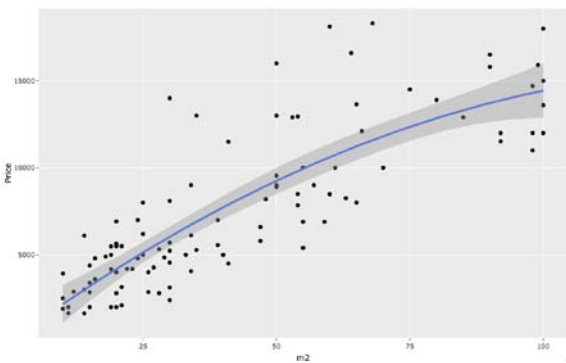


By optimizing the model, a second-order polynomial regression was selected (see Equation 4). As in the case of the p-value for Prague, the p-value for Brno is lower than $2.2e-16$. The relevance of the model in terms of R-squared is explained at approx. 67.39 %, with AIC value being 5719.38. The model rental price of office spaces in Brno with an area of 10 m^2 is approx. 2849 CZK.

$$BRNO_{rent} = 305.22x - 0.8336x^2 - 119.43 \quad (4)$$

The price regression model for office spaces in Ostrava can be seen in Figure 9.

Figure 9: Regression between rental price of office spaces and area (Ostrava)

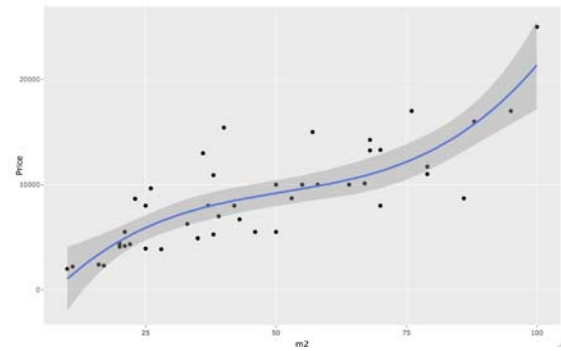


Even in this case, a second-order polynomial regression was selected as optimal (see Equation 5). The p-value of the regression model is lower than $2.2e-16$. The statistical relevance of the model is approx. 67.46 %; AIC shows the value of 2023.33. The model rental price of office spaces with an area of 10 m^2 in Ostrava is approx. 2172 CZK.

$$OSTRAVA_{rent} = 225.9389x - 0.8155x^2 - 6.0135 \quad (5)$$

At this point, office spaces in Pilsen will be analysed (see Figure 10).

Figure 10: Regression between rental prices of office spaces and area (Pilsen)

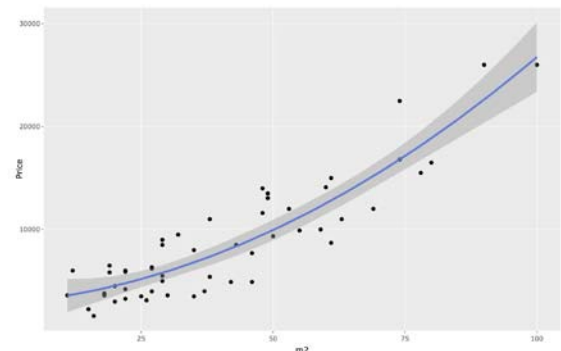


The functional prescription of the regression model is given by a third-order polynomial (see Equation 6). The p-value of the regression model is $6.688e-11$. The statistical significance of the model expressed by means of R Squared is 66.44 %, with AIC = 885.28. The model rental price of office spaces with an area of 10 m^2 in Pilsen is 1052 CZK.

$$Pilsen_{rent} = 630.8x - 10.73x^2 + 0.06987x^3 - 4253 \quad (6)$$

Finally, the regression model for České Budějovice will be analysed (see Figure 11). In the case of the sample of office spaces in České Budějovice, a second-order polynomial regression is optimal (see Equation 7).

Figure 11: Regression between rental prices of office spaces and area (České Budějovice)



The p-value of the regression model is lower than $2.2e-16$. Adjusted R-squared is 81.28 % and AIC = 1036.559. The model rental price of office spaces with an area of 10 m^2 in České Budějovice is approximately 3489 CZK.

$$CB_{rent} = 44.9777x + 1.9409x^2 + 2845.5386 \quad (7)$$

The above analyses of the regression models were performed to determine the approximate rental prices of office spaces (with an area ranging from 1 m^2 to 100 m^2) in the five selected cities of the Czech Republic.

5 Discussion of results

The objective of this manuscript was to determine rental prices of office spaces and define a tool to determine the relationship between the rental prices and area (in the range of 1 m^2 - 100 m^2) in five regional cities of the Czech Republic, namely Prague, Brno, Ostrava, Pilsen, and České Budějovice. To meet the objective of the paper, two research questions were formulated.

RQ1: What were the usual rental prices per m^2 for office space in the selected cities?

Data distribution as such is a valuable statistical instrument for potential Bayesian prediction of future states. Gdakowicz &

Putek-Szelag (2020) highlight the importance of appropriate parametrization of the models and processes in expert activities in order to achieve the most accurate outputs possible. In Prague, 63 % of the unit prices in the interval of 5000 to 20000 can be found to be distributed in the monitored period. In Brno, it was 74.1 % of the unit prices distributions in the interval of 0 to 15000 CZK. As for Ostrava, it was 67 % in the interval of 2000 to 10000 CZK, 89.8 % in the interval of 0 to 15000 CZK in Pilsen, and 89.2 % in the interval of 0 to 15000 CZK in České Budějovice. This indicates the dominant interval of distribution of office space unit prices, specifically 10 – 15000 CZK.

In line with Baranska (2019) and Wang & Hartzell (2022), the correlation analysis was performed to analyse the relationship between area and rental prices of office space, which was complemented by a cluster analysis. As expected, a direct relationship between these variables was confirmed.

RQ2: How can rental prices for office space be defined in the selected cities in the range of 1 – 100 m²?

For a more detailed definition of the relationship between area and rental prices, OLS regression model was used in accordance with Garang et al. (2021). Its application was supported by ex-ante analysis of statistical inverse indicators – correlation coefficients. Using calibrated regression models, regressions were performed between the variables, resulting in functional prescriptions with the potential of defining approximate rental prices of office spaces in Prague, Brno, Ostrava, Pilsen, and České Budějovice with an area of 1 - 100 m². In all cases, the regression curves can be described as increasing (and combining convex and concave shapes), as already indicated by the resulting values of the correlation coefficients. In the given interval, it is thus possible to define a relatively simple (when applying the principle of proportionality) instrument, which can serve as a guide for determining approximate offer prices.

A considerable limitation of the research is the primary dataset, which does not fully reflect the situational factors of the real estate market, such as the location of office spaces, etc. Generalization is distorting in this context. In smaller cities, such as Pilsen and České Budějovice, the dataset is not very extensive, which can also cause distortion. Estimated prices are based on historical data and the indexation of rental contracts by so-called inflation causes can also distort the results, especially in the context of the receding inflation shock caused by the COVID-19 pandemic and the ongoing war conflict in Ukraine. Another distorting and thus limiting factor is the use of offer prices, which in many cases do not correspond to execution prices.

The limitations identified imply further potential research direction. As already stated by Hromada & Krulicky (2021), attention should be paid to the socio-economic environment and macroenvironment in general. It is also possible to consider the location and the vicinity of the institutions and factors of social and natural character, as mentioned by Janeczko et al. (2022). Further research could also focus on other types of real estate and their interaction, as stated by Ji & Bhandari, (2022). In this context, it is possible to compare rents and prices across commercial and residential property. Finally, researchers could also look at the real estate market more comprehensively and include other cities to obtain more comprehensive results or even to make comparisons at the international level (especially in the sense of agglomeration associated with the capital city of Prague and other foreign metropolitan agglomerations).

The research results are beneficial to persons engaged in valuation and expert activities, as they provide valuable insights on the rental price distribution of office spaces in five major cities of the Czech Republic (in fact, metropolises of higher territorial self-government units, i.e., regions) with an area of up to 100 m².

6 Conclusion

The objective of the manuscript was to determine the price distribution of office space rental prices and identify a tool for

determining approximate offer prices of commercial space with an area of 1 - 100 m² in Prague, Brno, Ostrava, Pilsen, and České Budějovice.

Based on the research, it can be stated that most office spaces (in general) are distributed in the price interval of 0 - 15000 CZK. At the level of Prague, it was 5000 - 20000 CZK (63 % of the distributions), in Brno, it was 0 - 15000 CZK (74.1 % of the distributions), 2000 - 10000 CZK in Ostrava (67 % of the distributions), 0 - 15000 CZK (89.8 % of the distributions) in Pilsen, and 0 - 15000 CZK (89.2 % of the distributions) in České Budějovice. Furthermore, regression models were developed to define the usual rental prices of office spaces in the selected cities of the Czech Republic with an area of (1-100 m²) in the context of the datasets and appropriate calibration. The objective of the paper was thus fully met.

The research limitations are mainly in the dataset, which was not sufficient, especially for smaller cities, such as Pilsen and České Budějovice. The lack of data as well as the fact that the offer prices of rents are still influenced by the receding inflation shock associated with the COVID-19 pandemic and the complicated geopolitical situation in Ukraine can be misleading, as landlords often complement lease contracts with inflation clauses, which has an inertial effect on rental prices. Another limitation is also the use of offer prices instead of execution prices.

The limitations imply future research directions within which it is recommendable to address the issue in the context of macroeconomic variables and social services. Furthermore, it is possible to compare commercial and residential properties in the context of prices and rents. In terms of international demand, a comparison of key properties in metropolitan areas can be made. From a methodological point of view, it is recommendable to perform analysis by localities (i.e., not to use general data), as locality is a key factor determining the price.

The results are particularly useful for professions such as real estate market experts and valuers. When applied appropriately, the output has the potential to identify rental prices of office spaces in the selected towns at the level of more general price ranges and more specific price data on the basis of floor area of 1-100m².

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INCLUSIVE MUSIC EDUCATION: OPPORTUNITIES FOR CHILDREN WITH SPECIAL EDUCATIONAL NEEDS

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Abstract: This research explores the impact of musical activities on at-risk children with special educational needs. The study uses qualitative research methods. The findings point to the inclusive potential of music education, especially for children with special educational needs, and highlight the benefits of music education. The research addresses communication barriers in music education and the need for specialized training of teachers. By presenting the positive results of including children with special educational needs in music education, the paper advocates for an inclusive educational model that values creativity and encourages equal access to the arts, emphasizing the essential role of music in education and its universal accessibility.

Keywords: Music Education, Resocialization, Children's Home, Social Exclusion, Special Educational Needs, Inclusive Approach, Social Justice.

1 Introduction

Often perceived as an exceptional phenomenon, music tends to be associated with grand concert halls, prestigious exhibition spaces, renowned artists, and a discerning audience from the upper echelons of society. This conventional narrative suggests that music is exclusive to the educated elite. However, our society is a diverse tapestry, not solely comprised of the educated and affluent. This research diverges from the norm by focusing on the most vulnerable community members—children residing in residential childcare institutions. Here, amid seemingly austere surroundings, the Muses can make their presence felt.

This paper's main aim is to reveal the research results that closely follow the impact of musical activities on children in residential care settings. It challenges the conventional narrative of music's exclusivity by demonstrating that music is not restricted to certain social groups. The paper unfolds in two distinct sections. Initially, we delve into our theoretical underpinnings and research's methodological design. Our qualitative design is explained in detail and contextualized within the rich tapestry of resources that explore music activities in the realm of education for children with special educational needs. This groundwork provides the framework we researched, allowing for a nuanced understanding of its significance.

After establishing our theoretical foundation, we presented significant research findings. These findings shed light on the transformative impact of artistic activities on children in residential childcare homes, particularly in music education. The paper not only unveils these impactful results but also advocates for modifications in the approach to music education, drawing from the insights garnered during the research process.

In this paper, we explore the inclusive potential of music education. The recommendations from this study extend beyond the immediate context of the children's home under scrutiny. They hold promise for broader application in various institutional settings and would benefit a larger group of individuals at risk of social exclusion.

In essence, this research serves as a testament to the transformative power of music, breaking down conventional barriers and showcasing its capacity to reach even the most marginalized segments of our society. The implications of our findings extend far beyond the walls of residential childcare institutions, resonating with the broader discourse on inclusivity and social impact. Through this exploration, we seek to broaden the horizons of music, making it a force for positive change and enrichment for all, regardless of socio-economic standing or circumstance.

2 Theoretical Background

There is currently a growing interest in music education for children with special educational needs, as evidenced by the work of Merck and Johnson (2017), Bovsunivska (2022), and Xin et al. (2023). The issue of music activities, music education, and music itself in the context of special educational needs can only be seen as downright interdisciplinary. Thus, our research is anchored not only in the field of music education but also in the field of special education. We might miss critical contexts if focusing only on one disciplinary direction. At the same time, we are aware of the differences and specificities between the different grasps of the researched issue in the international context. Among the most frequently cited works are, in particular, the works of Adamek and Darrow (2018) and Merck and Johnson (2017); we must include Sobol (2008). However, significant differences in the grasp of the issue are found, for example, in the works of South American authors (Nazario, 2021). Among Slavic experts, let us mention Daněk (2023a), Kmentová (2019) or Kružiková (2020). It is essential to highlight that music activities are often understood as a music therapy field, which is the field of special pedagogy (Kantor et al. 2009; Pavlicevic 2014). The special pedagogical area of our interdisciplinary research is anchored by the works of Stárek (2023) and Lechta (2016). During our study, we have tried to grasp the multidisciplinary grasp of the issue, taking into account the specifics of all disciplines that touch upon the issue of music education for children with special educational needs.

3 Research Methods

In pursuing our research objectives, we adhere to a qualitative design that undergoes a continuous and critical review process, aiming to strike the optimal balance among various research tools and methods. Our existing research design unfolds in a two-stage approach, commencing with a foundational information-gathering phase. This initial stage incorporates diverse methods, including interviews, observations, and an in-depth analysis of case studies. The wealth of information garnered through these methodologies is then subjected to the analytical lenses of grounded theory methods and interpretative phenomenological analysis. Case studies play an essential role in our research. Case studies are necessary for qualitative research (Hyett et al. 2014; Eisenhardt and Graebner 2007). For this paper, we obtained a unique case report of a child involved in researched music activities. The information for this case report is very detailed and provides a deep insight into the complex situation of the child.

Grounded theory and interpretative phenomenological analysis stand out as fitting research methods, as they eschew the confirmation of hypotheses to uncover new facts (Charmas 2006; Denzin and Lincoln 2018). The qualitative nature of our research empowers us to approach our chosen topic creatively, facilitating the capture of subjective views from the subjects under investigation. The transformative journey from subjective experiences, perspectives, and opinions to scientifically grounded knowledge is a hallmark of qualitative design (Given 2008; Leavy 2014). However, we acknowledge the importance of adhering to clear methodological rules in conducting qualitative research, employing triangulation methods and various methodological tools to enrich the processing of the research problem (Flick 2009).

While recognizing the inherent limitation of not generalizing the results, we emphasize that our qualitative research design holds the potential to significantly contribute to the current inclusive paradigm (Willig 2017). Our commitment extends beyond the confines of traditional disciplinary boundaries, reflected in our interdisciplinary research that spans music education and special education.

Striving for a comprehensive theoretical foundation, we remain aware of the limitations inherent in our knowledge scope. Despite these constraints, our commitment lies in meticulously applying rigorous methodologies, ensuring the reliability and validity of our research findings. In the ever-evolving landscape of music education and special education, we advocate for a dynamic and adaptive approach, continuously refining our qualitative design to meet the challenges presented by emerging trends and evolving needs. Through our interdisciplinary efforts, we aim to advance knowledge within the specific music and special education domains and contribute meaningfully to the broader discourse on inclusive paradigms and innovative research methodologies. By doing so, we aim to foster a deeper understanding of the transformative potential inherent in the intersection of arts, education, and inclusivity.

4 Researched Environment

Our exploration takes us into the intricate environment of a residential childcare setting, specifically a children's home in Prague, Czech Republic. The poignant circumstances leading to a child's placement in such a home often arise from the family's inability to provide a safe and stimulating environment, compelling the intervention of the court. For the children and young adults placed in these homes, the experience is synonymous with separation from their loved ones. This profound loss not only triggers a sense of resignation but can also result in a notable loss of motivation (Kaasinen et al. 2022; Daněk 2023b).

Moreover, the unstimulating and pathological conditions prevalent in their original families contribute to challenges in the realm of social competence. The impact of institutional care is far-reaching, influencing individuals for the remainder of their lives (Gabriel et al. 2021). As society undergoes transformative changes, so do the children within these homes (Daněk et al. 2023). The evolving landscape prompts us to closely monitor the shifting needs of these children, who increasingly grapple with psychiatric problems and profound psychological deprivation. Addressing these challenges necessitates an inclusive and multicultural educational approach (Deppler et al. 2015; Acuff 2018; Daněk and Klugerova 2023).

Our research zeroes in on this dynamic environment, seeking to understand musical activities' influence on children's educational and social competencies. Initially, our focus centres on a string orchestra, methodologically grounded in the globally acclaimed social music program, El Sistema. Renowned for its transformative impact, El Sistema is perceived by many experts as a catalyst for social change through musical experience (Puromies and Juvonen 2020). Despite the Czech Republic's solid cultural traditionalism, particularly in music, our study demonstrates that the El Sistema program holds the potential to thrive in the artistic milieu that produced musical luminaries like Antonin Dvorak and Leos Janacek.

Subsequently, our investigation delves into a music ensemble curated by the children's home itself, providing an intimate look into localized musical initiatives tailored to the unique needs and context of the residents. By exploring the impact of globally recognized programs and locally crafted musical activity, our research aims to unearth insights into how musical activities can catalyze positive change in the educational and social spheres of children facing the challenges of residential care. In doing so, we aspire to contribute to the academic discourse and the practical implementation of inclusive and culturally relevant educational strategies for vulnerable children in residential settings.

A total of 23 children from the children's home participated in our research. The vast majority of them had been diagnosed with special educational needs. Dyslexia and dysgraphia predominated, and in three cases, we had confirmed ADHD. This group of children was very exceptional as it included one girl with ADHD, although ADHD is not often found in girls. In two cases, we worked with severe behavioural disorders. All participants were psychologically deprived. We noted instances

of sexual abuse, domestic violence, and neglect in the educational records. Not surprisingly, many of the children in the target group were under the care of a psychiatrist or psychologist. The children in our research did not have good school results, had low aspirational levels, and had minimal social skills. This unusual group of children was involved in our music projects. In the case of the orchestra project based on the El Sistema program, the children played string instruments; in the case of the musical ensemble organized by the children's home, the main musical activities were singing and playing keyboard and flute. The children had no previous musical experience. How did their contact with music affect them? As an example, we present the following case study.

5 Case study

The boy comes to the children's home from a broken, incomplete family at age 14. His mother was his foremost caregiver. The mother was unable to provide the boy with the necessary educational boundaries. The boy began to have difficulty attending school and gradually began to exhibit negative patterns of risky behaviour. Truancy appeared, and grades deteriorated rapidly. The court ordered residential care. The boy came to the children's home with a terrible reputation. The available documentation portrayed the boy as an aggressive, antisocial who refused to tolerate social norms. The boy was assigned to a family group with predominantly male caregivers. This decision proved to be a very fortunate one. Colleagues were able to offer the boy dominant male role models. Although we expected significant disciplinary difficulties given his diagnosis, the boy behaved well in his family group in the children's home. However, problems arose in primary school. The boy was a student in his last year of primary school. From the first days of schooling, he had issues with the teachers. He refused to accept female authority. He presented himself as a dominant personality who would not submit to a person of the opposite sex. The boy had inferior grades and very problematic behaviour. Colleagues tried to motivate the boy to change his behaviour. The problem was that girls of the boy's age found his dismissive behaviour towards women beautiful. The young man put himself as a rebel for whom no rules applied. Although we were warned, we offered the boy the opportunity to join the orchestra.

The boy chose the violin as his instrument. He had never played the violin. However, during our conversations, he mentioned his grandfather, who dealt with musical instruments several times. Indeed, the boy was well-versed in the terminology of the instrument. Compared to others, he knew what the terms fingerboard, string, and tuners meant. He needed to gain experience with art music. However, music has been the boy's main hobby since he arrived at the children's home. He devoted himself to modern dance music. At first, only in a passive form, he listened to contemporary popular artists and collected a discography. Subsequently, he began to work as a DJ at various events at the children's home. Although the boy had no musical background, he could compose short pieces in various modern dance music styles. He invested all his financial resources in computer equipment, speakers, and mixing consoles. In his own words, the time spent composing helped him calm down. He was a concertmaster in the orchestra. Mastering the required level of violin playing was smooth for the boy. His teachers often pointed out his natural violin posture. He had the proper grip with his left hand. Surprisingly, even the bowing was correct. He mastered the required pieces very quickly. The instructors said the young man was a talent. In addition to his musical talent, the young man was physically available. His palms were quite square. The fingers were not long; they were considerably rich in muscle mass. The fingers were capped with flared tips, and the nails sunk well below the edge of the finger. The little fingers were very developed, ending at the level of the middle of the last link of the ring finger. The teachers judged the boy's hand ideal for playing the violin. During orchestra rehearsals, he gave a satisfied impression. He responded very calmly to the authority of the teachers. The boy quickly established solid and friendly relationships with the orchestra teachers. His good behaviour in the orchestra amazed all the primary school teachers who knew

about the boy's educational problems. The boy even physically threatened the teacher several times during lessons. Similar incidents never occurred in the orchestra.

Although in the case of the boy diagnosed with behavioural disorders, we did not expect a successful involvement in the project, the results were surprisingly positive. The boy was actively integrated into the orchestra. He very quickly mastered the required level of playing the instrument. He particularly benefited from public performances. He has calmed down a lot; he has modified his behaviour. In his own words, the most significant benefit of the orchestra was the environment where he could present himself in a positive light. However, he saw the problem as the need to rehearse regularly. He left at his request, but he always remembers his orchestra membership. He continues to play music. In interviews, he stated that his orchestra membership motivated him to further his musical development. He was very popular among the lecturers. He also exercised his natural authority as concertmaster. He looked forward to rehearsals. His participation in the orchestra raised a wave of interest in the program among the teaching staff at the elementary school. The teachers knew the boy as a troubled student. During interviews, teachers often pointed out that they failed to understand that he was a calm and composed student in an orchestra setting. After leaving the orchestra, the boy maintained contact with teachers and members. Currently, the young man is in a difficult life situation. According to our information, there is a possibility of incarceration for drug offences.

6 Course of Research and Important Finding

Our primary research thrust revolves around several pivotal questions, each aimed at unravelling the intricate relationship between children in residential care and their engagement with musical activities. First and foremost, we inquire into the ability of children residing in children's homes to actively and meaningfully participate in musical pursuits. This research question involves probing how these children, often grappling with challenging circumstances, can effectively navigate and immerse themselves in the world of music. Understanding their capacity for participation serves as a foundational step in tailoring musical interventions to their unique needs and circumstances.

A subsequent focal point of our inquiry revolves around the comparative impact of musical activities on children from residential care settings versus their counterparts in the general population. This line of questioning seeks to discern whether musical interventions, when presented in a standard manner, yield similar outcomes for children in the specific context of a children's home as they do for those in more conventional family settings. Unravelling these nuances is crucial for comprehending standardized musical programs' effectiveness and identifying the need for tailored approaches, considering the distinct challenges and dynamics prevalent in residential care.

An integral facet of our investigation pivots around formulating optimal methodologies for presenting musical activities to children with special educational needs. Recognizing the diverse and often complex needs of children in residential care, especially those with special educational requirements, we aim to pinpoint the most effective and inclusive ways to introduce and engage them in musical endeavours. This question involves a nuanced exploration of pedagogical strategies, adaptive approaches, and the incorporation of inclusive elements that resonate with the unique profiles of these children.

In essence, our research sheds light on the potential barriers and facilitators influencing the musical engagement of children in residential care. By addressing these key research areas, we aim to contribute valuable insights that enrich our understanding of the intersection between music and the well-being of children in such settings and inform the development of tailored interventions that can positively impact their educational and social experiences. Through this holistic approach, we aspire to

pave the way for more inclusive and effective musical programming for children in residential care, fostering a sense of empowerment and joy in their lives.

Our research attempts have yielded many intriguing findings, shedding light on the remarkable artistic potential residing within children and young adults in the unique context of a children's home. Their demonstrated capability for high-quality artistic performances is a testament to their creative expression's richness and the untapped reservoir of talent within them. However, a poignant revelation emerged, signalling the imperative to tailor music education for children with special needs. The rationale behind this adaptation stems from a commitment to ensuring that no child, regardless of their educational challenges, is denied access to the invaluable benefits of music education (Wright 2019).

Music, as a powerful medium, provides a means for adequate compensation in areas impacted by special educational needs. Moreover, the transformative potential of modern technology in music education cannot be overstated. Tablets now grace the shelves of musicians, replacing traditional stacks of music sheets. The availability of sheet music and musical records has become seamless, ushering in new possibilities and democratizing access to musical resources (Vancova and Osvaldova 2020).

Our research underscores that most children with special educational needs can be included in musical activities. This revelation challenges preconceived notions, prompting reflection on the potential of music education as a bridge for children facing challenges such as ADHD or dyslexia. While acknowledging that inclusion demands significant efforts, we must pose the crucial question: what needs to be done to facilitate this inclusive musical journey?

Enriching music education with innovative elements stands out as a paramount solution (Powel et al. 2020). Music educators who guide these children through their educational challenges must have the necessary skills and knowledge. This entails comprehensive preparation to work effectively with children who find solace and support through music education.

The role of music educators extends beyond individual preparation; it calls for an emphasis on special education needs and the cultivation of functional interdisciplinary collaboration (Adamek and Darrow 2018). This collaborative approach not only enhances the quality of education but also fosters a supportive environment where the unique needs of each child are met. Moreover, the responsibility for promoting inclusivity in music education extends beyond the educators to encompass society. A broader societal shift towards embracing diversity is crucial, challenging the prevailing norms that might not currently favour differences.

Our firm conviction is that music education is irreplaceable in every child's educational journey. In the fast-paced landscape of contemporary times, music education emerges as a beacon guiding us toward the much-desired ideal of inclusive education. It is a conduit through which diverse learners can find common ground, fostering an inclusive educational environment that nurtures and celebrates differences.

Like all art forms, music transcends the realm of mere artistic performance; it is, above all, a social phenomenon (Small 1998). Art and music are intricately linked to social status (Murray 2012). The families of the children under study often come from backgrounds characterized by a lower cultural status. The recurring theme of communication barriers underscores the challenges these children face in expressing themselves within the confines of a restricted code prevalent in their home environments (Bernstein 2003; Jones 2013). Artistic communication in a perfect linguistic code adds another layer of complexity to successful communication.

Furthermore, children from indigenous families may not bring with them the intrinsic motivation crucial for success in the arts (Stanko-Kacmarek 2012). This fact presents an additional challenge for music educators, necessitating the cultivation of solid skills to activate motivation in children facing significant hurdles.

Our research paints a vivid picture of the transformative potential of music education for children with special educational needs in residential care. It calls for a comprehensive approach encompassing adaptation, innovation, interdisciplinary collaboration, and societal change. As we envision a future where inclusive education is the norm, music education emerges as a powerful catalyst, breaking down barriers and fostering an environment where every child can thrive, regardless of their unique challenges and backgrounds.

A profound inquiry surfaces as we delve into the heart of our research findings: why does music education sometimes find itself excluded from the comprehensive embrace of an inclusive approach? Is it deemed less significant than other subjects, perhaps relegated to secondary status compared to mathematics or sciences? These questions have gained prominence, particularly in the context of our music projects, where the public often raises eyebrows at the sight of children from residential care homes holding violins. Music educators have occasionally posed a challenge, asserting that children with special educational needs are ill-equipped to participate fully in standard lessons.

However, our research vehemently challenges these assumptions. We have consistently demonstrated that the capacity to engage in musical activities is an intrinsic capability shared by most individuals. We firmly assert that not every participant in the educational process needs to possess absolute hearing or sing with a crystal-clear soprano. The diversity of talents and abilities should not be stifled by limitations imposed by those who might be less musically gifted. Special educational needs should never be an excuse to replace genuine practice, and affirmative action, in particular music education, is an impractical notion. The essence of inclusion lies in celebrating differences and resisting the temptation to flatten the rich tapestry of educational realities into a homogenous shade of mediocrity.

Throughout our research journey, we have grappled with the ambiguity surrounding the inclusive understanding of music education and related activities. Conversations with music educators surfaced a prevailing disillusionment with the current state of inclusive education. A significant factor contributing to this disillusionment is the vague perception of inclusion as a phenomenon that demands excessive attention to children with special educational needs, potentially hindering the learning pace for typically developing students and inadvertently neglecting the needs of exceptionally gifted children. The lack of familiarity with the intricacies of inclusion within a segment of the educational community further exacerbates these challenges.

The crux of our argument underscores the absolute necessity for teacher preparedness in working with children with special educational needs (Lee et al. 2015). This preparedness extends beyond the mainstream classroom to encompass a broader understanding of the very concept of inclusion. The Salamanca Conference of 1994 served as a pivotal moment for inclusive education, marking the declaration that every child has a fundamental right to education and must have the opportunity to achieve and maintain an acceptable level of education (UNESCO 1994). However, achieving proper inclusive education remains daunting despite this significant milestone.

Inclusive education, we posit, is not merely an educational goal but a societal aspiration—an ideal reflecting a tolerant society where everyone collaborates in an environment saturated with respect and humanity. The collaborative partnership between schools and families is a linchpin for the success of inclusive education. It is misguided to assume that even the most

exemplary inclusive school can navigate the challenges posed by the inclusive paradigm without the support of families. This collaborative spirit must extend beyond families to include school founders and legislators, forming a united front with the necessary tools and weapons for the arduous campaign for inclusion. Despite progress since the Salamanca conference, a lingering reluctance to fully embrace inclusive ideas in society persists (Pivik et al. 2002). This reluctance underscores the formidable obstacles in the path of promoting inclusive education. As we navigate this challenging terrain, our research stands as a clarion call for a renewed commitment to inclusive education, recognizing its potential to create a harmonious and respectful society where every child's right to education is acknowledged and upheld.

7 Conclusion

Research findings have unequivocally revealed a widespread musical aptitude among most children from the children's home. This musical potential holds significant promise for the studied group, particularly for individuals with special educational needs who often harbour substantial creative capabilities (Kapoula 2016). The inherent creativity and artistic abilities within this demographic can serve as compensatory and growth-promoting factors, as underscored by the work of Healey and Rucklidge (2008). Activating the creative competencies of our target group emerges as a pedagogical imperative with the potential to significantly facilitate their inclusion into mainstream society.

Communication and creative skills are highly esteemed and intricately linked to artistic activities in the contemporary landscape. By recognizing this, our pedagogical duty becomes clear—cultivating educational environments that eliminate potential discriminatory factors (Mernick 2021). As educators, we must foster an inclusive reality where every individual, regardless of background or abilities, can access the transformative power of artistic expression.

A growing realization permeates our understanding—an inclusive approach to education not only upholds quality but actively dismantles barriers that may hinder the participation of diverse learners. While acknowledging that identical outcomes might not be universally attainable, we steadfastly advocate for the insistence on equal opportunities for all. The right to access education is a fundamental entitlement, yet it must not be wielded to restrict or hinder other participants in the educational process. Thus, our commitment extends beyond merely securing access to education; it embraces the broader goal of democratizing the arts.

In our conviction, music possesses an extraordinary ability to positively influence all facets of our lives. This belief underscores our firm conviction that music activities hold an irreplaceable place in modern education—they must be accessible but also open, welcoming, and developmental. The democratization of music education is pivotal; it is not confined to the realm of elites but must transcend social strata. As a phenomenon, music should belong to the masses, not the exclusive domain of a privileged few.

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VICTIMISATION OF TEACHERS AS A FACTOR THREATENING THEIR WELLBEING (WITH SPECIAL REFERENCE TO THE SLOVAK AND CZECH REPUBLICS)

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This article is a partial output of the project KEGA 012KU-4/2022 Safety of School Environment – New Challenge for the Development of Selected competences of Primary and Secondary School Teachers

Abstract: The study focuses on the issue of aggressive behaviour of pupils towards teachers in Slovakia and the Czech Republic. Its occurrence is confirmed by the results of objective research. Aggressive behaviour of pupils towards teachers is a serious educational problem. Such behaviour seriously undermines the well-being of teachers. The satisfaction and wellbeing of teachers and other school staff is not only important for their mental health, but also for the wellbeing of their pupils.

Key words: the teaching profession, aggression, aggressive behaviour of pupils towards teachers, wellbeing of teachers

1 Introduction

The work of teachers, as well as other pedagogical and professional employees in schools, is psychologically very demanding. The teaching profession is accompanied by a higher level of work stress: problem and risk behaviour of pupils, the need to maintain discipline in the classroom, constant control and criticism from parents. A serious fact at present is the incidence of aggressive behaviour towards teachers and other school employees by pupils and their parents.

The most common sources of stress are: demands on the psyche, high responsibility, low social evaluation and prestige and the related lack of appreciation of teachers' work, inadequate working conditions, frequent changes in educational projects and school organization, monitoring by the inspector or school management, teaching in classes with very different levels and large numbers of pupils, time pressure, problems in teachers' interpersonal relationships, pupils with poor attitudes to work and disruptive pupils (Holeček, Jiřincová, Miňhová, 2001; Nešpor, 2019). Other researches (Štětkovská, Skalníková, 2004) also confirm that the most common stressors for teachers include poor working conditions, lack of appreciation of their work, conflicts with colleagues and parents, and problem behaviour of pupils. Baranovská and Petlák (2022) list stressors that can negatively affect the performance of the teaching profession, such as problem behaviour of pupils (passivity, aggressiveness, noise in the classroom, provocativeness, conflicts, disturbance, low motivation of pupils), cyberbullying (through communication technologies, mobile phones, the Internet). Parents of pupils can also act as a stress factor for teachers (parental ideas about education and upbringing, non-acceptance of school and teacher recommendations, interest in influencing the teacher's evaluation, or not showing any interest in the child), changes in the content of the curriculum, other stress factors (school management, work team, low or inadequate salary, and other circumstances).

The high demands and requirements of the teaching profession are also reflected in interpersonal relationships in the workplace. Conflicts are a natural part of our lives, they also occur in the work environment and therefore also in school. Conflicts are present even among teaching and professional employees in schools. Conflicts, especially in the workplace, can have positive aspects, e.g. attitudes can be clarified, engagement can be increased and even performance can be enhanced. If conflicts are resolved, they can bring about constructive change. However, if they are not addressed, they can escalate into more serious problems in the workplace such as mobbing, bossing and staffing.

Mayer (2017) draws attention to the fact that if we want to talk about improving the quality of the teaching profession, we

assume the continuous professional growth of teachers, through continuous and lifelong learning. The improvement of teachers' professional performance will also be reflected in the quality of the educational process, which is purposeful and should be active, constructive and ultimately effective. In order to reach the desired level, pressure is permanently exerted on professional development and, therefore, on the gradation of teachers' competences.

Disproportionate pressure can result in a negative mental state leading to escalating stress and burnout syndrome. Burnout syndrome is a process, it is the result of an imbalance between expectations, ideals and reality. The development of the burnout syndrome is preceded by certain phases: enthusiasm (one has great ideals, is enthusiastically engaged), stagnation (great ideals cannot be implemented), frustration (work is a great disappointment for a person, he/she perceives it negatively), apathy (the worker does only the most necessary tasks, avoids conversations and activities) and self-burnout (the stage of complete exhaustion). Burnout syndrome usually occurs in three stages (Morovicsová, 2016; Žitniaková Gurgová, Behúňová, 2017): The first stage is characterized by time pressure and performing work tasks under stress. Deficiencies in the performance of job duties appear, which the worker may carry over into the private sphere. Not being able to rest adequately, the worker gives up free time and relaxation. The second stage is characterised by persistent physical and psychological strain. A compulsive need to resolve the situation comes to the fore, but the effort results in distractibility, reduced concentration, and failure to complete work tasks. In the third stage, there is a loss of interest in work; the ability to enjoy positive events at work and in private life is lacking. Fatigue, exhaustion and disappointment are typical.

Wellbeing is understood as a state of subjective welfare where one can fully develop physical, emotional, social and spiritual areas and live a full and satisfying life. Physical wellbeing is mainly related to physical health and safety, emotional wellbeing is reflected in a positive self-perception and trust in others, social wellbeing is related to empathy, maintaining relationships, ability to cooperate and communicate effectively, and spiritual wellbeing is related to values and ethical principles.

Šolcová and Kebza (2004) point out that it has become common to associate wellbeing mainly with the dimension of mental wellbeing, which, however, does not exhaust the concept. More precise is personal wellbeing, where mental, physical and social dimensions are implicitly based.

According to Hanesová (2022), wellbeing as the search for happiness and goodness in human life is a concept as old as humanity (or education) itself. Nowadays, wellbeing conveys comfort, happiness, or welfare.

Wellbeing is influenced by various factors such as health status, socio-economic status, social support, etc., as well as work stress.

The situation in the Slovak Republic with regard to teachers' well-being is illustrated by the results of a questionnaire survey conducted by the State School Inspectorate (Ružeková et al., 2022). The questions in the questionnaire focused on four areas, namely overall job satisfaction, negative impact on physical and mental health, job stress and strain, and professional self-confidence. Overall satisfaction with their own profession, with the school in which they work and with the evaluation of their work by senior teaching staff was expressed by 70% of all teachers. 16% of the teachers considered changing career or changing school, with no differences between school types. The negative impact of work on mental or physical health was felt by up to 27% of the teachers, with no difference between school types. The proportion of the teachers who felt a negative impact

of work on both physical and mental health was 13%. Some form of stress, strain or pressure while carrying out their teaching activities was expressed by 78% of the teachers.

The situation in the Czech Republic is approximated by Herynková (2022), according to research, 60% of the teachers experience excessive stress, 25% of teachers have reduced resilience to stress, and 80% of teachers experience high workload. In the Slovak Republic, it is Lovašová and Vasilová (2017) who point to stress and burnout in teachers.

The issue of meaningfully addressing the safety of the school environment is now a matter of great urgency. A safe school environment influences pupil satisfaction, which translates positively into learning outcomes. Aggressive pupil behaviour and bullying seriously undermine the safety of the school environment and the wellbeing of pupils, as well as the teaching and professional employees of schools.

2 Material and methods

In this study we present the results of research on aggressive behaviour towards teachers in Slovakia and the Czech Republic since 2003. The results of the research have been published in the Slovak, Czech or English language in both database journals and journals not included in any of the databases. We did not take into account researches within the qualifying theses, only researches published in scientific journals.

3 Results and Discussion

Problem behaviour among primary and secondary school pupils is widespread and varied in terms of severity, intensity and frequency of occurrence, which is reflected in the daily work of primary and secondary school teachers. This fact is confirmed by the results of objective researches (Čerešník, Tomšík, Čerešníková, 2017; Hollá, Kurincová, 2013; Niklová, Dulovics, Stehlíková, 2022). Several authors (Kopecký, Sztokowski, 2016; Lokmic, Opic, Biic, 2013) point to the aggressive behaviour of pupils towards teachers.

Within the selected time period, i.e. since 2003, several researches on aggressive behaviour of pupils towards teachers have been carried out in Slovakia and the Czech Republic. We present research from both countries, as we have similar and comparable school systems, a common history, and a similar socio-cultural tradition. This situation makes it possible to carry out joint researches of workplaces from Slovakia and the Czech Republic and to compare the results (Čerešník, 2019).

The research reflects the various forms of violence perpetrated by pupils, as well as their parents and guardians, against teachers. In recent years, researchers have also focused their attention on cyber-attacks where the victim is a teacher.

- Research was conducted among secondary school teachers in 2004 by Džuka and Jenčová (2005). They considered a teacher to be a victim of violence if he/she had been subjected to one of the violent acts at least once during the last 30 days. The most frequent were verbal negative expressions - unpleasant statements, taunts and insults which was reported by 129 respondents (35.4%). Being forced to do something against one's will was reported by 61 respondents (16.8%) and social manipulation by 60 teachers (16.5%). Taking things was the case for 45 (12.4%) and direct physical assault or threatening for 18 respondents (4.9%).
- In the second study by Džuka and Dalbert (2007), 108 vocational high school teachers participated in the research, of which 60 (55%) teachers reported experiencing violence from pupils in the past 15 days.
- In the 2007/2008 school year, research was conducted with secondary school teachers in the Czech Republic by Tomášek (2008). He found out that up to 43.4% of the respondents had experienced at least one form of aggressive behaviour towards themselves in their career,

which is almost half of the surveyed secondary school teachers. Of the specific forms, rude verbal insults or name-calling by students during class, followed by rude verbal insults by a parent or other relative, and threatening by a parent or other relative with abusive acquaintances were the dominant forms of bullying.

- Bendl (2010) also paid attention to the issue of teacher bullying and pointed to the results of the research of the Association of Primary School Teachers, where 27% of primary school teachers have encountered vulgarity towards teachers and 2.76% have even experienced bullying of teachers by pupils. Among the second grade of primary school teachers, 51.92% of the respondents reported acts of vulgarity towards teachers and 10.84% reported bullying of teachers by pupils.
- Kariková (2010) presents the results of a research conducted in 2010. The respondents were kindergarten, primary and secondary school teachers. The results clearly indicate significant changes related to the increase of negative aspects in the teaching profession: the increase of problem behaviour of pupils at all types and levels of schools, as well as communication with parents.
- The results of the research (Emmerová, 2014), which was carried out in the school year 2010/2011 using the questionnaire method in the Central Slovak region on a sample of 351 primary and secondary school teachers, confirmed the occurrence of aggressive behaviour of pupils and their parents towards teachers. 237 teachers or 67.52% encountered aggressive behaviour towards themselves. The most widespread form was insults of teachers by pupils during lessons, the second most widespread form was threats by pupils, followed by insults of parents or other relatives. Only 32.48% of primary and secondary school teachers had not encountered any form of aggressive behaviour towards themselves during their practice, which is not even one third of the respondents.
- From the research conducted in the Czech Republic in the conditions of the second grade of primary schools in 2010-2013 (Csémy et al., 2014), 52% of teachers stated that they had not encountered rude verbal aggression of pupils against their own person in the last year, 28.8% had encountered it 1 to 2 times a year, 19.2% of respondents confirmed a more frequent occurrence. Being the object of physical aggression by pupils in the last year was reported by 4.4% of teachers, 1.4% of them repeatedly.
- Niklová and Šajgalová (2016) conducted a research among the teachers of the second stage of primary schools in the Banská Bystrica and Žilina regions in Slovakia, as well as among experts working in the centres of pedagogical-psychological counselling and prevention. They found out that teachers with longer teaching experience reported the lowest incidence of aggressive behaviour of pupils towards them - in the research 1.29% of teachers with 21-25 years of teaching experience reported this, and up to 25% of teachers with 6-10 years of teaching experience reported that they encounter aggression from pupils. 25.00% of the respondents (teachers) had experienced acts of aggressive behaviour by pupils towards themselves, and these were teachers with 6-10 years of teaching experience. The lowest occurrence of aggressive behavior of pupils towards themselves was reported by 1.29% of teachers with a length of educational experience of 21 - 25 years. Aggressive behaviour of pupils towards teachers did not occur in only 20.26% of the respondents.
- Research by Emmerová and Kohútová (2017) also confirmed the occurrence of this serious negative phenomenon. In their research conducted in 2016, they used a questionnaire of their own design, which included scaled questions (5-point scale - completely disagree to completely agree) and open-ended questions on the following areas: perception of aggression, the prevalence of forms of aggression, the reason for pupils' aggressive behavior, discipline, and teacher authority. 268 teachers participated in the research by available sampling. The results of the research showed that 85.4% of the teachers had experienced aggressive behaviour. The most common

manifestations were deliberate disturbance, ignoring and provoking. Based on the research conducted, we found out that the most common aggressive behaviours encountered by teachers were: deliberate disturbance, ignoring and provoking.

- In the Czech Republic, research on cyberbullying of teachers was conducted on a sample of 5136 primary and secondary school teachers (Kopecký, Szotkowski, 2017). They found out that 21.73% of teachers were victims of some form of cyberbullying. The most common forms of cyber attacks on teachers included verbal attacks through mobile phone or internet, harassment through name calling, threatening or intimidating through internet or mobile phone services, dissemination of humiliating, mocking or embarrassing photographs, and hacking of electronic accounts.
- The most recent research (Emmerová, 2023) was carried out in October 2022 to March 2023 using a questionnaire method among primary and secondary school teachers in Slovakia (N 384 respondents). Teachers most frequently encounter pupil insults during class and threats, followed by pupil insults outside of class. Physical assault by a pupil was experienced once by 40 teachers (10.42%) and repeatedly by 8 (2.08%). Threatening by a parent or guardian at least once was reported by 31 (8.07%) respondents and repeatedly by 43 (11.20%) teachers. Physical assault by them was experienced once by 17 respondents (4.43%).

The results clearly show significant changes that are related to the increase in negative aspects in the teaching profession. Pupils' indiscipline and aggressive behaviour take up teachers' time, disrupt the teaching process and provoke conflicts between teacher and pupil, often with the pupil's parents.

The predominant research method was a self-administered questionnaire, not a standardized questionnaire. Little attention was paid to cyberaggression against teachers. Differences were also noted when assessing the incidence of aggressive behaviour towards teachers in terms of timing - over the last school year, the last calendar year, or over the course of a teacher's career.

4 Conclusion

On the basis of the presented research results, we can confirm the occurrence of aggressive behaviour of pupils as well as their parents or legal guardians towards primary and secondary school teachers.

Prolonged psychological strain, caused by exposure to stressors or victimization, can result in experiencing stress, which negatively affects the mental and physical health of teachers, affecting their quality of life even in contradiction to the state of well-being. All this also affects their pedagogical performance.

The current social, political and economic situation in the world is full of rapid changes that bring fear and uncertainty. Global problems also affect education. The teaching profession is demanding and quite stressful. The difficulty is due, among other things, to the rapid development of knowledge, advances in information technology, the social evaluation of the teaching profession, including its financial evaluation, and the increase in socio-pathological phenomena in society, which are reflected in the problem behaviour of pupils (of varying intensity and severity). The satisfaction and well-being of teachers and other school employees is important not only for their mental health but also for the well-being of their pupils.

On a positive note, the health of our citizens, including young people, has been included in the current State Health Policy of the Slovak Republic through the document "Strategic Framework for Health 2030", which in the medium and long term determines the direction of the efforts of all components of society on health as a key factor in the development of society. The basic values underlying the State Health Policy in Slovakia are that health is a fundamental human right, that health is the

key to social development and that full development of health is only possible in a health-supportive environment - family, work, school. Only a mentally healthy population contributes to and develops society.

According to Dončevová (2021), factors related to school organization and school climate can improve and sustain job satisfaction in school. School leadership has an important position. The same qualities as a teacher has should be first of all possessed by the headmaster/principal if his/her management is to be useful and effective for all the actors of the educational process, he/she should possess qualities such as respect and dignity, objectivity and fairness, human approach, interest in the opinion of others and discussion with them, tolerance, ability to establish a healthy working relationship with the employees, to seek appropriate solutions for all and to be a positive role model, open and authentic.

Intensive and effective preventive work with pupils is extremely important. Within the framework of preventive activities, school action should be aimed at developing pupils' social competences with regard to the promotion of protective factors, the development of social perception, anger management, self-regulation, etc. It is important to implement various cooperative activities. According to Jablonský (2009, 2017) interpersonal skills, such as the ability to communicate and work in a team, are increasingly important. Danek (2022) emphasizes that it is necessary to eliminate indifference, disinterest or making light of negative life expressions and to use the possibilities and opportunities for shaping helpfulness towards people during the teaching of each subject.

When implementing the prevention of risk or problematic behaviour, it is necessary to emphasise its systematic and well-thought-out coordinated planning. Regular prevention activities are much more effective than a one-off activity. In schools, prevention can be implemented through various forms of preventive action. Ineffective prevention includes intimidation, emotional appeals, simple passing on information, one-off events, mass activities or showing films without discussion or small-group conversation. Do not implement ineffective prevention activities in schools.

The requirement for permanent training of teachers in the field of prevention of socio-pathological phenomena is becoming topical. Universities preparing future teachers should also prepare students to work with pupils with problem or risk behaviour and include the prevention of risk and problem pupil behaviour for all student of teaching.

In schools, it is necessary to eliminate risk behaviour of pupils and to implement activities to promote social relations between pupils in the classroom and between pupils and teachers. Regularly monitor the incidence of risky behaviour of pupils as well as the wellbeing of pupils and teachers. Establish professional staff positions in all schools to implement prevention at a professional level, to deal effectively with problematic or risky behaviour of pupils and to provide support and guidance in dealing with stressful situations for pupils and teachers.

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COPING WITH DEMANDING SITUATIONS IN MANAGERIAL WORK IN THE CONTEXT OF THE PERSONALITY TRAITS OF MANAGERS

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Abstract: Effectively resolving demanding situations in managerial work and the residues of these processes can significantly impact the quality of a manager's life, both mentally and physically. The goal of research project is to focus attention on identifying and specifying selected personality traits of managers that are related to coping with demanding situations. The results confirmed the expected correlations between the ways of behaving in demanding managerial work situations and the features of interpersonal behavior of managers. The acquired knowledge also reveals risk factors that can significantly reduce the level of a manager's work and are thus an important aspect of decision-making not only in the process of selecting people for managerial positions, but also in the education and training of managers.

Keywords: Coping, Demanding situations, Managerial work, Personality traits.

1 Introduction

Managers perceive challenging situations in varying ways—some view them as problematic, crisis-ridden, or conflict-ridden, while others see them as opportunities to demonstrate skills and advance their careers (Frankovský, Ištvaníková, Štefko, 2009). Understanding the demands of managerial work requires considering both situational characteristics and personal traits. The strategies chosen to address these situations can lead to different outcomes, influencing either self-reinforcing or self-threatening behavior (Fedáková, 2002).

Demanding situations in managerial roles encompass not only major life events or organizational changes but also routine challenges encountered on a daily basis, such as interpersonal conflicts or decision-making dilemmas (Lajčín, 2023). The interpretation of these situations varies based on situational and personality factors. While some managers may view tasks like employee layoffs or strategic decisions as routine and manageable, others may perceive them as highly stressful and burdensome. Similarly, individuals may perceive the same situation differently, with some seeing it as a threat and others as an opportunity for growth or as routine work. Managers regularly confront challenging scenarios, irrespective of their personal assessment of the difficulty level. Addressing these situations often requires a full mobilization of their efforts, sometimes leading to varying degrees of success or occasional failure. Successfully navigating these challenges and their aftermath can significantly impact a manager's well-being and the effectiveness of their organizational leadership. Ultimately, it influences not only the manager's own performance but also the overall success of the organization, thereby impacting its stakeholders. The pursuit of effective strategies for managing demanding situations in managerial roles necessitates an interdisciplinary approach (Vávrová, 2004; Hrbáčková, 2010; Čuka, 1997).

Developing fundamental research inquiries regarding managing challenging situations in managerial roles entails focusing on and expanding upon established research frameworks for coping with such challenges (Frankovský, 2003). These inquiries explore three primary research avenues (Frankovský & Ištvaníková, 2008):

1. Identification, characterization, and classification of situations perceived by managers as problematic, demanding, conflict-ridden, complex, stressful, or

unpleasant. This line of inquiry typically involves delineating key dimensions of these situations, which serve as the basis for proposing specific empirical taxonomies and classifications.

2. Analysis of managerial behavior in addressing and managing these situations. Research in this area often aims to create a comprehensive classification of managerial responses to challenging situations using inductive taxonomies.
3. Examination of the relationships between managerial coping strategies and the dispositional characteristics of managers or the situational contexts in which specific problems arise. This aspect of research usually focuses on the personal traits of managers and the organizational conditions that influence their coping mechanisms.

The management domain is a common setting where facing challenging situations is prevalent. The interest in investigating how managers navigate these challenges stems from the desire to elucidate broader factors, as outlined by Výrost et al. (1995):

- Understanding individuals' life plans, personal perspectives, and career development.
- Gathering insights into the motivational and emotional aspects of an individual's personality.
- Characterizing various methods and approaches to problem-solving and coping.

In terms of practically applying the knowledge gained regarding coping with demanding situations in managerial work, Lajčín and Frankovský (2011) suggest specific applications in managerial practice that relate to the broader factors influencing interest in this issue, including:

- Selecting individuals for managerial roles where they will inevitably face challenging situations.
- Training managers in these roles to effectively handle challenging situations in organizational management (Pitt & Sims, 1998).
- Developing protocols for addressing these situations within the organization and providing training at different management levels.

The investigation of correlations between personality traits as inherent characteristics that predict behavior across various situations and coping mechanisms is a standard and, some might argue, traditional area of research in coping studies. In this realm, Judge, Thoresen, and Pucik (1999) scrutinized seven personality traits. Callan and Dickson (1993) focused on analyzing the connections between locus of control and coping strategies amid challenging circumstances. Hu and Cheng (2010) delved into coping with challenging situations within the context of burnout syndrome. Förster and Ducheck (2017) propose that specific personality traits are positively linked to resilience. They discovered a significant positive correlation between concerns and certain dimensions of their resilience construct.

Wei and Taormina (2014) highlight a favorable association between the personality trait of responsibility and resilience in both workplace and career settings. They contend that responsible individuals tend to be more industrious and systematic, rendering them better prepared to tackle challenges. Additionally, they assert that future orientation, openness to new experiences, and emotional stability are positively correlated with resilience in workplace and career contexts. Several researchers conceptualize resilience as a skill that can be cultivated and emerges from experiencing positive emotions in the workplace (Hartmann et al., 2019).

Sommer, Howell, and Hadley (2016) discovered that positive emotions bolstered employee resilience, whereas negative emotions diminished it during an organizational crisis.

Managers regularly encounter challenging situations, necessitating them to muster all their resources to address them, with varying degrees of success. Failures in managing these situations also occur. Understanding the complexity and stress associated with demanding situations requires considering situational management conditions, assessing managerial competencies, and evaluating the manager's personality traits.

From a practical standpoint of handling demanding situations, we can link the application of acquired knowledge with these research directions:

- During the assessment of managerial competencies and the selection of individuals for managerial roles, where they inevitably confront demanding situations (Frankovský, Lajčín, & Vargová, 2013).
- In preparing managers for effectively managing demanding situations within the organization (Pitt & Sims, 1998), fostering their activity and performance (Lajčín, Hrmó, & Krištofiaková, 2014).
- While developing protocols for resolving these situations within the organization and providing training at different management levels, such as through coaching (Birknerová, Frankovský, & Lajčín, 2014).

Within the work environment, the managerial position emerges as a pivotal factor. The efficiency of managers intertwines significantly with the advancement of the entire system, encompassing an array from individuals, through organizational dynamics, to the overall expansion of the company. These managers serve as purveyors of strategic foresight, thereby fostering the evolution and advancement of the entire organizational framework. Consequently, the selection process for managerial roles stands out as a paramount endeavor within any organization. This process necessitates precise and intricate procedures geared towards prognosticating successful managerial performance.

The findings presented regarding the management of challenging circumstances, particularly within managerial contexts (Lajčín, Frankovský, & Štefko, 2012; Lajčín, 2017; Lajčín, & Frankovský, 2017), underscore the sustained attention directed towards this domain. This emphasis aligns with the depth of knowledge amassed within this field. Our research endeavors have been centered on addressing inquiries pertaining to coping mechanisms in managerial settings, including the identification, detection, and anticipation of managers' behaviors in such scenarios. This aligns with the primary research trajectory focused on empirical classification and taxonomy of coping strategies in demanding situations.

The objective of the research project is to spotlight the identification and delineation of specific personality traits among managers that correlate with their ability to manage demanding situations. The research project, as outlined by Lajčín and Frankovský (2017), is centered on elucidating the interrelationships among various antecedents and outcomes, particularly focusing on the analysis of personality traits, social intelligence, and coping mechanisms utilized by managers in challenging scenarios. Through their work, the authors have not only enhanced the efficiency of managerial practices but also deepened our comprehension of the managerial role. This encompasses both the essential prerequisites for effective managerial performance and the obstacles that managers must navigate.

We designated the original questionnaire developed by the authors as WBMW – Ways of Behaving in Managerial Work (Lajčín, Frankovský, & Štefko, 2012). This Slovak questionnaire was crafted and validated with the specific aim of identifying coping mechanisms in demanding managerial situations. The final version of the questionnaire enables the assessment of individual preferences for coping strategies across various challenging scenarios encountered by managers. Its development entailed a qualitative analysis of detailed accounts of demanding situations experienced by managers in their professional roles.

The questionnaire was meticulously designed to gauge preferences for coping strategies applicable in real-world managerial contexts. Constructed on the foundation of the principle of transsituational stability in personality assessment methodologies, as articulated by Vróst (1998), this approach involves presenting respondents with specific managerial challenges and prompting them to evaluate the efficacy of various coping strategies using interval-based rating scales.

The development of the WBMW methodology (Lajčín, Frankovský, & Štefko, 2012) draws on the insights gained by authors Frankovský and Baumgartner (1997) during the creation process of a revised edition of the BSDS(r) Questionnaire: Behavioral Strategies in Demanding Situations. Additionally, it was influenced by the experiences of authors Frankovský, Ištvaníková, & Štefko (2009) with the BSDWS Questionnaire: Behavioral Strategies in Demanding Work Situations and the analysis outcomes of the BSBM methodology: Behavioral Strategies in Business Management (Lajčín, & Frankovský, 2011).

2 Materials and Methods

The WBMW questionnaire, validated through research (Lajčín, Frankovský, & Štefko, 2012), facilitates the recognition of coping mechanisms in managerial settings amid challenging circumstances. It encompasses descriptions of nine prototypical demanding situations representing diverse scenarios encountered in managerial roles. Each situation presents several potential behavioral responses. For instance, consider the scenario: "You discover that false, negative information about you is circulating within the company. What actions would you take?" Following the situation's description, various coping strategies are outlined:

Forms of behavior	strongly agree	agree	neither	disagree	strongly disagree
a) Without any hesitation, I discuss it with my co-workers.	1	2	3	4	5
b) I highlight that such behavior is unethical.	1	2	3	4	5
c) I think about how to solve this situation.	1	2	3	4	5
d) I ask for an advice on how to proceed.	1	2	3	4	5
e) I get angry.	1	2	3	4	5
f) Such a situation is an unpleasant experience for me.	1	2	3	4	5

Respondents are tasked with evaluating their potential responses to each alternative provided on a five-point Likert scale (1 – strongly agree, 2 – agree, 3 – neither, 4 – disagree, 5 – strongly disagree).

The questionnaire facilitates the identification of five factors describing managers' coping tendencies in business management situations:

Emotional Coping Factor: Pertains to the emotional response evoked by the situation, independent of its context.

Cognitive Coping Factor I: Focuses on cognitive processes such as information seeking and problem analysis within the social context.

Cognitive Coping Factor II: Centers on cognitive processes like information gathering and analysis concerning general managerial challenges.

Behavioral Coping Factor I: Relates to immediate behavioral responses in addressing common managerial challenges.

Behavioral Coping Factor II: Concerns immediate behavioral responses in handling situations with significant social implications.

The identified factors account for 43 % of the variance, which is deemed acceptable. Therefore, there was no need to specify additional factors to increase this percentage. The factors extracted could be clearly delineated in terms of their content. This is supported by the satisfactory Cronbach's alpha values (Emotional factor = 0.92, Cognitive factor = 0.79; Cognitive factor II = 0.82; Behavioral factor I = 0.67; Behavioral factor II = 0.64), indicating the reliability of the items within each factor. The content validity of the WBMW methodology was assessed in comparison to a standard coping questionnaire.

The IAS Questionnaire, designed by Wiggins (1991), was utilized to identify the personality traits of managers. This questionnaire, developed based on insights from the Interpersonal Check List (ICL) by Leary (1957), arranges eight crucial interpersonal behavior characteristics into an "interpersonal circumplex." These characteristics, depicted in a counterclockwise circle and represented by four bipolar dimensions, are defined by Wiggins (1979) as follows:

- Ambitious, dominant – Lazy, submissive
- Arrogant, calculating – Unassuming, ingenuous
- Cold, quarrelsome – Warm, agreeable
- Aloof, introverted – Gregarious, extraverted

In this research, a condensed version of this methodology, comprising a list of 24 adjectives where each dimension is described by three pairs of bipolar adjectives, was employed. Respondents assessed each interpersonal behavior trait on an 8-point scale, ranging from 1 (very inaccurate) to 8 (very accurate). Below is an example of eight adjectives from the IAS methodology along with the corresponding answer key:

Manipulative	1	2	3	4	5	6	7	8
Calculating	1	2	3	4	5	6	7	8
Arrogant	1	2	3	4	5	6	7	8
Introverted	1	2	3	4	5	6	7	8
Submissive	1	2	3	4	5	6	7	8
Honest	1	2	3	4	5	6	7	8
Able to understand others	1	2	3	4	5	6	7	8
Joyful	1	2	3	4	5	6	7	8

1 – very inaccurate, 8 – very accurate

The study drew upon the findings of a research survey encompassing 179 participants, comprising 86 male and 93 female managers occupying positions in top management (11 respondents), middle management (60 respondents), and line management (108 respondents). Regarding their professional domains, the sample encompassed 27 managers from production, 85 from services, 33 from trade, and 34 from the education sector. These managers possessed technical (92 respondents), natural science (15 respondents), or social science (72 respondents) backgrounds. Among the participants, 49 were single, 107 were married, 19 were divorced, and 4 were widowed. The average age of the managers was 38.5 years, with a standard deviation of 8.39 years, ranging from 21 to 66 years. On average, they had accumulated 14.6 years of professional experience (standard deviation of 8.350) and had served in managerial roles for approximately 7.8 years (standard deviation of 7.432). This dataset underscores the diversity of managerial experience levels within the sample, ranging from novices to individuals with extensive experience, spanning up to 38 years.

3 Results

A comparison between the outcomes derived from our questionnaire and Amirkhan's (1990) Coping Strategy Indicator (CSI) methodology revealed several intriguing insights that substantiate the distinctiveness of each factor within our methodology. Upon scrutinizing the preference for individual behavioral strategies, we observed the highest degree of

preference in evaluating the Behavioral factor of coping I, juxtaposed with the lowest degree of preference in appraising the Cognitive factor of coping I. Statistical scrutiny of the results, employing the non-parametric Friedman test for dependent choices, confirmed statistically significant disparities in the preferences for individual coping strategies (Table 1). Evaluation of the extracted coping factors placed the Cognitive factor of coping II and Behavioral factor of coping I within the agreement section of the utilized scale. The Emotional factor of coping and Behavioral factor of coping II garnered rather neutral assessments, while the Cognitive factor of coping I was assessed within the disagreeing segment of the scale.

Tab. 1: Assessment of individual extracted coping factors

	Mean Rank	Chi-Square	Asymp. Sig.
Emotional factor	3.17	137.887	.000
Cognitive factor I	4.13		
Cognitive factor II	2.52		
Behavioral factor I	2.19		
Behavioral factor II	3.03		

The structured five-factor model delineating various ways of coping with demanding situations, alongside its foundational validation metrics, substantiate the significance of the devised multidimensional approach for delineating coping mechanisms in managerial contexts. Moreover, we regard the outlined analytical outcomes and discoveries as pivotal for refining the taxonomic understanding of coping strategies within managerial domains.

The findings corroborated the anticipated correlations between behavioral responses in challenging managerial scenarios and the interpersonal behavioral attributes of managers, as illustrated in Table 2.

The coping mechanism characterized by emotional reactions exhibited correlations with certain personality traits—namely, aloof, introverted, lazy, and submissive. This suggests a higher inclination towards this coping style among managers with introverted, lazy, and submissive tendencies. Conversely, the coping strategy categorized as cognitive I (involving thinking and seeking further information about situations with a significant social context) demonstrated a negative correlation with personality traits such as arrogant, calculating, cold, and quarrelsome. This implies that managers exhibiting these traits are less likely to prefer this coping approach in situations with significant social implications.

Furthermore, a statistically significant positive correlation was observed between the assessment of coping behavior specified as behavior II (involving immediate behavioral reactions in addressing situations with significant social implications) and certain personality traits of managers—specifically, ambitious, dominant, gregarious, and extraverted. Conversely, a negative correlation was identified between this coping factor and personality attributes such as aloof, introverted, lazy, and submissive. This suggests that the coping strategy in situations with significant social implications is favored by ambitious, dominant, gregarious, and extraverted managers, while it is less favored by introverted, lazy, and submissive managers.

Tab. 2: Correlations between the ways of behaving in demanding managerial work situations and the features of interpersonal behavior of managers

	PA	BC	DE	FG	HI	JK	LM	NO
Emotional factor	-,116	-,152	-,118	,157*	,209**	,103	,128	,091
Cognitive factor I	-,013	-,173*	-,209**	-,018	,091	,083	,118	,017
Cognitive factor II	,011	,073	-,033	-,040	,002	,004	,079	-,028
Behavioral factor I	-,062	-,102	-,057	-,107	,063	,025	,002	-,016
Behavioral factor II	,173*	-,112	-,087	-,185*	-,203**	,092	,107	,213**

Key: PA – ambitious, dominant, BC – arrogant, calculating, DE – cold, quarrelsome, FG – aloof, introverted, HI – lazy, submissive, JK – unassuming, ingenuous, LM – warm, agreeable, NO – gregarious, extraverted.

** Correlation is significant at the 0.01 level (2-tailed)

* Correlation is significant at the 0.05 level (2-tailed)

The exploration of interpersonal behavior traits provides valuable insights into how individuals navigate demanding situations, particularly in managerial roles. Using the IAS Interpersonal Adjective Scales questionnaire (Wiggins, 1991), we assessed these traits, revealing correlations between active, positive approaches to managing challenges and various attributes of social intelligence and interpersonal behavior.

Managers who exhibit higher levels of empathy tend to prefer actively managing difficult situations. Empathetic individuals often demonstrate traits such as self-assurance, intelligence, warmth, and introversion. Conversely, managers characterized by manipulation tendencies are more likely to opt for active resolution strategies, particularly if they exhibit cold and arrogant behavior.

Furthermore, managers adept at acquiring and leveraging social information, possessing strong social competency and awareness, tend to exhibit traits such as self-confidence, warmth, extraversion, openness, conscientiousness, and emotional stability. Notably, the personality trait of agreeableness is positively associated solely with social awareness.

These findings underscore a preference for extroverted and emotionally stable individuals in managerial positions, highlighting the importance of social intelligence and interpersonal behavior in effectively managing demanding situations.

The effectiveness of managerial work is influenced by various factors, including education, experience, and the personal qualities of managers, which serve as important predictors of success in managerial roles. Our analyses of the connections between managers' personality traits and their coping strategies in demanding situations confirm the expected correlations between specific features of interpersonal behavior and coping mechanisms.

Managers who are introverted, insecure, or submissive tend to exhibit a stronger inclination towards emotional reactions when dealing with challenging situations, reflecting sentiments such as discomfort or unpleasantness. Conversely, self-assured, dominant, sociable, and extraverted managers show a reduced preference for emotional coping strategies, opting instead for direct and immediate solutions to challenges. Notably, these correlations were particularly prominent in situations with a significant social context, aligning with the focus of the IAS

methodology used to assess interpersonal behavior traits, which inherently carry social implications.

The solution directly pertains to predicting managers' behavior in challenging situations, thereby influencing the methodological approach for identifying coping strategies within management contexts, considering managerial competencies and personality traits. The suitability of the chosen approach corresponds to the nature of the problem managers face in managing demanding situations. This aspect was evident in the research project, where both approaches were effectively utilized. While the mentioned methodologies possess dispositional traits, the WBMW methodology developed by the authors exhibits a situational nature. The research outcomes validated the efficacy of employing both types of methodologies. The COPE methodology, coupled with CSI, represents a balanced approach amalgamating both situational and dispositional perspectives.

4 Discussion

Managerial work is directly related to solving demanding situations. The way managers deal with these situations affects their lives, the lives of their co-workers. At the same time, the effectiveness of coping with demanding situations has an impact on the operation and efficiency of the entire organization that these managers manage. As part of the research projects implemented by us (Frankovský, Lajčín, & Birknerová, 2011; Frankovský, Lajčín, & Sláviková, 2012; Lajčín, Sláviková, Frankovský, & Birknerová, 2014; Lajčín, 2017 and others), we have therefore focused our attention on solving questions related to specifying contexts between selected personality traits of managers, managerial competencies and ways of coping with demanding situations in managerial work.

Several methodologies were used in research projects to solve the problem of links between the selected attributes of social intelligence and assessment of ways of coping with demanding situations in managerial work. Assessment of ways of coping with demanding situations in managerial work was determined by the original WBMW questionnaire (Lajčín, Frankovský, Štefko, 2012) and the COPE questionnaire (Carver, 1997). The personality traits of the managers were assessed by IAS Interpersonal Adjective Scales questionnaire (Wiggins, 1991).

Baumgartner and Frankovský (2000) presented similar results in the analysis of connections between traits of interpersonal behavior and strategies for managing demanding situations, primarily from the point of view of immediate solution of the situation, based on research of the general population. The presented findings testify not only to the meaningfulness of investigating the issue of coping with demanding situations in the context of managerial work, but also point to the possibility of predicting the behavior of managers in these situations based on the use of the developed questionnaire WBMW - Ways of behavior in managerial work. The aforementioned knowledge also reveals risk factors that can significantly reduce the level of a manager's work and are thus an important aspect of decision-making not only in the process of selecting people for managerial positions, but also in the education and training of managers, e.g. also for coping with demanding situations in their work.

5 Conclusion

Managers who exhibit a preference for coping strategies outlined in the original WBMW questionnaire tend to be socially active, communicative, adventurous, and receptive to novelty, embracing unknown challenges with curiosity. They demonstrate broad interests, inventiveness, creativity, and originality. Interpersonally, they project kindness, friendliness, trustworthiness, forgiveness, helpfulness, and sincerity. Managers characterized by self-assurance, extroversion, openness, warmth, and astuteness are inclined towards proactive problem-solving in demanding situations. Conversely, a propensity to avoid solutions is more evident in managers who are insecure, arrogant, and aloof. These findings have

implications for managerial practice, particularly in discussions concerning the predictability of managerial behavior based on stable dispositional traits—traits that influence behavior irrespective of specific circumstances—or situational factors that shape managerial responses (Terry, 1994; Carver et al., 1989; Parkes, 1986; Holahan & Moos, 1987; Frankovský & Lajčín, 2012; Frankovský, Birknerová, & Lajčín, 2014).

Addressing the challenge of predicting managerial behavior is intricately linked to managerial effectiveness. Predictors encompass a diverse array of characteristics, indicators, and criteria, ranging from managerial competencies and work experience to personality traits. As previously mentioned, the second aspect of this inquiry involves examining the correlations between coping strategies in stressful situations and the dispositional traits of managers, as well as situational factors.

The outcomes of the conducted research have significantly advanced this domain of knowledge, particularly in terms of delineating the structural components of managing demanding situations by managers. These findings hold relevance not only in the realm of management theory but also within the discourse on managerial competencies. They contribute to the expansion of knowledge in management theory, particularly concerning the interplay between a manager's personality and their ability to manage demanding situations. The personality of the manager stands out as a pivotal factor from various perspectives on management issues. As highlighted by Frankovský, Kentoš, Lajčín, and Sláviková (2011), it is imperative to continually consider the level of generality of established conclusions regarding coping strategies, the situational context of these strategies, and the individual context of coping.

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Primary Paper Section: A

Secondary Paper Section: AE, AN

IMPACT OF ESG SUBSET PERFORMANCE ON FINANCIAL AND MARKET OUTCOMES

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Abstract: This study examines the relationship between subsets of Environmental, Social, and Governance (ESG) performance measures and corporate financial and market-based performance. Utilizing regression analysis on longitudinal data spanning ten years from global car manufacturers, the findings reveal no significant relationship when considering composite ESG measures. However, further investigation into specific dependent and independent variables indicates a short-term significant negative effect of Environmental performance on financial performance, measured by Return on Assets (ROA). In contrast, a long-term significant positive effect on the market-based measure, Tobin's Q, is observed only within the Governance subset of the ESG score. These results underscore the critical role of governance in the automotive industry as reflected in our dataset.

Keywords: ESG disclosure, social capital, human capital, financial performance, market-based performance.

1 Introduction

The Environmental, Social and Governance (ESG) is incorporated into the managerial processes of all companies. Private companies are expected to exist no longer to serve their shareholders but all stakeholders like customers, employees, the environment, and the global community (Brockett, 2012). At the same time, investors regard a strong ESG performance as a driver for long-term profitability and assessing their investment decisions. With increasing investors weighing in on ESG issues, tens of thousands of publicly listed firms now provide "materiality assessment" of ESG issues, prioritising specific issues based on their distinguished materiality to society, firms and investors.

The market-based performance of a company is significantly influenced by the market's valuation and, consequently, investors' portfolio decisions. Recent trends highlight the rise of ESG (Environmental, Social, and Governance) investing. But what exactly is ESG investing? Although there is no unified definition, ESG investing is often considered a derivative of Socially Responsible Investing (SRI), which emerged in the 1960s. ESG investing generally relies on ethical or moral criteria, applying negative screening to exclude entire industries (such as arms or tobacco) or specific stocks from portfolios. Initially driven by ethical considerations and value alignment, financial materiality has also become a strong motivator for many ESG investors (Barman, 2020).

The scope of ESG topics is vast and continually evolving. The materiality of these factors varies significantly depending on the industry and individual company. For example, resource-intensive industries like car manufacturing are more exposed to environmental factors than sectors such as commercial real estate (Adler et al., 2020).

ESG issues can present both risks and opportunities, potentially leading to additional costs or benefits. These issues significantly impact a company's risk profile, financial performance, and reputation. They also influence a firm's long-term valuation, consumer satisfaction, and product sustainability. High-profile cases of ESG misconduct, such as the Volkswagen Diesel scandal and the Deepwater Horizon oil spill, illustrate the severe financial and ecological consequences of neglecting ESG principles (Barman, 2020). Conversely, positive ESG activities can create substantial value. For instance, a corporate reputation grounded in good working conditions, high ethical standards, and diversity can attract qualified employees, enhance brand loyalty, improve customer retention, and ensure the retention and attraction of talented workers (Adler et al., 2020).

According to the Global Sustainability Investment Alliance, integrating ESG factors systematically and explicitly into financial analysis is the most widely used sustainable investing strategy. However, challenges persist, such as limited access to non-financial metrics, data consistency across sectors and geographies, and comparability. Unlike financial reporting, which adheres to uniform standards like the International Financial Reporting Standards (IFRS), no comparable set of standards exists for ESG-related reporting. Consequently, the demand for ESG score providers has surged, bridging the gap between complex non-financial data of companies and the needs of ESG-focused investors (PRI, 2020).

In terms of legislative frameworks, Japan's sustainability reporting approach fundamentally differs from Europe's. Japan has adopted a soft-law approach based on non-compulsory principles, unlike the mandatory requirements in Europe. Despite being voluntary, ESG-related disclosure in Japan has been robust and rapidly evolving. Between 2011 and 2020, all German and Japanese car manufacturers included in this study published either a Corporate Social Responsibility (CSR) report or an integrated report, indicating a growing commitment to ESG practices (Azmi et al., 2021).

A company's market-based performance depends on the market's valuation and, therefore investors' portfolio decisions. Recent trends indicate that ESG investing is on the rise – but what exactly is ESG investing? Although there is no unified definition of ESG investing, it is often referred to and has its roots in Socially Responsible Investing, which dates to the 1960s (Han et al., 2016). It is generally based on ethical or moral criteria and applies negative screening to exclude entire industries (e.g. arms or tobacco) or specific stocks from portfolios. Since then, ethical considerations and alignment with values have been strong drivers for many ESG investors, but financial materiality has also become a source of motivation. As a result, topics included in the scope of ESG are numerous and ever-shifting.

The central research question surrounding the relationship between ESG performance and corporate performance has been subject to numerous academic studies in the past decades as it impacts the credibility around the ESG domain, and the competitiveness of automobile firms certainly impacts the trust of investors and stakeholders. (Billio et al., 2021; Tarmuji et al., 2016; Dinca et al., 2022). Throughout most of the literature, theoretical justification is found in the stakeholder theory developed by Freeman et al. (2007), which essentially claims that the interests of all stakeholders need to be considered to ensure a firm's continued stability and its long-term value creation. The firm's engagement in ESG responsibilities highlights its commitment to comply with stakeholders' demands to avoid additional costs associated with strict adherence to "formal contractual obligations (Freeman et al., 2007). Supporters of the stakeholder theory argue that it is more necessary than ever to focus on good stakeholder relationships to achieve profit maximisation in today's difficult business context. Subsequently attaining a competitive edge over its competitors and enhancing firm value. (Xie et al., 2019). From a stakeholder theory perspective, it is reasonable to acknowledge the link between a firm's ESG performance and financial benefits as the main stakeholders are directly affected by its ESG-related activities. ESG should be perceived as a scope of expansion, competitive advantage & opportunity for corporate development. Moreover, ESG responsibilities are a source of strategic investment for Automobile firms. They build the trust of stakeholders by aligning & balancing the common (ESG) interests which assist in the expansion of the firm's business operations, structuring confidence in the automobile firm's management by restraining risk-taking, hence attaining a competitive edge over its competitors, enhancing firm-value with stakeholders alliance. Therefore, automobile firms in recent years are becoming increasingly aware that organisational decisions surrounding ESG should be balanced to ensure long-

term return on investments for the stakeholders and innovatively comply with sustainability requirements in their products. So, they can differentiate their products from their adversaries to gain a competitive advantage and increase market access in the long term. Safeguarding stakeholders' interests eventually assists firms in achieving long-term success leading to higher financial performance (Zailani et al., 2021). Subsequently, for regulators, firms that increasingly dedicate resources towards ESG issues and responsibilities could help stabilise and stimulate long-term sustainable development in the industry. Furthermore, with regulatory compliance in place for ESG disclosures, the depth of information collected industry-wide could be utilised for supervision, evaluation & guidance, with necessary enforcement measures to be placed where needed (Zhao et al., 2018). Moreover, ESG as an integrated approach helps investors identify the performance benchmarks set by the firms by analysing themes such as materiality and governance structure and thereby driving returns on their financial investment associated with the firms due to a variety of factors such as enhanced risk management and operational efficiency, furthermore providing downside protection in times of (social or economic) crisis (Whelan et al., 2022). In parallel, integrating financial materiality in ESG performance assessment allowed differentiating between firms that encapsulate substantial ESG issues instead of firms that address ESG issues with a moderate financial impact on their business, which could lead to better-informed investment decisions and enhanced investment analysis (Madison and Schiehl, 2021).

2 Methodology and Data

The population of this study consists of the 20 largest car companies in the world, consisting of German, Japanese, Dutch, French, Swedish, US, South Korean, Chinese, and Japanese car manufacturers publicly listed on the stock market. The period covers ten years, from 2011 to 2020, resulting in 200 observations. The financial data is collected from the investment research platform YCharts and annual reports of sampled car manufacturers. The ESG scores and sub-scores, which act as a proxy for ESG performance, are sourced from the global ESG data provider Arabesque S-Ray.

Multiple regression analysis is executed in the statistical software R for evaluation purposes.

For investigation of the relationship of the mentioned variables based on recent societal, regulatory, and investment trends as well as findings from existing literature, we examine the following research questions:

RQ1: What is the impact of the change in the ESG performance score or its subcomponents on the financial performance (FP) of a firm in the automotive sector?

RQ2: What is the impact of the change in the ESG performance score or its subcomponents on the market-based performance (MP) of a firm in the automotive sector?

Additionally, differences in financial and market-based performance (FP and MP) can not only be explained by the ESG score. Therefore, it is necessary to include control variables; First, control variables for systematic and unsystematic risk are included as they are expected to affect financial performance. Systematic risk is represented by a 'company's beta factor (BETA), which controls for an 'equity's price change about movements in the market. Unsystematic risk is represented by the debt ratio (DEBT), which is calculated as total liabilities over total 'shareholder's equity and measures the extent of a 'company's leverage. It is expected that companies with high financial leverage are more likely to experience financial distress and profitability deterioration. Capital expenditure (CAPEX) has also been regarded as one of the potential control variables and is calculated by the net capital expenditure divided by revenue. A dummy variable is included in line with prior studies to test for possible country features (COUNTRY). A firm's size (SIZE) should also be controlled by the natural logarithm of a

firm's total assets. A positive effect could be explained by larger firms having more resources to invest in ESG activities and non-financial disclosure.

The following regression model should be applied to test research question RQ1 and examine the relationship between change in the ESG score or its subcomponents and change in the financial performance:

$$\Delta ROA_{i,t+1} = \alpha + \beta_1 \Delta ESG_{i,t} + \beta_2 \Delta BETA_{i,t} + \beta_3 \Delta DEBT_{i,t} + \beta_4 \Delta SIZE_{i,t} + \beta_5 \Delta CAPEX_{i,t} + \beta_6 COUNTRY_{i,t} + \epsilon_{i,t} \quad (1)$$

To test research question RQ2 and examine the relationship between the change in the ESG score and the change in the market-based performance, a change in Tobin's Q should become the dependent variable:

$$\Delta TQ_{i,t+1} = \alpha + \beta_1 \Delta ESG_{i,t} + \beta_2 \Delta BETA_{i,t} + \beta_3 \Delta DEBT_{i,t} + \beta_4 \Delta SIZE_{i,t} + \beta_5 \Delta CAPEX_{i,t} + \beta_6 \Delta COUNTRY_{i,t} + \beta_7 \Delta ROA_{i,t+1} + \epsilon_{i,t} \quad (2)$$

In both equations, the change in ESG score could be replaced by the particular changes in the three components ΔE , ΔS or ΔG .

3 Results and Discussion

From the individual models shown in Table 1 (Fixed effects models - FE), it is clear that the ESG variable (that is, its difference, that is, the change) is not statistically significant either in the case of the ROA model (model 1a) or in the case of TQ (2a). In addition, the problem of multicollinearity also appears to be problematic. For this reason, we developed modified models in which we work with individual ESG subcategories, namely E, S and G. These models are statistically significant. From our point of view, the poolability of the models was tested. In contrast, classic OLS models appeared less suitable in the given panel data structure (twenty companies over ten years). Testing was carried out using the Hausman test. Calculations and tests were performed using the R program, stargazer, plm, and car packages.

In individual models, we first worked with the level of change in the composite ESG indicator. Since it appeared to be statistically insignificant in the individual models both for the change in financial performance (ROA) and the change in market-based performance, we proceeded to the decomposition and testing of its components - environmental (E), social (S) and governance (G). It was already possible to capture their significance in the individual components. Change in E score, i.e., Environmental performance, comes out as significant, whereas in the case of growth of this performance, according to the model, there is a decrease in profitability. Here it is possible to consider that the government's efforts and the pressure of the environment to improve environmental performance and the implementation of environmental policies and related investments have a direct negative impact on the change in profitability in the form of the short-term financial indicator ROA. In this case, the controlled variables were the size of the company, where a positive effect of the change in size on profitability can be seen.

Table 1 Regressions with 'Tobin's Q (Note: ***, **, and * denote a significance level of 0.001, 0.01, and 0.05).

Model	Dependent variable: Tobin's Q			
	(1a) FE	(1b) FE	(2a) FE	(2b) FE
	Coefficient (Std. Error)	Coefficient (Std. Error)	Coefficient (Std. Error)	Coefficient (Std. Error)
Dependent Variable	ΔROA	ΔROA	ΔTQ	ΔTQ
Independent Variables				
ΔESG	-0.00086 (0.00081)		0.00342 (0.00256)	
ΔE		-0.00108** (0.00035)		0.00128 (0.00116)
ΔS		-0.00013 (0.00049)		-0.00166 (0.00163)
ΔG		0.00036 (0.00037)		0.00300* (0.00125)
$\Delta SIZE$	0.28026*	0.23356*	-0.88149*	-0.94849**

	(0.10974)	(0.09660)	(0.34727)	(0.34498)
COUNTRY		0.00027 (0.00206)	-	-
ΔBETA	-0.00912 (0.00881)	-0.00504 (0.00855)	-0.02595 (0.02787)	-0.02148 (0.02845)
ΔDEBT	-0.04196*** (0.01077)	-0.03566*** (0.00986)	0.02570 (0.03409)	0.02794 (0.03369)
ΔCAPEX	-0.01426 (0.21436)	-0.04550 (0.19865)	-0.89040 (0.67835)	-1.10236 (0.68434)
Constant	-	0.00834 (0.00447)	-	-
N Observations	200	200	200	200
R2	0.14678	0.17496	0.07551	0.1126

It can be assumed (but it was not the subject of testing) that a two-way causal relationship can work there. The indicator of the manifestation of investments in debt (DEBT) also had a negative effect, which can be seen in the increase in indebtedness caused by implementing policies improving ESG performance in the form of a decrease in profitability. It should be noted that neither the change in capital expenditure (CAPEX) nor the change in the systematic risk component are statistically significant as critical variables in this model. But what can be read from the above results is that the increase in investments in the improving level of environmental impact has a negative short-term impact on the growth of profitability, which means a decrease in profitability with an increased level of investment in environmental measures.

However, in the case of the long-term market-based performance indicator, only the management component (G) was statistically significant, the correlation of which was positive. That is, investments in improving the management level will be reflected in the long-term growth of the company's market performance, expressed in the change of Tobin's Q indicator.

4 Conclusions

The main objective of this study was to investigate the relationship between ESG performance on the one hand and corporate financial as well as market-based performance on the other. The focus was placed on the twenty largest car manufacturers worldwide. Recent developments in sustainability reporting, ESG investing and the automotive industry globally have revealed trends toward more sustainability. Results from the regression analysis based on longitudinal data (long panel) have found no significant relationship between composite ESG measures. Therefore, based on data from the global car manufacturers over ten years, we investigated the differences in the particular dependent and independent variables that reveal the short-term significant negative effect of Environmental performance on financial performance (ROA). Long-term positive signification in the market-based measure (Tobin's Q) has been found only in the Governance subset of the ESG score, which points to the importance of this aspect in our dataset and for decision-makers in the automotive industry.

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WHAT DO I DO WITH MY USED PHONE? THE SUSTAINABILITY IN ICT IN CZECH REPUBLIC

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Abstract: Smartphones have become part of our everyday life. But what to do with our old device when we want a new one? Everyone will deal with this question differently and this paper aims to present the most used approaches and the reasoning behind them as well as pros and cons of each approach. The study is done by using an analysis of research conducted by the Czech Statistical Office on the topic of sustainability in ICT on respondents over the age of 16 in 4.5 million households. The results can help smartphone companies understand how their products are disposed of once replaced by another model and help us understand the effects and potential risks this might have on our environment. The targeted research area is the Czech Republic. By comparing age categories, we get the results that the most common option is to keep the old phone at home if the new one breaks, this option was chosen by 46,9 % of respondents. Other favorite options are sending it for recycling which chose 17,5 % or selling it with the results being 14,9 %.

Keywords: Smartphones, sustainability, recycling, ICT, electronic waste

1 Introduction

In the current era of the digital economy, the role of information communication and technology (ICT) and economic complexity is crucial for controlling environmental unsustainability and formulating policies to deal with ecological concerns (Khan & Ximei, 2022). This can be followed by the research done by Panzio & Gallardo (2023). The increasing integration of systems into people's daily routines, especially smartphones, requires ensuring the correctness of their functionality and even some performance requirements (Panzio & Gallardo, 2023). The number of end-of-life mobile phones is increasing every year, which includes parts with high reuse values and various dangerous and toxic compounds (Li et al., 2022). ICT products and especially smartphones are one of the most used products we use daily. Although smartphones are small mini computers, their impact on the environment is no longer small (Chun et al., 2022). Since mobile phones are one of the most popular electronic devices but have a short service life, they are one of the vital contributors to the fastest-growing waste streams worldwide, and the problems of recycling waste smartphones urgently need to be fully resolved (Liu et al., 2022). The issue of what to do with our old smartphones is becoming more and more problematic. Most people will store smartphone waste or give it to others (Sari et al., 2021). Some people buy new smartphones every year, or every other year - this depends on what they use the smartphone for. Some people can be addicted to their phones and just can't lay them down. It has been claimed that smartphone usage constitutes a behavioral addiction characterized by compulsive, excessive use of one's phone and psychological withdrawal or distress when the phone is absent. However, there is uncertainty about key phenomenological and conceptual details of smartphone addiction. One of the central problems has been understanding the processes that link smartphone usage and addiction (James et al., 2023). One of the most problematic behaviors is becoming the disposal of electronic waste and recycling of smartphones. Mobile phones represent an ever-increasing waste stream due to the increasing ownership and short lifetime. In particular, smartphones are among the most valuable e-waste because of their extremely high content of numerous key metals, specifically in the printed circuit board and magnets (Kastanaki & Giannis, 2022). Digitalization has considerable potential to help achieve the sustainability of the planetary and human systems, including organizations. As digitalization is one of the most promising factors for transformation, there is no doubt that ICT and big data can help promote sustainability (Alnasrallah & Saleem, 2022). As the use of information technology increases, the number of discarded devices increases, they are no longer functional or obsolete, and so the question arises of how to deal with such devices. From the perspective of sustainability, these devices can be recycled, and their parts reused or disposed of in

an ecological way. But how do Czechs really deal with discarded devices? And how many of them do they accumulate at home or throw away mixed waste?

2 Theoretical backgrounds: literary research

Smartphones have become one of the most important things in our daily lives. The increasing integration of systems into people's daily routines, especially smartphones, requires ensuring the correctness of their functionality and even some performance requirements (Panzio & Gallardo, 2023). Technology and especially the one used in smartphones evolve every year. The expeditious developments in technology alongside the demand for a high-standard living have resulted in the massive production of electronic gadgets which eventually leads to the generation of huge quantities of obsolescence (Vishwakarma et al., 2022). The development of ICT changed our daily lives. Human capital and ICT have a significant role in determining human development. The impacts of ICT and human capital on green growth and environmental sustainability should be explored for sustainable economic development (Chen et al., 2022).

With the development of ICT and smartphones, the waste that comes with the making of all of the ICT products has become major in waste production management. In the last century, increased urbanization and population growth produced a dramatic increase in waste production, causing severe problems for the global environment and human health like never before. Currently, correct waste management represents a serious challenge that can be faced using new technologies (Baralla et al., 2023). As said by Sakthivel et al. (2022), electronic waste describes the rejected electrical or electronic products of electrical and electronic equipment which has been discarded by users as waste with the lack of reuse or recycles (Sakthivel et al., 2022). Electronic waste is becoming more and more problematic by the year. Understanding the role of information communication and technology (ICT) in environmental issues stemming from extensive energy consumption and carbon dioxide emission in the process of economic development is worthwhile both from policy and scholarly fronts (Gyamfi et al., 2022). Proper recycling and waste management start in the design process of the product. It depends on the manufacturer if the product can be reused or not. The retailer and remanufacturer should focus on increasing product sales and recycling quantity of waste products to promote the achievement of economic and environmental value (Zhang et al., 2022). One of the problems is consumer behavior toward recycling. Some countries and their citizen know how to recycle and are thorough in the process. Some countries are trying to improve the recycling situation. One of the reasons to improve recycling in the country is the transformation to a circular economy. Change in consumer behavior that leads to increased waste separation and recycling has been identified as a critical component of Chinese national strategy for constructing a "Circular Economy" (Tong et al., 2018). The concept of Circular Economy has made a crucial contribution to establishing a changed perspective on recycling, one in which recycling is no longer regarded as merely a part of waste management, but rather intimately linked with preceding stages of production, such as product design and manufacturing. It has been shown that recycling achievements significantly depend on the inputs into recycling processes where complex products require higher recycling efforts (Roithner, et al., 2022). This can be followed by the research of Hischier, Böni (2021), who focused on the reuse of electronics in the circular economy. One key strategy which can be used to promote a Circular Economy is 'reuse'. This is particularly relevant for Electrical and Electronic Equipment due to its often rather short use phase as well as its resource-intensive production phase (Hischier & Böni, 2021). The circular economy can help solve many problems. Circularity can help to prevent the depletion of the earth's limited material resources,

which are vital for human's modern society (Moraga et al., 2021).

One of the worst things that citizens can do is improper disposal of electronic waste. It can have severe damage to nature or human lives. The most severe problem associated with these wastes is their informal recycling and improper disposal, threatening the environment and human health (Preetam et al., 2023). That is followed by Wirtu & Tucho (2022) dumping and improper recycling and handling of e-waste cause problems such as contamination of soil and water, depletion of grazing land, health problems such as respiratory infections, various cancers, congenital disabilities, and other health issues that affect the brain and other vital organs (Wirtu & Tucho, 2022). Climate change can be affected by several reasons, and the improper disposal of electronic waste can be one of them. Climate change calls for action from all sectors of our global economy, including ICT. Therefore, it is important to change the way we develop software to address the challenges posed by sustainability (Moreira et al., 2023).

Another crucial thing is the sustainability of the product. Sustainability is a very complex concept made up of a multitude of interacting aspects that do not necessarily work synergistically with each other (Pérez-Martínez et al., 2023). As in the recycling process, the sustainability of the product starts with its design. Designing a sustainable system of recycling used mobile phones (UMPs) is an urgent concern in terms of cleaner production ideas (Wan, Yu, 2022). This can be followed by Gutiérrez-Ángel et al. (2022), who focused on the improvement of ICT and digital competence. The process can positively influence the design of the product. From this point of view, it is considered that an improvement in digital competence has a positive impact on the use made of ICT and also on its link with sustainable development (Gutiérrez-Ángel et al., 2022) and according to Biedenkopf et al. (2018). Achieving sustainable consumption and production requires a break from current practices in many sectors, including the smartphone sector. Leaders are central actors in catalyzing such change by developing, implementing, and promoting innovative ideas, products, and practices (Biedenkopf et al., 2018).

The recycling process of electronic waste is another interesting topic. Firms can appropriately recycle used products to, not only save material costs but also bring back customers to make repurchases. However, customers may return their used products at any time and in any condition, and firms may thus be unable to fully utilize the returned items in their remanufacturing activities (Huang et al., 2019). For future development, it is important to design recyclable products. It is thus necessary to develop new eco-designed devices that allow the recycling of all the components and recovering the valuable materials through sustainable methods (Cocchi et al., 2021). As said the process of the future product should start with the design to be more recyclable and sustainable. With a modular design, it becomes easier to repair the product or replace parts, allowing for an extended lifespan (Frantz Schneider et al., 2018). Every year millions of smartphones are bought and the old one is kept by other members of a family, sold or kept in the household. But it could be better if smartphones could be recycled. Recycling is one option for reducing waste and, consequently, pollution. Various efforts have been made to create more sustainable phones, promoting recycling (Cheng et al., 2022). One of the options to promote recycling can be provided. If not, provisions should be made for better identification and more efficient recycling so that materials designated as critical can have increased potential for more than a single functional use (Graedel et al., 2022).

Considering the nature and complexity of electrical/electronic product materials, their energy consumption, and the e-waste they create, sustainability should be included in their design and innovation (Liao & Chuang, 2022). Smartphone development is becoming faster and faster. Smartphones change by the year and are thinner, bigger, and faster. The more modern electronics are, the smaller and more complex printed circuit boards are. Thus,

these materials are continually changed (physiochemically), increasing the copper concentrations in smartphones. In this sense, it is challenging to set standardized recycling processes to improve metal recovery (Andrade et al., 2022).

One of the reasons to not send the phone to recycle or resell it can be the fear that the information that we had can be stolen. The IT support can assist smartphone users to decide whether to sell their smartphones in a second-hand market and at the same time encourage developers and researchers to design methods of social media data sanitization (Benrhouma et al., 2021). Today we cannot imagine our lives without ICT. The increasing consumption of electrical and electronic devices is alarming. Therefore, the transition from a linear to a circular economy becomes essential. The key solution to support this transformation is artificial intelligence. This work presents a transfer learning approach to support the recycling of electrical and electronic waste (Ewaste) (Abou Bake et al., 2022).

3 Methodology and Data

The survey (VŠIT) is representative of the population of persons aged 16 and over to 64 living in the Czech Republic. In 2022, this was a group of 8.8 million people and 4.5 million households. In terms of conversion to the basic population, the acquired data are weighted by the post-stratification weight of the predominant individual in terms of gender, age, region, and economic activity. The data talks about the treatment of information technologies that people have stopped using. The questions always asked about the last device used, as people may have had multiple phones, that they used during their lifetime. The data are from Czech statistical office (CSO, 2022).

The data were divided into categories based on the age of the respondents.

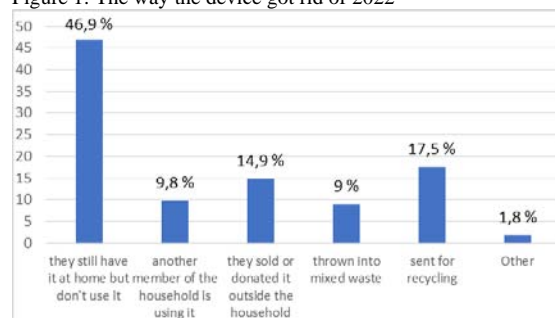
Category:

Overall (include all the respondent's data)

- 16-24 years old respondents,
- 25-34 years old respondents,
- 35-44 years old respondents,
- 45-54 years old respondents,
- 55-64 years old respondents.

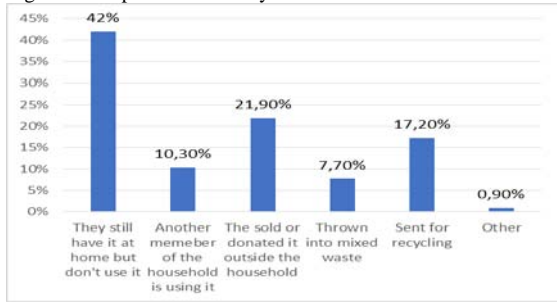
4 Results

Figure 1: The way the device got rid of 2022



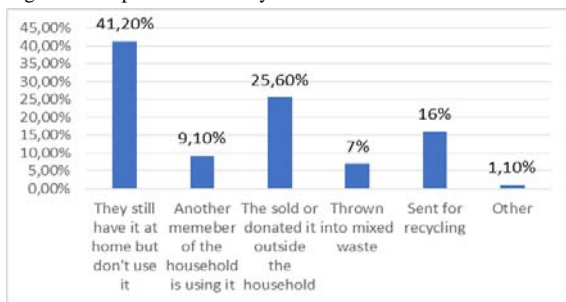
In Chart 1 we can see how the respondents got rid of their smartphones. We can see that the most popular option is to keep the phone at home. Keeping the phone at home can be beneficial if the new one stops working and suddenly, we must switch to a different phone. The old one is just right there. The other popular option is to send it for recycling, 17.5 % of respondents do that. 14,9 % sold the old phone or donated it. The most alarming result is that 9 % of respondents throw their old smartphones into mixed waste. As we discovered earlier, we concluded that this is the most dangerous way to get rid of an old phone.

Figure 2: Respondents 16-24 years



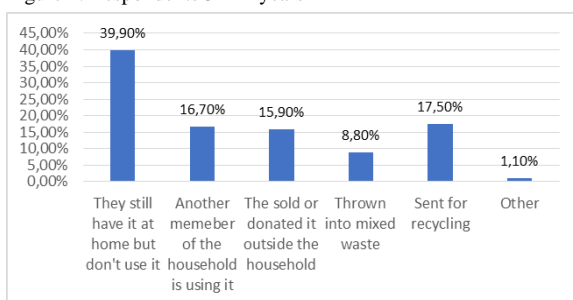
In Chart 2 we can see the results of respondents in the years between 16 and 24. The biggest number we can see is in the first category. 42% still have old phones at home, which corresponds with the overall trend we see in Chart 1. The second most popular option is to sell it or donate it outside the household. This option is chosen by 21,9%. 17,2% sent it to recycle which is 0,3% less than the overall results. But it is still a good amount. The fact that 7,7% of respondents throw it into mixed waste is still better than the overall results, specifically 2,3% less.

Figure 3: Respondents 25-34 years



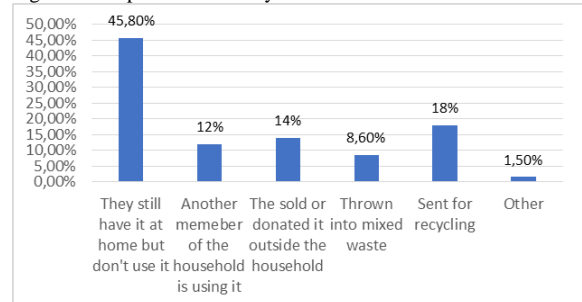
The results for the category 25 to 34 years which we can see in Chart 3 are very similar to the results in the previous category. Most of the people (41,2%) store their old phones in the house. The second most popular option is to sell it or donate it. The recycling trend and giving it to the other member of the family are really close to the overall results as the difference between Chart 1 and this is in the option giving it to other member is 0,7% and recycling is 1,5% difference. Thankfully this category shows the smallest number of respondents that throw it into mixed waste.

Figure 4: Respondents 34-44 years



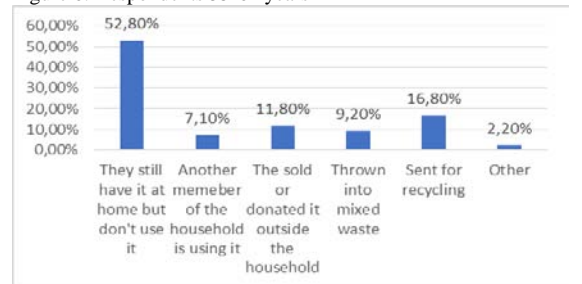
In Chart 4 we can see the results in the category of 35 to 44 years old. The trend of keeping the old phone in the household stays here too, but from all the categories is the smallest amount. It's even a 7% difference between the overall results and this category. Results in the three categories are very similar, in that other member of the family uses it, they sold it or donated it and recycling it varies less. 8,8% of the responders throw it into the mixed waste which is a 0,2% difference from the overall results.

Figure 5: Respondents 45-54 years



The results represented in Chart 5 are from the category 45 to 54 years. The second most popular option is recycling the old phone which in this case 18% is the highest amount compared to the other categories. It's even 05% more than the overall results. A significant number of respondents (14%) sold it or donated it to someone else. And 8,6% throw it into the mixed waste.

Figure 6: Respondents 55-64 years



The last Chart 6 represents the category 55 to 64 years old. This category has the highest number of respondents that store their phone in their home, which is 52,8%. But also has the highest number of people who throw it into the mixed waste with 9,2%.

5 Discussion and conclusion

In all the categories the number one option how to get rid of the old phone is to keep it at home even if they don't use it. The overall number is 6,9% and the highest amount recorded is in the category of 45-54 years old with 45,8 which is a 3,8% difference. The smallest amount is in the category of 35-44 years old. This shows us that keeping the phone in the home is the most popular way of getting rid of the old phone. Because smartphones become one of the most important things in our daily life is safest to keep the old one if the new one just stopped working. As said by Shi et al. (2023). Smartphone use has become an indispensable aspect of daily life for billions of people (Shi et al., 2023).

Giving it to another member of the family or household is the least chosen category (if we exclude the "other" option) with overall results of 9,8%. The highest amount in this option is recorded in the 35-44 years old category with 16,7% and the smallest amount is 7,1% in the 55-64 years old category. This corresponds with the research done by Gray & Charness (2022). However, they may be more likely to own more dated devices, such as non-smart mobile phones. Models of device age showed that older adults are more likely to own older smartphones, as well as older desktop and laptop computers (Gray & Charness, 2022).

Selling or donating the old phone is the option that's "in the middle". The results show that overall, this option was closed by 14,9% and the category that picked it most is 25-34 years old. The least amount was recorded in the last category which is 55-64. This shows that the 25-34 category is most likely to sell their old phone to have more money for the new one. Since these days smartphones become more and more expensive. Considering short replacement cycles and low recycling rates of smartphones, establishing effective return mechanisms for unused

smartphones is necessary to prolong product use phases and thereby reduce the environmental impact of smartphones. Consumer-to-business return options provide a novel, accessible way to return unused devices but require consumer acceptance to fulfil their ecological potential (Ratay & Mohnen, 2022).

The literature research proved that the least favorite option how to get rid of an old phone is to throw it away. This option was closed by 9 % of respondents overall. The highest amount was reported in the category of 55-64 years old. The least in 25-34 years old. This can prove that the older generation is most likely to not know other ways to properly dispose of the device or how to give it for recycling. The discourses of sustainability are inextricably linked to the influence of technology in shaping the future. Information and Communication Technology (ICT) in particular plays a crucial role in our understanding of the environment and human impacts as well as our search for future solutions to mitigate climate change (Admo & Willis, 2022).

The most interesting category for this research is how many respondents chose to recycle their old phones. The overall number of respondents that chose this option is 17,5 % Which is the second overall highest number. All the categories got similar results being 16 % the smallest and 18 % being the highest. The highest amount is 45-54 is the number one in recycling. Repeated actions and behaviors are characteristic of people's daily lives. However, there is a dilemma when this repeated action is associated with mobile phone recycling since convincing mobile users to recycle sustainably is challenging (Ben Yahya et al., 2022).

For all the categories is the most favorable option to keep their old phone at home "Just in case". For the younger generation changing their old smartphones for new ones every other year, they are more likely to keep the old phone "just in case" or sell it to get more money for a new one. All the categories tend to recycle their old phones or give them to another member of the family 9 % overall of the respondents, unfortunately, throw it into the mixed waste.

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Primary Paper Section: A

Secondary Paper Section: DM

DIGITAL SKILLS OF EMPLOYEES - DESIRED VERSUS ACTUAL

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This paper is an output of the projects: VEGA no. 1/0188/24 Hybrid work regimes as a result of companies learning from the crisis and the implications of their implementation for the people management; and VEGA no. 1/0328/21 Post-pandemic business management: identifying temporary and sustainable changes in sequential and parallel management functions in the context of the COVID-19 pandemic.

Abstract: The aim of our research was to investigate the actual level of digital skills and the level required to practise a profession, to identify significant differences and to suggest appropriate training methods. The research was conducted by questionnaire among respondents from Slovakia, the Czech Republic and Spain. The results of the research show that employees do not reach the level of digital skills required by employers, the expectations of the highest level of skills were in the field of cyber security, where statistical significance between the desired and actual value was also demonstrated. There was no statistically significant dependence of respondents' skill level on education or job position.

Keywords: digital competences, literacy, skills, learning needs, education

1 Introduction

The competitiveness of European industry depends on its ability to cope with the transition to digitalisation and innovation. All processes implemented must ensure sustainability. In line with these needs, Europe's priorities are also set, where it is expected to ensure Europe's technological sovereignty and transform itself into a digital, technological and industrial leader with the strengthening of the EU single market. In conceiving the research design, we have drawn on the European Union's commitment and the European Commission's 2016 Digitising European Industry initiative.

A special report by the European Court of Auditors concludes that EU businesses are not taking full advantage of the innovation benefits of advanced technologies. Digitalisation is supposed to be the key to better business performance. The Commission's actions within the framework of the adopted strategy, where the establishment of European Digital Innovation Hubs and the setting of conditions for the 2021-2027 programming period (ECR, 2024) are considered highly effective, are to be highly commended. Governmental materials have been adopted within the individual Member States, for example the 2030 Strategy for Digital Transformation and the action plans ensuring digital transformation.

Through empirical research, we want to contribute to information identifying the gap between actual digital skills and the required digital skills for a selected group of professions. We draw on the European Digital Competence Framework (DigComp) and the description of learning outcomes in terms of Bloom's Taxonomy in five domains of digital skills and competencies to construct the research and build our hypotheses.

2 Theoretical background

The pressure to digitise, which involves not only acquiring new IT equipment and systems, but also exploiting the opportunities presented by new technologies, is enormous. The transition to a digital economy requires companies to adapt to new business models and global trends, bringing much greater control over products, while offering greater opportunities to tailor products to increasingly individual customer requirements.

Digital transformation, which involves all kinds of industries and economic sectors, is essential to keep many businesses competitive. As part of the ongoing digital transformation of the economy and society, the industrial society is transforming into an information society (Stareček et al., 2023) and subsequently

into a knowledge society. Organizations that are unable to meet the timely and harmonized adoption, implementation, and use of technology solutions will not thrive or, in the worst case, will not survive. Measuring the extent of the digitalisation of industry in the EU has been monitored by the European Commission since 2014 through the Digital Economy and Society Index (DESI), which summarises five¹ indicators: connectivity, human capital, use of supported services, integration of digital technologies and digital public services, thereby tracking Member States' progress in digital competitiveness (European Commission, 2023).

2.1 Literature review

While information and communication technologies (ICT) is the foundation of innovation, it starts with people, making human capital critical within intellectual capital. Human resources and competencies are the most valuable capital in society, a source of created value and sustainable competitive advantage in a dynamically changing environment (Kowal et al., 2022). The real challenge of digitalization is not the technology, because the introduction of new technology in the workplace is not just about hardware and software, but about the workforce having to adopt it, learn how to use it, and change their behaviour (Bala & Venkatesh, 2016; Colbert et al., 2016).

The digital revolution is fundamentally affecting the labour market. The use of digitalization, automation and robotization is gradually changing job roles, new forms of employment are emerging, and employers' requirements for employee competencies are changing (Kotíková et al., 2019). The necessary knowledge, skills and attitudes are required to successfully manage changes in labour market status in order to maintain current living standards, promote high levels of employment and cultivate social cohesion with a view to the future society and the world of work (Európsky parlament, Rada a Komisia; 2017). Digital literacy, i.e. the demonstrable ability to confidently, critically and responsibly use digital technologies to work in a digital society, becomes a prerequisite for an individual's employability, thereby increasing their chances of getting a job, keeping a job, or transitioning to another job. In addition to the effective use of digital technologies, there is a need to build awareness of basic literacies in the areas of cyber security, media literacy, and the ability for increasingly necessary digital hygiene (Mirri.gov.sk, 2022).

The process of digital transformation requires skills and knowledge that enable users to extract and exchange data, analyse it and transform it into useful information (Štaka et al., 2022), which means that almost all jobs require some level of digital skills and knowledge (Ananiadou & Claro, 2009). As a result, employers increasingly demand knowledge workers who are highly skilled (Kefela, 2010) and are an increasingly important strategic resource for them (Middleton & Hall, 2021). Digital technologies used in the workplace are increasingly advanced and digital literacy skills have become critical skills in the digital age (Nikou et al., 2022). These are mastery of ICT applications to solve cognitive tasks at work; skills that are not technology-based as they do not relate to the use of any particular software program; skills that support higher order thinking processes; and skills related to cognitive processes that support continuous learning for employees (Claro et al. 2012). Employees should be competent and keep their skills up to date (Ali & Richardson, 2018).

Employee digital literacy has significant implications for organizations that rely on a skilled workforce to remain competitive in the digital age (Farrell et al., 2021). Therefore, decision-makers and managers should pay close attention to the level of digital literacy of their employees (Nikou et al., 2022)

¹five indicators up to and including 2020: connectivity, human capital, use of internet services, integration of digital technologies and digital public services; and four indicators from 2021: human capital, connectivity, integration of digital technology and digital public services.

and take systematic approaches that support digital skills development to a strategic level (Mazurchenko et al., 2022).

Numerous studies show that digital skills are increasingly required by all types of businesses (Iniesta-Alemán et al., 2020), and they expect their employees to have the latest digital technology skills related to various abilities in using digital devices and applications, as well as information and communication applications (Suarda et al., 2023). Skills requirements in job advertisements are also important indicators to identify the skills required by employers (Kowal et al., 2022).

According to Ferreira et al. (2023) a rapidly changing work environment requires rapidly changing skills, what may have been sufficient in the past may not be able to address what will be critical in the future. They also note that a strategic approach to future development ensures that individuals can keep their skills relevant while preparing their careers for the future.

2.2 Theoretical background of the research

The changing content of work due to the overall development of science, technology, production and the economic prosperity of society are determined by two factors: the introduction of new technologies that give priority to cognitive competences and psychomotor skills and the development of new organisational forms that create new requirements with an emphasis on diversity, flexibility and quality of work activities.

The European Framework of Reference has defined eight key competences that are necessary for personal fulfilment and development, employability, social inclusion, sustainable lifestyles, successful living in a peaceful society, for managing life with a responsible attitude to health and active citizenship (Official Journal of the EU, 2018). Key competences are a dynamic combination of knowledge, skills and attitudes that individuals need to develop throughout their lives. Each of the competences defines and at the same time delineates the core knowledge, skills and attitudes related to that competence.

Digital competence encompasses the confident, critical and responsible use and engagement with digital technologies for learning, work and participation in society. It includes information and data literacy, communication and collaboration, media literacy, digital content creation (including coding), security (including digital wellbeing and cyber security literacy), intellectual property issues, problem solving and critical thinking (Official Journal of the EU, 2018).

Digital literacy integrates information and data literacy, communication and collaboration, media literacy, digital content creation, security, intellectual property issues, problem solving and critical thinking. It means that digitally literate individuals understand the functioning of digital technologies (computers, mobile phones, internet and other devices), have skills in working with digital tools (software, online platforms for various purposes, etc.), have the ability to critically assess and recognise information (whether information is relevant or false), know how to protect themselves in the online space (protection of personal data, use of strong passwords, adherence to cyber security principles), have communication skills (ability to communicate effectively in the online space, create content for different platforms, etc.) and are creative and innovative (use of new tools for creating content, projects, etc.).

According to Barykin et al. (2020, p. 4), who propose to complement the structure of digital competence with experimental and scientific research skills, digital literacy consists in the "ability to select, critically evaluate various data and information through experimentation, scientific research and using technological potential, being aware of their own and respecting mutual rights, to create common and joint knowledge and apply them in creating globally competitive products."

Digital skills for the 21st century are divided into the following areas (Van Laar et al., 2019): Information skills area (to search,

evaluate and manage digital information), Communication skills area (to transfer information online, to prepare a presentation of this information), Collaboration skills area (to work effectively in teams with the intention of achieving a common goal and to be able to take joint responsibility for tasks and work outcomes), critical thinking (ability to make informed judgements about information and communication based on sufficient reasoning and evidence), creativity (appropriate use of online tools, online resources to create online content) and problem solving (use ICT to analyse a problem and knowledge to find a solution to a problem).

The European Digital Competence Framework (DigComp), published by the European Commission in 2013, offers a tool to improve the digital competence of European citizens and supports national frameworks and strategies for digital skills (Digitálna koalícia, 2023). DigComp describes in the form of learning outcomes (according to Bloom's taxonomy) five areas of digital competences (information and data literacy, communication and collaboration, digital content creation, security and problem solving) at six levels of difficulty (Tulinska, 2021), which correspond to the European Qualifications Framework (EQF). The description of each level includes knowledge, skills and attitudes described in one descriptor for each level of each competency.

Since 2013, the framework has been updated several times and the latest major update released in 2022 (DigComp 2.2) provides more than 250 new examples of knowledge, skills and attitudes, taking into account emerging technologies (artificial intelligence, the Internet of Things, data technology or new phenomena resulting from the pandemic crisis, which have led to the need for new and increased requirements in the area of digital competence for citizens and workers) in order to help European citizens in self-assessment, identification of training offers and job search (Digitálna koalícia, 2023).

The attitudes of a digitally competent individual are defined by the Official Journal of the European Union (2018): "Working with digital technologies and digital content requires an insightful and critical, yet curious, open and forward-looking approach to their development. It also requires an ethical, safe and responsible approach to using these tools."

In our empirical research, we are concerned with digital knowledge and skills as one of the components of key competences. The intention of our research was to investigate the actual level of digital skills and the level required for the profession in line with the objectives of the VEGA project no. 1/0188/24 Hybrid work regimes as a result of companies learning from the crisis and the implications of their implementation for the people management. On this basis, to identify the essential differences and the resulting training needs and to propose appropriate training modalities.

3 Research methodology

Based on the research design, we established three research hypotheses (formulated as null and alternative) as follows:

Hypothesis 1:

1H0a,b,c,d,e: There is no relationship between the actual level of digital skills and the desired level required for the profession in the areas of (a) information and data literacy, (b) communication and collaboration, (c) digital content creation, (d) cyber security, and (e) problem solving.

1H1a,b,c,d,e: The desired level of digital skills required for a profession in a) information and data literacy, b) communication and collaboration, c) digital content creation, d) cyber security, e) problem solving, is statistically significantly higher than their actual level.

Hypothesis 2:

2H0: There is no relationship between the actual level of digital skills and educational attainment.

2H1: The actual level of digital skills is conditional on educational attainment.

Hypothesis 3:

3H0: There is no relationship between the actual level of digital skills and job position.

3H1: There is a statistically significant relationship between actual level of digital skills and job position.

In order to verify the research hypotheses, a research model was developed and a questionnaire survey was subsequently conducted among line managers and employees – specialists in food production from Slovakia, the Czech Republic and Spain. According to the occupational classification (SK ISCO-08, 2020): line managers (no. 3122001 Master/supervisor in food production) and employees (no. 2141002 Specialists – technologists in food production and no. 3142006 Technologist in food production).

The questionnaire survey was conducted in the months of January to February 2024. The individual indicators were rated by the respondents on a 7-point Likert scale from 0 to 6, with the following meanings according to Bloom's taxonomy: 0 – not required, 1 – remembering level, 2 – understanding level, 3 – applying level, 4 – analysing level, 5 – evaluating level, 6 – creating level.

The research model consisted of parameters and five groups of research variables. Parameters consisted of variables characterizing the research sample, namely: P1 – country, P2 – education, P3 – occupation (function in the company).

The first group of variables (1.1A, 1.1R ... 1.9A, 1.9R) included an assessment of the level of their own digital skills (actual - A) and the digital skills required by their businesses (required - R) in the area of information and data literacy. The second group of variables (2.1A, 2.1R ... 2.5A, 2.5R) concerned the assessment of the level of digital skills in communication and collaboration, the third group (3.1A, 3.1R ... 3.8A, 3.8R) the level of digital content creation, the fourth group (4.1A, 4.1R ... 4.6A, 4.6R) the level in cyber security and the fifth group (5.AS, 5.1R ... 5.4A, 5.4R) the level in cyber security. The significance of the research model variables along with the results of the descriptive statistics are presented in Table 1 ... Table 5.

In addition to the standard methods of scientific work (analysis, synthesis, comparison), the methods of evaluation of research variables in Excel and statistical verification of hypotheses in Jamovi were used in the paper. These were the following statistical tests and tools: descriptive statistics, Levene's test, non-parametric alternative of ANOVA test (Kruskal-Wallis test, Durbin-Wattson test for autocorrelation, Shapiro-Wilk test, Binomial logistic regression and Multinomial logistic regression.

4 Results and Discussion

We present the results of the research in the following structure: research sample, reliability of the research instrument, descriptive statistics and outliers of the results, evaluation according to Bloom's taxonomy, testing the statistical significance of the research hypotheses, and drawing conclusions.

4.1 Research sample

The research sample consisted of 186 respondents from industry C – Manufacturing, division 10 – food manufacturing, 11 – beverage manufacturing (according to SK NACE).

Table 1: Research sample

Parameters		Number	% share
P1 – country	Slovakia	61	32.81
	Czech Republic	68	36.56
	Spain	57	30.65
P2 – education	Secondary	51	27.42
	Higher education	135	72.58
P3 – function in the company*	Line manager	106	56.99
	Employee	80	43.01

*Note: according to the occupational classification SK ISCO-08, 2020), a line manager is no. 3122001 Master/supervisor in food production and Employee no. 2141002 Specialists – technologists in food production and no. 3142006 Technologist in food production.

4.2 Reliability of the research instrument

The research instrument (questionnaire) contained five groups of scale-type variables; therefore, reliability was tested using Cronbach's α and McDonald's ω .

The reliability of the 1st group of scale variables (1.1A, 1.1R ... 1.9A, 1.9R) reached $\alpha = 0.70$, $\omega = 0.73$ (overall). Reliability of individual variables reached α values from 0.67 to 0.71, ω from 0.70 to 0.73.

The scale reliability of the 2nd group of variables (2.1A, 2.1R ... 2.5A, 2.5R) reached $\alpha = 0.51$, $\omega = 0.56$ (overall). Reliability of individual variables ranged from 0.40 to 0.55 for the coefficient of α , from 0.50 to 0.59 for the coefficient of ω .

The scale reliability of the 3rd group of variables (3.1A, 3.1R ... 3.8A, 3.8R) was $\alpha = 0.74$, $\omega = 0.78$ (overall). Reliability of individual variables ranged from 0.70 to 0.76 for the coefficient of α , from 0.74 to 0.79 for the coefficient of ω .

The scale reliability of the 4th group of variables (4.1A, 4.1R ... 4.6A, 4.6R) was $\alpha = 0.90$, $\omega = 0.92$ (overall). Reliability of individual variables ranged from 0.89 to 0.90 for the coefficient of α , from 0.90 to 0.93 for the coefficient of ω .

The scale reliability of the 5th group of variables (5.1A, 5.1R ... 5.4A, 5.4R) was $\alpha = 0.56$, $\omega = 0.63$ (overall). Reliability of individual variables ranged from 0.48 to 0.61 for the coefficient of α , from 0.59 to 0.64 for the coefficient of ω .

We consider the above reliability values of our research instrument to be reasonable, despite the fact that authors such as Hanák (2016), Kolarčík (2013), and Marko (2016) report desired values of Cronbach's $\alpha > 0.7$. According to Ullah (2018), Cronbach's α values around 0.5, although low, are still acceptable and are most often due to the smaller number of items in the respective group of variables. Therefore, the reliability was further supplemented by the McDonald's coefficient ω (Marko, 2016), whose value satisfies the above condition.

4.3 Descriptive statistics and description of extreme values of the results

From the descriptive statistics, we provide two tables for each group of variables. One table shows the mean and standard deviation (due to the limited scope of the paper), and for each variable we compare the rating of the desired and actual level of digital skills and the difference between them (Table 2 ... Table 11). A difference greater than 1 is shaded in grey. The second table shows the frequencies of the ratings of each variable (from 0 to 6) for the desired and actual levels according to Bloom's taxonomy.

Table 2 Evaluation of research variables in the area of Information and Data Literacy

I.	INFORMATION AND DATA LITERACY AREA (working with the Internet)	Required skill level (R)		Actual skill level (A)		Difference
		AVG	STDEV	AVG	STDEV	
1.1	Getting up-to-date information for work (exchange rate tickets, tax returns, weather information, pollen situation...)	5.188	0.571	3.704	0.664	1.484
1.2	Use of information from published price lists for goods and services	3.935	0.990	1.925	0.795	2.010
1.3	Completing and submitting online forms for state and public institutions (health insurance, social insurance...)	3.500	0.668	2.683	0.616	0.817
1.4	Using information from maps and navigation	2.441	0.498	1.301	0.472	1.140
1.5	Use of information	3.952	0.572	3.258	0.439	0.694

	published by public authorities and institutions (government, ministries, statistical office, tax office, social security, health insurance...)					
1.6	Use of data from publicly available portals (cadaster portal, trade register, commercial register, FINSTAT...)	4.597	0.573	4.016	0.653	0.581
1.7	Use of published publicly available data from the Internet (Open data)	4.167	0.402	3.478	0.562	0.689
1.8	Use of data from commercial databases (Albertina, Datamax, European databank, Kompass, Golden Pages...)	2.774	0.692	4.22	0.728	-1.446
1.9	Implementation of online marketing	2.108	0.831	1.581	0.695	0.527

Table 3 Level of evaluation of research variables in the area of Information and Data Literacy according to Bloom's Taxonomy

Variable/level	0	1	2	3	4	5	6	Bloom's taxonomy (level of most assessments)
1.1 R	0	0	0	3	7	128	48	evaluate, create
1.1 A	0	0	6	56	111	13	0	apply, analyse
1.2 R	0	0	16	49	52	69	0	apply, analyse, evaluate
1.2 A	0	63	76	46	0	1	0	memorize, understand, apply
1.3 R	0	0	1	108	60	17	0	apply, analyse
1.3 A	0	11	41	130	4	0	0	understand, apply
1.4 R	0	0	104	82	0	0	0	understand, apply
1.4 A	0	131	54	1	0	0	0	memorize, understand
1.5 R	0	0	0	35	125	26	0	analyse, evaluate
1.5 A	0	0	0	138	48	0	0	apply, analyse
1.6 R	0	0	0	8	59	119	0	analyse, evaluate
1.6 A	0	0	2	32	113	39	0	analyse, evaluate
1.7 R	0	0	0	2	151	33	0	analyse, evaluate
1.7 A	0	0	3	94	86	3	0	apply, analyse
1.8 R	0	0	70	88	28	0	0	understand, apply
1.8 A	0	0	0	33	79	74	0	analyse, evaluate
1.9 R	0	53	62	69	2	0	0	understand, apply
1.9 A	5	85	79	17	0	0	0	memorize, understand

The frequency table (Table 3), which shows a comparison of the desired and actual digital skills level for the respective pair of variables, confirms the fact that the desired digital skills level is 1 to 2 levels higher than the actual digital skills level of the respondents. The highest level (creating level) is only required in 1 case (variable 1.1 R). The most frequently required and actual levels are 3 (applying) and 4 (analysing). Level 0 (not required) occurs only minimally.

Table 4 Evaluation of the research variables in the area of Communication and Cooperation

II.	COMMUNICATION AND COOPERATION AREA (collaboration tools and social networks)	Required skill level		Actual skill level		Difference
		AVG	STDEV	AVG	STDEV	
2.1	For group (team) collaboration we require the use of MS Outlook	4.473	0.852	3.919	1.148	0.554
2.2	For group collaboration we require the use of Google Calendar	4.355	0.814	3.371	1.417	0.984
2.3	For group collaboration we require the use of MS Exchange	2.758	0.598	1.172	0.651	1.586
2.4	For group collaboration, we require the use of shared files on Google Drive	4.382	0.749	2.355	0.652	2.027
2.5	For group collaboration we require the use of social networks (Facebook)	4.306	0.868	4.102	0.910	0.204

Table 5 Level of evaluation of the research variables in the area of Communication and Collaboration according to Bloom's Taxonomy

Variable/level	0	1	2	3	4	5	6	Bloom's taxonomy (level of most assessments)
2.1 R	0	0	0	36	34	108	8	analyse, evaluate, create
2.1 A	0	4	21	43	36	82	0	analyse, evaluate
2.2 R	0	0	2	34	46	104	0	analyse, evaluate
2.2 A	0	24	30	47	23	62	0	apply, analyse, evaluate
2.3 R	0	2	55	115	14	0	0	understand, apply
2.3 A	17	127	37	3	2	0	0	memorize, understand
2.4 R	0	0	2	44	35	105	0	apply, analyse, evaluate
2.4 A	0	18	84	84	0	0	0	understand, apply
2.5 R	0	0	2	44	35	105	0	apply, analyse, evaluate
2.5 A	0	0	5	53	46	82	0	apply, analyse, evaluate

Table 4 shows that the use of software tools such as MS Outlook, Google Calendar, Google Drive and social networking are highly demanded by enterprises (around level 5) and the ratings of the actual level of use are close to them (except for Google Drive, where the difference is 2.027). Among our respondents' businesses, the least popular application is MS Exchange, which scores the lowest in both average desired and actual values.

The frequency table (Table 5), which shows a comparison of a pair of variables assessing the desired and actual level of digital skills, confirms, as in the first group of variables, that the desired level of skills is 1 to 2 levels higher than the actual level. Only in the case of variable 2.5 can we say that the actual level reaches the desired level. The highest level (production level) is the desired level only in 1 case (variable 2.1 R). The most frequent required and actual levels are 3 (apply) and 5 (evaluate). Level 0 (not required) occurs only minimally.

Table 6 Evaluation of research variables in the area of Digital Content Creation

III.	DIGITAL CONTENT CREATION AREA (office tools and corporate IS)	Required skill level		Actual skill level		Difference
		AVG	STDEV	AVG	STDEV	
3.1	Use of MS Office and all its applications to create electronic documents	5.909	0.289	4.565	0.727	1.344
3.2	Use of MS Excel to create calculations and graphs	4.849	0.707	2.839	0.369	2.010
3.3	Using MS Word for administration	5.855	0.353	4.495	0.707	1.360
3.4	Use of MS Power point for presenting	3.29	0.772	2.059	0.634	1.231
3.5	We require the use of other office software at work	1.129	0.336	0.946	0.726	0.183
3.6	Use of all enterprise IS modules	1.355	0.491	3.294	0.433	-1.939
3.7	Use of selected IS modules according to job classification	4.382	0.53	3.317	0.467	1.065
3.8	Use of the employee portal (data related only to a specific employee – absence registration, leave...)	3.828	0.722	3.226	0.865	0.602

Table 7 Level of evaluation of the research variables in the area of Digital Content Creation according to Bloom's Taxonomy

Variable/level	0	1	2	3	4	5	6	Bloom's taxonomy (level of most assessments)
3.1 R	0	0	0	0	0	17	169	evaluate, create
3.1 A	0	0	0	22	41	119	4	analyse, evaluate
3.2 R	0	0	0	0	62	90	34	analyse, evaluate, create
3.2 A	0	0	30	156	0	0	0	understand, apply
3.3 R	0	0	0	0	0	27	159	evaluate, create

3.3 A	0	0	1	20	51	114	0	analyse, evaluate
3.4 R	0	6	18	78	84	0	0	apply, analyse
3.4 A	1	29	114	42	0	0	0	understand, apply
3.5 R	0	16	24	0	0	0	0	memorize, apply
3.5 A	54	88	44	0	0	0	0	memorize, apply
3.6 R	0	12	64	1	0	0	0	memorize, apply
3.6 A	0	0	0	14	46	0	0	apply, analyse
3.7 R	0	0	1	1	11	74	0	analyse, evaluate
3.7 A	0	0	0	12	59	0	0	apply, analyse
3.8 R	0	0	1	64	87	34	0	apply, analyse, evaluate
3.8 A	0	0	40	77	56	13	0	understand, apply, analyse

Table 6 characterizes the high required level of digital skills using MS Office (5.91), MS Word alone (5.86), MS Excel (4.85), lower level of using MS Power Point (3.29) and high level of using selected enterprise IS modules (4.34). Enterprises are least likely to require the use of other office software (as opposed to MS Office) and the use of all enterprise IS modules. These variables also show the largest difference between the desired and actual levels.

When projected into Bloom's taxonomy (Table 7), we see that firms require the highest level of skills in MS Office overall, MS Excel and MS Word specifically, while the reality is at least 1 level lower. At the same time, variable 3.5 (use of other office software) is not required at all in up to 54 cases.

Table 8 Evaluation of Cyber security research variables

IV.	CYBER SECURITY AREA	Required skill level		Actual skill level		Difference
		AVG	STDEV	AVG	STDEV	
4.1	Use a suitable and up-to-date web browser, e.g. Microsoft Edge, Google Chrome, Mozilla Firefox, Opera	5.538	0.531	4.242	0.429	1.296
4.2	Use of effective virus protection	5.989	0.103	5.754	0.48	0.235
4.3	Backing up important data regularly	5.973	0.367	5.812	0.392	0.161
4.4	Knowing the meaning of http cookies	2.548	0.530	1.403	0.554	1.145
4.5	Verifying the security of connections to websites where an employee enters sensitive information to prevent the leakage of sensitive information	6.000	0.000	5.710	0.511	0.290
4.6	For any email message that asks to check passwords or other sensitive data, verify that it is not a fake sender	5.995	0.073	5.641	0.481	0.354

Table 9 Level of evaluation of research variables in the area of Cyber security according to Bloom's taxonomy

Variable / level	0	1	2	3	4	5	6	Bloom's taxonomy (most assessments)
4.1 R	0	0	0	1	0	83	102	evaluate, create
4.1 A	0	0	0	0	141	45	0	analyse, evaluate
4.2 R	0	0	0	0	0	2	184	create
4.2 A	0	0	0	0	4	37	145	evaluate, create
4.3 R	0	1	0	0	0	0	185	create
4.3 A	0	0	0	0	0	35	151	evaluate, create
4.4 R	0	0	8	96	3	0	0	understand, apply
4.4 A	0	116	6	3	1	0	0	memorize, understand
4.5 R	0	0	0	0	0	0	186	create
4.5 A	0	0	0	1	2	47	136	evaluate, create
4.6 R	0	0	0	0	0	1	185	create
4.6 A	0	0	0	0	0	67	119	evaluate, create

The area of Cyber security was ranked the highest of all the areas addressed (Table 8) in terms of both the required and actual level of digital skills. Of the six pairs of variables, in up to four cases the desired level was greater than 5.90, with the 4.5 R variable (verifying the security of the connection to the website...) reaching the highest value of 6 for all respondents. In the case of these variables, the actual level of digital skills also reaches high values. Knowing the meaning of http cookies is the least important for businesses.

The high level of digital skills in this area is also reflected in Bloom's taxonomy (Table 9), where the highest level, create, is found in high proportion.

Table 10 Evaluation of research variables in the area of problem solving

V.	PROBLEM-SOLVING AREA	Required skill level		Actual skill level		Difference
		AVG	STDEV	AVG	STDEV	
5.1	Solving technical problems	2.849	0.497	1.866	0.784	0.983
5.2	Identification of needs and technological solutions	5.414	0.536	3.043	0.605	2.371
5.3	Creative use of digital technologies	4.742	0.899	2.937	1.317	1.805
5.4	Identifying gaps in digital competence	4.866	0.414	3.871	0.564	0.995

Table 11 Level of evaluation of research variables in the area of problem solving according to Bloom's taxonomy

Variable/ level	0	1	2	3	4	5	6	Bloom's taxonomy (most assessments)
5.1 R	0	0	36	145	2	3	0	understand, apply
5.1 A	0	63	93	22	8	0	0	memorize, understand
5.2 R	0	0	0	0	4	101	81	evaluate, create
5.2 A	0	0	28	124	32	2	0	understand, apply, analyse
5.3 R	0	0	0	13	66	63	44	analyse, evaluate, create
5.3 A	0	48	9	39	80	10	0	memorise, apply, analyse
5.4 R	0	0	0	0	30	151	5	analyse, evaluate
5.4 A	0	0	0	43	124	19	0	apply, analyse

The evaluation of the Problem Solving area showed a relatively high gap between the desired and actual level of digital skills (Table 10, Table 11) in favour of the desired skills. The largest difference was observed for variable 5.2 Identification of needs and technological solutions (>2). When translated into Bloom's taxonomy, the desired level is the skills performing evaluation and creation, while the actual skills are at the level of understanding, applying and analysing. Similarly, for variable 5.3 Creative use of digital technologies, the difference between the desired and actual levels of digital skills is 1.805. Enterprises also require respondents to be proficient in identifying digital competency gaps at the analysing and evaluating level, but the difference between the desired and actual value is less than 1. The actual value is at the applying and analysing level. The least required skill is technical problem solving (level understand and apply), while the actual skill level is memorise and understand.

4.4 Testing the statistical significance of the hypotheses

Testing the statistical significance of hypothesis 1

Since the variables of the research model consisted of variables that were assessed two times by the respondents, once the level of the respective variable required by the company, the second time the actual level of their own skills, pairs of variables (required and actual) were investigated.

Levene's test of Homogeneity of variances did not show normality of the research sample for all variables, so we used a non-parametric alternative to the ANOVA test, namely the Kruskal-Wallis test. The results are presented in Table 12 to

Table 16. Statistically significant relationships are highlighted in grey.

Table 12 Results of testing the research variables in the area of Information and Data Literacy (Kruskal-Wallis test)

Variables	χ^2	df	p	ϵ^2
1.1 R. 1.1 A	14.41	4	0.006	0.07
1.2 R. 1.2 A	7.35	4	0.119	0.03
1.3 R. 1.3 A	7.52	4	0.111	0.04
1.4 R. 1.4 A	5.49	3	0.139	0.02
1.5 R. 1.5 A	4.31	2	0.116	0.02
1.6 R. 1.6 A	18.19	4	0.001	0.09
1.7 R. 1.7 A	7.43	4	0.115	0.03
1.8 R. 1.8 A	4.67	3	0.197	0.02
1.9 R. 1.9 A	1.94	3	0.584	0.01

Table 13 Results of testing the research variables in the area of Communication and Cooperation (Kruskal-Wallis test)

Variables	χ^2	df	p	ϵ^2
2.1 R. 2.1 A	18.25	4	0.001	0.09
2.2 R. 2.2 A	16.13	4	0.003	0.08
2.3 R. 2.3 A	6.00	4	0.199	0.03
2.4 R. 2.4 A	5.26	3	0.154	0.03
2.5 R. 2.5 A	5.53	4	0.240	0.03

Table 14 Results of testing the research variables in the area of Digital Content Creation domain (Kruskal-Wallis test)

Variables	χ^2	df	p	ϵ^2
3.1 R. 3.1 A	12.22	4	0.020	0.07
3.2 R. 3.2 A	3.50	2	0.170	0.02
3.3 R. 3.3 A	30.61	4	<0.001	0.16
3.4 R. 3.4 A	7.64	3	0.054	0.04
3.5 R. 3.5 A	0.53	2	0.770	0.00
3.6 R. 3.6 A	6.35	2	0.040	0.03
3.7 R. 3.7 A	5.95	2	0.051	0.03
3.8 R. 3.8 A	6.53	4	0.160	0.03

Table 15 Results of testing the research variables in the area of Cyber security (Kruskal-Wallis test)

Variables	χ^2	Df	p	ϵ^2
4.1 R. 4.1 A	15.58	2	0.0004	0.08
4.2 R. 4.2 A	57.66	3	<0.001	0.31
4.3 R. 4.3 A	63.80	2	<0.001	0.34
4.4 R. 4.4 A	5.13	4	0.27	0.03
4.5 R. 4.5 A	187.00	4	<0.001	1.00
4.6 R. 4.6 A	65.35	2	<0.001	0.35

Table 16 Results of testing the research variables in the area of Problem solving (Kruskal-Wallis test)

Variables	χ^2	Df	p	ϵ^2
5.1 R. 5.1 A	8.66	4	0.070	0.05
5.2 R. 5.2 A	4.09	4	0.391	0.02
5.3 R. 5.3 A	8.28	4	0.079	0.04
5.4 R. 5.4 A	7.82	3	0.054	0.04

It is clear from the results presented in Table 12 to Table 16 that only the results presented in Table 15 (cyber security area) can be considered statistically significant after excluding variable 4.4 (knowledge of the meaning of http cookies), which can be done given the significance of the other variables in this group.

In the other groups of variables, a maximum of three variables were statistically significant. Therefore, we conclude that

- We accept the hypothesis 1H0a. 1H0b. 1H0c. 1H0e. We reject hypothesis 1H1a. 1H1b. 1H1c. 1H1e. Thus, we fail to show a statistically significant relationship between the actual level of digital skills and the required level needed for the occupation in the area of (a) information and data literacy. b) communication and collaboration. (c) digital content creation (e) problem solving.
- We accept hypothesis 1H1d, reject hypothesis 1H0d, i.e., the desired level of digital skills required for a profession in cyber security is statistically significantly higher than their actual level.

Testing the statistical significance of hypothesis 2

We tested the statistical significance of hypothesis 2 by means of logistic regression. This method was used because the conditions for linear regression were not met. Namely, both the Durbin-Watson test for autocorrelation and the normality test (Shapiro-

Wilk) showed a p value <0.05. Binomial logistic regression was used for variables, which took 2 values and Multinomial logistic regression was used for variables, which took more than 2 values. The results of testing the 1st group of variables are shown in Table 12.

Table 17 Results of logistic regression testing the dependence of the research variables of the Information and Data Literacy domain on educational attainment

Model	Deviance	AIC	R ² _{McF}	R ² _N	χ^2	df	p
1.1 A	351.9591	363.9591	0.0208	0.0261	7.37	3	0.0582
1.2 A	409.4373	421.4373	0.0049	0.0063	1.90	3	0.5726
1.3 A	306.6129	318.6129	0.0111	0.0136	3.89	3	0.3275
1.4 A	232.3483	240.3483	0.0149	0.0182	3.74	2	0.1723
1.5 A	211.3119	215.3119	0.0052	0.0087	1.1085	1	0.2924
1.6 A	362.0781	374.0781	0.0087	0.0110	3.1726	3	0.3658
1.7 A	308.4372	320.4372	0.0067	0.0081	2.0701	3	0.5580
1.8 A	385.8205	393.8205	0.0000	0.0000	0.0134	2	0.9933
1.9 A	383.8024	395.8024	0.0055	0.0071	2.1283	3	0.5462

From Table 17 it can be seen that from the 1st group of variables, there was no statistically significant relationship between the actual level of digital skills and educational attainment (p>0.05). Similar testing was carried out on all groups of variables and there too the p<0.05 value occurred in only one case. For these reasons, we accept the null hypothesis 2H0 and reject the alternative hypothesis 2H1. Thus, we conclude that there is no relationship between the actual level of digital skills and educational attainment and we fail to show, that the actual level of digital skills is conditional on educational attainment.

Testing the statistical significance of hypothesis 3

Testing the statistical significance of hypothesis 3 was carried out in a similar way to hypothesis 2 by means of logistic regression. Also, in this case the conditions for linear regression were not met. Both the Durbin-Watson test for autocorrelation and the normality test (Shapiro-Wilk) showed a p value <0.05. The results of testing Group 1 variables are shown in Table 18.

Table 18 Results of logistic regression testing the dependence of the research variables in the area Information and data literacy on job position

Model	Deviance	AIC	R ² _{McF}	R ² _N	χ^2	df	p
1.1 A	357.2363	369.2363	0.0061	0.0077	2.65	3	0.5326
1.2 A	409.5890	421.5890	0.0045	0.0058	1.73	3	0.6047
1.3 A	306.4680	318.4680	0.0116	0.0141	3.39	3	0.3088
1.4 A	234.5419	242.5419	0.0056	0.0069	1.39	2	0.5159
1.5 A	212.4060	216.4060	0.0001	0.0001	0.01	1	0.9044
1.6 A	355.8643	367.8643	0.0257	0.0323	9.63	3	0.0246
1.7 A	306.1743	318.1743	0.0140	0.0170	4.30	3	0.2277
1.8 A	385.8276	393.8276	0.0000	0.0000	0.01	2	0.9969
1.9 A	376.1411	388.1411	0.0254	0.0323	9.96	3	0.0204

For hypothesis 3, the situation is similar to hypothesis 2. In a similar manner, the results of which are presented in Table 18, testing of all groups of variables was carried out, and there too a p-value of <0.05 occurred in only three cases. For these reasons, we accept the null hypothesis 3H0 and reject the alternative hypothesis 3H1. Thus, we conclude that there is no statistically significant relationship between the actual level of digital skills and job position.

5 Conclusion

Based on the analysis of theoretical sources and respondents' views from the empirical research conducted in the three countries, we concluded that creating conditions for organized continuous education and learning by doing allows to increase employees' innovative abilities, risk-taking abilities at an acceptable level, and to develop cognitive and psychomotor endowments that also support affective attitudes and agility, while at the same time reinforcing the intention to embrace digital technologies.

The aim of the paper was to examine the actual level of digital skills and the level required for the profession. Based on this, to identify the essential differences and the resulting learning needs and to propose appropriate learning pathways.

The results of the research showed that employers' desired level of digital skills in each of the identified areas is higher than employees' actual level of digital skills, however, only the relationship in the area of cyber security proved to be statistically significant among the areas studied. At the same time, the actual level of digital skills was not found to be statistically significant in relation to educational attainment or job position. It is therefore very important that employers place emphasis on further, continuous training for employees.

Training organized in enterprises should be aimed at meeting the current standard requirements for work performance in the workplace and also prospectively prepare employees to achieve the expected results and performance in the future, prepared along two basic lines.

The first line is workplace learning in terms of team and group work. Learning by doing is becoming an increasingly important element for employee learning. In many countries, researches are conducted (Buligina & Sloka, 2022), where researchers analyse different aspects affecting the implementation of work-based learning. In this implementation of learning by doing, digital skills are increasingly important. The importance should be seen from several aspects, it is mainly the interest (motivation) to perform the tasks and duties set, the willingness and ability to update one's knowledge and skills in the professional field, the ability to work independently, the personal interest to perform the tasks, loyalty to the company, the attitude to work, the interest and ability to improve knowledge and skills. This requires the creation of organisational units incorporating team learning into teamwork.

The second line is organised training in cooperation with educational institutions or by implementing training programmes developed by the relevant training departments in the company. This approach requires close cooperation between educational institutions, the business sector and decision-makers. Training institutions must develop training programmes in line with the requirements of the decision-making sphere, the requirements of international institutions, the needs of enterprises and the current labour market. They must keep pace with changes in the labour market and consistently incorporate cognitive and psychomotor learning objectives in their educational programmes to meet the needs of the digital transformation and the emerging digital economy.

HR managers, in collaboration with line managers, should develop career plans for individual employees that show how they can move from their current level to a higher job level. In addition to employee digital competency development, interdisciplinary skills development programs should also be targeted, which could significantly improve employees' growth prospects with the application of modern digital technologies. Appropriate pilot training programmes should be designed based on the identified training needs and the identified critical requirements of employees for different levels of skills, which include technical skills, technological skills and soft skills. For example, employees should understand that technology is important not only for the business to remain competitive but also for their personal development and career growth.

The limitations and constraints of our research were in terms of the orientation to the three selected European countries and in terms of the orientation to a specific sector within the statistical classification of economic activities.

Suggestions for further research are in the analysis and subsequent elaboration of specific educational activities in support of digital transformation and the preparation of adult education institutions for cooperation with the business sector.

We are aware that a real transformation of industry can be achieved by the joint action of the countries of the European Union, with the effective support of the European Economic and Social Committee as an advisory body of the European Union, which brings together representatives of workers' and employers'

organisations and other interest groups. Genuine digital competitiveness of businesses requires a smart and combined knowledge and skills strategy that enables current and future employees to meet the tough challenges of today.

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EFFECTIVENESS OF THE USE OF COMPENSATION BONUSES IN THE CZECH REPUBLIC

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Abstract: Aim: This paper focuses on the evaluation of the impact of the use of compensation bonuses during a pandemic on the economic situation of companies. Methods: In order to achieve this objective, a primary quantitative survey in the form of a questionnaire survey was conducted in Czech enterprises and two research questions were set. The research questions were answered by testing four hypotheses, which focused on testing the relationship between the use of compensation bonuses and the nature of the change in the economic situation of the enterprise in terms of sector, size and prevailing business relationship. The parametric two-sample one-factor ANOVA and Pearson's Chi-squared test were used to test the hypotheses. Main findings: The results showed that the use of compensation bonuses was associated with a negative change in the economic situation of the firms. Differences in the magnitude of the effect were observed in terms of the prevailing business relationship and the size of the enterprises. The business sector did not affect the strength of the association between bonus use and change in economic situation. Limitations of the paper: the paper focuses on observing the short-term trend and is limited to Czech enterprises during the pandemic period.

Keywords: post-crisis period, financial turnaround, compensation bonus, industry, trade and services, B2B and B2C, firm size.

1 Introduction

The Covid-19 pandemic had a significant impact on national economies around the world, including the Czech Republic (Lebedeva and Moskalenko, 2021). According to Bienvenido-Huertas (2021), repeated closures and restrictions on the movement of people caused a significant decline in economic activity, leading to serious consequences for businesses, workers and the state budget. Sectors such as tourism, travel, gastronomy and retail have been the hardest hit. This has led to a significant drop in the income of these sectors and an increase in unemployment. It was not only the national economy of the Czech Republic that suffered a decline in GDP and an increase in public debt (Daniels et al., 2021). Klimovsky and Nemeč (2021) reported that governments of various countries, including the Czech Republic, introduced various measures to support the economy during the pandemic. One of these measures was the provision of compensation bonuses to help businesses maintain operations and sustain employment. Laca and Laca (2021) explained that the Antivirus program was introduced, which provided support to employers in the form of compensation bonuses per employee. These bonuses were intended to help employers retain their employees and minimize layoffs. The bonuses were provided based on the comparison of the firms' sales in the previous period (Lasak, 2023). According to Lizcova (2020), the share of compensation bonuses in the state budget was significant. In the Czech Republic, several programs were implemented to support businesses during the pandemic, such as the Antivirus, Compensation Bonus and Guarantee Covid programs. These programmes were in the order of billions of crowns and were introduced in the Czech Republic during the Covid-19 pandemic to provide support to firms and tradesmen in difficult financial situations and ran from 2020 to the present. However, the exact share of the state budget depends on specific figures and government decisions (Melyk, Mazaraki and

Pugachevska, 2021). Song and Zhou (2020) think that the effectiveness of the use of compensation bonuses in the Czech Republic and abroad is a debatable issue. Stukalo, Simakhova and Baltgailis (2022) in their research stated that the effectiveness of the use of compensation programs depends on many factors, including the way the programs are implemented, controls and payouts, transparency and efficiency of the use of funds. It is important to ensure fair and transparent criteria for awarding bonuses and to monitor the impact on employment retention and economic recovery (Dostal et al., 2022).

An interesting question is how the use of compensation bonuses has affected the economic prosperity of Czech companies. The main objective of this paper is to find out how the use of compensation bonuses has affected the change in the economic situation of enterprises.

To address this issue, the following research questions were constructed:

1. What was the impact of compensation programs on the change in the economic situation of Czech enterprises during the Covid-19 pandemic?
2. How did the impact of compensation programs on the change in the economic situation of enterprises differ in terms of the prevailing business relationship (B2B/B2C), sector (services, trade, industry), size (micro / small / medium)?

2 Literature review

The Covid-19 pandemic has had a significant impact on value chains in many sectors. Production and supply chains were disrupted due to mobility restrictions and factory closures (Strange, 2020). This led to shortages of raw materials, components and finished products, causing delays in supply and reduced production. A firm that depended on foreign raw material supplies may have faced challenges associated with dependence on a single supplier (Tejani and Fukuda-parr, 2021). Havakawa and Mukunoki (2021), Xiong et al. (2021), and Sagapova and Dusek (2021) pointed out that tourism industries such as aviation, accommodation, and travel agencies were severely affected. Travel restrictions and quarantine measures have caused a dramatic decline in demand for tourism services. Airlines had to cancel flights and lost many customers. The hotel industry was forced to close operations or operate with very low occupancy rates (Xia et al., 2022). Many small businesses in the tourism industry found themselves in a difficult situation because they could not retain employees. According to the research of Choudhury et al. (2022), retail chains had to adapt to new measures and changed customer behaviour. Many stores were forced to close or reduce their hours of operation. Retailers also had to get used to the increase in online shopping and had to allow customers to use delivery services (Frederico, Kumar and Garza-Reves, 2021; Pollak et al., 2021). Retailers that can quickly adapt to new trends and changes in demand may have seen a decline in sales and even closures (Magableh, 2021). According to Paul, Adhikari, and Bose (2022), the pandemic also had an impact on global supply chains and international trade. Restrictions on mobility and closing borders have led to difficulties in transporting goods and services between countries. Many companies have had to rely on local sourcing and reduce their dependence on foreign suppliers.

Compensation programs are government measures that were introduced in the aftermath of the Covid-19 pandemic to provide financial assistance to entrepreneurs and compensate them for the negative impacts that the pandemic caused to their businesses (Shtembari, Kufo and Haxhinasto, 2022). Three of these compensation programs that have been implemented are the Antivirus, Covid and Compensation Bonus and the Covid Guarantee (Zelenska and Bell, 2022). Covid and Compensation Bonus was another compensation program that focused on self-

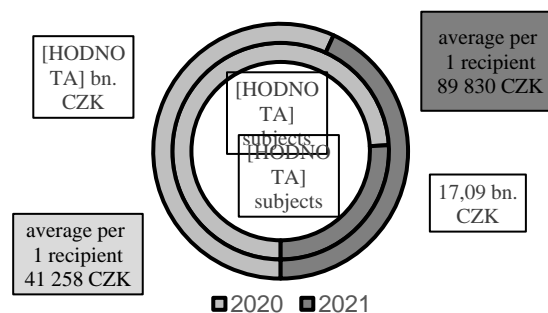
employment (Bedford et al., 2023). Entrepreneurs who were significantly affected by the pandemic and had to stop or reduce their activities could apply for financial compensation. This support was intended to help them keep their businesses alive and minimise the negative financial impact of the pandemic (Ricci et al., 2020). According to Stephany et al. (2020), the Covid Guarantee was a program to provide entrepreneurs with a guarantee for their loans and borrowings. As a result of the pandemic, many entrepreneurs faced financial hardship and problems repaying their obligations. The Covid Guarantee program provides a guarantee for these loans, which reduces the risk to lenders and helps entrepreneurs maintain access to funds. Overall, a significant amount of funding has been disbursed under these compensation programmes. Each program had its own budget that was allocated to provide support to entrepreneurs (Satiani and Davis, 2020).

During the Covid-19 pandemic, the financial situation of businesses changed significantly. Many sectors and industries, especially those related to travel, entertainment and retail, suffered significant losses (Streimikiene and Kaftan, 2021). In contrast, digital sectors, such as e-commerce, telecommunications and online payments, experienced significant growth (Ciemlaja and Kozlovskis, 2021). Large companies with sufficient financial resources have been better able to withstand the effects of the crisis. According to Heo, Grable and Rabbani (2020), small and medium-sized enterprises often faced greater difficulties and many had to close or downsize. Financial situations have had a significant impact on the economy as a whole, with some businesses able to adapt and take advantage of new opportunities, while others are struggling and restructuring their business models (Chodnicka-Jaworska, 2022). The change in the financial situation during Covid has also triggered the need for new financial strategies and measures (Szustak, Gradon and Szweczyk, 2021, Straková et al., 2021). Many firms had to rely on government stimulus packages, loans and support to maintain their liquidity and protect jobs. Banks and financial institutions provided support and flexible loans to struggling businesses. Growing investment in digital technology, enabling remote working and sales, is becoming a priority for many businesses (Ramirez, 2022).

Efficiency in the use of compensation programs has become a central issue around the world. Many countries and organizations are struggling to find optimal ways to maximize the effectiveness and outcomes of these programs. Research by Ben-Gal et al. (2022), Aman-Ullah et al. (2022) and Amantea et al. (2022) shows that these programs are well designed and properly implemented. Moreover, compensation programs are expected to have a positive impact on employees and the organization as a whole. For example, a study conducted internationally by Fabio and Suriano (2021) found that compensation programs that focus on employee motivation improve job performance and meet employee satisfaction. Thorough evaluation and measurement of the effectiveness of these programs are crucial to ensure that they are properly set up and tailored to the needs of the organization (Takci, Gozel and Hocaoglu, 2021). Studies have also been conducted in the Czech Republic to investigate the effectiveness of compensation programs. For example, research by Antosova, Hazuchova and Stavkova (2022) conducted by the Management Association (CMA) found that properly designed compensation programs can lead to increased employee motivation, employee loyalty and productivity. It is clear from these studies that the effectiveness of compensation programs is influenced by many factors, including appropriate program design, transparency, fairness, and clear communication channels (Elkmash, Abdel-Kader, and Badr El Din, 2022). In the Czech Republic, several programs have been implemented to support business, compensation programs during the pandemic, such as Covid and compensation bonus programs, Antivirus programs, Covid CK guarantee programs, and others. For the individual bonus periods, the financial administration has paid out approximately CZK 48.3 billion under the KB (Compensation Bonus) programme between 2020 and 2022. A graphical representation of the amount of compensation bonus paid and the number of

beneficiaries is shown in Figure 1 (National Audit Office (NAO), 2023).

Fig. 1. Amount of compensation bonus paid and number of beneficiaries.



Another programme was aimed at supporting employment retention (Antivirus A, A+, B programmes). The Antivirus programme has supported a significant majority of small and micro enterprises, which tend to be the most vulnerable in times of crisis. Specifically, 86% of the firms fell under 25 employees. Businesses with 100 or more employees accounted for only 5% of those supported. Summary statistics of the Antivirus programme are presented in Figure 2 (Ministry of Labour and Social Affairs of the Czech Republic (MLSA), 2021).

Fig. 2. Antivirus summary statistics

Total	
Mode A (in CZK)	10 860 100 616
Mode B (in CZK)	18 147 765 966
Mode A+ (in CZK)	21 171 445 850
Total (in CZK)	50 179 312 432
Total supported companies	74 278
Total supported employees	1 073 133

Share of supported employees in the private sector	
	37%

Guarantee programmes (e.g. the Covid CK Guarantee programme) aimed to help small and medium-sized CKs to take out the legal obligation to take out bankruptcy protection insurance (bankruptcy insurance). A total of CZK 299 billion of taxpayers' money has been paid out until 12 January 2022. One measure of the effectiveness of the provision of compensation schemes is the trend in the number of defunct businesses.

3 Methods

3.1 Methods of data collection

The research questions were defined as follows:

RQ1: What was the impact of compensation programs on the change in the economic situation of Czech enterprises during the Covid-19 pandemic?

RQ2: How did the impact of compensation programs on the change in the economic situation of enterprises differ in terms of the prevailing business relationship (B2B/B2C), sector (services, trade, industry), size (micro/small/medium)?

To answer the first question, H0 and H1 were determined. H0: The use of compensation bonus has no impact on the change in the economic situation of the enterprise. H1: The use of the compensation bonus affects the change in the economic situation of the enterprise. To answer the second RQ, H2, H3, H4 were determined. H2: The degree of influence of the use of compensation bonus on the change of the economic situation of the enterprise is related to the business sector (the degree of influence is higher for B2C than for B2B). H3: the degree of influence of the use of compensation bonuses on the change in the economic situation of the enterprise is related to the business sector (the degree of influence is higher for service providers than for industrial enterprises and trades). H4: the degree of impact of the use of compensation bonuses on the change in the economic situation of the enterprise is related to the size of the enterprise (the degree of impact is higher for small enterprises than for medium-sized enterprises). To test the defined hypotheses, a primary quantitative survey will be conducted in Czech enterprises in the form of a questionnaire survey. The questionnaire questions and response options are presented in Table 1.

Table 1: Survey questions including response options

Question	Answer options
1. Main field of business	Production company, Service provider, Retail and wholesale
2. Company size	0 – freelancer; 1 - 10 employees – micro-firm; 11 - 50 employees – small company; 51 - 250 employees – medium-sized company
3. Predominant type of business relationship	B2B, B2C; another
4. How did you do in business before the crisis?	The business was profitable, earning money for its operations and the owner's daily life; The business was becoming profitable; Stagnated; The company was loss-making
5. How do you assess the current situation of the company (situation as of October 2021)	We are considering going out of business; We are trying to recover, but the situation is still uncertain, we have a number of problems;
	We are almost recovered and we are getting on with business; We are now fully recovered and continuing as before the pandemic; We are now fully recovered and better off than before the pandemic; The pandemic did not have a negative impact on the company)
6. Have you used any of the programs to support affected businesses?	Employment retention support (Antivirus programmes); Support for entrepreneurs (Covid and compensation bonus programmes); Warranty programs (Covid Warranty programs), Did not use

In this survey, the sample will be defined by non-probability sampling based on voluntary sampling. A minimum threshold of 150 enterprises has been set for this survey due to the likely return rate of the questionnaires. The sampling of enterprises for the survey will be carried out by random selection. A key element of the testing is to define the change in the economic situation (the difference between the situation at the end of 2021 and the economic situation before). The definitions of positive change, negative change and no change situation are described in Table 2.

Table 2: Definition of economic change during a pandemic (2020-2021)

Positive change (B11)			
Economic situation before	Economic situation after (end of 2021)		
The company was profitable	We are almost recovered, and we are getting on with business	We are now fully recovered and continuing as before the pandemic	We are now fully recovered and better off than before the pandemic
Stagnated			
Negative change (B12)			
Economic situation before	Economic situation after (end of 2021)		
The company was profitable, earning money for operations and the owner's daily life	We are considering going out of business	We are trying to recover, but the situation is still uncertain, we have several problems	
The company was becoming profitable			
Without change (B13)			
Economic situation before	Economic situation after (end of 2021)		
The company was loss-making	We are considering going out of business	We are trying to recover, but the situation is still uncertain, we have a number of problems	
Stagnated			
XX			
The company was profitable, earning money for operations and the owner's daily life	We are almost recovered, and we are getting on with business	We are now fully recovered and continuing as before the pandemic	We are now fully recovered and better off than before the pandemic

The description of the samples for testing the relationships within each hypothesis H1-H4 is presented in Table 3.

Tab. 3. Description of samples for H1-H4 testing

Sample description for H1 testing		
Use of bonuses	Change in the economic situation during the pandemic	
A11: took advantage of the bonus	B11: positive	
A12: did not take advantage of the bonus	B12: negative	
	B13: without change	
Sample description for H2 testing		
Use of bonuses	Change in the economic situation during the pandemic	Prevailing business relationship
A11: took advantage of the bonus	B11: positive	C21: B2B

A12: did not take advantage of the bonus	B12: negative	C22: B2C
	B13: without change	
Sample description for H3 testing		
Use of bonuses	Change in the economic situation during the pandemic	Business sector
A11: took advantage of the bonus	B11: positive	C31: provision of services
A12: did not take advantage of the bonus	B12: negative	C32: production/industry
	B13: without change	C33: retail, wholesale
Sample description for H4 testing		
Use of bonuses	Change in the economic situation during the pandemic	Company size
A11: took advantage of the bonus	B11: positive	C41: micro-firm
A12: did not take advantage of the bonus	B12: negative	C42: small company
	B13: without change	C43: medium-sized company

3.2 Methods of data processing

Hypothesis testing will be conducted in two stages.

In the first stage, H0 and H1 will be tested. The companies will be divided into three categories according to the symptom Change in economic situation: positive, negative, no change. Furthermore, the sample will be divided according to the use of compensation programs (A/N).

Testing will be done using one-factor ANOVA and Pearson chi-square test. Normality of data will be ensured by similar sample size, allowable difference 5 percent. The significance level will be set at 3 percent.

During the second stage, hypotheses H2, H3 and H4 will be tested, aiming to establish the association between the change in the economic situation of enterprises and the use of compensation bonuses in terms of differentiation according to different criteria (predominant type of business relationship (B2B and B2C), sector (trade, manufacturing, services), size of the enterprise (micro, small, medium). Testing will be carried out using Pearson's Chi-squared test. The significance level will be set at 5 percent.

One-factor ANOVA

One-factor ANOVA, or analysis of variance, is a statistical method used to test the validity of hypotheses by comparing the differences between the treatment groups. The ANOVA method of testing is performed on more than two treatment groups, thus differing from the so-called t-test, which looks at only two groups. When using ANOVA to determine statistical significance, we work with two hypotheses. The null hypothesis (H0) puts forward that the means of all groups are the same and therefore there is no statistical difference between them. In contrast, the alternative hypothesis (H1) proposes that at least one mean of the selected groups is different (Cavus, 2022).

Pearson's Chi-squared test

Pearson's Chi-squared test is the most widely used statistical method from the category of Chi-squared tests, this method has found its use in comparing differences of categorical variables. The principle of this method is based on the probability of the observed difference occurring by chance. As with ANOVA, Pearson's Chi-squared test works with two basic hypotheses. The null hypothesis (H0) assumes that there are no observable

differences between the treatment groups and therefore they are not statistically dependent on each other. The alternative hypothesis (H1) operates with the assumption that there is a statistical association between the observed groups (Hodges et al., 2022).

$$\chi^2 = \sum \frac{(O - E)^2}{E}$$

Where:

E = Expected frequency,
O = Observed frequency.

4 Results

A total of 251 enterprises participated in the survey. This whole set was tested under H0/H1. For testing H2, H3, H4 a set of 209 enterprises was used, according to the symptom of the predominant business relationship B2B and B2C.

The hypothesis H1 was confirmed. The use of compensation bonus affects the change of economic situation in the enterprise. The results of testing using Pearsons Chi-squared test and one-factor Anova are presented in Table 4.

Tab. 4: Test results H1

Pearson's Chi-squared test results					
File	X-squared	df	p-value		
Change in the economic situation of the company	12.816	2	0.001648		
ANOVA test results					
	Df	Sum Sq	Mean Sq	F value	Pr (>F)
Use of the program	1	1.38	1.3774	8.261	0.0044
Residuals	249	41.52	0.1667		

However, it can be concluded that the use of the compensation bonus is rather related to a negative change in the change in the economic situation shows a negative tendency with the use of compensation bonuses, Table 5.

Table 5: Description of the sample for testing H1

Change.economic. situation	Yes	No
Without change	78	128
Negative	24	10
Positive	5	6

Hypothesis H2 was not confirmed. The degree of influence of the use of compensation bonuses on the change in the economic situation of the company is higher for B2B compared to B2C. The results of the testing are presented in Table 6.

Table 6: Results of H2 testing, Pearson's Chi-squared test and ANOVA test

Pearson's Chi-squared test results					
File	X-squared	df	p-value		
Change in the economic situation of the company, B2C	5.1408	2	0.00765		
Change in the economic situation of the company, B2B	13.359	2	0.001257		
ANOVA test results					
	Df	Sum Sq	Mean sq	F value	Pr (>F)
B2C					
Use of the program	1	0.724	0.7244	4.775	0.00311*
Residuals	105	15.930	0.1517		

B2B					
Use of the program	2	3.184	1.5922	7.46	0.00096*
Residuals	99	21.129	0.2134		

Again, this is an inverse proportionality. That is, the use of the compensation bonus in the short term has resulted in a rather negative change in the economic situation.

Hypothesis 3 was partially confirmed. The results of testing H3 are presented in Table 7. Primarily, there is no relationship between the degree of influence of the use of compensation bonuses on the change in the economic situation of the enterprise and the business sector. However, it can be concluded that the effect of the use of compensation bonuses is more evident in-service providers than in other industries.

Table 7: Results of H3 testing using Pearson's Chi-squared test

Pearson's Chi-squared test results, H3			
File	X-squared	df	p-value
Production	1.5032	2	0.4716
Services	5.166	2	0.07555
Sales	1.2311	2	0.5404

The results of H4 testing are presented in Table 8.

Table 8: Results of H4 testing using Pearson's Chi-squared test.

Pearson's Chi-squared test results, H4			
File	X-squared	df	p-value
Micro firms	4.6752	2	0.09656
Small companies	7.1198	2	0.02844
Medium-sized companies	2.676	2	0.2624

Hypothesis 4 is confirmed, the degree of influence of the use of compensation bonuses on the change in the economic situation of the enterprise is higher for small enterprises than for medium-sized enterprises.

5 Discussion

The scientific article focuses on the evaluation of the impact of the use of compensation bonuses during the Covid-19 pandemic and their influence on the change of the economic situation in Czech enterprises in the short term.

The Covid-19 pandemic had a significant negative impact on the national economy of the Czech Republic, especially on the tourism, travel, catering and retail sectors. The loss of revenue in these sectors led to an increase in unemployment and a reduction in GDP. Compensation programmes, including the Antivirus, Covid and Compensation Bonus and Covid Guarantee programmes, have been introduced to provide financial assistance to businesses in the Czech Republic. These programmes were designed to keep businesses operating and minimise redundancies. Fairness and transparency in the process of granting compensation bonuses is an important criterion for granting them. The literature search shows that the effectiveness of the use of compensation programs depends on many factors such as proper program design, transparency, fairness, and a clear communication strategy. Thorough evaluation and measurement of the effectiveness of these programs are key to their success. Most studies report that well-designed and properly implemented compensation programs can have a positive impact on employees and overall organizational performance.

In the course of our research, we focused on two research questions and four hypotheses to understand the short-term effects of compensation programs during the Covid-19 pandemic in Czech companies. The results of the conducted research show

that there was a negative change in the economic situation in the short term when compensation bonuses were used. Differences were observed in the effectiveness of use in terms of sector, size and prevailing business relationship. We now discuss each hypothesis in more detail and evaluate them on the basis of the results obtained.

According to the results of testing hypotheses H0 and H1, it can be concluded that the use of compensation bonus affects the change in the economic situation of the company. Our analysis reveals a link between the use of compensation bonus and negative change in the economic situation of the company in the short term. Compensation programs helped firms to retain employees and minimize losses, however, in the short run it resulted in a rather negative change in the economic situation (Zelenska and Bellova, 2022). The testing of hypothesis H2 determined that the degree of impact of the use of compensation bonuses on negative change in economic situation is higher for B2B firms than for B2C firms. The relationship between the effect of the use of compensation bonuses on the change in the economic situation of the enterprise and the business sector was not confirmed during the testing of hypothesis H3. However, the impact of compensation programs varied across sectors. Some sectors, such as tourism, catering and retail, were affected by a greater decline in sales and a higher risk of bankruptcy (Kovacs and Zsigmond, 2020). These sectors showed a greater use of compensation programs, especially the Antivirus program, and were also more dependent on government support. On the other hand, sectors such as IT and pharmaceuticals showed less dependence on compensation programs because their revenues were less affected by the pandemic. Although there is no correlation between the degree of impact of the use of compensation bonuses on the change in a company's economic situation and the business sector, the impact of the use of compensation bonuses is more evident for service providers than for other sectors. The results of testing hypothesis H4 suggest that there is a stronger tendency for negative short-run change in economic situation among small businesses when compensation bonuses are used. The Antivirus, Covid and compensation bonus programs were mainly aimed at supporting small and micro enterprises, which allowed them to retain their employees and operations even in times of crisis (Zubikova and Smolak, 2022). The results of other studies (Dostal et al., 2022; Lizcova, 2020; Hedvicakova and Kozubinova, 2021) show that compensation programs were an effective tool for improving the financial situation of many enterprises, but did not have the same impact on all entities. Improving and optimizing these programs could lead to their even more effective use in future crisis situations. Criticism of compensation bonuses has focused, among other things, on the claim that bonuses have only led to the pumping of state money into dysfunctional (uncompetitive enterprises) and are a short-sighted solution (Zubikova, Vesela and Smolak, 2023). It can be concluded that, according to their own results, recipients of compensation bonuses "got poorer" than "non-recipients". Another important aspect is the extent of the potential threat from which the introduction of compensation bonuses protected entrepreneurs. It can be assumed that, despite the negative change in the economic situation, the recipients of compensation bonuses were saved from the complete liquidation of their own businesses. The observed correlation also suggests that the support was given to 'at risk' enterprises, which were helped by the bonus to survive, not to improve their financial situation (overall, by prevailing business relationship and by size). However, from a sectoral perspective, we cannot conclusively establish this link. It can therefore be summarised that none of the sectors mentioned was particularly vulnerable compared to the others.

6 Conclusion

The main objective of the paper was to find out how the use of compensation bonuses affected the change in the economic situation of companies. In order to achieve the main objective, quantitative research was carried out using a questionnaire survey in Czech enterprises. The relationship between the use of compensation bonuses and the deterioration of the economic

situation of the beneficiaries in the short term was found. The survey in Czech enterprises showed that compensation programmes such as Antivirus, Covid and Compensation Bonus and Covid Guarantee were more associated with a negative change in the economic situation in the short term. This generalized conclusion was confirmed in the sub-assessments by size and sector of enterprises. The results show an association between the use of compensation programmes and a worsening of the economic situation for small enterprises, with a predominantly B2B business relationship. No association was found for the business sector attribute.

Several recommendations for the target segment can be made from the results of the study. A complex set of metrics, including potential macroeconomic impact, must be considered when planning the delivery and then evaluating the effectiveness of similar programmes. For example, the financial stability of the enterprise and the extent of damage would be useful in assessing the suitability of the beneficiary. The compensation programme may have helped reduce the number of businesses going out of business, but it has not promoted greater economic stability (at least in the short term).

Overall, it is important to ensure transparency and fairness in the compensation bonus process to maintain business confidence in government support measures. Greater transparency can reduce the risk of corruption and misuse of bonuses. Based on the survey results, it can be recommended that the government further assess the needs of different sectors and industries and tailor compensation programs to be as effective and targeted as possible.

The research carried out has some limitations. On the one hand, the results are limited in terms of time, as they only examine short-term trends. On the other hand, the results are limited in terms of objects, as they focus exclusively on small and medium-sized Czech enterprises. It is therefore not possible to determine with certainty whether a similar trend would be sustained in other settings.

The main directions for future research include (1) monitoring the long-term impact of the pandemic and creating new models of economic growth forecasts, (2) assessing the effectiveness and optimality of government support measures for businesses.

The first line of research would focus on the long-term economic consequences of pandemics and examine how prolonged economic changes affect corporate strategies, competitiveness, and recovery. Formulating new models of economic growth forecasts that take into account pandemic effects and analysing trends in consumer behaviour and preferences can contribute to a better understanding of future market developments.

The second line of research would focus on a critical assessment of the effectiveness and impact of the existing support measures provided during the pandemic on the corporate economy. The aim would be to identify which specific measures have been most effective in maintaining business stability and growth. The effects of various factors such as enterprise size, sector, regional specificities, etc. on the effectiveness of support measures should also be analysed. This research would provide a more comprehensive and detailed view of the mechanisms that affect the corporate economy during pandemics and the subsequent period. Such knowledge could lead to better adapted and more effective policies to support the economy in the event of future crises. In conclusion, compensation programs in the Czech Republic played a key role in improving the financial situation of many businesses during the Covid-19 pandemic. However, it is important to continuously examine and optimize these programs to be as effective as possible in supporting businesses during difficult times. Future research could be directed towards examining the long-term effects of these programmes on the economy and identifying best practices to support businesses in the event of future crises. In light of the results, we suggest that the Czech government further assess the needs of different sectors and industries and tailor compensation programs to be as

effective and targeted as possible. Such adjustments could lead to even more successful use of these programmes in future crisis situation.

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Primary Paper Section: A

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IMPACT OF WORKING CONDITION FACTORS ON THE MIGRATION OF DOCTORS AND NURSES IN HOSPITALS IN SLOVAKIA

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Abstract: The phenomenon of labour migration within the European Union is currently one of the most significant factors affecting economic and social development. A multitude of factors, encompassing economic, social, and political elements, give rise to the dynamics of migration flows. One aspect of this issue is the migration of Slovak doctors and nurses for employment purposes. It is evident that there is a demand for healthcare professionals. This will result in a shortage of labour in hospitals. The probable causes are the challenging working conditions of healthcare professionals and the perception of their quality compared to working conditions abroad. The aim of the article is to interpret the results of part of the research project, entitled 'Setting up personnel management processes in hospitals and their impact on the migration of doctors and nurses for work abroad'. The problem is examined from the perspective of the perceived influence of various aspects of working conditions in Slovak hospitals on migration. The degree of influence of the identified factors is modelled using the statistical method of Structural Equation Modelling (SEM).

Keywords: labour migration, factors of migration, questionnaire, SEM.

1 Introduction

The personnel management processes within the organisation prioritise employees as a key production factor. The correct implementation of these processes allows for the optimal utilisation of all resources, thereby ensuring the quality of healthcare delivery. The intensification of competition for the workforce in the healthcare system has led to a migration of qualified healthcare workers to other regions or abroad. This situation has a negative impact on the sustainability of the healthcare system's staffing with the necessary workforce. The issue is not, as is often presented, a lack of healthcare workers. In Slovakia, according to the OECD, the average number of doctors and nurses per 1,000 citizens is approximately the same as in other EU countries. However, a concerning aspect is the average age of these employees, particularly that of nurses.

A significant proportion of medical professionals in Slovakia commence their careers after completing their studies, but subsequently opt to relocate for employment purposes. What are the principal factors that influence this decision? Previous surveys have indicated that wage levels and professional growth are the main motives influencing the decision to migrate for work in general. The aforementioned factors, namely the number of hours worked, overtime, work schedule organisation, and the amount of administrative work, are rated very negatively by healthcare workers. The outflow of labour from the healthcare sector, coupled with a perceived deterioration in the quality of Slovak healthcare, represents a negative trend. Consequently, it is imperative that this trend is subjected to rigorous analysis and supported by robust evidence. The impact of migration on the functioning of Slovak healthcare is considerable. The formulation of political decisions aimed at influencing migration is often problematic, as valid data is often not available.

The labour market is undergoing significant changes, with a notable imbalance between supply and demand. The healthcare and social assistance sector is one of the most affected, with a significant mismatch between the two. It is likely that the migration of healthcare workers to economically more developed countries will continue in the coming years. This is due to the fact that the profession of doctors and nurses in the healthcare sector is not tied to a specific country or nation. The provision of healthcare is comparable worldwide, with the main differences being in the level of services provided, the level of staff knowledge, cultural practices, and the availability of more or less modern equipment.

The European continent has long grappled with the challenge of medical professionals seeking opportunities elsewhere. The labour markets of developed countries have become more open, and there is a real risk that Central and Eastern European countries will continue to act as source countries to replace the shortage of qualified workers in better-off countries. This will have both positive and negative consequences. From the perspective of long-term sustainability, it is essential for Slovakia to create a favourable environment, improve working conditions for all healthcare workers, and utilise new technologies to meet the demand for these services not only in developed regions, but also in less developed ones.

2 Literature review

The international migration of healthcare workers is largely driven by the fact that the profession of doctors and nurses in the healthcare sector is not tied to a specific country or nation. It is possible to make a comparison between healthcare systems worldwide, although there are differences in the level of services provided, the level of staff knowledge, and cultural practices. The mobility of healthcare workers is on the rise, particularly in light of the ageing population and the shortage of qualified personnel in some economies (Lozano et al., 2015; Buchan, 2006).

A number of studies have demonstrated that the migration of doctors and nurses abroad from new EU member states was less than the intentions of these workers to leave (Becker and Teney, 2020; Wismar et al., 2011). The departure of doctors and nurses has a detrimental impact on the provision and quality of healthcare services (Botetzat and Ramos, 2020; OACD, 2019). A significant challenge is the uneven distribution of healthcare workers across different regions of the country. The migration of healthcare professionals from less attractive regions and the current lack of interest in migrating to these regions have a number of economic and social consequences for patients, doctors, hospitals, and the state. For hospitals and the state, this implies elevated levels of stress among staff and the public, in addition to increased financial expenditure (Williams et al., 2020; Hajian et al., 2020). From the perspective of long-term sustainability, it is essential for Slovakia to create a favourable environment, improve working conditions for all healthcare workers, and utilise new technologies (Tupá et al., 2020).

The shortage of healthcare personnel has been a long-standing issue in Western European countries. Following the enlargement of the European Union, these countries have increasingly relied on immigration of highly skilled workers from newly admitted countries as a source of labour in this sector (Yates, 2011; Kovacheva et al., 2015; Pichlhöfer et al., 2015). Labour migration is inextricably linked to changes in the labour market. A number of studies have indicated that the influx of highly skilled migrants into the healthcare sector can result in a reduction in wages and the displacement of domestic healthcare workers seeking similar job opportunities (Krajňáková et al., 2020; Lo Sasso, 2021; Lee et al., 2019).

The research indicates that the factors that motivate doctors to leave their home country and relocate to another country (push-pull factors) include poor wages and working conditions, as well as limited opportunities for personal growth and advancement in their home environment. From the perspective of the countries of receiving migrants, the advantages include the offer of significantly higher income, an improved working environment, and better living conditions for themselves and their families. In the context of push and pull theory, the primary economic factors driving migrants' decisions to leave their home country and seek employment abroad are wages, lower unemployment rates, and a greater number of job openings (Tupá, 2020). In this context, the Slovak Republic is regarded as a potential source country that could contribute to the supply of healthcare professionals to affluent EU countries. It is well documented that

young doctors and nurses are dissatisfied with their salaries. Furthermore, their proficiency in foreign languages and the absence of significant administrative obstacles to working abroad contribute to their attractiveness as potential migrants. In Slovakia, the risk of these healthcare workers leaving is often associated with the threat to the availability and quality of healthcare. The Health Policy Institute, in its document (Páleník, 2021), presents a summary of the projected imbalance between the demand and supply of labour in the Slovak healthcare labour market, concluding that the current equilibrium is unsustainable.

It is evident that there is a pressing need for greater alignment between human resources policies in healthcare and health systems and management in EU countries. However, workforce management in healthcare in the EU is affected by a lack of uniformity in reforms, as well as a lack of coordination between planning, management, and policy (Buchelt et al., 2021; Cometto et al., 2020; Correia et al., 2020). Strategies aimed at quantitatively solving staff numbers through educational programmes are ineffective and inaccessible. This is due to demographic changes (Apostu et al., 2020). There is a lack of specialised studies that apply management theory to healthcare workforce issues. There is no model that specifies and transforms multiple levels of healthcare management into empirically observable dimensions (Creese et al., 2021; WHO, 2016). Kuhlman et al. (2019) examined a number of key areas related to healthcare workforce challenges, including migration, the integration of healthcare workers, education reforms, and management strategies focused on work-life balance for doctors working in hospitals. Tupá (2024) identified the primary factors influencing the intention of various actors in the healthcare labour market in Slovakia to migrate for work. She concentrated on factors related to satisfaction with human resources management processes and discussed potential solutions to address their negative impacts.

The aim of the study is to identify and signify differences in the perception of the impact of various working conditions factors of doctors and nurses in Slovak hospitals on their decision to emigrate for work based on empirical data.

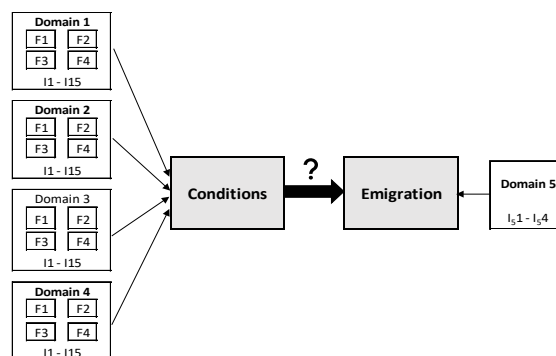
3 Materials and methods

The primary objective of the research was to conduct an analysis of the personnel management processes in Slovak hospitals and to determine their impact on the migration of doctors and nurses for work abroad. This entailed the identification of the significant aspects of working conditions in hospitals that are reasons for work-related emigration. Given the wide diversity of factors influencing the phenomenon of emigration, it was necessary to create a sufficiently comprehensive database that allowed the study of the effects of economic, social, and institutional factors on emigration. In order to achieve the research objectives, it was necessary to construct a new, previously unvalidated survey tool, a questionnaire. A qualitative field survey was conducted to gain insight into the factors influencing the decision to emigrate. Based on the findings of this study, four areas were identified as having a significant impact on this decision: The following factors were identified as influencing the decision to emigrate: material working conditions, organisational culture, the internal setting of personnel activities, and the external setting of working conditions. In the pilot survey, items were divided into these areas. From the quantitative analysis of responses, five domains (D1 – D5) were constructed to model the studied areas: D1 - Satisfaction with working conditions before the COVID-19 period, D2 - Attitude to changes in working conditions during the COVID-19 pandemic, D3 - Attitude to the impact of working conditions on emigration, D4 - Attitude to differences in working conditions at home and abroad, D5 - Attitude to the possibility of emigration. Domains D1 – D4 saturate the construct related to the perception of working conditions of doctors and nurses (CONDITIONS). Domain D5 fulfills the construct that characterizes the decision to emigrate for work (EMIGRATION). In the operationalization phase, the constructs were characterized by measurable variables (items) that filled the factors (constructs) in the individual domains. Scales of

satisfaction and attitudes were defined. The responses of respondents in the pilot survey were statistically analyzed using exploratory factor analysis (Kaiser-Meyer-Olkin Measure of Sampling Adequacy $KMO=0.823$, Bartlett's Test of Sphericity $Sign.<0.000$). Four factors (F1 – F4) were identified and named: F1 - Material working conditions (EQUIPMENT), F2: Management and organizational culture (COMMUNICATION), F3 - Internal setting of personnel activities (EVALUATION), F4 - External setting of working conditions (SOCIAL CLIMATE). Based on item analysis, it was determined how well a set of questions (items) measures one construct and identified questions that are problematic using Cronbach's alpha (CA). Questions that did not sufficiently saturate the studied factors or correlated with each other were omitted. The validity and reliability of the questionnaire were assessed.

The structure of the final version of the questionnaire consisted of 95 closed questions (14 of which concerned the demographic and social characteristics of the respondent) and one open question. The questionnaire was divided into several parts. The first part contained demographic and social data of the respondent. The second part contained questions concerning the independent variable (push factors), domains D1 – D4. Each domain was filled with 15 identical items (I1 - I15). Each item saturated one factor. The items reflected the respondent's satisfaction or attitude. The respondent could express the degree using a five-point Likert scale. The third part contained questions about the dependent variable, (pull factors), domain D5, which was the respondent's emigration (EMIGRATION). The research problem model, which emerged from the results of the pilot survey, defined phenomena, domains, factors, and corresponding items, is illustrated in the following figure.

Figure 1: Design of the complete model



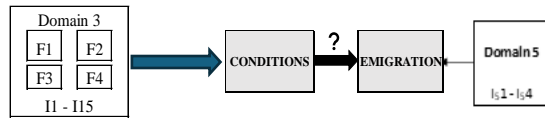
The causal relationship of the individual constructs is evident from the figure. The aim of the questionnaire was to determine the effect size (rate arrow) of each domain and the factors included in them on the constructs. Comprehensively processed research results were published by Tupá (2024).

4 Findings

A more detailed account of the results obtained from analysing responses in domain D3, which related to the respondents' attitude towards the extent of the impact of the specified working conditions (attributes) on emigration, will be provided. Two research questions were formulated, and the relevant statistical hypotheses were specified accordingly. RQ1: It is assumed that there are differences in the perception of working conditions in Slovak hospitals between nurses and doctors, as well as among different age categories. RQ2: To what extent does the perception of working conditions by doctors and nurses influence their attitude towards work migration? The respondent was given a choice of responses, which included "not at all," "to a small extent," "to a moderate extent," "to a considerable extent," and "to a great extent." The statistical analysis was primarily concerned with identifying the differences between the attitudes of two groups: doctors and nurses. A total of 751 nurses and 211 doctors completed and submitted the questionnaire. The

research problem model, which is presented in Figure 2, outlines the results of the study.

Figure 2: Submodel design



The structure of respondents was found to be an adequate representation of the actual structure of doctors and nurses in Slovak hospitals. The mean age of respondents in the medical profession was 43.69 years, while that of nurses was 45.43 years. The largest group in terms of marital status was that of respondents who were married. For doctors, this figure was 63.03%, while for nurses it was 60.32%. A notable discrepancy was observed in the 30-40 years age category within the practice category. The proportion of nurses in this category was 27.30%, while that of doctors was only 8.06%. For each item, a score was assigned. The coding direction was aligned with the researchers' objective of identifying the working conditions that exert the greatest influence on the emigration of doctors and nurses. Consequently, the higher the value, the more the examined attribute of working conditions was perceived to be influential on emigration. The difference between doctors' and nurses' evaluations of the influence of individual attributes of working conditions was identified using the Mann-Whitney U test. Table 1 presents the p-value of the Z-test.

Table1: Factors and questionnaire items

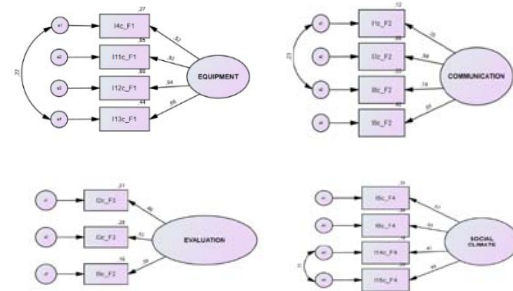
Factor and Items		Mean		
		Doctors AIS	Nurses AIS	p*
F1 - EQUIPMENT				
I4	Office equipment	3,02	3,97	0,000*
I11	Material and spatial provision	4,13	4,15	0,793
I12	Instrumentation	4,13	4,16	0,621
I13	Computerisation (digitisation) of work	3,61	3,89	0,000*
F2 - COMMUNICATION				
I1	Organisation of work, assignment of tasks, time frame, cooperation with colleagues	4,06	4,18	0,075
I17	Communication and relations with colleagues	2,76	3,27	0,000*
I18	Communication and relations with supervisors	3,48	3,63	0,095
I19	Communication and relations with patients	2,65	3,00	0,000*
F3 - EVALUATION				
I2	Remuneration for work	4,69	4,84	0,000*
I3	Employee benefits, perks, etc.	4,2	4,53	0,000*
I10	Training, professional and career development	4,06	3,50	0,000*
F4 - SOCIAL CLIMATE				
I5	Workload, overtime, duty, emergencies	4,39	4,66	0,000*
I6	Bureaucracy, administration	3,96	4,08	0,096
I14	Prestige of the medical profession	3,49	4,27	0,000*
I15	Current political, economic and social situation in Slovakia	4,35	4,35	0,766

*- significant at the level of significance $\alpha=0,05$, p – probability level, AIS - average item score

When assessing the impact of the type of occupation and age of hospital employees on attitudes towards migration, four age categories were created. Using one-way ANOVA, we assessed whether there is a statistically significant difference in attitudes between the defined age groups regarding the importance of working conditions factors on attitudes towards migration. In the Post Hoc multiple comparison, based on the observed homogeneity of variances, the Scheffe test was used. Significantly (at the significance level of 0.05), respondents expressed different attitudes in factor F3 ($p<0.05$). In the case of the occupation factor, different attitudes were identified between doctors and nurses in all four factors ($p<0.000$).

For a comprehensive assessment of the impact of the working conditions factors of Slovak doctors and nurses on migration, the model, proposed after the pilot survey, was verified on the obtained data using the SEM method. The convergent validity of the questionnaire was verified using confirmatory factor analysis (CFA). CFA was carried out using the robust maximum likelihood (MLR) method, which corrects for possible non-normality of item distributions. The complex structural model consists of four partial models. The model includes four measurement models, and the latent variables from these measurement models then have regression relationships among them, thus creating an analogy to path analysis. The resulting model includes four confirmatory factor analyses (measurement models) for the variables Equipment, Communication, Evaluation, Social Climate (independent variables) and Emigration (dependent variable). These are constructs that measure the D3 phenomenon using items I1 to I15. Domain D5 was measured by four items, but only the first three were included in the final model. During the process of evaluating reliability and validity, it was found that this item very minimally saturates domain D5 (Cronbach's Alpha = 0.35). In constructing the complex structural model, attention was first paid to the partial models and their modifications. To confirm a good fit of the model, the results of the chi-square test and some absolute, comparative, and informational criteria were used: the ratio of χ^2/df , AGFI, CFI, TLI, RMSEA, AIC, BIC. The recommended values for these criteria for a suitable model are: $\chi^2/df=2$ (tolerance 0.5), AGFI>0.9, CFI>0.9, TLI>0.9, RMSEA<0.08. The values of AIC and BIC should be as small as possible. Diagrams for the modified measurement models for individual constructs are in the following figures (standardized results).

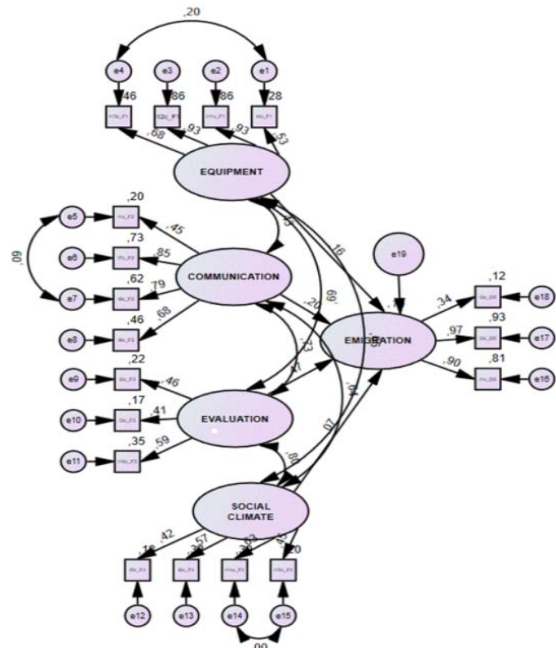
Figure 3 Measurement models for individual factors



In the next step, we constructed an approximate regression model. We assume that there is a regression relationship between factors F1-F4 and D5, with the endogenous dependent variable (Emigration) and four exogenous (independent) variables (Equipment, Communication, Evaluation, Social Climate). This relationship is also intertwined with the realistically expected mutual relationships between the exogenous variables. The correlation coefficient was $R=0.485$, indicating that the accuracy of the prediction is not high. From the ANOVA analysis, we inferred that the linear regression model appropriately predicts the dependent variable (Sig. $p<0.000$). In terms of statistical significance tests, the impact of factors F3 (Evaluation) and F4 (Social Climate) can be considered significant. The impact of factors F1 and F2 was not statistically significant. It might be appropriate to link both factors with a covariance relationship. The complex structural model was created by combining individual modified measurement models. After certain modifications, the best-fit model is shown in the following diagram. The results of the confirmatory factor analysis and the

assessment of model fit were evaluated using the previously mentioned coefficients ($\chi^2/df=2.753$; AGFI=0.929; CFI=0.964;

Figure 4 A Comprehensive Structural Model for Emigration



TLI=0.948; RMSEA=0.053; AIC=520.652; BIC=842.076). When comparing the final comprehensive model with the preliminary regression model, the conclusions about the positive relationship of the observed factors with the Emigration factor hold true. The regression coefficients in the preliminary regression model are slightly smaller than those in the comprehensive model. Factors F3 and F4 are statistically significant. The strength of the relationship between the exogenous variables was also significant, with correlation values shown in the table 2 (abbreviations are used for factor names).

Table 2: The strength of the relationship between the exogenous variables

			Corr.	Cov.	C.R.	p-value
EQ	↔	COMM	0.395	0.349	10.629	0.000*
EQ	↔	EV	0.652	0.479	12.244	0.000*
EQ	↔	SOC_CLIM	0.456	0.198	8.061	0.000*
COMM	↔	EV	0.702	0.436	11.976	0.000*
COMM	↔	SOC_CLIM	0.626	0.229	9.047	0.000*
EV	↔	SOC_CLIM	0.926	0.282	8.529	0.000*

*. significant at the level of significance $\alpha=0,05$, p – probability level

A further comparison will be made of the factor loadings, which indicate the extent to which individual indicators are explained by the model. The table presents the results of the four-factor model of attitudes of doctors and nurses in Slovakia regarding the influence of working conditions on consideration of emigration. Table 3 presents the estimated standardized regression weights of the final model.

When evaluating the model as a whole, it can be noted that the chi-square test indicates inadequacy of the model, but given the large sample size, this test is not a good indicator of model quality. Commonly used indicators (AGFI, CFI, TLI, RMSEA) suggest that the model is relatively decent. Overall, it can be stated that our conceptual model was not refuted; minor modifications were necessary, which can be substantiated factually. Validity and reliability were assessed based on the results of CFA and item analysis using Cronbach's Alpha coefficient (CA=0.870). The index of internal consistency was

expressed for each domain (CA_D1=0.879; CA_D2=0.878, CA_D3=0.868, CA_D4=0.893, CA_D5=0.651). In methodology, the usual minimum requirement for the reliability of a research tool is 0.80. It is evident that the coefficient of internal consistency for domain D5, which reflects the respondent's attitude toward potential work migration, does not meet this requirement. The average inter-item correlation was approximately the same across all domains ($r_{D1}=0.327$, $r_{D2}=0.336$, $r_{D3}=0.310$, $r_{D4}=0.384$, $r_{D5}=0.378$). In our case, a scale of attitudes was used, where reliability is usually slightly lower. There are some issues with domain D5, which, however, is saturated with a low number of items. When using the questionnaire repeatedly, it would be appropriate to supplement the dimension with additional items.

Table 3: Saturation of items by factors

			Estimate	p-value
EMIGRATION	<---	EQ	0.164	0,870
EMIGRATION	<---	SOC_CLIM	0.366	0,021
EMIGRATION	<---	EV	0.475	0,007
EMIGRATION	<---	COMM	0.202	0,620
I13c_F1	<---	EQ	0.676	0.000*
I12c_F1	<---	EQ	0.929	0.000*
I11c_F1	<---	EQ	0.926	0.000*
I4c_F1	<---	EQ	0.534	0.000*
I9c_F2	<---	COMM	0.680	0.000*
I8c_F2	<---	COMM	0.785	0.000*
I7c_F2	<---	COMM	0.855	0.000*
I1c_F2	<---	COMM	0.448	0.000*
I10c_F3	<---	EV	0.591	0.000*
I3c_F3	<---	EV	0.414	0.000*
I2c_F3	<---	EV	0.464	0.000*
I15c_F4	<---	SOC_CLIM	0.449	0.000*
I14c_F4	<---	SOC_CLIM	0.628	0.000*
I6c_F4	<---	SOCIAL_CLIM	0.566	0.000*
I5c_F4	<---	SOCIAL_CLIM	0.421	0.000*
I3c_D5	<---	EMIGRATION	0.342	0.000*
I2c_D5	<---	EMIGRATION	0.966	0.000*
I1c_D5	<---	EMIGRATION	0.899	0.000*

*. significant at the level of significance $\alpha=0,05$, p – probability level

5 Discussion

The aim of the article was to examine the attitudes of doctors and nurses towards the extent to which working conditions influence migration. The research problem was defined as part of a larger scientific project and constituted only one of several domains. The objective was to identify any differences between doctors and nurses and between age groups of employees in this field. The analyses yielded some interesting conclusions. Fifteen items were subjected to analysis, which were subsequently divided into factors. The factors under consideration encompassed a broad spectrum of elements that could potentially influence the satisfaction of doctors and nurses with their work in Slovak hospitals. Together, these factors constituted the construct of job satisfaction. Our interest lay in determining the extent to which this construct influences the construct of emigration. The construct of emigration was saturated with items in the questionnaire, which enabled respondents to indicate the extent to which they considered work migration. Exploratory factor analysis identified four factors. The factors were Equipment, Communication, Evaluation, and Social Climate. The statistical analysis revealed significant differences in the following items: work equipment, work electronicisation, communication and relationships with colleagues and patients, remuneration, benefits, career growth, staff shortage, and the prestige of the medical profession. The remuneration for work

emerged as the most significant aspect cited by both doctors (4.69) and nurses (4.84) as a reason for considering emigration. The aspect of communication and relationships with patients was identified as the least important by both doctors (2.65) and nurses (3.00). When the four factors of working conditions were analysed from the perspective of age, it was observed that there were significant differences in the Evaluation factor ($p=0.004$). A statistically significant difference was observed between the youngest employees (up to 30 years) and other age categories ($p < 0.05$). The most significant difference was observed between the group of employees aged 45-60 years ($p=0.005$). As anticipated, remuneration is the most crucial factor for young doctors and nurses when considering work migration. For the older age group of doctors and nurses, influenced by established family and work backgrounds, remuneration is likely to become less important. This exhaustive description provides an answer to research question RQ1. The response to research question RQ2 was generated by developing a complex structural model utilising the SEM method within the IBM SPSS Amos environment. The final model comprised partial measurement models for individual factors of working conditions and the search for the most suitable model. The factor loadings, correlation coefficients, and coefficients of model goodness of fit indicate that the constructed tool for measuring the perception of working conditions by doctors and nurses in Slovak hospitals regarding consideration of work migration has, on average, been verified as suitable. The research findings indicated that the most significant push and pull factors were remuneration and social climate. Table 3 provides a means of assessing the degree to which individual factors saturate items. The factor with the most significant (statistically significant) impact on emigration is evaluation and social climate. Items that saturate these factors relate to remuneration, benefits, and employee career growth. There is scope for enhancement in personnel management processes that impact this aspect. It is evident that there is a need to facilitate the education and career advancement of doctors and nurses. It is widely acknowledged that the certification process for doctors in Slovakia is considerably more complex than in economically more developed European countries. Furthermore, the excessive bureaucracy also has a significant impact on the consideration of emigration. The introduction of an e-health system could be a potential solution to this problem. The shortage of medical personnel is a societal problem that is closely related to the perception of the social situation. Its solution is therefore a complex and multifaceted process that requires significant systemic changes within the country. The sooner improvements are implemented in hospitals and the wider healthcare system in Slovakia, the sooner the impact of working conditions on the decision to emigrate will be reduced.

6 Conclusion

Currently, labor migration represents an important economic, social, and political issue. The issue of labour migration is inextricably linked to changes in the labour market. The topic of labour migration of healthcare workers is a subject of considerable public interest. It is evident that healthcare systems can only function with healthcare workers, yet there is a shortage of them in the labour market. Consequently, it is of great importance to analyse the factors that influence the decision to migrate for work. The presented cross-sectional study examined the attitudes of doctors and nurses in Slovakia towards labour migration. It formed part of a research project that evaluated the setup of personnel management processes in hospitals and their impact on the migration of doctors and nurses for work abroad. The initial results of the published study identified specific push and pull factors. The resolution of these factors may reduce the outflow of Slovak healthcare workers abroad in the future. An understanding of the causes and motives that influence the decision to migrate can assist in the creation and comprehension of this model. The modelling of the causality or associations between the factors under study and the concept of labour migration was based on the acquisition of knowledge from the research project, information on hospital management, the labour market in the healthcare sector, statistical research, and official statistical databases.

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Primary Paper Section: A

Secondary Paper Section: AO, BB, FP

RESEARCH ON THE CZECH STUDENTS' SATISFACTION WITH ONGOING STUDIES

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Abstract: Studying educational satisfaction is a crucial component in understanding the current state of affairs and forecasting future actions. The satisfaction experienced by students can influence their motivation to achieve educational and career goals. This article presents the results of a study on the level of satisfaction with education among students in the Czech Republic, conducted from November 2023 to April 2024. The study explored students' satisfaction with their education, the reasons for pursuing higher education, and the motives for choosing specific educational institutions. A total of 154 respondents participated in the study, utilizing diagnostic survey methods, questionnaire techniques, and an interview survey. The analysis of the results indicated that many of students reported a satisfaction level higher than average.

Keywords: satisfaction with education, students, education system, education, educational path, academic education

1 The State of Higher Education in the Czech Republic

Based on the data released by the Czech Bureau of Statistics, the Czech Republic's population exceeds 10.6 million. Among these inhabitants, 1.3 million individuals have attained higher education degrees. Statistical surveys reveal a significant rise in the number of individuals with higher education in the Czech Republic, showing an increase of nearly 750,000 people. Additionally, annual reports from the Ministry of Education indicate that this figure represents an approximate 134% growth compared to two decades ago. The number of college students in the population has increased. At that same time, during that 20-year period the number of persons who have graduated from the kind of secondary school that does not offer a school-leaving examination has declined by 125 000. As of today, the ministry reports there are 2.2 million such students. It also has to be said that the number of persons successfully passing the secondary school-leaving examination has grown to 505 000 inhabitants. Overall, therefore, 2.1 million people have successfully passed a school-leaving examination. According to ISCED and the Czech education system, college education is the third (or tertiary) level of education provided by academic institutions. It therefore represents the highest degree after which no further study formally exists.

In comparison to other European countries, the Czech Republic continues to be one of the countries that expends the smallest proportion of its financial capacities on education, its structures and its systems. The issue of preventing academic failure in higher education, which has been a focus of our research in recent years, remains underexplored in the Czech Republic. This topic has not garnered sufficient attention within the tertiary education system nor across various research-oriented and academic platforms established in the country. And similar problems are written in the publication by the authors D. Kizeková and J. Žolnová (2021). The regularly performed collection of educational data points that are processed through the relevant statistical indicators, including the ongoing monitoring of demographic data and its subsequent presentation, cannot sufficiently meet the definition of the epistemologically required knowledge about the essence of the problem as a whole. The paradigm of sociological research, in which answers are found to questions about the existence, extent and development of societal phenomena, requires that processes define exact standards for the implementation of extensive empirical objectives that can apply across the board. The findings of partial surveys are just able to serve as a framework orientation. They

cannot be considered holistic knowledge of the problem exactly because they lack the above-mentioned standards.

2 Methodology and Methods

The presented research is a segment of a broader study on the phenomenon of satisfaction with education conducted in the Czech Republic, Poland, and Slovakia. The entire research took place from November 2023 to May 2024. The section below focuses exclusively on students pursuing higher education in the Czech Republic.

The subject of this research was the phenomenon of satisfaction with education among students. The aim was to understand the declared level of satisfaction with education among students.

To systematize the issues of interest to researchers, the following research problems were defined:

1. How is the phenomenon of satisfaction with education among students shaped?
2. What other variables (demographic) are related to the declared level of satisfaction with education among students?

Due to the diagnostic nature of the research, no research hypotheses were formulated. To answer the questions of interest to researchers, a survey was conducted using an online questionnaire. Data collection took place from February 2024 to May 2024. The study included students from the following universities: Silesian University in Opava, University of Ostrava, and Ambis University in Prague.

The adopted method was a diagnostic survey, which is an appropriate method when researchers are interested in the attitudes, interests, and motives of respondents (Łobocki, 2003). The survey technique was used, allowing, among other things, to minimize the researcher's influence on the responses given by the respondents and fostering a sense of anonymity (Maszke, 2008).

The tool used in the research was an original questionnaire. The questionnaire consisted of 7 closed-ended questions and 2 open-ended questions. The closed-ended questions were constructed using a 7-point scale. The highest possible score was 49, and the lowest was 7. The open-ended questions concerned the general motive for undertaking studies and the motive for choosing a specific university. Regarding the closed-ended questions, the tool was subjected to reliability analysis. The Cronbach's alpha coefficient was 0.84, indicating good test reliability (George, Mallery, 2016).

The inspiration for this questionnaire was the SWLS tool developed by E. Diener, R. A. Emmons, R. J. Larsen, and S. Griffin in the adaptation by Zygfryd Juczyński. However, it is essential to note the fundamental differences, as SWLS consists of 5 statements and relates to the overall level of life satisfaction. The tool developed by the authors of this publication relates only to satisfaction with education.

According to this research, satisfaction with education is understood as the feeling of pleasure associated with participating in the academic education process. Education serves as a pivotal element of development, significantly impacting the future trajectories of individuals (Kukla, 2020). A comprehensive literature review has delineated the components of this concept. Therefore, satisfaction with education encompasses: a sense of the purposefulness of education, loyalty to the chosen educational path, a vision of future opportunities, a sense of fulfilment of personal aspirations, and a declarative sense of satisfaction with the chosen educational path (Juczyński, 2012; Chodkowski, 2021; Frish, 2006; Hall, 2022; Douglas, McClelland, Davis, 2008; Finogenow, 2013; Zalewska, 2003; Pujer, 2017; Łaguna, 2012; Bańka, 2000; Wołowska, 2014; Springer, 2018; Plewka, 2016).

3 Research Results

3.1 Characteristics of the Surveyed Group

The surveyed group of respondents was heterogeneous and diverse in terms of developmental periods. To further characterize the group of students surveyed, certain categories of demographic variables were distinguished, such as gender, age, place of residence, education, and type of study. The total number of respondents was 154.

When categorizing the respondents by gender, it was not possible to obtain evenly distributed groups. This may be due to the random selection of the sample or the general characteristics of the higher education institutions participating in the study. The surveyed group included 136 (88.31%) women and 18 (11.69%) men. Due to the strong unevenness of the groups, it was decided to exclude the demographic variable related to gender from further analysis. In the analyses themselves, gender was not distinguished as a specific category. However, it should be noted that the percentage of women was significantly higher.

The next grouping category was age. Due to the large variation in respondents based on this criterion, it was decided not to include age in the analyses. However, it can be mentioned that the youngest participants in the study were 18 years old, and the oldest were 60.

Regarding the place of residence, three groups of respondents were identified: those living in rural areas, those living in a city with up to 100,000 inhabitants, and those living in a city with over 100,000 inhabitants. Among the respondents living in rural areas, there were 66 people (42.86%). In the group of respondents living in a city with up to 100,000 inhabitants, there were 53 respondents (34.41%). In the last group living in a city with over 100,000 inhabitants, there were 35 people (22.73%).

Another demographic variable according to which the respondents were differentiated was education. In this area, four groups of respondents were identified. Among those with secondary education, there were 90 people (58.44%). The second largest group was those with a second-cycle higher education, which included 34 people (22.08%). A first-cycle higher education was declared by 25 people (16.23%). In the group of those with a third-cycle higher education, there were 5 people (3.25%). The last grouping variable was the type of study the respondents attended. In this category, three groups were distinguished. The group of full-time students included 76 people (49.35%). A combined form of study was declared by 66 respondents (42.86%). In the group of part-time students, there were 12 people (7.79%).

3.2 The Phenomenon of Satisfaction with Education

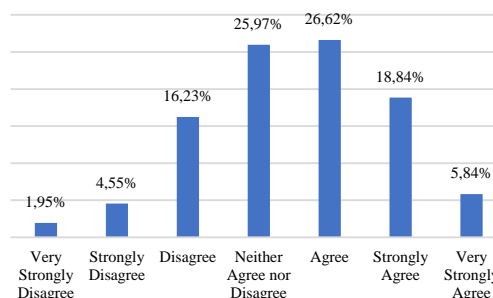
As mentioned in the previous section of the article, the number of respondents was 154. After conducting analyses using the Jamovi software, the descriptive characteristics are as follows, shown in Table 1.

The data indicate that students from the Czech Republic declare a satisfaction with education above the average level. To find out which specific categories highlighted by the researchers are particularly satisfying for students, an analysis of specific questionnaire questions was conducted. The maximum number of points possible to obtain for a specific question was 7. The first question concerned the category of comparing the current state with one's own vision of academic education. Among the obtained responses, the average was 4.51. The distribution of respondents' answers is presented in Figure 1.

Table 1 Descriptive Statistics Characteristics (N=154)

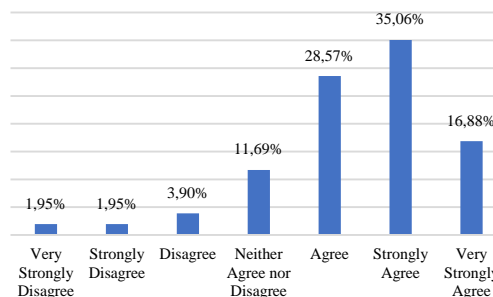
	Satisfaction with Education
N	154
Mean	33,6
Median	34,0
Standard Deviation	7,60
Minimum	14
Maksimum	49

Figure 1 Distribution of Responses to Question One (N=154)



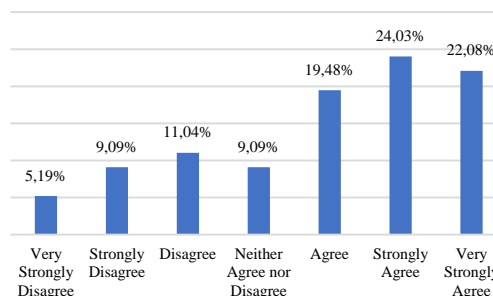
The second question related to the sense of purpose in academic education. For this question, the average of the obtained responses was 5.36. The graphical distribution of respondents' answers is presented in Figure 2.

Figure 2 Distribution of Responses to Question Two (N=154)



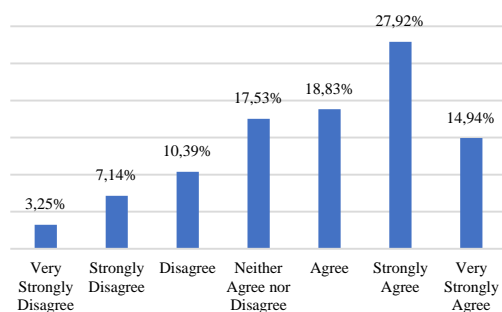
The third question related to loyalty to the chosen path and the declaration of making the same educational choice again. Among the obtained responses, the average was 4.89. The distribution of respondents' answers is illustrated in Figure 3.

Figure 3 Distribution of Responses to Question Three (N=154)



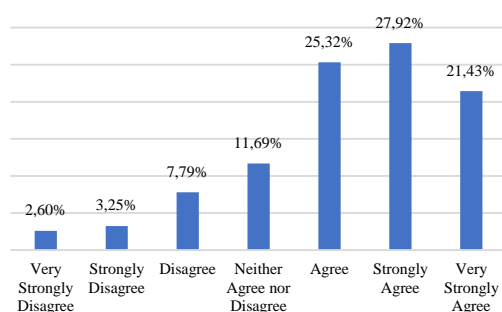
The fourth question related to the declared sense of satisfaction with the entire academic education. Among the obtained responses, the average was 4.85. The graphical description of the distribution of responses is presented in Figure 4.

Figure 4 Distribution of Responses to Question Four (N=154)



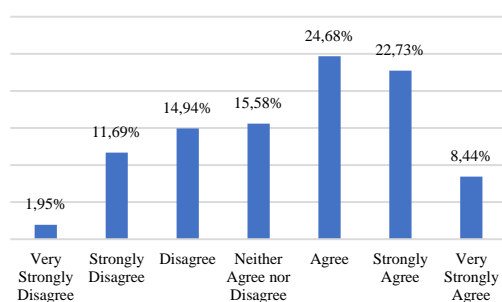
The fifth question related to the declared sense of satisfaction with the choice of a specific educational path. Among the obtained responses, the average was 5.23. The graphical representation of respondents' answers is shown in Figure 5.

Figure 5 Distribution of Responses to Question Five (N=154)



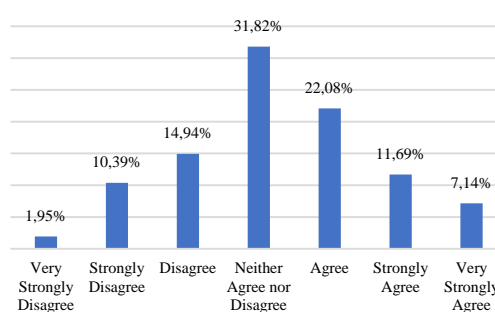
The sixth question related to the sense of fulfilling one's own aspirations. Among the obtained responses, the average was 4.51. The distribution of respondents' answers is presented in Figure 6.

Figure 6 Distribution of Responses to Question Six (N=154)



The seventh question related to the declared assessment of educational conditions. Among the obtained responses, the average was 4.25. The graphical distribution of respondents' answers is presented in Figure 7.

Figure 7 Distribution of Responses to Question Seven (N=154)



As indicated by the above data, the most satisfying element highlighted in the questionnaire tool was the sense of purpose in education. This was encompassed in the second question, where both the average and total responses were the highest. The sense of purpose refers to the perception and achievement of one's own educational and career goals. It can be assumed that respondents may view academic education as a tool to achieve future goals and improve their professional lives. This is also confirmed by some respondents' statements, where they indicated that the motivation for undertaking studies was to gain or strengthen their professional position, the possibility of broad development, or enhancing their qualifications.

Regarding the lowest score, it was obtained in the question about the declared conditions of academic education. This may indicate that respondents have higher expectations concerning educational conditions than what is currently reflected in their experience.

To deepen this research, it was decided to conduct an analysis for correlations. The Jamovi software was used for statistical analyses. In the Shapiro-Wilk test, the p-value was 0.01, indicating the asymmetry of the distribution. Therefore, during the analyses, the Spearman's rank correlation test, a non-parametric equivalent of the Pearson correlation test, was used. The significance level was set at $p < 0.05$. The results of the analyses are presented in Table 2.

Table 2 Relationship Between Satisfaction with Education and Demographic Variables of Czech Students (N=154; $p < 0.05$)

	Satisfaction with Education
Place of Residence	-0,11
Form of study	0,16
Education	0,14
Age	0,15

During the above analyses, no correlation was detected between satisfaction with education and demographic variables such as age, place of residence, form of study, or education. This may indicate that the feeling of satisfaction with education is influenced more by personality factors than by demographic variables.

3.3 Motivation for Undertaking Studies

The above research was enriched with open-ended questions relating both to the general motivation for pursuing higher education and the choice of a specific higher education institution. These questions were open-ended, allowing respondents to provide voluntary written responses. It should be noted that respondents could mention several aspects or choose not to respond at all. Consequently, the answers do not sum up to the total number of respondents.

Regarding the general motivation for pursuing higher education, certain thematic areas were identified during the analysis of the obtained material, which frequently appeared in the respondents' statements. The following categories were derived in this way:

- Obtaining higher education
- Enhancing qualifications
- Changing or obtaining a specific profession
- Acquiring or expanding knowledge
- Personal development
- Interests, vocation, and passion
- Social development
- Influence of external factors (peer pressure)

The most frequently declared category was the area related to personal interests, vocation, or passion, indicated by 48 people. It is therefore likely that the largest number of respondents pursued higher education precisely to develop these factors. Perhaps students who are aware of their interests decided to utilize their potential and develop it during their academic education. It should also be noted that respondents sometimes decide to realize their plans related to their interests after some time. This category appeared in respondents' statements in the following ways. Examples of responses in this category are as follows:

Woman, 26 years old: *"I would like to reach a point where I can dedicate myself to a field that is meaningful to me. I told myself, if not now, then when. That's why I am currently studying"*.

Woman, 38 years old: *"I have become interested in the social sphere, and at the same time, it connects to the field I have already studied"*.

Woman, 20 years old: *"To acquire the knowledge and skills necessary to solve social problems and provide support to people in need, stemming from my passion for helping others"*.

Man, 44 years old: *"This field has always interested me"*.

A slightly smaller group was the category related to personal development, indicated by 38 people. It can be assumed that respondents saw academic education as an opportunity for broad personal development. This category may be somewhat linked to interests. However, in the respondents' statements, there was a clear emphasis on general self-development. Examples of respondents' answers are presented below.

Man, 37 years old: *"A lot of time and a desire to change something in my current life, to learn something new"*.

Woman, 24 years old: *"My motivation was the desire to try something new, something that had intrigued me for a long time"*.

Woman, 42 years old: *"Self-fulfilment, expanding knowledge"*.

Man, 20 years old: *"A new and interesting chapter of life"*.

Next in order among the respondents' indications was the category related to acquiring and expanding knowledge, indicated by 26 people. This may mean that respondents expect the educational process to provide specific information that they consider useful. It should be emphasized that during their statements, respondents pointed to the expansion of both personal and professional knowledge. Examples of respondents' answers are as follows:

Woman, 50 years old: *"Learning new things, gaining new information that I will use in my work in social services"*.

Woman, 21 years old: *"I started my studies mainly to learn new things that will definitely be useful in the professional direction I want to pursue"*.

Woman, 43 years old: *"I started studying special education to learn more about the work at the place where I currently work and mainly to be able to stay in that position"*.

Next, students indicated the possibility of changing or obtaining a specific profession. Respondents also mentioned the specifics of the current times. They believe that higher education can help them develop their professional careers. By obtaining specific qualifications, they can find employment in legally regulated

professions. Below are examples of respondents' answers in this category.

Woman, 30 years old: *"Expanding job opportunities, the ability to perform a job according to my expectations"*.

Woman, 23 years old: *"The opportunity to do meaningful work"*.

Woman, 22 years old: *"My motivation is working with children and obtaining a higher education for employment purposes"*.

Among the further indications of the respondents, the category of enhancing qualifications was distinguished. It was indicated by 21 people. This category was often associated with situations where an already employed person received the opportunity to change positions. This may mean that new and sometimes unexpected opportunities in the course of their working lives often compel respondents to pursue education in a specific direction. Examples of respondents' answers in relation to this category are presented below.

Woman, 50 years old: *"I was promoted from the position of teaching assistant to the position of educator with the condition of completing my education"*.

Woman, 34 years old: *"To maintain my position as an educator"*.

Woman, 45 years old: *"I was approached by the management of the school where I teach to study the field of special education. I would not have thought of it myself; it was not the path I initially wanted to take"*.

The next category was obtaining higher education, indicated by 17 people. It should be mentioned that this often involved forward-thinking and pointing out the positive aspects of having higher education, most frequently in a professional context. This idea is illustrated by the following example responses from the respondents:

Woman, 23 years old: *"I believe that a university degree will enable me to find a quality job with good financial rewards in the future"*.

Woman, 20 years old: *"My motivation is indeed the degree, but mainly I wanted to learn more about this field, which will give me a broader range of options when it comes to choosing my subsequent employment"*.

Woman, 37 years old: *"I need a degree in this field to be able to do what I excel at and what fulfils me"*.

The least frequently indicated categories were "influence of external factors," mentioned by 4 people, and "social development," mentioned by one person. It can be assumed that respondents rarely pointed to peripheral factors, such as making acquaintances or the influence of their surroundings, in their statements. Examples of respondents' answers are presented below.

Woman, 24 years old: *"Family pressure"*.

Woman, 20 years old: *"Studying at a university is something I have wanted to achieve since a young age, and my parents have always encouraged me towards it, as both of them have degrees"*.

In summary, respondents indicated various motives for pursuing higher education. Most frequently, they expressed a desire to develop their own interests, the possibility of obtaining a degree, expanding their knowledge, or performing a specific profession. Often, respondents' statements included factors indicating internal motivation or personal beliefs that led them to undertake studies. It can be assumed that those who pursue academic education see it as a tool to help them achieve their own educational and professional goals.

3.4 Motivation for Choosing a Specific University

The second open-ended question in the online survey related to the reason for choosing a specific university. Similar to the first question, certain thematic areas were identified during the data analysis. These areas formed the following categories:

- Location
- Educational offer
- Opinions about the university, reputation
- Own positive experiences
- Economic considerations (cost of studies, cost of living in the city)

The most frequently indicated category was the educational offer of the institution, mentioned by 66 people. This may suggest that respondents often chose a specific university based on the available study programs. Examples of respondents' answers are shown below.

Woman, 33 years old: *"The opportunity to study special education at the master's level"*.

Man, 47 years old: *"An interesting and appealing field that will broaden my horizons"*.

Woman, 25 years old: *"There is a program here that intrigued me, and I couldn't find it elsewhere"*.

In second place, respondents indicated the category related to the convenient location of the university, mentioned by 38 people. This may suggest that respondents often consider logistical factors, such as transportation and general ease of access to the university. Examples of respondents' answers are presented below.

Woman, 45 years old: *"My choice was practical - I chose the university that was closest to where I live"*.

Woman, 22 years old: *"It is close to my home"*.

Woman, 47 years old: *"The best and quickest accessibility considering my place of residence"*.

In third place, respondents indicated the category related to good opinions about the university, mentioned by 35 people. This may suggest that the positive evaluation of the university by others motivated respondents to choose this institution. Examples of respondents' answers are shown below.

Woman, 46 years old: *"I chose to study here based on recommendations from acquaintances who also studied here"*.

Man, 44 years old: *"I thought the faculty had lecturers who were interested in sharing their experiences"*.

Man, 50 years old: *"My wife's previous experience with the university and the teaching style, which I enjoy very much"*.

Next, in fourth place, respondents indicated the category related to their own positive experiences with the university, mentioned by 13 people. Examples of respondents' answers in relation to this category are presented below.

Woman, 43 years old: *"I had already studied at OSU and felt close to both Ostrava and the Faculty of Education"*.

Woman, 36 years old: *"I had already studied there, so I knew the faculty"*.

Woman, 35 years old: *"I went to the same university where I completed my bachelor's degree; the familiar environment, system, and good experience were a certainty for me"*.

Finally, respondents indicated economic considerations (cost of studies, cost of living in the city), mentioned by 3 people. It should be noted that this category was often mentioned along

with others. Examples of respondents' answers are presented below.

Woman, 38 years old: *"Accessibility, previous experience, free of charge"*.

Woman, 48 years old: *"Proximity to my workplace and the associated lower financial costs"*.

Woman, 43 years old: *"Practical reasons - commuting distance, time and financial savings"*.

In summary, regarding the motivation for choosing a specific university, respondents most often cited the institution's educational offer as the main reason. The following factors were: location, reputation, own experiences, and economic considerations. This may indicate that when making a decision, students most frequently consider the university's offerings. This suggests a thoughtful and conscious choice, a step towards achieving their own goals.

4 Conclusions

In this study, the phenomenon of satisfaction with education was examined. In the surveyed group, the level of satisfaction with education was higher than average. No statistically significant differences were detected between satisfaction with education and demographic data. This might suggest that the feeling of satisfaction in this aspect is more influenced by individual differences.

A qualitative analysis of the questionnaire questions revealed that the most satisfying aspect for respondents is the sense of purpose in academic education. This category was rated the highest when analysing both the total and average responses. This may indicate that students largely perceive the realization of their educational and career plans positively. They might believe that academic education brings them closer to their goals. The lowest score, however, was indicated in the context of the declared conditions of academic education. The total and average in this area were the lowest. This may suggest that students have higher expectations for the conditions of education than what they currently experience.

The analysis of the open-ended questions showed that, in the context of the general motivation for undertaking academic education, respondents most often pointed to aspects related to the development of interests, passions, or personal calling. This may indicate that students, when deciding to pursue academic education, largely considered their own preferences. They might have a good understanding of themselves and wish to develop in the direction that interests them the most.

Regarding the question about the motivation for choosing a specific university, the main reason indicated was the educational offer of the institution. This result corresponds with the previous question. Students who are aware of their preferences might seek an institution that can provide them with development in their chosen field based on their interests.

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PRICE DYNAMICS OF FOSSIL FUEL COMMODITIES IN THE PERIOD 2014 - 2024

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Abstract: Over the last decade, the dependence on fossil fuels and their prices has been increasingly discussed. This paper aimed to assess the development of fossil fuel prices and their relationship to GDP in the Czech Republic. To achieve this objective, a VAR model and Granger causality test were used. All fossil fuel prices peaked in 2022. The causal relationship with GDP in the Czech Republic was confirmed for natural gas and coal prices. On the other hand, the causal relationship between oil and GDP in the Czech Republic was not confirmed during the period under study. Weak correlations were found with the Covid-19 pandemic, inflation, and unemployment in the EU. The only exception is the correlation between coal and inflation in the EU, which was moderately strong. A limitation of the paper is the length of the period studied, with data collection taking place only once a month.

Keywords: Oil, natural gas, coal, GDP, price development

1 Introduction

Over the past decade, fossil fuel sales have increased, leading to a discussion on the financial and environmental impacts on the general public (Abid et al., 2023). Fossil fuels account for 86% of global greenhouse gas emissions, raising the need for action to reduce their use despite the lack of direct reference to them in the Paris Agreement (Janzwood, Harrison, 2023). The introduction of carbon policy causes an increase in the cost of fossil fuels through emissions trading, carbon taxes, caps, and indirect regulations that lead to an increase in the price of fossil fuels (Zhang & Cross, 2020). The COVID-19 pandemic has caused a slowdown in the global energy market while changing the use of energy resources (Li & Huang, 2023). Furthermore, it has contributed to climate change, which may accelerate the transition to renewable energy commodities (Apanovych et al., 2023). However, fuel producers are unlikely to switch to a greener pathway, thus cementing dependence on fossil fuels (Le Billon et al., 2021). Since the Ukraine war outbreak, EU countries have been implementing emergency measures that lead to lower energy prices (Enescu et al., 2023). Furthermore, as a result of sanctions imposed on Russia, imports of oil, oil products, solid fossil fuels, and natural gas have declined, and in 2023, imports of oil products have almost ceased, while restrictions on natural gas are not as severe (Rokicki et al., 2023). Oil is one of the most important sources of fuel, and accurate price predictions impact the economy and society (Vochozka et al., 2023). However, several factors influence the price of oil, making future prices very difficult to predict (Deng et al., 2021). Economic, geopolitical, and climate policies cause fluctuations in oil prices, making oil even more volatile from a financial perspective (Ding et al., 2022). Liquefied natural gas is an essential element in the energy industry due to its characteristics, which include high energy density, low carbon emissions, and accessible transportation (Xu et al., 2022). As the largest consumer, China consumed 2,934.4 million tonnes of coal in 2021, which occupies an essential position in the market and industrial system, especially as a raw material in power, steel, and other industries (Zhu et al., 2022).

The aim of this paper is to assess the development of fossil fuel prices and their relationship to GDP in the Czech Republic. To achieve this, we have formulated the following research questions, which are crucial for understanding the dynamics of the fossil fuel market.

Understanding historical developments is essential for analyzing their trends and predicting future developments. This question will help us understand the interrelationship of fossil fuels and their response to various events.

RQ1: How has the price of fossil fuels evolved over the last 10 years, and what insights can we gain from this evolution?

Analyzing the relationship between fossil fuels and GDP in the Czech Republic will show us how a country's economic development affects the price of fossil fuels. The results of this question can be used to address policy issues in the energy sector.

RQ2: What is the relationship between fossil fuel prices and GDP in the Czech Republic?

Analyzing economic and political events will reveal how they affect the fossil fuel market. This is important for planning and risk management in energy security.

RQ3: What are the impacts of political and economic events on fossil fuel prices?

2 Literary research

Substitutability and complementarity between fuel inputs are affected by price efficiency, where imperfect price efficiency implies that if the price of fuels increases, demand for fuels will decrease (Wang et al., 2022). After developing an autoregressive model, Carfora et al. (2022) argue that switching from fossil fuels to renewable energy helps combat energy poverty by promoting economic development and contributing to the Sustainable Development Goals, thus meeting one of the United Nations goals. As a result of prolonged high inflation, central banks have been forced to change their approach to monetary policy and raise interest rates. This could also affect the correction in the price of emission allowances. In this context, it might be appropriate to consider reforming the EU Emissions Trading Market to address upcoming challenges better and thus support the EU's climate change objectives (Heijmans, 2023). Fullat et al. (2021) analyzed the relationship between emission allowances and economic and energy factors in the EU using a vector autoregressive model. They pointed to a surplus of emission allowances and reduced price efficiency in limiting CO₂ emissions. Using the ARDL method, it is possible to evaluate the impact of both long- and short-term effects (Kripfganz & Schneider, 2023). This method was used by Samour and Pata (2022), who found a relationship between interest rates in the US and Turkey. Their results show the negative impact of interest rates on the use of renewable resources in Turkey and prove that a significant increase in oil prices can reduce the demand for goods that consume fossil fuels, thus reducing the demand for fossil fuels. The ARDL method was also used by Zimon et al. (2023), who investigated the impact of fossil fuels, renewable energy, and nuclear energy on the environment of South Korea. The results indicate stable equilibrium linkages between GDP, population, fossil fuels, renewable energy, nuclear energy, and the environment. It was also found that GDP and population growth increase CO₂ emissions, but using renewable energy helps reduce emissions.

Higher coal prices have less impact on consumption in emerging countries than developed countries, and the impacts on GDP are less pronounced, especially in poorer countries (Smith et al., 2021). Atuahene and Sheng (2023) used a vector autoregression model to analyze the relationship between variables in Ghana's energy sector and energy consumption from 2002 to 2021. They revealed a direct correlation between the GDP growth rate and fossil fuel electricity consumption, and Granger causality showed a feedback relationship between these factors. Zhang (2021) examined the main factors affecting coal prices using neural networks and found that the most influential factor affecting prices is national economic development, followed by national policy, coal production, and imports and exports.

Dependence on natural gas imports increases the risk to EU energy security, especially in geopolitical conflicts. Therefore, the EU's efforts to diversify its natural gas sources and seek alternative supply routes are key to reducing vulnerability (Zakeri et al., 2023). Martínez-García et al. (2023) investigated the changes in oil and gas prices in EU countries during the war

in Ukraine by building an input-output price model. The results show that the increase in oil prices had the most meaningful impact on Austria, the Czech Republic, Croatia, Finland, Romania, Slovakia, and Lithuania, and the most significant increase in natural gas prices was found in the Netherlands and Poland. Hence, the increase in oil and gas prices led to price increases in the manufacturing and service sectors.

Using a vector autoregression model, Tang and Aruga (2021) analyzed the effects of the 2008 financial crisis and the COVID-19 pandemic on the dynamic relationship between the Chinese and international fossil fuel markets. They found that the cointegration relationship between the Chinese and international fossil fuel markets was more affected during the 2008 financial crisis than by the COVID-19 pandemic, which did not significantly impact the relationship. Zhu et al. (2024) investigated the effects of energy imports on environmental innovation in the EU in the context of the ongoing war in Ukraine. An analysis using panel data from 1999-2022 found that natural gas imports promote innovation in renewable and environmentally friendly energy sources, while oil imports may slow down potential progress. Stajic et al. (2021) analyzed natural gas price volatility using the Pearson correlation coefficient. They found correlations between natural gas prices, oil prices, natural gas production, renewable energy production, and coal production. The highest positive correlation was recorded with coal production and oil prices, while high negative correlations were recorded with gas production and renewable energy production. Dehghani et al. (2022), using qualitative content analysis to obtain a large amount of information, examined Iran's five-year renewable energy policy development plans and found that Iran has the necessary capacity to develop a sustainable renewable energy policy. Using quantitative content analysis, Pierre et al. (2023) found that hybrid models such as ARIMA-LMST or ARIMA-GRU are more appropriate for predicting peak energy consumption than single models such as ARIMA, GRU, and LMST.

Based on the literature search, the vector autoregressive model (VAR) and Granger causality test will be used to meet the objective. The VAR model will address the first and third research questions, and the Granger causality test will address the second research question. Quantitative content analysis will collect data for all three research questions.

3 Data and Methods

The data on the price trends of different fossil fuels, used to answer the first research question, will be obtained from the Trading Economics website. The period from January 1, 2014, to January 1, 2024, will be monitored. The data obtained will then be projected onto a graph.

The data on the development of GDP in the Czech Republic and fossil fuel prices necessary to answer the second research question will be recorded from the Trading Economics website for current fossil fuel prices and from the CSO website for GDP development in the Czech Republic. Data will be recorded at the end of every third month from 2014 to 2024.

Data on EU inflation, EU unemployment, the COVID-19 pandemic, and fossil fuel prices will be used to answer the third research question. Data on the COVID-19 pandemic will be obtained from the WHO website, data on the prices of different fossil fuels from the Trading Economics website, and data on inflation and unemployment in the EU will be obtained from the Eurostat website. The impact of economic and political events on fossil fuel prices will be monitored during the selected period. The data will be monitored at the end of each month.

To answer all the research questions, quantitative content analysis will be used to collect quantitative data for all variables. All data will be processed using the statistical software R.

The VAR method will answer the first and third research questions. This method involves lagged values of all variables, allowing each variable to influence the other variables in the model. Several steps must be taken to calculate a VAR model:

1. Upload the data and install the necessary packages.

Figure 1. Installed packages

```
install.packages("readxl")
install.packages("ggplot2")
install.packages("urca")
install.packages("vars")
install.packages("mFilter")
install.packages("tseries")
install.packages("tidyverse")
install.packages("tsDyn")
```

(Source: Authors elaboration in Rstudio)

2. Convert the data to stationary using the *adf* test function.
3. Name the data using the *data.frame* function.
4. Select the number of lags using the *VARselect* function.
5. Name the model and add the appropriate number of lags.
6. Use the summary function to display the results of the model.
7. For the first research question, use the *fevd* function and display the results using the plot function.

Figure 2. Example of VAR model processing procedure

```
ropax<-ts(ceny_paliv$ropa, start = c(2014,01,01), frequency = 12)
zemni_plyn <-ts(ceny_paliv$zemni_plyn,start = c(2014,01,01),frequency = 12)
uhli<-ts(ceny_paliv$uhli, start = c(2014,01,01), frequency = 12)
autoplot(cbind(ropa,zemni_plyn))

adf.test(ropa)
ropax <- diff(ropa)
adf.test(ropax)

adf.test(zemni_plyn)
zemni_plyn1 <- diff(zemni_plyn)
adf.test(zemni_plyn1)

adf.test(uhli)
uhli3<-diff(uhli)
adf.test(uhli3)
uhli4<-diff(uhli3)
adf.test(uhli4)

ropax2 <- diff(ropa, differences = 2)
zemni_plyn2<-diff(zemni_plyn, differences = 2)

vliv_paliv<-data.frame(ropax2,zemni_plyn2,uhli4)
view(vliv_paliv)
VARselect(vliv_paliv,lag.max = 10,type = "both")
model1=VAR(vliv_paliv,p=10)
summary(model1)

fossil <-fevd(model1,n.ahead = 10)
plot(fossil)
```

(Source: Authors elaboration in Rstudio)

The Granger causality test, a practical tool, will be used to answer the second research question. Granger causality is used to determine the relationship between two time series. It addresses whether the past values of one variable can provide relevant information for predicting the values of the other variable. It is usually tested using regression analysis. Next, the relationship between two time series is evaluated using a regression model. Finally, it is examined whether the inclusion of lagged values of one variable improves the prediction of the other variable; if so, there is evidence of Granger causality between the variables. In a Granger causality test, the interpretation of the results depends on the null and alternative hypotheses, where:

- HO: No causal relationship between the variables.
 H1: The existence of a relationship between the variables.

To obtain the results, the following steps must be performed:

1. Build a VAR model.
2. Use the causality function to determine the existence of the causal relationship, with GDP in the Czech Republic as the influencing variable.

Figure 3. Example of Granger causality test procedure

```
ropax<-ts(ceny_paliv$ropa, start = c(2014,01,01), frequency = 12)
zemni_plyn <-ts(ceny_paliv$zemni_plyn,start = c(2014,01,01),frequency = 1)
uhli<-ts(ceny_paliv$uhli, start = c(2014,01,01), frequency = 12)
autoplot(cbind(ropa,zemni_plyn))

adf.test(ropa)
ropax <- diff(ropa)
adf.test(ropax)

adf.test(zemni_plyn)
zemni_plyn1 <- diff(zemni_plyn)
adf.test(zemni_plyn1)

adf.test(uhli)
uhli3<-diff(uhli)
adf.test(uhli3)
uhli4<-diff(uhli3)
adf.test(uhli4)

ropax2 <- diff(ropa, differences = 2)
zemni_plyn2<-diff(zemni_plyn, differences = 2)

vliv_paliv<-data.frame(ropax2,zemni_plyn2,uhli4)
View(vliv_paliv)
VARselect(vliv_paliv,lag.max = 10,type = "both")
model1=VAR(vliv_paliv,p=10)
summary(model1)

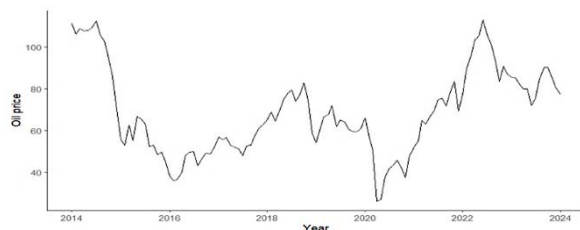
fossil <-fevd(model1,n.ahead = 10)
plot(fossil)
```

(Source: Authors elaboration in Rstudio)

4 Results

Chart 1 shows the evolution of oil prices from January 2014 to January 2024. Oil prices are quoted in USD/Bbl. The chart shows that the oil price peaked in 2022, with similar values also seen in 2014. In contrast, the lowest oil price was recorded in 2020.

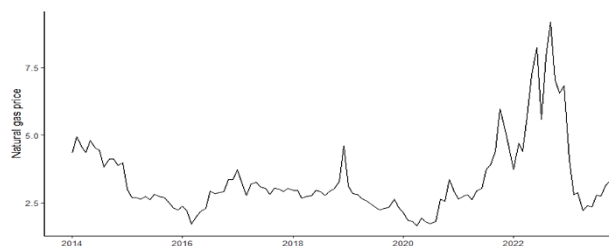
Figure 3. Oil price development



(Source: Authors elaboration based on data from Trading Economics)

Chart 2 shows the evolution of natural gas prices from January 2014 to January 2024. Prices are quoted in USD/MMBtu. The highest natural gas price was recorded in 2022. On the other hand, the lowest prices were recorded in 2020, with very similar natural gas prices in 2016.

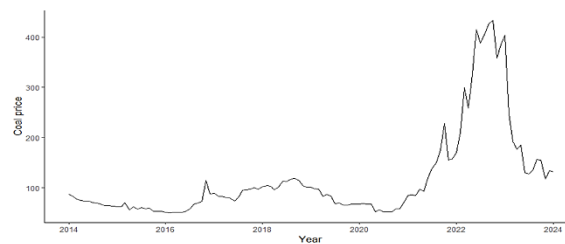
Figure 4. Natural gas price development



(Source: Authors elaboration based on data from Trading Economics)

Chart 3 shows the evolution of coal prices from January 2014 to January 2024. Coal prices are quoted in USD/T. The chart shows that coal prices peaked in 2022, while the lowest coal price was recorded in 2016, with similar prices recorded in 2020.

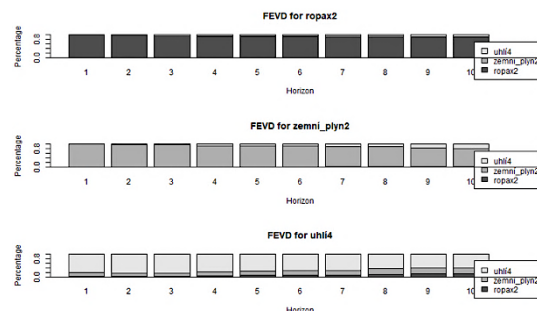
Figure 5. Coal price development



(Source: Authors elaboration based on data from Trading Economics)

In Chart 4, it is possible to see how the variables influence each other. Oil prices do not significantly affect natural gas and coal prices. The same applies to natural gas prices, where price trends depend on internal factors. Coal prices show the most significant dependence on oil and natural gas prices, although this dependence is not very high.

Figure 5. Forecast deviation distribution



(Source: Authors elaboration based on data from Trading Economics)

Table 1 shows the results of the Granger causality test. The significance level was set at 0.05. This implies that the GDP development in the Czech Republic directly affects the development of natural gas and coal prices since the values of the Granger causality test do not exceed the significance level. Therefore, the alternative hypothesis can be accepted. On the other hand, the alternative hypothesis is rejected for oil prices because the result is greater than the significance level. This means that GDP development in the Czech Republic does not affect the development of oil prices.

Table 1. Granger causality test

Fossil fuels	Granger causality test
Oil	0,946
Natural gas	0,0195
Coal	1,077e-07

(Source: Authors elaboration based on data from Trading Economics and CZSO)

Table 2 shows the results of the correlation matrix of residuals. Oil is the only variable directly correlating with all the other variables studied, with the highest correlation observed during the ongoing COVID-19 pandemic. Suppose the variables have a direct correlation with each other. In that case, it means that if the value of one variable increases, the value of the other variable will also increase. Natural gas has an inverse correlation with inflation, and coal has an inverse correlation with unemployment in the EU. If the variables have an inverse correlation, it means that if one variable's value increases, the other variable's value will decrease.

Table 2. Matrix of correlation residuals

	Inflation	Unemployment	Covid – 19
Oil	0,2140	0,1404	0,23465
Natural gas	-0,01479	0,004467	0,06082
Coal	0,6926	-0,01594	0,32435

(Source: Authors elaboration based on data from Eurostat, Trading economics, WHO)

5 Discussion

RQ1: How has the price of fossil fuels evolved over the last ten years, and what insights can we gain from this evolution?

At the beginning of the period under review, a downward trend in fossil fuel prices can be observed, with prices gradually declining until 2016. More pronounced volatility in fossil fuel prices can be observed since the beginning of the COVID-19 pandemic when prices rose significantly faster than in the earlier part of the period under review. For oil and natural gas, the lowest prices were recorded in 2020, while the lowest coal price in 2020 was not much different from its low in 2016. For all fossil fuels, the highest prices within the period under review were in 2022, when the war in Ukraine began. The analysis of the forecast variance decomposition showed that individual fossil fuels mainly depend on internal factors, though it can be argued that individual fossil fuels partially influence each other. Zakeri et al. (2023) examined the role of natural gas in electricity pricing in Europe and its reliance on imports. With Russia being a major natural gas supplier to Europe and fossil fuel prices surging post the Ukraine war, it's evident that fossil fuel imports can significantly impact prices until a new supplier is found and market conditions stabilize.

RQ2: What is the relationship between fossil fuel prices and GDP in the Czech Republic?

The Granger causality test results provide crucial insights into the relationship between GDP in the Czech Republic and natural gas and coal prices. While the test couldn't confirm a causal relationship between GDP and oil during the study period, it's important to note that the data was collected quarterly from January 31, 2014, to January 31, 2024. With a larger dataset and a longer observation period, a causal relationship between these variables could be established. Given the existence of a causal relationship between coal and GDP, one can agree with Smith et al. (2021), who argued that the impacts on GDP are less pronounced, especially in poorer countries.

RQ3: What are the impacts of political and economic events on fossil fuel prices?

There are weak correlations for all variables examined, except for the relationship between coal and inflation in the EU, where a moderately strong correlation was found. An inverse correlation was only observed for the relationship between natural gas and EU inflation and for the relationship between coal and EU unemployment. Based on the finding of correlations with EU inflation, especially with coal, one can agree with Heijmans (2023), who argues that central banks are forced to raise interest rates due to prolonged high inflation, which may also affect the price of emission allowances.

6 Conclusion

The aim of this paper is to assess the development of fossil fuel prices and their relationship to GDP in the Czech Republic. Regarding the development of oil prices, it was found that the highest price during the period under study reached 113.140 USD/barrel in 2022. The lowest price was in 2020, when the price of oil dropped to 25.990 USD/barrel. The Granger causality test did not confirm that GDP in the Czech Republic directly affects oil prices. However, direct correlations were found with EU inflation, EU unemployment, and the COVID-19 pandemic, with the highest correlation found with the COVID-19 pandemic. This unexpected finding piques further interest in

the research. In contrast, the lowest correlation was found with EU unemployment.

For natural gas prices, it was found that the highest price was in 2022, when the price climbed to 9.1940 USD/MMBtu. On the other hand, the lowest price was found in 2020, when the COVID-19 pandemic broke out, with natural gas costing 1.6480 USD/MMBtu. The Granger causality test, a crucial tool in this research, confirmed the existence of a causal relationship between natural gas prices and GDP in the Czech Republic, indicating that GDP in the Czech Republic directly influences fossil fuel prices. This robust finding provides a solid foundation for the research. Furthermore, the correlation between fossil fuel prices and EU inflation, EU unemployment, and the COVID-19 pandemic was analyzed. A weak direct correlation was found for all variables except EU inflation, where an inverse correlation was observed.

Regarding coal prices, it was found that the price of coal peaked in 2022, reaching 433.70 USD/T. The lowest coal price was recorded in 2016 when the price dropped to 49.95 USD/T. The Granger causality test confirmed a causal relationship between coal prices and GDP in the Czech Republic, indicating that GDP in the Czech Republic directly influences coal prices. When examining the correlation between EU inflation, EU unemployment, and the COVID-19 pandemic, direct correlations were found between EU inflation and the COVID-19 pandemic, with inflation showing the highest correlation. In contrast, an inverse correlation was found with EU unemployment.

For all fossil fuels, the highest price volatility was observed between 2020 and 2022, indicating that the COVID-19 pandemic and the ongoing war in Ukraine greatly impacted fossil fuel prices. Increasing the frequency of data collection to, for example, weekly or daily data may lead to more accurate results.

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Primary Paper Section: A

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VALUATION OF INTANGIBLE ASSETS IN THE MANUFACTURING INDUSTRY

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Abstract: From an economic and psychological point of view, building and maintaining a good reputation is essential for any branch of economic activity. This work evaluated goodwill using the weighted average return on assets method, WARA. This is according to the average company in the manufacturing industry in the Czech Republic between 2016-2020. The average enterprise was created by filtering enterprises determined according to the classification of economic activities of CZ NACE from section C. These data were transformed into a single entity valued on an accounting basis, and the value of its goodwill was determined. This value was determined from an accounting point of view as the difference between the revenue value of the business plant and the asset value of the business plant. The benefit is the value of goodwill expenses in connection with strengthening the competitive advantage in the market. The limitation of this work was determining which companies should filter out from the list of accounting data completely and which to keep. Further research could examine companies in individual subgroups in the manufacturing industry and other sections of the classification of economic activities.

Keywords: Intangible assets, goodwill, intellectual property, profitability, assets, liabilities.

1 Introduction

The accelerated pace of economic development, the digital revolution and the internationalization of business meant for some entities the creation or acquisition of intangible assets, which are becoming increasingly important for economic prosperity and for determining the global value of the enterprise, and also become an essential stimulus for the creation of added value (Cosmules et al., 2021). The company's assets are divided into financial, tangible and intangible. In particular, the valuation of intangible assets is a challenging task for companies, although in some cases, the obligation to value assets in the Czech Republic is imposed by law (Kruclický, Machová and Rowland, 2020). A significant and ever-growing part of corporate assets comprises intangible assets. Despite the growing importance of internally generated intangible assets, they are mostly absent from balance sheets and other corporate statements (Lim, Macias, & Moeller, 2020).

Business plants need to gain a competitive advantage in an interconnected global market. Organizations look for these benefits in all areas; therefore, it is understandable that their areas of interest also apply to tangible and intangible assets and their valuation. Unlike tangible assets, the valuation of intangible assets is very individual and dependent on their nature and specific characteristics. In addition, intangible assets directly rely on their carrier economically and in terms of riskiness. Different methods based on comparison or cost or income approaches are mainly used to estimate intangible assets (Štefánková, 2017a). From a practical point of view, the WACC method, which uses the average cost of capital, is prevalent. One of the other methods that can also be used is the WARA method, which is based on the added value and return on the assets themselves (Schüler, 2020).

Every business has a natural interest in protecting its assets, and this tendency is no less important in the vulnerable area of patent protection. Competitiveness in the protection of new technologies in the Czech Republic is significantly increasing compared to the over-declaration of European patents, thus indicating a significant improvement in this protection in our national market (Štefánková, 2017b). The majority of the source of wealth creation, not only in industrial fields, can be summarized under the same denominator, namely intellectual property. Private individuals' and businesses' financial and economic stability is closely linked to this form of property in business, career and personal life. Another no less important point in the evaluation of this area is also the issue of license fees and their possible relief (Havier, Jančovičová and Bartoš,

2017). Also, overpriced license fees and, conversely, undervalued ones are a significant risk for companies from a financial and legal point of view (Trappey et al., 2021). This trend does not avoid any sector of the manufacturing industry or other sectors of the national economy. Characteristic features and different issues, such as construction technologies, also cause uniqueness in the field of valuation. However, their valuation plays a vital role in the further development, transactions and commercial use of these technologies (Hong et al., 2010).

This article differs from others in emphasizing current economic and technological trends, the individuality of intangible asset valuation, specific valuation methods such as WACC and WARA, patent protection and royalty issues, and uniqueness in construction technology. This approach provides a deeper and more practical insight into the problem of intangible assets, which may be more applicable to the reader in actual business conditions. This article highlights the impact of accelerated economic development, the digital revolution and the internationalization of business on the creation and valuation of intangible assets. The article specifically points to the fact that internally generated intangible assets are often not included in balance sheets and corporate statements despite their growing importance. While all articles discuss different methods of valuing intangible assets, this article focuses more on the WACC (weighted average cost of capital) method and its popularity in practice. It also mentions the WARA (weighted average return on assets) method and its focus on value addition and return on assets.

The article aims to apply the valuation of intangible assets, specifically the WARA method and its approaches, in the manufacturing industry in the Czech Republic between 2016 and 2020.

Research question 1: How can the practical application of the average weighted return on assets method benefit the manufacturing industry in the specified period in the Czech Republic?

Research question 2: Why is this method suitable or, on the contrary, unsuitable for application in the processing industry in the Czech Republic?

2 Literature review

In today's globalization and rapid change era, businesses have to deal with several externalities and internal influences that increase their demands. One of them is necessary innovation in new technologies, automation and the introduction of robotic systems (Vrchota et al., 2020). According to the Classification of Economic Activities, the monitored industries can be classified into four primary groups, one of which is the manufacturing industry (Czech Statistical Office, 2022). According to CZ-NACE, some companies included in this manufacturing industry group have already taken their path to innovation. Other lean production process innovations are being introduced (Klečka, 2018). Glova et al. (2022) also analyses the effect of intangible assets on firm value in the manufacturing industry and confirm that this causes an increase in market capitalization. Innovations are necessary for global investors in development, research, and market valuation. Investors mainly form their expectations in intellectual property valuation according to comparable companies. This is done by observing the essential industrial unique features of patents or trademarks and their influence on the value of the company and the valuation of its assets (Dosso, Vezzani, 2020). However, in some countries, the main problems of asset valuation are the unstable market environment and the often-unprofessional behavior of appraisers (Cheloti, 2021). In Czech legislation, this problem is minimized by legal measures and regulations. Above all, Act No. 254 /2019 Coll.

Mercurio and Kim (2017) also delve into international patent rules and legal protection challenges. They advocate for a systemic and agile approach from legislators, urging them to seek new solutions within the realm of patent protection proactively. This underscores the need for policymakers to stay abreast of the evolving landscape of intellectual property and adapt their strategies accordingly.

Asset pricing is a trade-off between risk and return. Risk thus plays a fundamental role in the actual asset valuation process. This consists in determining the discount rate and the overall orientation of investors in the valuation of their assets. To arrive at the price of this asset, the expected return must be discounted by the rate of return demanded by investors (Asgar, 2021). Campbell (2000) discussed the stochastic discount factor and its role in economic asset valuation. He presented the opinion that actual interest rates limit this discount factor and risk premiums, on the contrary, limit their volatility. Ionita and Dinu (2021), dealing with listed companies in Romania, point to the negative effect of innovative intangibles on sustainable growth rate and firm value.

In the long-term development of enterprises, the input of intangible assets plays a significant role as a tool for innovation in the knowledge economy (Li et al., 2019). Intangible assets form a substantial part of the assets of both the private and public spheres. They are also one of the essential factors of competitive advantage and one of the greatest assets of modern society. Knowledge and skills generate intangible assets that have become irreplaceable economic resources. And the very reason it is impossible to touch this property physically makes it problematic regarding its valuation. The development of intangible asset and intellectual capital valuation methods has significantly increased since 1988, and this trend continues. However, many intangible asset valuation methods have already been described (Osinski et al., 2017). Dohnal et al. (2019) addressed the importance of Goodwill in a world that is considered an integral part of society and its values. For the scientific community, the value of corporate Goodwill is a constant problem, a phenomenon and a challenge that always offers to find new solutions (Podhorská et al., 2019). According to Tahat et al. (2018), intangible assets are of fundamental importance in increasing companies' performance. However, we must state that the current accounting framework is not a sufficient source of information about intellectual capital. Even among the professional public, there is no agreement on a single correct method of calculating intellectual capital, which could be considered a generally acceptable model (Atalay et al., 2018). Among other things, it is necessary to think that, except for the trademark, the value of industrial property decreases over time (Malý, 2002). Property rights that include intangible assets and industrial rights are valued according to Act No. 151/1997 Coll. on property valuation (Czech Republic, 1997).

Among the primary methods used to evaluate intangible assets as intellectual capital are the market, income, cost and option approach methods as quantitative approaches. On the contrary, the qualitative approaches mentioned by the author are based on point evaluation or indicators. However, a specific difference exists between intangible assets and intellectual capital, as Pastor et al. (2017) refer to the Organization for Economic Cooperation and Development. They explain this difference by classifying intangible assets as non-monetary assets without physical substance that are held, leased, or administratively used for production use. In contrast, intellectual capital is the estimated economic value of a company's intangible assets (Pastor et al., 2017).

According to Svačina (2010), two reasons exist for such a high number of intangible asset valuation methods. Above all, I will discuss these assets' diversity, specificity, and innovation within the newly acquired knowledge framework. However, all methods are based on three approaches, as Pastor et al. (2017) reported. However, Svačina (2010) classifies the option approach under the yield method, as he finds comparable signs with it but performs it using a different technique.

Intangible asset valuation methods also have their pitfalls, as discussed by research into evaluating these assets at one of the international conferences. Huang and Huang (2017) addressed the problems of these three basic methods. With the income method, the authors see the main difficulties in determining and calculating excess income, and selecting the discount rate can also appear very difficult. The market method is very complex when valuing a company, and it is challenging to determine financial indicators and coefficients for self-evaluation. Furthermore, the reliability of relevant data on the securities market could be more questionable or at least debatable. It also needs to be clarified, or at least very difficult, to determine how to use information from listed companies to assess the value of unlisted companies. Finally, the study also addresses problems with the cost method of valuing intangible assets and determining the actual use of these assets (Huang and Huang, 2017).

Although many methods are available for determining the value of intangible assets, the discounted cash-flow approach is most often used in practice. Certain limitations may arise in determining the appropriate discount rate. Carlin (2010) proposes an approach based on the weighted average return on assets (WARA) method. Under this method, a business plant's weighted average cost of capital (WACC) should equal the plant's weighted average return on various assets (WARA). This approach is thus adequate for determining the required return or discount rate of intangible assets. Lipovská (2019) also mentions this method in her work concerning the calculation of goodwill as the difference between the company's purchase price and the assets' net value.

The literature review focuses on the meaning and valuation of intangible assets in the current business environment, where innovation and automation are critical success factors. The valuation of these assets represents a trade-off between risk and return, where the discount rate is a crucial factor. Intangible asset valuation methods have their pitfalls. The income method is complicated because of the determination of excess returns and the discount rate. The market method is complex due to the need for more financial indicators and coefficients. On the other hand, the cost method presents a problem when calculating the actual use of assets. The discounted cash flow (DCF) method, which is most often used in practice, was chosen for the calculation. This method is appropriate because it considers expected returns and discounts them to present value, allowing for a realistic assessment of the future benefits of intangible assets. The discounted cash-flow approach is reliable, mainly thanks to the weighted average return on assets (WARA) method. WARA ensures that the weighted average cost of capital (WACC) equals the weighted average rate of return on the various assets within the business, which facilitates the determination of the required rate of return, or discount rate.

3 Data and methods

Data taken from the Cribis database from Crif—Czech Credit Bureau will be used and analyzed in this work. This will be the accounting data necessary for processing the balance sheet and profit and loss statement for companies operating in the manufacturing industry from 2016 to 2020. According to the CZ NACE classification of economic activities, this is section "C" Manufacturing industry. Data from subgroups 10 to 33 from 2016-2020 will be used.

The accounting data will be divided into individual years and cleaned of companies with meaningless values in their data, inactive or liquidated. This data will be processed using Excel software, where a balance sheet and a profit and loss statement will be prepared from the assessed companies in the processing industry and individual years. With this procedure, the data will be merged and further analyzed as an average enterprise in the manufacturing industry.

As a next step, the valuation of the assessed average enterprise in the manufacturing industry will be carried out using the income method of capitalization of net income. The calculation of the

revenue value of the enterprise will be carried out according to the following formula:

$$HP = \frac{T\check{C}V}{i_k} \quad (1)$$

Where: HP – enterprise value,

$T\check{C}V$ – permanently deductible net income,

i_k – calculated interest rate.

The necessary accounting data will be entered into the prepared Excel application, and the table of deductible returns will be transferred to the results section. To determine the capitalization rate, it will be necessary to implement the modular method using data published by the Ministry of Industry and Trade of the Czech Republic. As another essential quantity, the risk-free yield will be determined by comparing the yield of a ten-year government bond for 2020. This data will be searched on the CNB website and processed into a clear table. Additional risk premiums needed for the following capitalization rate calculation will be taken from the tables on the Ministry of Industry and Trade website. The calculation of the company's capitalization rate will be carried out according to the following formula:

$$r_e = r_f + r_{pod} + r_{finstab} + r_{LA} \quad (2)$$

Where: r_e – cost of equity capital,

r_f – risk-free yield,

r_{pod} – risk premium for business risk,

$r_{finstab}$ – risk premium for financial stability,

r_{LA} – risk premium for size.

(Lipovská, 2019)

These searched data will be compiled into a table, and their sum will determine the required capitalization rate. The prediction of the average rate of inflation in 2020 will be found on the website of the Ministry of Finance of the Czech Republic. Then, a table will be compiled from the determined results for calculating permanently deductible net income after correction for the level of investments and capitalized net income, determining the income value of the assessed average business in the manufacturing industry. Furthermore, the asset value of this company will be determined on an accounting basis, where the liabilities of the company are deducted from the company's assets using the equation:

$$(DHM + DNM + OM + P + DFM + FM) - obligations \quad (3)$$

Where: DHM – Tangible fixed assets,

DNM – Fixed intangible assets,

OM – Current assets (inventories),

P – Receivables,

DFM – Non-current financial assets,

FM – Financial property.

The illustrative table will be replaced with calculations from the Excel application and the following goodwill calculation table. Here, the determined revenue value of the enterprise will be deducted from its property value according to the formula (Svačina, 2010):

$$+/- Goodwill = Purchaseprice of the business - (\sum Assets - \sum Liabilities) \quad (4)$$

This calculation is based on the statement that goodwill, in accounting terms, is the difference between the purchase price of the business and the sum of the business's net assets. A company's intangible assets can be considered its good reputation (goodwill) represented, for example, by a trade mark, a brand of goods and a trademark (Lipovská, 2019). Furthermore, the data needed to calculate the value of goodwill using the WARA method according to the following formula will be searched and added to the compiled financial statements of the assessed company and inserted into the table.

$$WARA = rVK * \frac{VK}{K} + rCK * (1 - d) * \frac{CK}{K} \quad (5)$$

Where: rVK – required return on equity,

VK – equity,

K – total value of invested capital (gross),

rCK – required return on foreign capital,

d – income tax rate (19%),

CK – foreign capital,

$\frac{CK}{K}$ – debt ratio.

I will show the calculation of the WARA coefficient in a table and confirm it with the subsequent calculation of the WACC according to the formula:

$$WACC = \frac{CK}{K} * nCK * (1 - d) + \frac{VK}{K} * nVK \quad (6)$$

Where: $WACC$ – weighted average cost of capital,

nVK – cost of equity capital,

nCK – the cost of foreign capital

d – income tax rate,

CK – foreign interest-bearing capital,

VK – equity (in market value),

K – invested capital.

(Lipovská, 2019)

A similar result will confirm that the relation $WARA = WACC$ is valid (Svačina, 2010).

The value of the goodwill determined in the accounts will be multiplied by the achieved value of the WARA coefficient to determine the resulting value of intangible assets in the average enterprise of the manufacturing industry in the years 2016 to 2020. Based on the relationship:

$$\begin{aligned} & \text{Value of goodwill} \\ & = \text{The value of goodwill determined on the basis of} \\ & \quad \text{accounting data} \\ & + (\text{The value of goodwill determined on the basis of} \\ & \quad \text{accounting data} * \frac{WARA}{100}) \end{aligned} \quad (7)$$

4 Results

The valuation of intangible assets in the manufacturing industry in the assessed years 2016-2020 was divided into several parts.

1. Determination of the average company in the manufacturing industry in 2016-2020

2. Valuation of the determined average company in the manufacturing industry in 2016-2020 using the revenue method
3. Determining the asset value of the average company in the manufacturing industry in 2016-2020
4. Calculation of goodwill of the average company in the manufacturing industry in 2016-2020
5. Weighted Average Return on Assets (WARA) concept method

4.1 Determination of the average business in the manufacturing industry in 2016-2020

After cleaning the data of the specified companies in the manufacturing industry from 2016 to 2020, their financial statements were compiled with meaningless and harmful data. These are the balance sheets, where the internal links have been adjusted to maintain the balance between assets and liabilities. Then, the statement of profits and losses, and based on them, the valuation of the average company in the manufacturing industry from 2016 to 2020, will be carried out.

4.2 Valuation of the determined average company in the manufacturing industry in 2016-2020 using the revenue method

The net capitalized income method is used to determine the value of an average company in the manufacturing industry for the period under review from 2016 to 2020. The basis for this method is historical data from the balance sheet and profit and loss statement for the last 3 to 5 years. Part of the specified time series calculation is the removable net income, which can be withdrawn from the company without jeopardizing its continued existence. This situation is shown in Table 1 for the assessed company.

Table 1: Permanently deductible net income before depreciation

	2016	2017	2018	2019	2020
Profit before tax	28 240 759	31 914 745	32 037 360	33 210 151	35 027 288
(+) depreciation	436 287	765 458	891 540	386 669	569 882
(-) Financial returns	0	0	0	0	0
(-) Revenues from the sale of long-term assets	-854 846	-873 173	-976 119	-1 141 590	-1 491 820
(+) The residual value of the sold fixed asset	1 277 086	1 239 463	1 461 644	1 589 568	1 651 688
(+) Extraordinary personnel costs - restructuring				2 000	
(-) Extraordinary earnings	-318 305	-116 021	-112 274	-175 744	-110 138
(+) Extraordinary costs	163 013	153 414	487 369	389 234	141 809
Adjusted profit before depreciation and taxes	28 943 994	33 083 888	33 789 518	34 260 287	35 788 710
Chain price index	1,033	1,014	1,004	1,003	1,005
Primary price index related to 2016	0,974	0,988	0,992	0,995	1,000
Adjusted profit for inflation	29 702 782	33 482 451	34 060 341	34 431 589	35 788 710
Scales	1	2	3	4	5
Adjusted profit for inflation * Scales	29 702 782	66 964 902	102 181 024	137 726 356	178 943 548
TOTAL					515 518 612
Permanently deductible net income before depreciation					34 367 907
Depreciation from replacement prices from the assignment					52 500
Permanently Deductible Net Income Before Taxes					34 315 407
Tax base (with depreciation from the last year)					33 798 025
Tax (19 %)					6 421 625
Permanently deductible net income after tax before adjustment					27 893 783

Source: Own processing based on data from the Cribis database.

Table 1 shows the permanently deductible net income before depreciation. This table shows the company's financial results from 2016 to 2020. It shows the operating result before taxation, which gradually increased from CZK 28,240,759 in 2016 to CZK 35,027,288 in 2020. Various items are subtracted and added from the operating result, such as depreciation, revenue from the sale of fixed assets, extraordinary income and expenses. Adjusted EBITDA is also shown and then recalculated using price indexes that consider inflation. Finally, the permanently deductible after-tax net income is presented after considering taxes and other weighting factors.

To calculate the capitalized net method, the calculated interest rate, which represents the cost of equity capital, is usually referred to as r_e , must be determined. Here, the modular method will be applied using data published by the Ministry of Industry and Trade of the Czech Republic, the Ministry of Finance, the Czech Statistical Office, and the Czech National Bank.

One of the basic quantities for an asset valuation is the discount rate or, in this case, the calculated interest rate or the capitalization rate. The requirements for the risk-free rate, such as the absence of the risk of non-payment, minimal risk of illiquidity, and accessibility to investment, are determined, and government bonds mainly meet these. With these securities, it is assumed that the state can pay its debt, at least in nominal value. This development of the government bond yield is modelled in Table 2.

Table 2: Development of the ten-year government bond yield in 2020

Month	Ten-year government bond yield [%]
January	1,62
February	1,47
March	1,28
April	1,28
May	0,92
June	0,86
July	0,86
August	0,95
September	0,98
October	0,94
November	1,12
December	1,26

Source: Own processing according to the Czech National Bank

The development of the yield of the ten-year government bond of the Czech Republic in 2020 ranged from 0.86% to 1.62%. For this work, the last value from this year will be used, i.e. the figure from December 2020, i.e. 1.26%.

Other quantities needed to determine the capitalization rate, such as the risk premium for business risk, the risk premium for financial stability, and the risk premium for size, were taken from the data in the tables of the CZ NACE classification of economic activities with section C for the manufacturing industry on the Ministry of Industry and Trade website. The actual calculation is shown in Table 3.

Table 3: Calculation of the calculated interest rate (cost of equity)

r_f	1,26 %
r_{pod}	3,70 %
$r_{finstab}$	2,89 %
r_{LA}	0,84 %
$r_e = \text{capitalisation rate}$	8,69 %

Source: Processing according to the Ministry of Industry and Trade of the Czech Republic

Table 3 shows the various components needed to calculate the calculated interest rate. The risk-free rate (r_f) is set at 1.26%, the enterprise risk premium (r_{pod}) is 3.70%, the financial stability premium ($r_{finstab}$) is 2.89% and the liquidity premium (r_{LA}) is 0.84 %. Combining these components results in a total capitalization rate (r_e) of 8.69%. This calculation is essential for determining the cost of equity capital, which affects the company's overall financial strategy.

Table 4 shows the average annual rate of inflation in the Czech Republic expressed by the increase in the average consumer price index (the average of the last 12 months against the average of the previous 12 months).

Table 4: Average annual rate of inflation

Year	Average annual rate of inflation
2016	0,70 %
2017	2,50 %
2018	2,10 %
2020	3,20 %

Source: Processing according to the Czech Statistical Office

The macroeconomic predictions on the Ministry of Finance of the Czech Republic website predict the average inflation rate in 2020 at 3.2%. Therefore, this figure will be used (for 2020). After substituting this data into Table 5, we get the permanently deductible net income after correction for the investment rate, and Table 6 shows the calculated value of equity.

Table 5: Permanently deductible net income after correction for the investment rate in thousands of CZK

Expected long-term inflation	3,20%
Calculated interest rate (without inflation)	8,70%
Permanently deductible net income after correction for investment rate	20 386 625

Source: Own processing based on data from the Ministry of Finance and own calculations

Table 5 shows the effect of inflation and interest rates on permanently deductible net income. Expected long-term inflation is listed at 3.2%, while the calculated interest rate without inflation is 8.7%. The result of these calculations is a permanently deductible net income after correction for the investment rate, which amounts to CZK 20,386,625. This correction is crucial for a realistic valuation of the company's returns after considering investment conditions. The calculations here include data from the Ministry of Finance and its calculations.

Table 6: Capitalized net income in thousands of CZK

Operating income value	234 598 677
Non-operating assets at the valuation date	15 719 320
Equity value according to capitalised net income	250 317 996

Source: Own processing based on data from the Cribis database

Table 6 provides an overview of the company's capitalized net income. The revenue value of the operating part of the company is set at CZK 234,598,677. The value of non-operating assets as of the valuation date is added to this, which amounts to CZK 15,719,320. The total equity value according to capitalized net income is then CZK 250,317,996. This data provides critical insight into a business's financial health and ability to generate revenue from various assets.

4.3 Determining the asset value of the average company in the manufacturing industry in 2016-2020

This method consists of valuing assets at their market values and liabilities and then reducing the values determined in this way. In this case, however, the result will be determined on an accounting basis using items in the balance sheet of an average company in the manufacturing industry from 2020, as shown in Table 7.

Table 7: Property valuation

Type of property	Results
Long-term tangible assets	105 884 306 CZK
Long-term intangible assets	8 708 516 CZK
Long-term financial assets	2 097 974 CZK
Current assets (inventories)	66 258 571 CZK
Receivables	4 162 300 CZK
Financial property	1 905 353 CZK
Liabilities	14 408 763 CZK
Total property	189 017 021 CZK
Total liabilities	14 408 763 CZK
Enterprise value	174 608 258 CZK

Source: Own processing based on data from the Cribis database

Table 7 shows the value of different types of business assets. Long-term tangible assets are valued at CZK 105,884,306, while long-term intangible assets amount to CZK 8,708,516. The values of long-term financial assets (CZK 2,097,974), current assets (CZK 66,258,571), receivables (CZK 4,162,300) and financial assets (CZK 1,905,353) are also shown. The company's total liabilities are CZK 14,408,763, which leads to a total value of the company of CZK 174,608,258 after deducting liabilities.

4.4 Calculation of goodwill of the average company in the manufacturing industry in 2016-2020

To calculate the value of the goodwill of an average company in the manufacturing industry for the period 2016-2020, the accounting base mentioned was used based on the established valuations of the company using the income and property method. These values were subtracted from each other to determine the goodwill value of the Assessed Average Business, as shown in Table 8.

Table 8: Calculation of the value of goodwill

$+/- \text{ Goodwill} = \text{Purchase price of the business} - (\sum \text{Assets} - \sum \text{Liabilities})$
$+/- \text{ Goodwill} = \text{Equity value according to capitalised net income} - \text{Property value of the enterprise}$
$+/- \text{ Goodwill} = 250\,317\,996 - 174\,608\,258$
$+/- \text{ Goodwill} = 75\,709\,738 \text{ CZK}$

Table 8 explains the calculation of the company's goodwill. Goodwill is calculated as the difference between the equity value according to the KČV and the company's property value. Specifically, the value of goodwill is CZK 75,709,738, which is the difference between CZK 250,317,996 and CZK 174,608,258. This calculation is essential for understanding what added value a business has beyond its tangible and intangible assets. Goodwill often reflects intangible values such as brand, customer relationships and others.

4.5 Weighted Average Return on Assets (WARA) concept method

Goodwill can be calculated using the WARA method or weighted return on assets. We can say that the value of WARA = WACC, i.e. the average weighted return on assets should be equal to the average weighted return on capital from the perspective of liabilities. The substitution of the necessary indicators and the actual calculation of the WARA coefficient are shown in Table 7, and the resulting value of goodwill in the WARA concept is shown in Table 8.

Calculation of required return on equity

This required return on equity (ROE) calculation can be constructed using the following relationship:

$$ROE = \frac{\text{Profit after tax}}{\text{Equity}}$$

Calculation of the required return on foreign capital

$$ROI = \frac{\text{Bank loans}}{\text{Cost interest}}$$

Table 9: Calculation of the WARA coefficient

Indicator/Year	2016	2017	2018	2019	2020	Average
Total value of invested capital (brutto)	155 935 583	139 747 210	144 909 698	161 310 993	184 086 943	157 198 085
Required return on equity	0,282	0,254	0,229	0,255	0,244	0,253
Equity	110 541 880	98 474 120	103 785 721	118 075 783	132 079 390	112 591 379
Equity/total market value of invested capital	0,709	0,705	0,716	0,732	0,717	0,716
Required return on foreign capital	84,332	4,492	8,688	15,628	4,063	23
Income tax rate	0,19	0,19	0,19	0,19	0,19	0,19
1 - income tax rate	0,81	0,81	0,81	0,81	0,81	0,81
The value of foreign capital	45 393 703	41 273 091	41 123 977	43 235 210	52 007 553	44606706,8
Indebtedness rate	0,291	0,295	0,284	0,268	0,283	0,284
WARA						5,58 %

Table 9 calculates the WARA (Weighted Average Return on Assets) coefficient for the years 2016 to 2020. It shows the total value of invested capital, the required return on equity capital, the value of equity capital, the debt ratio, and the required return

on debt capital. The income tax rate is constant at 19%. The calculations show how the ratio of equity to the total market value of invested capital changes and the average return on these investments.

After performing the WACC calculation according to the above formula, the same value was calculated as when calculating the WARA coefficient, namely 5.77%

Table 10: Calculation of the value of goodwill using the WARA method

Indicator	
Goodwill value	75 709 738
Goodwill value * WARA/100	4 222 353
Result	79 932 091

Table 10 shows the calculation of the value of goodwill using the WARA coefficient. The value of goodwill is 75,709,738 CZK. Subsequently, this value is multiplied by the WARA coefficient (in %) and added back to the original goodwill value. The resulting value of goodwill after adjustment using WARA amounts to CZK 79,932,091. This approach allows the weighted average return on assets to be taken into account when valuing the business's goodwill.

5 Discussion

At the beginning of this work, the following two research questions were set, to which answers were sought by carrying out the application part. This was done using accounting data of companies operating in the processing industry from 2016 to 2020.

RQ1: How to apply the weighted average return on assets method in the manufacturing industry in the specified period in the Czech Republic?

RQ2: Why is this method suitable or, on the contrary, unsuitable for application in the processing industry in the Czech Republic?

The application's results proved that the weighted average return on assets method can be used in the manufacturing industry to determine the average company.

In the method of weighted profitability of WARA assets, the value of goodwill is determined equal to the value of WACC, which corresponds to the control calculation where the same accounting data were used. This comparison is also used in the work by Svačina 2010 and Lipovská 2019. By determining the average company in the entire industry, this procedure can be used to value the goodwill of the Assessed company.

This method can be used in this context for this field of business activity, but it is necessary to consider which accounting data will be considered meaningless or unnecessary in order to filter and modify them properly. In its essence, the WARA approach can be regarded as suitable for application in the processing industry in the Czech Republic in the set time horizon of 2016 to 2020.

However, there is still very little comparable research and information on using the WARA method.

There is not enough information about the method in a narrower context. Therefore, it can be concluded that this question will be addressed again in the future, and other ways will be sought to find a satisfactory result and move the intangible asset valuation industry forward.

6 Conclusion

The work aimed to apply the valuation of intangible assets, precisely the WARA method and its approaches in the manufacturing industry in the Czech Republic between 2016-2020. After processing the application part of this work, we can state that the set goal of the work has been fulfilled. The issue of

intangible assets in the form of goodwill was analyzed and examined on the accounting basis of companies in the manufacturing industry from 2016 to 2020. Here, the resulting value of goodwill was achieved using the calculated coefficient of the weighted return on assets method.

The value of goodwill as of 31/12/2020 from the point of view of accounting as the difference between the revenue value of the commercial plant and the property value of the commercial plant was set at 75,709,738 CZK and due to the WARA weighted average profitability concept, the value of the average business in the manufacturing industry is set at the resulting value of 79 932,091 CZK.

Because goodwill is intangible and, therefore, very difficult to grasp, I have a very vague idea about it and the company unless a good name is mentioned. Every business entity would like to own a good name or reputation to the greatest extent possible and would not want to slip into the level of bad will, increasing the business risk of losing stakeholders. The business entity would lose its primary function of generating profit by losing public interest.

Further investigation and introduction into the more profound practice of the weighted return on assets gives experts and appraisers another possibility in assessing and valuing intangible assets. Determining goodwill as a specific surplus value of a company is very difficult, and no uniform methodology has been established. The business entities would like to know if the costs incurred in creating and maintaining the company's good name are spent purposefully with a specific possible value in their return. This return can prove to be a competitive advantage in the market, gaining and maintaining customer popularity and consolidating or finding its position in the competitive market.

The work was limited by filtering out certain types of businesses with meaningless or missing data and enterprises in liquidation. Further research shows that businesses could be broken down into subgroups 10-33 within the manufacturing industry section. Thus, the company could learn which subgroup has the greatest and least prestige and how this could be corrected.

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CHILDREN'S IDEAS ABOUT SYMBOLS OF SLOVAK STATEHOOD

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Abstract: The subjects of the research were authentic utterances of 5-6-year-old children. They represented individual conceptions of concepts of the pre-primary curriculum - symbols of Slovak statehood (capital, anthem, president, state, state flag, state emblem) in a narrower or broader context. The aim of the research was to find out the content meanings of narrower and broader conceptions of concepts in 5-6-year-old children, which are the content of the state curriculum. We hypothesized that at the children's exit from pre-primary education, their conceptions of concepts are more similar to scientific concepts. The study answers two research questions: do children's narrower and broader conceptions of concepts confirm theory? Which are the exceptional, non-repetitive children's conceptions of concepts? The research strategy was qualitative. Children's authentic utterances enabled short individual interviews to be obtained. Children's utterances were analyzed, categorized, and interpreted. Narrower conceptions are associated with a pre-scientific conception or a naive conception (45%). A broader context of conceptions emerged for 42% of the children in the research set. 13% of the statements were categorized as "don't know" responses. Exceptional conceptions of the symbols of Slovak statehood result from children's experiences in everyday life. If children perceived them in different contexts, they explained them by some features of objective reality. These concepts are still abstract for children at this age. According to the findings, it is questionable whether teaching children about symbols of statehood is meaningful in kindergarten when children's narrower conceptions of the concepts prevail at the exit.

Keywords: concept, notion, psycholinguistic theories, symbols of the state.

1 Introduction

Today's children are growing up in conditions of diverse changes, demands and advances. They are reflected in the curricula of formal education. Their development is to be informed by the results of research, including in the area of the concepts that are the content of learning in schools. A conception, according to Fontana (1996, p. 65), is "an idea that an individual has about a class of persons, objects, or events, grouped together on the basis of what they have in common". The child understands and uses concepts in speech in an individual way depending on the conditions of his/her development. They are explained by psycholinguistic, linguistic and pedagogical theories.

Our research is supported by Jean Piaget's (1896-1980) theory of concept formation in child cognitive development. This theory is extensive. A simple summary of its essence is complex. We have extracted knowledge from it in order to identify children's statements confirming this theory. We have drawn on the second stage of cognitive development: preoperational thinking - years 2 to 7 of life, when the child uses static figurative (reproductive) imagery. These are elicited by observed facts - sensory experience, which children reproduce. The child relies on demonstrative thinking to understand concepts. Piaget and Inhelder (1997) distinguished children's conceptions of reality in which children's thinking has played a role (spontaneous conceptions) from conceptions that have been formed by the action of knowledge from those around the child (scientific conceptions). The two groups of concepts (children's ideas) have much in common. "The child chooses from the set of presented concepts only those which are appropriate to him in view of the level of construction of cognitive schemata which he has reached. Moreover, what he chooses is subject to assimilation to these cognitive schemata, so that distortion of objective meanings occurs. Piaget explained distorting egocentrism as an irreducible imbalance between assimilation and accommodation" (Pupala, 2001, p. 193).

L. S. Vygotsky (1896-1934) studied the development of children's speech in the context of the development of thinking with a different approach than Piaget. He emphasized the social and cultural conditioning of language and thought, which develop through the influences of learning and environment. Vygotsky (2017, p. 109) considered the meaning of a word from

a linguistic point of view as an association between the sound form of a word and its subject content. He stated that "a concept is not a simple grouping of associative connections acquired by memory, nor is it an automated rational habit. It is a complex act of thought which cannot be acquired by simple rote learning, and which constantly requires that the child's thinking itself be raised to a higher stage in its internal development in order that the concept may come into being. A concept at any stage of its development is, from a psychological point of view, an act of generalization. Concepts, psychologically represented as meanings of words, evolve. Already at the moment when a child first acquires a new word associated with a certain meaning, the development of the word has not ended but only begun. Initially, the concept is a generalization of an elementary type. It is only in the course of the child's development that he passes from the elementary generalization to ever higher types of generalization and thus completes the process of forming real concepts. This process of developing concepts or meanings of words requires the development of a number of functions such as deliberate attention, logical memory, abstraction, comparison and discrimination. All of these more complex psychological processes cannot be contained by memory alone; they cannot simply be learned and acquired." Vygotsky doubted the correctness of the view that in schooling the child grasps concepts in ready-made form and acquires them in the same way as he acquires any intellectual habits (Vygotsky, 2017, pp. 72-73). He examined the development of scientific concepts in children on the basis of the school's declared task of "instilling in children a system of scientific knowledge". He found that the development of scientific concepts outpaces the development of spontaneous concepts by the influences of school instruction, the teacher's action, and the child's learning process. He rejected the view that "scientific concepts are simply acquired in a ready-made form by leading the child to scientific knowledge and to the acquisition of concepts". Vygotsky found that the concepts of ordinary life are inappropriately associated by researchers with the child's scientific thinking and transferred "also to another sphere of concepts which arise under quite different internal conditions". He wrote that the distinguishing characteristic of a word (concept) is a generalized reflection of reality. The examination of words is to be carried out in connection with their meaning, because it reflects different types of the child's perceiving and thinking consciousness and different ways of reflecting reality (Vygotsky, 2017, pp. 70, 72, 130). This means that the child acquires words (concepts) by interacting with culture, in social activities and discourse. Children interpret social interactions. They also take place in school education. School content contains concepts that are products of culture. Children learn by "negotiating meanings" so that they become their "cognitive property" (Pupala, 2001, p. 202).

Another theory from which we validated the claims in the children's statements is the theory of understanding the meaning of concepts. Bloom (2015, p. 29) stated that "the meaning of words is shaped by the concept. A concept (notion) need only include some aspects of knowledge about the internal world". Children learn words through the ability to acquire concepts, the ability to understand, and the ability to remember. Children categorize unfamiliar entities based on their perceptual properties (what they look like, what sounds they make). Children can interpret the meanings of concepts based on perceptual experience and similarity, essence, shape, and repetition of their use in certain situations, especially by nearby adults. Of course, such interpretations may carry errors and may be naive. Children think about concepts in layman's terms, naively with essences. Essences represent the relationship between the external properties of an object and how it is categorized by the child. "That is, if an object resembles another to a sufficient degree, it falls into the same category." Lay essentialism in children's conceptual thinking represents little insight into how things and the world around them actually work. "The idea that a concept is shaped by an understanding of

why it has the properties it has sets virtually impossible conditions for the possession of the concept." This is an explanation for why preschoolers do not understand the meanings of concepts in the strict sense, as a theory of correlation between certain properties. They are at the level of conceptualizing specific concepts on the basis of their perceptual properties. Children's conceptions of concepts correspond primarily to "what things really are, not just what they appear to be" (Bloom, 2015, pp. 151, 168). "The biggest problem 5-6-year-olds have is with abstract concepts that have no association with any concrete forms, or their associations are mistaken or incorrectly tied to the wrong meaning structures." Learning the meanings of words is complicated by the fact that they do not have labels telling them exactly what they mean. There is a concept on one side and a form on the other. "A relevant conception of a word in terms of language acquisition must include all - exclusively those forms whose meanings are to be learned". They are referred to as scientific concepts (electricity, heat, etc.). Children's scientific conceptions of concepts are concrete (concrete concepts). It is typical for preschool children to learn to name surrounding facts, to categorize them, to know functions and relationships (Bloom, 2015, p. 27). Children's conceptions of concepts are not always based on direct experience with real entities, but on experience with their visual representations-from books, movies, television programs, videos, and other people's narratives. Usually distant real entities, children learn to name them in pictures (photographs, drawings), but they do not represent them accurately, for example, three-dimensionally. Therefore, in research, it should be kept in mind that "naming pictures differs markedly from naming real-world objects" (Bloom, 2015, p. 170). This is the background knowledge for our research and interpretation of the meanings of children's conceptions of concepts.

1.1 Research Problem

Exploring children is important for sensitizing educators to them in education. There is always a child at the beginning, in the process and at the end of teaching. The educational process therefore needs to be combined with diagnostic and research procedures. Findings about the child's dispositions and potentials are central to a quality and effective educational process (Kasáčová et al., 2016). Exploring children's conceptions of concepts from a pedagogical perspective is a "risky" path. It requires the researcher's theoretical insight on the basis of which to think through the research design and plan well. Mainly, it involves the risks of slipping into psychological and linguistic intentions and interpretations without a sufficient knowledge 'background'. Nevertheless, we share Vuzňáková (2018) view that children's speech development, mother tongue teaching and children's educational success depend on knowing how to understand the meaning of words. They acquire knowledge through new, unfamiliar words and concepts. Therefore, the educator can find out what the children have learned about the concepts from the content of education and whether his/her work was effective. He/she can assess whether children are conceptualising concepts in a more scientific way, whether the content of the curriculum overestimates/underestimates children's cognitive abilities and opportunities for experience. We are aware that interpretations of the findings depend on the level of competence of the educators also in the area of application to teaching. Similar research but science concepts was conducted by Monat (1973; adapted from Pupala 2001) with children just before they entered Year 1 of primary school. Babiaková (2017) focused similar research on literacy concepts.

Such research (Pupala, 2001, p. 211) "reports that children, despite being subjected to instruction in scientific explanations of concepts, after a period of time interpreted these concepts inadequately, incorrectly, as if at a lower cognitive level. From this, the conclusion is then drawn that school teaching is of low functionality because it has failed to replace the empirical interpretation with a more scientifically adequate one". Instructive for this inquiry is the thought that "whether it is at all possible and functional to expect every person to use a scientific interpretation of concepts in every situation when, say, several

pragmatic needs are quite satisfied by such an understanding as is anchored in natural language. Therefore, surveys of this kind should account more for the importance of context in children's handling of concepts. They should not assess their knowledge only in terms of mistaken versus scientifically correct'. Concepts of concepts (objective-methodological approach) can be confronted with objective cultural contents, to what extent they approximate them. The second is the ethno-methodological approach. When analysing and evaluating children's conceptions of concepts, it is not appropriate to use confrontational criteria. It is sufficient to be interested in identifying meanings with an emphasis on their semantic essence, individual and cultural contexts. Children's conceptions of concepts are studied in a value-neutral definition and in different contexts of interpretation. The second approach inspired our research. The starting point for formulating the problem was Bloom's (2015) claim that children's utterances are the result of their conscious experiences of the content of concepts in narrower and broader contexts. "The narrower (internal psychological) context is often associated with a pre-scientific concept or naive misconception in children. The broader context represents the interpretive framework of adults (parents, teachers, experts), as a rule, a scientific concept" (according to Kasáčová et al., 2017, p. 12).

Research Focus

The subject of the research consisted of authentic utterances of 5-6-year-old children. They represented individual conceptions of concepts of the pre-primary curriculum - symbols of Slovak statehood (capital, anthem, president, state, state flag, state emblem) in a narrower or broader context.

Research Aim and Research Questions

The aim of the research was to find out the content meanings of narrower and broader conceptions of concepts in 5-6-year-old children, which are the content of the state curriculum. We hypothesized that at the children's exit from pre-primary education, their conceptions of concepts would be more similar to scientific concepts because they were intended to be part of the curriculum. We were interested in the answers to the research questions:

VO 1. *Do children's narrower and broader conceptions of concepts confirm theory?*

VO 2. *Which are the exceptional, non-repetitive childhood conceptions of concepts?*

2 Materials and methods

General Background

A qualitative strategy was applied to address the research problem. It was important to ensure validity, reliability and objectivity of the investigation. According to Kasáčová et al. (2017), this is to meet the challenging condition of child-centred qualitative research. The research had to be planned, implemented and evaluated according to scientific procedures. It was necessary to train teacher-researchers and to ensure a large sample of respondents. The research process was determined by the procedure of analytic induction. The obtained statements were analyzed, categorized and interpreted.

Sample

The transcripts of utterances of 51 girls (D) and 45 boys (CH) aged 5 to 6 years from kindergartens in the districts of Bratislava, Trnava, Poprad, and Spišská Nová Ves were analysed for content. The average age of the children was 5.4 years. 753 authentic utterances of the sample children were analysed - answers to the descriptive questions "What is it? Who is it?" A selection of children was available. Parents signed informed consent for the research. The children came from the classrooms of the teacher-researchers.

Instrument and Procedures

Authentic statements of the children were obtained through short individual interviews. Concepts for the interviews were selected from the content standards of the State Curriculum for Pre-primary Education (2016) from the topic "Home". The teacher-researchers were instructed how to hold conversations with the children. The children were asked a question to understand the concept. They could supplement the question with help questions to understand the meaning and encourage the child. Each child in the research set had to answer 6 basic questions - What is the capital? What is the national anthem? Who is the president? What is a state? What is the national flag? What is the national emblem? The children's answers were captured by audio recordings. The researchers were instructed to respect the child's right to voluntarily enter the conversation and speak freely. Sensitive and empathetic communication was important. They were to be aware of the limits of the interview and to protect the personal information of the child and his/her family. The interviews were preceded by informed parental consent.

Data Analysis

Children's ideas - authentic statements about the content of the concept were analyzed. In the first stage of data analysis, we conducted open coding of the transcripts. We identified the characteristics of children's authentic utterances according to claims from psycholinguistic theories about children's narrower and broader conceptions of concepts (Piaget, Vygotsky, Bloom) with a constructivist perspective. According to Charnazova (2003; after Svaříček and Šed'ová, 2007), the latter is tied to specific carriers and their perspective, which is not always a reflection of objective reality. In line with Strauss and Corbin's (1999, p. 14; after Svaříček and Šed'ová, 2007) recommendation, we started the research by exploring according to our interest, expecting that what is significant in this area would emerge. Therefore, we were also interested in children's exceptional, non-repetitive conceptions of concepts for which we did not create categories. To analyze the data, we identified statements (categories) in the three theories confirming the theory of narrower and broader conceptions of concepts (Table 1). To these, we identified codes for analysis (Gavora, 2001).

Table 1 Identified characteristics of children's authentic utterances confirming psycholinguistic theories with assigned codes for content analysis¹

Theory	Scientist	Concepts	Statements confirming the theory - meaning categories	Code
Theory of concept formation in child cognitive development	J. Piaget	spontaneous imagery	Children distort objective meanings	PSP
		and scientific terms	Children reproduce sensory experiences	PVP
Theory of the evolution of concepts in children	L. S. Vygotskij	concepts of everyday life	Children interpret social interactions	VBP
		and scientific terms	Children generalise facts	VVP
Theory of understanding the meaning of concepts	P. Bloom	perceptual concepts	Children explain similarities and essences	BPP
		a relevant word concepts	Children rely on specific characters	BVP

The codes in Table 1 were chosen according to our own judgement. They were used to indicate semantically similar, equivalent parts of the analysed transcripts of the children's authentic utterances about the meanings of the concepts on the basis of their close reading.

¹ Narrower concepts (spontaneous ideas, concepts of everyday life, perceptual concepts); Broader concepts (scientific concepts, relevant concepts).

3 Results

Results of research, results of research, results of research, results of research, results of research, results of research, results of research, results of research, results of research, results of research. The results of the content analysis of the utterance transcripts provided answers to the research questions. They also serve as evidence for the research. Table 2 shows the numbers of children's utterances for the meaning categories. Each child's utterances were assigned to one meaning category only once.

Narrower and broader conceptions of children's concepts confirming the theory

Table 2 Identified conceptual confirmation theories by meaning categories of analysis²

Concepts in the topic Home	Narrower concepts (number of statements)			Broader concepts (number of statements)			(N)
	Children distort objective meanings	Children interpret social interactions	Children explain similarities and essences	Children reproduce sensory experiences	Children generalise facts	Children rely on specific characters	
Capital City	40	16	14	12	8	12	13
Anthem	40	8	34	28	16	12	17
President	39	2	10	0	18	22	10
State	36	0	22	0	12	8	24
National flag	10	6	10	48	18	20	10
National emblem	8	8	20	20	16	26	16
Total	173	40	110	108	88	100	90
	323 (45%)			296 (42%)			13%

Table 3 Identified notions of concepts confirming theories by meaning parts/characters of the analysis³

Concepts in the topic Home	Narrower concepts			Broader concepts		
	Children distort objective meanings	Children interpret social interactions	Children explain similarities and essences	Children reproduce sensory experiences	Children generalise facts	Children rely on specific characters
Capital City	1. place, city where the child lives	1. they talked about it in kindergarten	1. a city where there is a lot of something	1. that there were in it	1. Slovakia	1. concerts, Performances,
	2. globe	2. people from the family who live in it	2. a city that is big	2. Bratislava that they learned it in kindergarten	2. largest city	2. trains,
	3. shop	3. they go there with someone for a holiday, a visit	3. the name of a country the child knows			3. where the president lives
	4. road					4. Bratislava Castle
	5. work					

² Did not know - the child responded with the word don't know or didn't answer.

³ Narrower concepts (spontaneous ideas, concepts of everyday life, perceptual concepts); Broader concepts (scientific concepts, relevant concepts).

Anthem	1. song for dancing 2. musicians 3. a song for an event	1. song when he is with someone at football, hockey 2. connecting with someone in the family when they are at some activity	1. when someone receives a medal, a cup 2. at a competition 3. in sports 4. hockey anthem 5. national song 6. played when one wins	1. the talking book sings it 2. they hear it in kindergarten, on the news, at hockey, football	1. music/song of the Slovak Republic /Slovakia 2. song about Slovakia 3. important song 4. sung by several people	1. Over the Tatra Mountains 2. singing 3. some words, verses from the anthem 4. to make the Slovaks better 5. mountains and the Tatras
President	1. someone from advertising 2. someone who works 3. a teacher 5. a boss 6. chairman/mayor	1. a connection to someone in the family or village /town 3. someone who decides something 4. the one who protects	1. solves something 2. police president 3. someone who decides something 4. the one who protects	1. we have it to have a good time 2. he cares about Slovakia /country 3. travels the world and talks to other people	1. the man what's in the news 2. telling people /even into a microphone 3. they said the president's name	
State	1. where children learn 2. where people are 3. something bad 4. the whole world 5. houses		1. kindergarten 2. Slovak state 3. our country 4. Bratislava 5. the globe, the world	1. Slovakia 2. names of other countries that children knew 3. republic	1. where we live 2. flag 3. anthem 4. name-Slovak Republic	
National flag	1. something that moves on a stick 2. a ribbon, a piece of cloth 3. coloured paper	1. that someone in the family has it	1. something painted, 2. it's pulled out when it's won	1. that they saw her on a pole somewhere, 2. it moves when the wind blows 3. at the hotel/school 5. at a hockey game 6. on holiday	1. flag of the Slovak Republic /Slovakia 2. flags of other countries 3. square, has stripes	1. colours of the Slovak flag 2. the emblem on the flag 3. square, has stripes
National emblem	1. something that is given in return for a reward 2. marking different objects (fighter jet, tractor, car ...)	1. does anyone in the family also have it on their clothes	1. pinned to the garment 2. given in exchange for something 3. something is written and drawn there 4. something that distinguishes countries	1. magnet 2. have it at home 3. there is one in the kindergarten 4. they have seen it on buildings 5. on TV	1. Slovak emblem 2. Slovakia, Czech Republic 3. Slovak mark 4. picture, which shows that Slovakia, 5. picture hanging on the wall	1. on the flag 2. the colours of the emblem 3. shield/hoods and 2 crosses /double cross

Exceptional children's sayings about concepts

Table 4 Non-repeating parts of conceptions of concepts by 5-6-year-old children (Kleštincová, 2016, pp. 101-105; Spišiaková, 2018, pp. 75-84).

Concepts in the topic Home	Exceptional children's sayings about concepts
Capital City	D 12: "I think Poprad or Bratislava, because it's an awfully big city". D 17: "It is such a city where everybody has to be careful because if something happens we have to call the police quickly". D 22: "Well it's some Slovak or English or Thai or Polish city". D 24: "The globe is the capital". D 28: "This is what is not a village, but it is a city". D 40: "It's like a universe that only rich people can go there". CH 10: "Komensky's school is the capital. That's the doctors, the policemen and I've seen the firemen too". CH 12: "The capital, it's a globe like that, actually it can't jump from space to space because our planet would be very big". CH 15: "Every city and village has that". CH 19: "When someone goes far to work and has to walk to earn money".
Anthem	D 26: "This is such a fight with the soldiers". D 32: "This is the most important song of our world". D 34: "Stable for the animals, that's where they live". D 40: "A hymn is such when such a long song is sung". D 46: "There's a lot of something. The anthem is sung, there is a football anthem, a Slovak anthem, an African anthem, an American anthem and all sorts of other anthems. The Slovak anthem is about Slovakia and it is in Slovak because it is Slovak. CH 9: "The anthem is where people sing at hockey and also football. I can sing it as well: Above Tatra the lightning is flashing, the thunder is beating wildly. We sing it for the Slovaks, to make them better". CH 11: "The anthem is probably some kind of train?" CH 21: "The anthem is probably a radiator".
President	D 7: "That's the writer's uncle, he's writing some papers for us". D 10: "The president is the one who put down all these buildings here". D 17: "He is someone like from a fairy tale". D 18: "The president goes everywhere and people help him". D 27: "That's Fico. There was such a figure of him at the centre". D 29: "We have to have a president to have a good time". D 30: "He takes care of the whole world". CH 11: "I've never seen him, but I know he's paying attention". CH 13: "If we didn't have a president, we wouldn't go to kindergarten". CH 19: "Ujo" who looks after our country". CH 20: "He preaches everything he can think of".
State	D 23: "A state can be an old book or a new book, all kinds of things." D 29: "That's when people run". D 31: "Everything, such a man has done, which has built the whole world". D 33: "Terribly something bad it is!" D 39: "That's like starting my car racing". CH 14: "That I'm supposed to stay still". CH 15: "That's some house untidy. The state is very important". CH 25: "There is a book when I look in bed and there are pictures". CH 27: "The place or shop where Mummy goes shopping". CH 28: "It's a house that can turn off and then it can pop up".
National flag	D 23: "The flag walks by the wind, where the wind blows, there it goes". D 24: "I've seen it on the side at the nursery, it waves like this, or it can be wedged". D 32: "When I went to the hotel, there were a lot of flags and they can be all kinds of languages". D 39: "The flag is for moving Slovakia". CH 24: "It is such a sail and my uncle has it at home". CH 27: "The flag is everywhere, for example it was at the hockey game". CH 28: "I have never seen it in Slovakia, I just know it, it is so square".
National emblem	D 29: "It's when I do something good that I get something". D 31: "My dad has such branded clothes because he goes to the forest and he needs to have such clothes there". D 38: "That's a Slovak brand. If it wasn't there, it means ban". CH 8: "The sign is to let people know where Slovakia is and where America is". CH 10: "Well the sign is about like this, like a fighter jet, a machine or a chimney". CH 11: "There is a tractor or a car". CH 13: "It's like a picture with letters and mountains". CH 22: "The Slovak emblem is very important for us. It says that we have Slovakia and it is ours. It is such, like a picture hanging".

5 Discussion

The research findings showed that the narrower concepts of Slovak statehood are more pronounced in 5-6-year-old children. According to the state curriculum, the studied concepts should be the content of children's learning in kindergartens. Narrower conceptions of concepts are associated with the pre-scientific concept or the naive concept. As many as 13% of the statements contained the answer "don't know". In this response we included the child's silence when he/she did not know the answer or was unsure of the answer and did not say anything. The broader context of the concepts emerged for 42% of the children in the research set. They had elements of an interpretive framework that contained at least one feature of scientific explanation. The narrower conceptions of concepts confirmed a statement from the theory of concept formation in child cognitive development (Jean Piaget). Children at the age studied distort the objective meanings of concepts (173 utterances) for those concepts that are more difficult to gain sensory experience with (capital, anthem, president, state). The research was conducted with children who do not live in the capital. Children also conceptualize concepts on the basis of similarities to other realities with which they have experience and essences (otherwise mediated reality) in accordance with Bloom's theory (110 utterances). In the narrower conceptions, children were least likely to use meanings that relied on social interactions (40 utterances). They mainly associated these statements with family members. This confirmed the claim from Vygotsky's theory that children interpret social interactions in a close social and cultural environment. Broader conceptions (scientific, relevant) confirmed the theoretical claims that children reproduce sensory experiences in conceptions (108 statements) and rely on concrete features of the content of conceptions (100 statements). They also begin to generalize the meanings of concepts (88 statements). Concepts of the symbols of Slovak statehood are mainly derived from children's experiences in everyday life (Table 4). If children perceived them in different contexts, they explained them by some features of objective reality.

6 Conclusions

The concepts being explored are abstract for 5-6-year-olds. According to the findings, it is questionable whether teaching children about symbols of statehood is meaningful in kindergarten when children's narrower conceptions of the concepts prevail at the exit point. Research is needed on other concepts in all educational areas. This learning should be part of primary education. In kindergarten, children should be educated in common concepts that are related to their childhood life. It is not possible to generalize the research results to the entire population of 5-6-year-old children, but only to the research population of children. We hypothesize that multiple variables influenced the children's responses, such as the child's personal characteristics, level of cognitive and language development, range of experiences, stimulating environment, and teacher-researchers' approach. Nonetheless, the investigation was meaningful. It approximated children's ability to verbally express ideas about concepts that are the content of kindergarten instruction. It can lead to thinking about the effectiveness of children's learning in kindergarten as well as to similar research. This study approached only the first level of children's understanding of concepts to the basic questions What is it and Who is it? Research in this area is also important because national curricula should be built on the results. Comprehensive research data is to be provided by the VEGA 1/0505/24 project Children's Preconceptions about the Phenomena of Reading Literacy.

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Primary Paper Section: A

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MORE WOMEN, LESS CORRUPTION, BUT HOW MANY WOMEN ARE NEEDED?

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Abstract: The gender-based evaluation of corruption tends to conclude the negative relationship between women politicians and the level of corruption. However, the research admits the opposite nature of this relationship, too. In this paper, the expectation of a negative linear relationship between women in politics and corruption is replaced by the non-linear assumption based on different initial economic and political conditions among EU members. The research covers the sample of 27 EU countries in 2001-2021 with further division of the sample into sub-samples of new and old EU members. The results show that the share of women in politics should reach a certain level to achieve their potential impacts on the level of corruption. This result is emulated in the sample of new EU member states, too.

Keywords: corruption, gender equality, women's political representation, post-communistic countries

1 Introduction

The examination of corruption in terms of gender attitudes towards it expresses the countries' progress (Agerberg, 2014). Sundström and Wängnerud (2016) consider the share of women in politics as an indicator of modernization. Therefore, extensive research has been made in this field in the last decades. Many authors (e.g. Dollar, Fisman, and Gatti, 2001; Brollo and Troiano, 2016; Barnes, Beaulieu, and Saxton, 2018; Merkle, 2021; etc.) mention the negative relationship between women in government and the perception of corruption. Besides, many studies raise the question of whether women differ in their attitudes toward corruption and bribery when compared to men, and if they do, what is the reason (Esarey and Schwindt-Bayer, 2018; Schwindt-Bayer et al., 2018). Waylen and Southern (2021) point to the importance of the overall development of the country, when discussing the role of women in politics in the perception of corruption. Erlich and Beauvais (2023) mention the specific situation in post-communistic countries, that suffered from high levels of corruption, even the former legislation introduced gender quotas in politics.

In this paper, we focus on the examination of the nature of the relationship between women in politics and the level of corruption in the EU. We consider the heterogeneity of the EU members when evaluating their initial economic and political conditions. We regard the development of post-communistic countries performing the progress in public sector modernization. When estimating the relationship in the question, we take into account hereinbefore mentioned approaches, which leads us to shift from the expectation of the linear dependence to a non-linear one. The research is conducted on the sample of 27 EU countries in the period 2001-2021 with further division of the sample into sub-samples consisting of new and old EU members.

The paper is organized as follows. After the introduction, the literature review provides us with basic knowledge in the field of gender-based evaluation of corruption. The section on data and methods describes variables, resources, and employed research methods. Results and discussion present the main findings. The paper ends with a conclusion.

2 Literature Review

Corruption was supposed to be gender-neutral (Merkle, 2021; Cvetanoska, 2022), but in recent decades, the scientific literature discusses the different attitudes of men and women towards corruption (Jha and Sarangi, 2018; Bauhr and Charron, 2021; Merkle, 2021). Many authors (e.g. Agerberg, 2014; Jha and Sarangi, 2018; Merkle, 2021; and others) point to the importance

of the seminal works of Dollar, Fisman, and Gatti (2001) and Swamy et al. (2001), which challenged to capture the relationship between women's representation in politics and the level of corruption. Since then a myriad of research on the nexus of gender and corruption has been published analyzing the situation in many countries worldwide. However, the research on gender-based evaluation of corruption focuses both on developed and developing countries. Jha and Sarangi (2018) ran an analysis on a sample of 17 European countries finding a negative relationship between women politicians and corruption level. Waylen and Southern (2021) focus on the UK, Bauhr and Charron (2021) on the local level in France. Brollo and Troiano (2016) examine the relationship under scrutiny in Brazil. Batista Pereira (2021) takes into account Brazil and Mexico, Schwindt-Bayer et al. (2018) compare the USA and Brazil due to different electorate accountability. Asomah et al. (2023) investigate the gender-based evaluation of corruption in Ghana, Afridi, Iversen, and Sharan (2017) in India. Erlich and Beauvais (2023) focus on Ukraine.

According to the literature on gender-based corruption, the negative relationship between women's representation in politics and the level of corruption could be explained by higher honesty of women when compared to men, higher risk aversion of women when compared to men, harder punishment of women for corruption by voters and lower engagement of women in informal social networks that encourage the corruption (Esarey and Schwindt-Bayer, 2018; Barnes and Beaulieu, 2019; Merkle, 2021; Bauhr and Charron, 2021; Batista Pereira, 2021; Guerra and Zhuravleva, 2022; Asomah et al., 2023). McGee and Benk (2023) give a summary of research on gender-based attitudes towards corruption. Barnes and Beaulieu (2019) explain why are women perceived as morally superior to men.

Guerra and Zhuravleva (2022) investigate if female politicians work as corruption cleaners in line with discussion provided by e.g. Esarey and Schwindt-Bayer (2018), Schwindt-Bayer et al. (2018), Stensöta and Wängnerud (2018), Bauhr and Charron (2021), Waylen and Southern (2021), Armstrong et al. (2022). Esarey and Schwindt-Bayer (2018), Schwindt-Bayer et al. (2018), and Waylen and Southern (2021) pose certain doubts about the connection between the higher shares of women in politics and lower levels of corruption. Schwindt-Bayer et al. (2018) find no evidence for women politicians being less corrupt and no evidence, that the electorate punishes women politicians engaged in corruption more harshly. Esarey and Schwindt-Bayer (2018) mention, that the inverse relationship between women's representation in politics and levels of corruption is determined by the overall development of the country meaning its electorate's accountability including factors such as press freedom or parliamentary systems. Waylen and Southern (2021) find out, that whether women are less corrupt than men, depends on the level of accountability, too. Barnes, Beaulieu, and Saxton (2018) investigate which stereotype (risk aversion of women, greater perceived honesty, or outsider status) could explain the negative relationship between women in government and the perception of corruption. Erlich and Beauvais (2023) describe the situation in post-communistic countries, where the share of female politicians is low after abolishing the gender quotas stipulated by the Soviet Union, and levels of corruption are high.

Bauhr and Charron (2021) investigate the relationship in the question at the municipal level in France. Their findings bring important insights into the adaptation of corrupt behaviour over time. Women mayors who are new in the office support the findings of an inverse relationship between women politicians and corruption risk, while re-elected women mayors are not in line with this. The research focusing on the sub-national (regional) level of the government is provided also by Jha and Sarangi (2018), where the share of women in the sub-national governments has an inverse relationship with the corruption perception, too. Brollo and Troiano (2016) investigated the impact of women mayors on corruption finding a negative

relationship, too. Sundström and Wängnerud (2016) provided research on 18 European countries, taking into account local governments, with outcomes similar to Brollo and Troiano (2016) and Jha and Sarangi (2018).

However, the literature on gender-based evaluation of corruption generally tends to conclude the negative relationship between the share of women in politics and the level of corruption. Oppositely, a group of authors (e.g. Schwindt-Bayer et al., 2018; Bauhr and Charron, 2021) find no evidence of such a relationship or identify situations in which the negative relationship between the share of women in politics and the level of corruption is not observed. In this research, considering the heterogeneity of the sample of EU 27 countries, we regard different initial conditions of EU members. Pointing to lower levels of women in politics in post-communistic countries and higher levels of corruption when compared to established democracies in the EU with higher GDP per capita, we focus on the non-linear relationship between the share of women in politics and the level of corruption. We work with an assumption, that the share of women in politics should reach a certain level to observe their potential impacts on the level of corruption.

3 Methods and Data

In this paper, the non-linear relationship between the number of women in parliament and two different measures of corruption is

examined in the sample of 27 EU countries in the period 2001-2021. The nonlinear relationship is estimated using econometric modelling based on the panel data approach. We run two regressions based on two different expressions of corruption. We employ the Control of Corruption Index and Corruption Perception Index provided by the World Bank (2023) to measure corruption. These two indicators of corruption serve as the dependent variables. Similarly proceed e.g. Jha and Sarangi (2018), but use the negative of the Control of Corruption Index, because, in the case of the original index, higher values imply less corruption (World Bank, 2023; see Table 1 for variables' description), and thus the negative relationship between the original corruption indices and women representation in politics should express the increasing corruption perception with an increasing number of female politicians. For this reason, we focus on seeking the positive relationship between the original indices of corruption and the share of women in politics. Dollar, Fisman, and Gatti (2001) similarly interpret their results, thus they find a positive sign of the beta estimate for the variable focusing on the percentage of women in parliament.

The explanatory variable is the share of women in parliament (see Table 1). Jha and Sarangi (2018) use an indicator of women's presence in parliament. Similarly proceed Sundström and Wängnerud (2016).

Table 1 Descriptive statistics

Variable	Characteristics	Source	Obs.	Min	Max	Mean	Stdeva
Dependent variables							
Corruption Perception Index	Indicator of perceptions of public sector corruption, i.e. administrative and political corruption. 100 = no corruption. Expressed in logarithm.	Transparency International	550	3.2581	4.5951	4.0930	0.2829
Control of Corruption*	Perceptions of the extent to which public power is exercised for private gain, including petty and grand forms of corruption, as well as capture of the state by elites and private interests. Range -2.5 weak; 2.5 strong.	The World Bank	540	-0.4400	2.9000	1.0195	0.8230
Explanatory variable							
Women	Logarithm of women in parliament - the percentage of parliamentary seats in a single or lower chamber held by women.	The World Bank	564	2.0399	3.8561	3.1251	0.4529
Women2	Logarithm of women in parliament squared	Own	564	4.1613	14.869	9.9713	2.7700
Control variables							
Public deficit	Net lending/ net borrowing as % of GDP	Eurostat	567	-32.100	5.6000	-2.6342	3.5682
Inflation rate	Percent change in the Consumer Price Index.	The World Bank	567	-4.5000	34.500	2.3379	2.6820
FDI	Foreign Direct Investment, net inflows of investment% of GDP.	The World Bank	566	-117.42	7509.0	25.341	317.87
Unemployment rate	Share of the labour force that is without work but available for and seeking employment.	The World Bank	567	1.7810	27.470	8.5538	4.3254
GDPpc	Logarithm of GDP per capita in market prices in EUR.	Eurostat	567	7.4747	11.543	9.8406	0.7593
Crisis 2009	Dummy variable for the year 2009	Own	567	0.0000	1.0000	0.0476	0.2132
Human development index	Measure of three basic dimensions of human development: long and healthy life, knowledge, and a decent standard of living. Range 0-1.	United Nations	560	0.7150	0.9550	0.8613	0.0472
Median Age	Median age of the population.	Eurostat	567	32.600	47.600	40.424	2.6713

Note: * Data available since 2002

When controlling for corruption, control variables are chosen in line with the literature on determinants of corruption. Cariolle (2018) mentions the determinants of corruption capturing economic development, human development, state size, trade, and democracy. A standard measure of the countries' economic development is GDP per capita (Sundström and Wängnerud, 2016; Jha and Sarangi, 2018; Cariolle, 2018) in the form of its logarithm (Sundström and Wängnerud, 2016; Jha and Sarangi, 2018). As a proxy for human development and human capital Brollo and Troiano (2016) employ the literacy rate, Sundström and Wängnerud (2016) employ the variable of education, and Jha and Sarangi (2018) employ the number of schooling years. We use a Human Development Index and median age to express the awareness of the population, assuming that a higher age points to higher awareness. To express openness or trade, usually, the net export variable is used in the literature on

corruption determinants (e.g. Cariolle, 2018; Jha and Sarangi, 2018). Countries with lower barriers to international trade are less corrupt. Jha and Sarangi (2018) comment on the economic and human development of countries. According to them, richer countries may tackle better corruption. Besides, corruption is lower with higher levels of human capital, because people are aware of their rights. In a very similar sense proceed Sundström and Wängnerud (2016). They introduce in their research a dummy variable for Central and East European countries. They mention several important issues tied to determinants of both corruption and women's representation in politics. According to them, countries more developed in the economic and human fields (higher GDPpc and higher level of education) evidence higher shares of elected female politicians. In line with this, Erlich and Beauvais (2023) mention that in post-communist countries women's representation in government has been low,

since the fall of the Soviet Union which respected gender quotas. For this reason, in the second step of the analysis, we divide the sample of EU member countries into new and old EU members. Cariolle (2018) employs a variable of democracy, but he runs the research on developing countries. Our sample consists of developed countries, so there are low differences among EU members in terms of the degree of democracy. According to data provided by Polity IV (2023), in the EU all countries are full democracies and democracies in the period since 2001.

To estimate the relationship between women in parliament and two different measures of corruption in the sample of 27 EU countries in the period 2001-2021 and two sub-samples, respectively, we use panel data models. We employ the fixed-effect models (FEM) or random-effect models (REM) referring to the Hausman test. To express the basic econometric formula, we can use the following:

$$\text{Corruption Perception Index}_{it} = \beta_0 + \beta_1 \text{Women}_{it} + \beta_2 \text{Women}_{it}^2 + \sum_{k=3}^L \beta_k \text{Control variables}_{kit} + \varepsilon_{it} \quad (1)$$

and altering the dependent variable:

$$\text{Control of Corruption}_{it} = \beta_0 + \beta_1 \text{Women}_{it} + \beta_2 \text{Women}_{it}^2 + \sum_{k=3}^L \beta_k \text{Control variables}_{kit} + \varepsilon_{it} \quad (2)$$

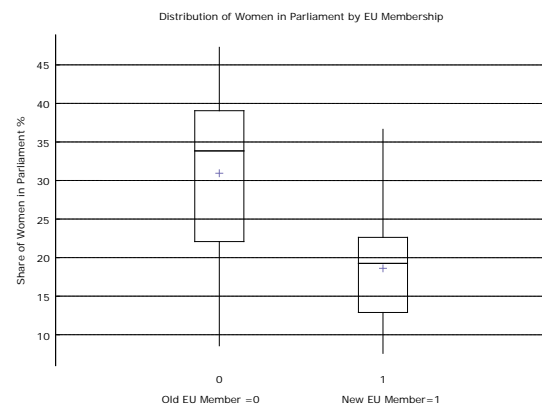
In the next step of the analysis the moment of the EU accession in 2004 is taken into account and the sample of 27 EU countries is divided into two subsamples – old and new EU member (old - Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, and Sweden; new – Bulgaria, Croatia, Cyprus, Czechia, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia

and Slovenia. Thus the equations (1) and (2) are used again, but for two sub-samples separately.

4 Results and Discussion

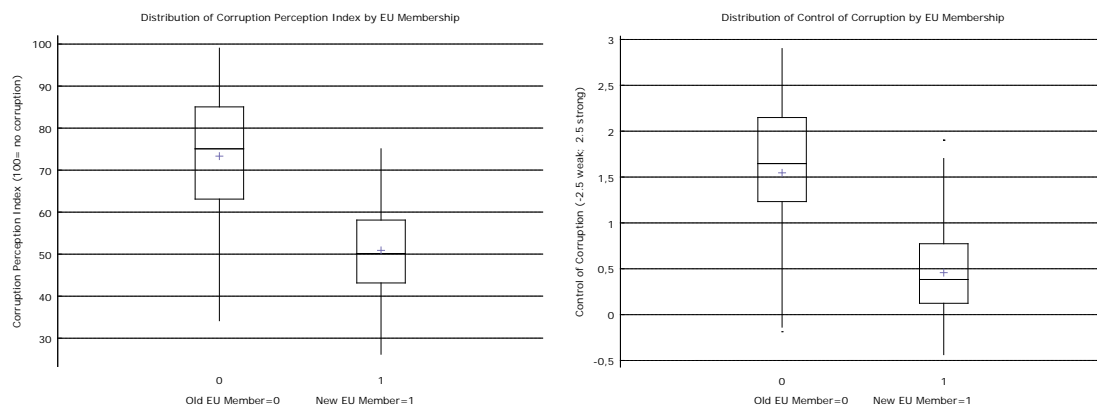
Analyzing the shares of women in parliament in the EU in 2001-2021, it is obvious, that these shares differ according to the countries’ access to the EU (see Figure 1). In the case of old EU members, the shares of women in parliament are higher than in the case of new EU members.

Figure 1: Distribution of women in parliament by EU membership



Analyzing the levels of corruption, it is possible to see evident differences between old and new EU members, again (see Figure 2). Both corruption indices (higher values of indices mean less corruption) are higher in the case of old EU member countries when compared to new EU members. Results projected in Figure 1 and Figure 2 are in line with the findings of Erlich and Beauvais (2023).

Figure 2: Distributions of corruption levels by EU membership



In the first step of the econometric analysis, we run the estimation on the whole sample of 27 EU countries without dividing them according to their access to the EU. Figure 3 projects the dependencies of the corruption indices and shares of women in parliament in 27 EU countries in 2001-2021 with a non-linear trend. The results of estimation for the full sample, 27 EU countries, are shown in Table 2.

It is important to mention, that the differences between old and new EU members are obvious. Besides, the representation of new EU members in the sample of 27 EU countries is evident and it could create a strong impact on the final results for the whole sample of EU countries

Figure 3: Relationship between the shares of women in parliament and corruption indices

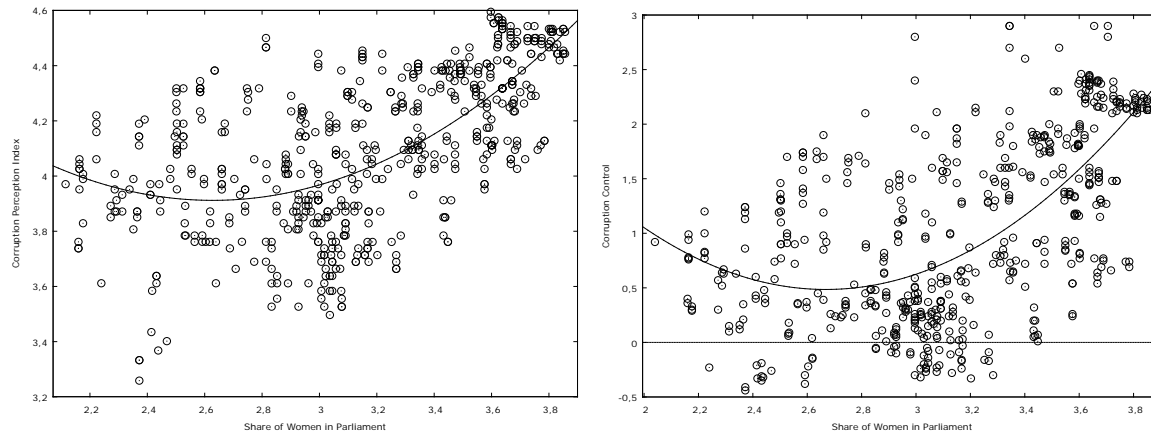


Table 2 displays the results of two models following the formulas (1) and (2) mentioned in the section on data and methods. Our findings point to the non-linear relationship between the women's share in parliament and corruption when the sign of the beta coefficient in the case of the women variable

is negative and in the case of women variable squares turns to positive. It means that the increase of women in parliament is related to higher corruption up to the point of turnover when the relationship turns positive. After passing the threshold, more women in politics are contributing to lower corruption.

Table 2: Estimation results, EU 27

Dependent variable	Corruption Perception Index		Control of Corruption	
	Model 1 FEM		Model 2 FEM	
Variables	Coeff.	Signif.	Coeff.	Signif.
Intercept	3.7961 (0.3032)	<0.0001 ***	2.6796 (0.7854)	0.0006 ***
Women	-0.5277 (0.1682)	0.0017 ***	-0.9358 (0.4519)	0.0384 **
Women2	0.0792 (0.0272)	0.0036 ***	0.1577 (0.0758)	0.0374 **
Public deficit	0.0030 (0.0013)	0.0223 **	-0.0031 (0.0030)	0.3011
Inflation rate	-0.0077 (0.00156)	<0.0001 ***	-0.0093 (0.0042)	0.0265 **
FDI	1.40e-05 (7.68e-06)	0.0682 *	-2.73e-05 (4.87e-05)	0.5752
Unemployment rate	-0.0047 (0.0014)	0.0006 ***	-0.0079 (0.0030)	0.0078 ***
lnGDPpc	0.2095 (0.0303)	<0.0001	0.4923 (0.0892)	<0.0001 ***
Crisis 2009	-0.0307 (0.0161)	0.0563 *	-0.0735 (0.0358)	0.0401 **
Human development index	-1.4605 (0.5732)	0.0108 **	-4.2570 (1.3400)	0.0015 ***
Median Age	0.0105 (0.0058)	0.0696 *	-0.0345 (0.0136)	0.0111 **
R2	0.3685		0.1514	
Hausman test p-value	<0.0001		<0.0001	

Notes: Standard errors in parentheses, *** denotes 1%, ** 5%, and *10 % significance level.

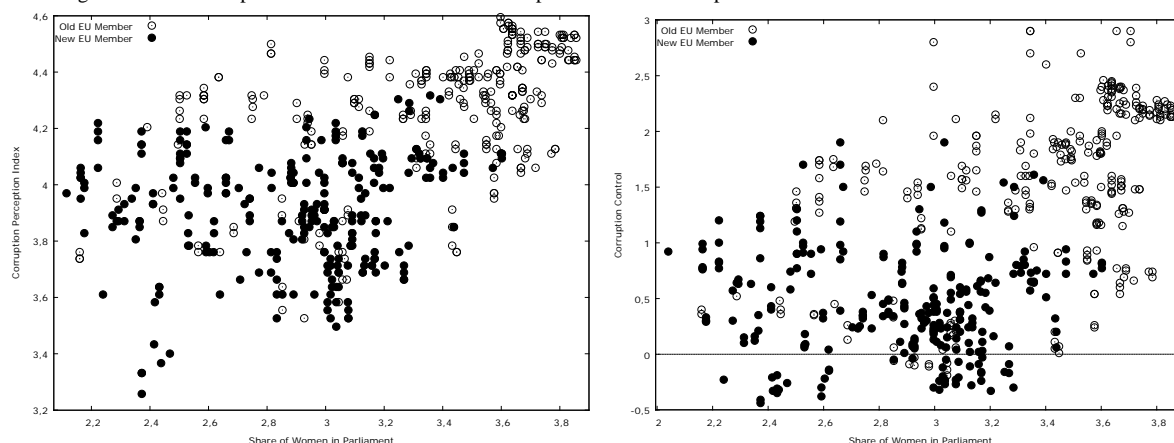
In the next step of the analysis, we focus on sub-samples of EU members regarding the 2004 EU accession moment. It divides the EU members according to the level of their development, too, considering the economic and political development (lower levels of initial GDP per capita, newly established democracies).

Figure 4 shows the dependencies of the Corruption Perception Index and the indicator of Control of Corruption on the share of women in the parliament according to the EU accession of the member states. The values for the old EU member states are located in the right top corner of both figures, where less corruption (perceived or controlled, higher values of indices) are

connected with higher shares of women in parliament. Contrary, in new EU member states, more corruption (perceived or controlled, lower values of indices) is connected with lower shares of women in parliament. This might lead us to the assumption, that the share of women in politics in new EU member states could be more critical when considering its impact on the level of corruption.

To remind, from the other point of view, the representation of new EU members in the sample of 27 EU countries is evident. It could create a strong influence on the final results for the whole sample of EU countries.

Figure 4: Relationship between the shares of women in parliament and corruption indices in old and new EU member countries



When estimating the relationship between the gender of politicians in the parliaments and corruption in various indices regarding the 2004 EU accession moment (see Table 3), it is evident, that the expected nonlinear relationship suit better the new EU members. Here, after passing a certain level of the share of women in the parliament, the positive impact of women

politicians on lower levels of corruption (perceived or controlled) is observed. In the case of old EU member states, the coefficients for women variables are not statistically significant and we might suppose the adequacy of the linear model to estimate the relationship in the question instead of the non-linear model.

Table 3: Estimation results, new and old EU members

Dependent variable	Corruption Perception Index				Control of Corruption			
	New EU Members		Old EU Members		New EU Members		Old EU Members	
	Model 3 FEM	Model 4 FEM	Model 5 FEM	Model 6 FEM	Model 5 FEM	Model 6 FEM	Model 5 FEM	Model 6 FEM
Variables	Coeff.	Signif.	Coeff.	Signif.	Coeff.	Signif.	Coeff.	Signif.
Intercept	4.1688 (0.4695)	<0.0001 ***	6.2145 (0.4879)	<0.0001 ***	3.7887 (1.2066)	0.0017 ***	-0.3545 (1.5023)	0.8135
Women	-1.5067 (0.3027)	<0.0001 ***	-0.1058 (0.2565)	0.6800	-2.4217 (0.8225)	0.0032 ***	0.5860 (0.7745)	0.4493
Women2	0.2471 (0.0521)	<0.0001 ***	0.0201 (0.0404)	0.6184	0.4012 (0.1420)	0.0047 ***	-0.0799 (0.1242)	0.5199
Public deficit	0.0068 (0.0024)	0.0045 ***	0.0002 (0.0013)	0.8986	0.0046 (0.0056)	0.4152	0.0082 (0.0036)	0.0250 **
Inflation rate	-0.0044 (0.0017)	0.0094 ***	-0.0098 (0.0035)	0.0046 ***	-0.0037 (0.0041)	0.3639	-0.0203 (0.0113)	0.0734 *
FDI	0.0004 (0.0001)	0.0019 ***	1.17e-06 (2.68e-06)	0.6621	0.0005 (0.0003)	0.1235	-2.77e-05 (4.65e-05)	0.5512
Unemployment rate	-0.0034 (0.0020)	0.0810 *	-0.0062 (0.0016)	<0.0001 ***	-0.0050 (0.0050)	0.3162	-0.0101 (0.0049)	0.0417 **
lnGDPpc	0.1648 (0.0465)	0.0004 ***	-0.1424 (0.0411)	0.0005 ***	0.2979 (0.1302)	0.0222 **	0.7680 (0.1924)	<0.0001 ***
Crisis 2009	0.0002 (0.0289)	0.9933	-0.0332 (0.0194)	0.0863 *	-0.0690 (0.0548)	0.2087	-0.0813 (0.0571)	0.1543
Human development index	0.0137 (0.5983)	0.9818	-0.7156 (0.4742)	0.1313	-3.2785 (1.4334)	0.0222 **	-5.4229 (1.8575)	0.0035 ***
Median Age	0.0130 (0.0078)	0.0947 *	0.0090 (0.0055)	0.1001 *	0.0073 (0.0192)	0.7025	-0.0539 (0.0178)	0.0024 ***
R2	0.5812		0.1989		0.1401		0.2595	
Hausman test p-value	<0.0001		<0.0001		<0.0001		<0.0001	

Notes: Standard errors in parentheses, *** denotes 1%, ** 5%, and *10 % significance level.

5 Conclusion

The gender-based evaluation of corruption takes place in the current research because the share of women in politics became a considered indicator of the modernization of the country.

The literature on gender-based evaluation discusses the expected negative relationship between the share of women in politics and the level of corruption. This paper investigates the relationship between women politicians and the level of corruption on a panel of EU 27 countries in the period 2001-2021. In this paper, the usual expectation of a linear relationship between women in politics and corruption is replaced by the non-linear assumption, when admitting both the positive and negative impact of women on corruption. The reason rests in considering the important differences among EU countries. The heterogeneity of the EU members when evaluating their initial economic and political conditions is evident. We regard the development of post-communistic countries performing the progress in public sector

modernization. We work with an assumption, that the share of women in politics should reach a certain level to achieve their potential impacts on the level of corruption.

The results confirm the assumption of a non-linear relationship between women in politics and the corruption level in the case of the whole sample of EU members in the period 2001-2021. When dividing the sample into new and old EU members, the non-linear relationship is confirmed for the new EU member states, while the same model does not suit the sample of old EU members. In the new EU member states, the share of women in parliament has to achieve a certain level to observe the inverse relationship between women politicians and corruption. The strong representation of new EU members in the sample of 27 EU countries (13/27) might influence the results of the whole sample.

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Primary Paper Section: A**Secondary Paper Section: AD**

THE PRICE DEVELOPMENT OF SELECTED ENERGETIC COMMODITIES

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Abstract: The aim of the paper was to evaluate the price development of electrical energy and inflation as a commodity in the course of the past 10 years. The production of electrical energy decreased from 83.7 TWh in 2010 to 70.6 TWh in 2020 in the Czech Republic in accordance with the results achieved by using the methods of descriptive statistics, time series, correlation analysis and regression analysis. The consumption of energy slightly increased. The proportion of production to consumption declined and consumption was higher than production in 2020. The prices of electricity reveal oscillations influenced by the conflict in the Ukraine. The use of the sources of energy changed, however, without specific trends. The dependence of prices on inflation is considerable and direct. Energy policy ought to deal with the dependence on import and support the domestic production of energy.

Keywords: Electrical energy, prices, inflation, development, consumption, production, import.

1 Introduction

Global macroeconomic conditions, inflation, economic policy uncertainty and monetary policy are important factors influencing the length of different phases of the commodity price cycle. In addition, a greater number of wars around the world are subsequently associated with shorter periods of booms and busts in commodity prices (Agnello et al., 2020). The ongoing geopolitical crisis that has emerged due to the war in Ukraine has created economic winners and losers. We adopt DS-ARDL and Cross-Quantilogram approaches to examine the impact of higher energy prices on commodity currencies during this war. (Sokhanvar et al., 2023) In analysing the risks associated with commodity investing, the authors were able to uncover interesting relationships between oil commodity prices and the prices of agricultural commodities such as wheat, corn, soybeans, and rice (Shahzad et al., 2018). Over the past 20 years, the evolution of electricity prices has been strongly influenced by the deregulation of electricity markets, the transition to a low-carbon energy system, and the growth of renewable energy sources. Electricity prices are important for electricity market coordination and long-term market analysis (Wyrwoll et al., 2021). Electricity prices in the Czech Republic have changed significantly over the last decade. Significant deregulation of the electricity market and the growth of renewable energy sources have led to greater price volatility (Dobeš et al., 2019).

The aim of the work is to evaluate the development of electrical energy prices and inflation as a commodity in the course of the past 10 years.

The following research questions were defined to achieve this aim:

RQ1: What was the proportion of generated, exported and imported electrical energy within the Czech Republic in the past 10 years?

RQ2: What was the development of the prices of electrical energy as a commodity in the past 10 years?

2 Literary research

Nguyen and Prokopczuka (2019) find that energy, metal, and grain commodities exhibit high jump correlations, while jumps in meat and soft commodities are barely correlated. Commodities may offer a lower correlation with traditional investments, meaning they may perform well in a market environment where traditional investments may weaken. In recent years, new models and techniques have been developed to predict electricity prices. One of the most recent innovations is the use of machine learning and artificial intelligence to develop forecasting models (González Romero et al., 2019). These

models have been shown to be able to capture complex patterns in electricity price time series and provide more accurate forecasts than traditional statistical methods (Bessa et al., 2017).

Effective modelling and forecasting of electricity prices has become an important need for all electricity market participants in recent years. It enables them to develop effective supply strategies and make investment decisions. However, accurate price prediction is difficult due to specific electricity price issues such as periods of high volatility, seasonal patterns, calendar effects and non-linearity (Jan, Shah and Ali, 2022). Uncertainty about future electricity supply, demand, and prices has increased with the advent of smart grids and the increasing integration of renewables. As a result, it has become increasingly important to correctly forecast electricity prices (and load) using probabilistic models, which is essential for efficient planning and operation of power systems (Nowotarski and Weron, 2018). Deregulation has taken place in many countries to create a more efficient market. This change makes it easier to purchase electricity across regions and countries. Electricity market participants have an advantage in predicting future prices to optimize risks and profits, as well as planning for the future (Beigaite, Krilavioius and Man, 2018).

Another new feature is the integration of probabilistic models. These provide uncertainty ranges and allow market participants to better manage the risks associated with electricity prices (Nowotarski and Weron, 2018). These models also enable more efficient planning and operation of power systems. Electricity prices in the Czech Republic have changed significantly over the last decade, with significant deregulation of the electricity market and the growth of renewable energy sources leading to greater price volatility (Dobeš et al., 2019). As a result of these changes, electricity prices have become more sensitive to factors such as changes in demand, supply and fuel prices (Stávková et al., 2017). Electricity prices in the Czech Republic are influenced by many factors, including global macroeconomic conditions, inflation, economic and monetary policies, and war conflicts (Agnello et al., 2020). In addition, the growing reliance on renewable energy sources such as solar and wind power has increased uncertainty about future electricity supply, demand, and prices (Wyrwoll et al., 2021). Factors such as changes in electricity consumption, policy decisions, regulation, infrastructure investment, and climatic conditions also play an important role in determining electricity prices in the country (Jan, Shah, and Ali, 2022).

Content analysis will be used as the data collection method for all research questions. Data processing methods will include descriptive statistics, time series, correlation analysis and regression analysis. Each scientific question will list the specific methods that were used to calculate the results.

3 Data and methods

The data on electrical energy prices in the Czech Republic obtained from the official sources, such as Czech Statistical Office (ČSÚ, 2023) or the operator of electricity market (OTE, 2023), will be used for the analysis. The data include the average annual prices for households and industrial consumers in korunas for megawatt-hour (CZK/MWh). Apart from the prices of electrical energy, there will also be collected data on macroeconomic variables, such as inflation (ČSÚ, 2022), political events and the development of renewable resources in the Czech Republic. All the needed data are included in the attachment No.1. It is necessary to determine the following hypotheses in relation to the determined research questions:

Does inflation bear principal influence on the prices of electrical energy in the Czech Republic in the monitored period?

H0: Inflation bears influence on the prices of electrical energy in the Czech Republic in the monitored period.

H1: Inflation bears no influence on the prices of electrical energy in the Czech Republic in the monitored period.

The determined hypotheses will be examined on the 0.05 significance level.

Descriptive statistics

This method includes the calculation of fundamental statistical indicators, such as average, median, standard deviation, minimal and maximal values providing an overview on the division of electrical energy prices in the course of the past 10 years comparing the main operators in the electricity market. Furthermore, there will be determined a statistic of production, export and import of electrical energy within the Czech Republic in the past 10 years. On the basis of these data the ratio of export vs import will be determined.

Time series

The analysis of time series will be performed with the aim of identifying seasonal patterns, trends and cycles in the prices of electrical energy. There will be employed methods, such as moving average, exponential smoothing and decomposition of time series.

Correlation analysis

This method will be used to identify the relations between the prices of electrical energy and various macroeconomic variables, such as inflation, political events and a development of the sources of renewable energy. Pearson correlation coefficients between the prices of electrical energy and these variables will be calculated. The parameters of individual linear dependencies are given in the table below.

Table 1 the parameters of linear dependency

lin.dependency	weak	medium	strong
correl. coef.	$r < 0.3$	$0.3 < r < 0.8$	$r > 0.8$

Regression analysis

Regression analysis will be made with the aim of better understanding the influence of individual factors on the prices of electrical energy. Multipath regression model involving the price of electrical energy as a dependent variable and macroeconomic variables (inflation) as independent variables will be used. We may presume the concurrence of prices of individual operators, where prices will be dependent on the size of inflation, within the results. The individual analyses mentioned above will help us prove this assumption.

4 Results

Descriptive statistics

The table shows the annual statistics of generation, consumption, export and import of electrical energy in the Czech Republic from 2010 to 2020. The energy generation dropped from 83.7 TWh in 2010 to 70.6 TWh in 2020, while the consumption slightly rose. Energy export dropped while import rose which resulted in decreasing the export – import ratio from 5.88:1 in 2010 to 2.62:1 in 2020.

In the tables below there are averages, maxims minimums or standard deviations in accordance with individual operators and OTE in the past 10 years.

Table 2 The comparison of annual averages of individual operators

Year	E.ON	PRE	ČEZ	OTE
2010	4.6	4.5	4.4	1.1
2011	4.7	4.3	4.6	1.2
2012	4.6	4.5	4.8	1.1
2013	4.8	4.4	4.9	1.0

2014	4.3	4.1	4.3	0.9
2015	4.2	4.1	4.2	0.9
2016	4.2	4.0	4.1	0.8
2017	4.3	4.1	4.2	1.0
2018	4.5	4.3	4.3	1.2
2019	4.9	4.6	4.7	1.0
2020	5.0	4.5	4.9	0.9
2021	5.2	4.7	5.2	2.6
2022	6.3	5.7	6.5	6.1
2023	8.2	7.8	8.2	2.8

Source: ČSÚ, OTE-ČR, Authors.

Table 3 The standard deviations of individual operators

Year	E.ON	PRE	ČEZ	OTE
2010	0.0	0.0	0.0	0.0
2011	0.0	0.0	0.0	0.0
2012	0.0	0.0	0.0	0.0
2013	0.0	0.3	0.0	0.0
2014	0.0	0.0	0.0	0.0
2015	0.0	0.0	0.0	0.0
2016	0.0	0.0	0.0	0.0
2017	0.0	0.0	0.1	0.0
2018	0.0	0.2	0.0	0.0
2019	0.1	0.0	0.0	0.0
2020	0.0	0.0	0.2	0.0
2021	0.1	0.2	0.7	0.0
2022	1.1	0.8	0.0	0.0
2023	0.2	0.0	0.0	0.0

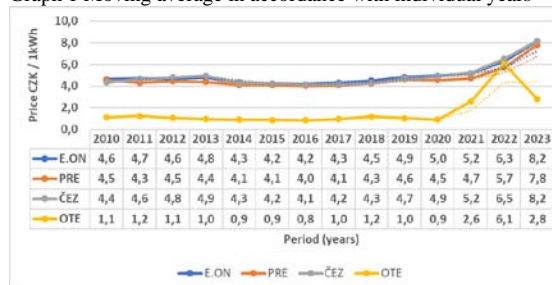
Source: ČSÚ, OTE-ČR, Authors.

When the values of minimal and maximal prices are analysed, there is a visible situation, when operators (sellers) have prices at the same level. When a purchase price (OTE) is compared, a percentage increase is visible. It is necessary to mention that all the fees related to distribution, EZO, seller's margin, etc., are included within the given increase.

Time series

It was found out within the analysis of available data by the method of moving average that the data of individual operators do not oscillate too much within the price range of individual years except for 2022, which was influenced by the conflict in the Ukraine in all respects.

Graph 1 Moving average in accordance with individual years



Source: ČSÚ, OTE-ČR, Authors.

Correlation analysis

Only the average prices of operators from 2010 and additional inflation values also from 2010 in accordance with individual years were used within correlation analysis.

Table 4 Pearson correlation coefficients.

E.ON	PRE	ČEZ	OTE
0.934608	0.915	0.94324	0.837711

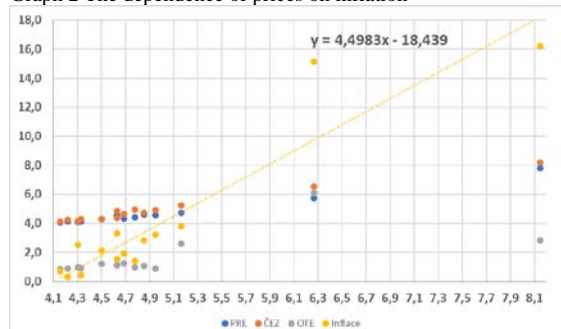
Source: ČSÚ, OTE-ČR, Authors.

The direct dependence of electrical energy prices on the size of inflation is visible from the obtained data. The data of all the operators are closer to the value of 1, which means in this

interpretation that that all values are in, so called, strong linear dependence against inflation.

Regression analysis

Graph 2 The dependence of prices on inflation



Source: ČSÚ, OTE-ČR, Authors.

It was found out within the results of regression analysis that inflation (violet points) bears influence on the prices of electrical energy. It confirms the determined hypothesis H_0 : Inflation bears influence on the prices of electrical energy in the Czech Republic in the monitored period.

5 Discussion

RQ1: What was the proportion of generated, exported and imported electrical energy within the Czech Republic in the past 10 years?

It is possible to observe several key trends in the production, consumption, export and import of electrical energy in the Czech Republic from 2010 to 2020 within the analysed data. Production vs consumption: There was a decreasing trend in the production of electrical energy in the Czech Republic, when it dropped from 83.7 TWh in 2010 to 70.6 TWh in 2020. On the contrary, there was a slight increase of energy consumption from 70.2 TWh in 2010 to 71.9 TWh in 2020. This trend indicates a growing dependency of the Czech Republic on the import of energy to satisfy its domestic demand. Production vs consumption ratio: The ratio of production to consumption gradually decreased from 1.19 in 2010 to 0.98:1 in 2020. This trend shows that the production and consumption of energy are increasingly becoming balanced in Czechia. In 2020 the consumption of energy in the Czech Republic was higher than its production for the first time in 10 years.

Export vs Import: The export from the Czech Republic dropped from 14.7 TWh in 2010 to 8.9 TWh in 2020, while the import gradually rose from 2.5 TWh in 2010 to 3.4 TWh in 2020. This trend shows that Czechia is increasingly becoming dependent on the import of energy to satisfy a growing domestic demand. Export vs import ratio: The ratio of export to import gradually decreased from 5.88 in 2010 to 2.62 in 2020. This trend shows that the difference between the export and the import of energy is increasingly diminishing in Czechia.

These trends indicate that Czech energy policy and strategy ought to take into consideration a growing dependency on the import of energy and seek ways how to increase a domestic production of energy to be able to satisfy a growing demand and simultaneously retain an energetic independence of the country.

RQ2: What was the development of the prices of electrical energy as a commodity in the past 10 years?

E.ON: The prices of electrical energy from E.ON oscillated between 4.2 and 4.8 CZK/kWh from 2010 to 2019. In 2020 there was a slight increase to 5.0 CZK/kWh and to 5.2 CZK/kWh in 2021. In 2022 there was a marked increase to 6.3 CZK/kWh and to 8.2 CZK/kWh in 2023.

PRE: The prices of PRE oscillated between 4.0 and 4.6 CZK/kWh from 2010 to 2019. In 2020 there was a slight decrease to 4.5 CZK/kWh and in 2021 there was an increase to 4.7 CZK/kWh. In 2022 there was a significant increase to 5.7 CZK/kWh and in 2023 there a rise to 7.8 CZK/kWh.

ČEZ: The prices of electrical energy from ČEZ oscillated between 4.1 and 4.9 CZK/kWh from 2010 to 2019. There was a slight increase to 4.9 CZK/kWh in 2020 and to 5.2 CZK/kWh in 2021. There was a significant increase to 6.5 CZK/kWh in 2022 and to 8.2 CZK/kWh in 2023.

Generally speaking, the prices of electrical energy in the Czech Republic increased in the course of the past 14 years, whereas the biggest rise was recorded in 2021 and in 2022.

RQ3: What was the proportion of using electrical energy in the Czech Republic in the past 10 years?

Renewable resources containing wind energy, solar energy, water and biomass displayed a marked oscillation in the course of years. They reached their peak amounting to 10.95% in 2014 followed by another peak amounting to 11.77% in 2015. However, it was followed by a decrease to the lowest value of 3.9% recorded in 2019. This trend may be influenced by various factors including the changes in the policy of renewable energy, technological innovations and economic conditions. Fossil resources, including lignite, coal, natural gas and oil used to be a dominant source of energy in the past. They reached their peak amounting to 59.53% in 2016, however, the proportion decreased to 52.50% in 2020. This decline may be the consequence of an effort to reduce greenhouse emissions and a transfer to cleaner sources of energy. Oil and oil products amounted to a small share in the sources of energy with a peak of 0.15% in 2019. Secondary resources and other resources also constituted a small proportion with a peak of 2.73% in 2017.

Nuclear resources, including the energy from nuclear power plants, showed a slight increase. Their peak was a 40.75% proportion in 2020, which is a significant rise comparing to 30.36% in 2016. This trend may be influenced by a growing recognition of nuclear energy as a low carbon source of energy. The results manifest that the energy mix of the Czech Republic has changed in the course of time, whereas it seems to take a direction towards both a diversification of the sources of energy and an attempt to reduce the dependence on fossil fuels.

6 Conclusion

In the course of the past 10 years the development of electrical energy prices as a commodity has been quite dynamic in the Czech Republic. It was found out on the basis of an analysis of available data that the prices of electrical energy demonstrate certain volatility and are influenced by various factors.

The average electrical energy prices of individual operators (E.ON, PRE, ČEZ and OTE) have slightly changed in the course of years. Nevertheless, these differences were relatively small between 2010 to 2020. Average prices were around CZK 4-5/kWh for households and CZK 0.9-1.2kWh for industrial consumers.

The electrical energy prices of individual operators increased in the course of monitored period, however, it differed in terms of extent in the case of individual operators. The most significant rise of prices was recorded in 2022 when there was a significant price rise of all operators as a consequence of geopolitical events in the Ukraine.

Correlation analysis showed a heavy positive dependence in terms of electrical energy and inflation. It indicates that inflation bears a significant influence on the prices of electrical energy in the Czech Republic. The high values of Pearson correlation coefficient existing in the case of all operators show a great dependency in terms of inflation and electricity prices.

With regard to these findings, it is important to take into consideration an inflation factor during planning and predicting the prices of electrical energy. Growing inflation may significantly influence the prices of electricity and it is important for energy policy and regulation to reflect such impacts.

RQ3: What was the proportion of using electrical energy in the Czech Republic in the past 10 years?

The analysis showed that the use of electrical energy in the Czech Republic slightly changed in the course of the past 10 years. Renewable sources of energy, such as solar and wind energy, gradually grew in significance, whereas their share oscillated between 10% and 15% of the total production of electrical energy.

Classical sources, such as coal fired and nuclear power plants, continued to dominate in the energy mix of the Czech Republic. Coal fired power plants provided the majority of electrical energy production, although, there has been a considerable pressure regarding the reduction of greenhouse gases in the past years.

Nuclear energy remained an important source of energy with a 30-35% share of total production. Although it is a low-carbon source of energy, there has been a continuous discussion about the future of nuclear energy and its possible substitution with renewable resources. Similarly, there has been a drop in the proportion of oil power plants, which have become less significant in the production of electricity.

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Primary Paper Section: A

Secondary Paper Section: AH

HYPOTHETICAL APPROACH TO EXTERNAL ENVIRONMENT FACTORS EVALUATION FROM THE VIEWPOINT OF VARIABILITY TO ENSURE THE ENTERPRISE DEVELOPMENT

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Abstract: The main problems of assessing the conditions of the external environment in the process of strategic planning of the development of the enterprise are outlined. The existing domestic and foreign methods of analysis of the conditions of the external environment, which can be used for the needs of the formation of strategies for the development of the enterprise, are analysed. The key attention is focused on the main factor such as the volatility having the maximum impact on the analysis process. It's evaluated either in terms of cyclicity or in manifestations of the "new economy". It is hypothesized that the uncertainty of the external environment should be evaluated from the point of view of variability, in order to obtain quantitative indicators. Such evaluation will not only take into account the relevant values in strategic planning but also enables seeing of changes in the spiral model visually.

Keywords: external environment, the enterprise development, the external environment factors analysis.

1 Introduction

Development strategies are regarded to be one of the priority directions in modern economic research. Today there is probably no enterprise that doesn't have a development strategy at every certain stage of implementation. The question arises on why our businesses can't always compete with foreign one in one or another direction of production as well as why the existing strategies need constant adjustment? All of us know the answer met almost in every scientific publication. It is the variability of the external environment. So in order to ensure both the effectiveness of the established strategy and the achievement of the planned results and forecasts one should to take into account possible changes in the external environment more conscious. But to do this it is necessary to develop a methodology for such an evaluation with a view to forecasting. The F. Taylor words "in order to manage it is necessary to measure at first" remain relevant and correspond to today situation [Teilor, 1911].

The external environment factors influence is clearly proved by the statistical data. Since the beginning of the 2008 crisis the number of unprofitable enterprises in Ukraine has increased by almost 5%, and in 2009 their number was 39.9%. In general, the indicator of operating profitability by type of economic activity decreased by 2 times [Statistical Yearbook of Ukraine for 2009, State Statistics Committee of Ukraine].

On the other hand it may be impossible to achieve the planned results due to the failure and not taking into account the development strategies of the external environment itself. But such strategies are embodied both in regional and national ones and therefore it's quite difficult to identify indicators that would have a direct impact on a particular enterprise. In addition most of the factors describing the impact of the environment are of a qualitative nature, that is, they can only be evaluated through expert evaluation, the result of which depends on the experts' competence.

And thirdly, there is no interpretation of the process arising due to changes that in one way or another have an impact on the company from the outside in any work. This process is often called variability. The main features of variability include such characteristic features as complexity, uncertainty, instability, rapid changes, and the emergence of new technologies. The issue of adaptation to the conditions but rather an adequate response to

the changes remains current in today's realities.

Thorough analysis of such contradictions puts the question what external environment factors make possible an achievement of the strategy the goal in particular development and whether there are ways to study such factors.

2 Theoretical basis

The methodology of the external environment factors notion study has become the basis of the economic community scientific researches in various fields of economic knowledge.

The notion of "external environment" has become the objects of scientific examination in the 60-70 years of the XX century together with the strategic management concept as well as of it separation from the operational one. The external environment of an enterprise is considered to be multi-level structure complex in modern economic literature. The elements of each level are formed under the influence of their own (specific) factors and in various ways (by force and direction) affect the activities of the enterprise.

The economists focus their attention on the fact that the external environment being a set of factors that have an impact on the enterprise activities management through the market subjects. Although in some sources the external environment is considered as the immediate conditions for carrying out the entrepreneurial activity that doesn't depend on the firm (enterprise, organization) but which must be taken into account when developing its development strategy, business plan, etc. [Besedovska, 2011].

S. Dziuba (2012) states that the external enterprise environment is a combination of actors and factors operating outside the enterprise, therefore, as a rule, they are not subject to direct control [Dziuba, 2012].

Designing the chapter "External Environment" of the educational edition "Enterprise Economics" edited by Lypych L.G. we analyzed the existing works by Balabanova L. (2004), Brovkova E. (1999), Pokropyvnyj S. (2001), Kindratska G. (2006), Kuzmin O. (2003), Koretsky M. (2007), Skibitsky O. (2006), who were engaged in research of the external environment and grouped the main factors and conditions of the external environment having an impact on the enterprise, namely: economic, political, socio-cultural, demographic, scientific and technological progress, environmental factors, factors of the international environment and their constituents [Lypych&Fatenok-Tkachuk, 2010]. Later a similar classification has become the basis of the external environment methodology analysis in the context of individual conditions on the basis of correlation-regression analysis.

F. Kotler work (1991) served the basis for such research was the, where he identified six major macro-environment factors: demographic, economic, natural, scientific, technological, political, cultural ones.

Depending on the nature of the impact whether direct or indirect one all elements of the company external environment are divided into two groups [Mamaluy, 2004; Taranenko O., 2010]. In the manner that makes influence the impact of the direct action factors on the enterprise should independently calculate the subjects of management, and the probability of the influence of factors of indirect influence of various kinds of consultative state centers on the needs of the enterprise.

Having analyzed the works by Balabanova L. (2004), Brovkova E. (1999), Kindratska G. (2006), Kuzmina O. (2003), Skibitsky O. (2006) Ryzhkova G. (2011) it can be argued that the medium of direct action on the organization (so-called microenterprise)

form certain entities such as consumers, competitors, suppliers, government agencies, financial institutions, and other external agents and contractors. This external environment is also called the environment of tasks because it contains elements that are directly related to the organization activities. Since the enterprise is the system-forming core of the micro-environment any changes in its activities directly and retroactively affect all the interconnected elements of the environment and the environment as a whole. The factors of direct influence, in particular, include consumers, suppliers, competitors, intermediaries, economic laws and state authorities.

The environment of indirect action (or macro-environment) encompasses material and technical conditions, social relations, institutes and other factors that influence the organization indirectly. The main ones include economic, political, socio-cultural, scientific and technological, environmental. The external environment is complex, variable and as a rule largely uncertain. Its elements are interconnected and affect each other. The interconnection of factors of the external environment is the level of force with which the change of one factor affects other factors.

Such division is supported by the scientists engaged in the external environment research whose views we share. The study of the external environment of the enterprise is aimed at analyzing the status of those entities with which the enterprise is in direct interaction. Sax J. emphasizes that "an enterprise can significantly affect the nature and content of this interaction, and thus take an active part in shaping new opportunities and preventing the emergence of threats". [Sachs J., 1996].

Orlov D. believes that the general feature of external environmental factors is not their control of the firm since they don't depend on it. In spite of this, there are a number of methods that allow somehow make an evaluation of the external environmental conditions [Orlov D., 2013].

Changes in the external environment affect the strategic position of the company on the market. Therefore the purpose of the analysis of the external environment is to monitor and analyze trends or events uncontrollable to the company that may affect the potential effectiveness of its activities. Westkamper E. (2008) proposed to conduct an analysis of the external environment in seven stages taking into account the generalized characteristics of each of them. The main steps in the author's opinion are the definition of the analysis object; the analysis purpose defining; the draft of an analysis plan; the development of schedules for the information collecting and processing; data processing, their systematization; analysis of collected information; development of conclusions and recommendations.

The author suggests using an integral evaluation of each group of factors influence. Such impact can be measured with a maximum score of 3 points, the direction of influence should be (+1) or (-1). The integral evaluation of indicators is calculated – (a • b • c). The evaluation results are displayed graphically. As a result we will see the level of a factor influence on the external environment in the industry and each specific enterprise. Such an approach to evaluating the environmental conditions is shared by such scholars as Khrushch N., Nyzhnyk V. and Polinkevych O. (2012), Orlova K. (2015), Kalny S. (2009), etc. Majority of scholars accept the well-known classification of the factors or conditions given above to evaluate them. But the factors characterized by a number of authors are different.

The interaction of the economic system of the enterprise and the external environment is proposed to be quantified using the coefficient of the external environment variability (K_{var}), which can be represented as a weighted average of its functional components:

$$K_{var} = \frac{\sum_{i=1}^n w_i k_i}{\sum_{i=1}^n w_i}, (1)$$

K_{var} – coefficient of variability of the external environment for the enterprise; k_i is the variability of the functional component of the external environment, $k \in [1;10]$; w_i – the value of the functional component of the external environment for the enterprise strategy (weight), $w \in (0;1]$; n – the number of selected functional external environment components.

According to the results of the analysis, determining the coefficient of variability can be concluded about the level of variability and, accordingly, about measures to adapt the enterprise.

After analyzing the above methodology it can be argued that it doesn't answer the questions which indicators of the enterprise activity will be affected by the external environment and how much they need to be adjusted. We only determine the probability of achieving the goals set but not their quantification. In addition some scientists propose to form forecasts for different levels of variability. For example, I. Karasev (2010) defines five such levels. Accordingly, the person during making the strategic decisions must make a decision depending on how much he is willing to risk. Although it is likely that the results thus obtained will be an additional argument for choosing an alternative or forming a specific target in the strategic perspective.

Regarding world practice the method of "5x5", the "list of four questions", the Wilson matrix, TEMPLES, PEST and SWOT, ETOM, QUEST analyzes can be considered the most well-known methods of the external environmental impact evaluating. The "5x5" method was suggested by A. H. Mescom in 1984. It includes five issues concerning five external environmental factors: name the five external environmental factors that you know about the information; which five external environmental factors are most dangerous; which five factors from your competitors' plans are known to you; which five factors are most important for achieving goals; name five external spaces change of which could be positive.

This method is a kind of interactive technique of the "Five Why" question used to identify the causal relationships that underlie a particular problem. This technique was formally developed by Sakita Toyoda and used by Toyota Motor Corporation during the development of production methodologies [Ono T., 2008].

Another evaluation tool is a methodology that includes a list of four issues including the main criteria for evaluating the impact of each significant external environmental factor on the future state of business processes at the industrial enterprise: how (positively or negatively) such factor can affect the state of the research object; what is the probability of the factor increasing and if it is possible to track its change; how much is the factor influence on the object of research; under what circumstances the influence of this factor on the object of research may weaken: in the nearest future? In the mid-term? In the long run? [Mamaluy, 2004].

Wilson suggested the matrix "the probability of increasing the factor – the influence of the factor on the enterprise" aiming at the practical application of this method. If the value of the factor is high according to the matrix then it should be given special attention. If it's slow, the value of the factor can be ignored. But this is a kind of correlation-regression analysis which by the way taking into account the multi-collinearity of factors will give a much more accurate picture of the external environmental factors influence.

World economic practice asserts that the most progressive method for analyzing the external environment is the PEST analysis. This is a method of external environmental analysis based on expert opinion and conducted to identify and identify the nature of the external environmental impact on the activities of the enterprise. PEST is the abbreviation of four English words: P – Policy, E – Economy, S – Society, T – Technology [Korenev, 2011]. An analysis of the four specified groups of

factors is performed by this method. Thus, based on various types of analysis of external factors influence on the structure of the enterprise, it becomes possible to analyze the strengths and weaknesses, and on the basis of the analysis, modernize one or another system, or to radically change them.

The advantage of PEST analysis is that we can investigate the factor by factor due to its application and create a holistic characteristic of the external environment. This methodology is presented in Table 2, where an increase or decrease of the factor by PEST analysis is shown depending on the values. Such fact that most of the elements under consideration are hard to quantify is suboptimal therefore it may cause difficulties in assessing their impact and the dynamics of change. We can assume that the adaptation to the current realities of this technique as well as the analysis of the main external environmental factors by the T.E.M.P.L.E.S. method [Churlei, 2011] become the basis of domestic methods.

One of the most common and recognized methods for evaluating the external environment is the SWOT analysis, that is the analysis of Strength and Weakness points, as well as Opportunities and Threats. SWOT analysis is a method of strategic analysis, which includes an evaluation of both components internal and external.

Some of domestic authors state that SWOT analysis has advantages and disadvantages in comparison with other methods (Konovalova O. & Andrushkevich T., 2011). Its main advantage is the simplicity and the ability to spend a small amount of money on its conduct, as well as flexibility and availability of many options. It is also the systematization of knowledge about the internal and external factors that influence the process of strategic planning; the ability to determine the competitive advantages of the enterprise and form strategic priorities, periodically carry out diagnostics of the market and resources of the enterprise. The disadvantages of SWOT analysis, which need to be considered are the impossibility of taking into account all the forces and weaknesses, opportunities and threats; the subjectivity of choice and ranking of factors of the external and internal environment; poor adaptation to a constantly changing external environment.

The ETOM analysis (Environmental Threats and Opportunities Matrix) is a tool that is close to PEST analysis by its nature, but has a number of features: limiting the number of factors (often no more than 10-15 factors); the possibility of using a standardized list of factors from which the expert chooses the most weighty in his judgment; providing a quantitative assessment of the influence of factors. The result of the ETOM-analysis is the construction of a table that formed as a result of processing and generalization of expert evaluations, and usually contains information on three factors with the highest ratings.

QUEST analysis (Quick Environmental Scanning Technique) involves identifying external environmental factors, ranking them according to the degree of significance and selecting the most important ones. The choice is based on the limit – usually no more than five factors are analyzed. The next step is an expert assessment of each factor probability being implemented and an analysis of the interrelationship between them. The relationship is displayed either in the form of a ballroom score or in verbal form. The results are presented in a matrix form [Mekheda N. & Chernysh O.].

So at the current time there are methods that can be used by economic entities in order to formulate development strategies. Moreover the analytical departments of enterprises in practice use them for strategic planning. But there are problems with the implementation of such strategies, due to the impossibility of achieving any strategic plan indicators due to changes in the external environment. And such tendencies are observed all over the world. Therefore it is necessary to pay more attention not to the study of the analysis methods itself, but to the phenomenon of rapid changes in the conditions of the external environment and to describe it in terms of the process that can be evaluated.

3 The purpose of the research

The research is aimed to substantiate the theoretical provisions of the method applied to assess rapid external environmental changes in order to improve the effectiveness of the implementation of development strategies.

4 Methods

The method of analogies, identification and systematization in the process of determining the nature of the “external environment” and identifying the conditions and factors influencing the enterprise is applied. It is emphasized that correlation-regression analysis is the main method in the analysis and evaluation of external environmental conditions. An analysis of existing methods for assessing the external environmental conditions and their impact on the activities of the enterprise has been carried out. The absence of a universal methodology due to the complexity of accounting for the phenomenon of variability is proved. As a result a hypothesis dealing with the probability of change evaluating in the external environmental conditions due to the physical variability phenomenon is developed. It can be proved and can be described. It is suggested to use a screw line to simulate the cyclic development phenomenon as well as provide quantitative assessment.

5 Results

The external environment analysis is primarily a means helping the leader to see, predict and evaluate the influence of various factors on the company in a sufficiently concrete sense and. Its goal is to make the most effective management decisions basing on such information.

None of the existing methods gives an affirmative answer whether the existing enterprise strategy will be implemented in full.

If we analyze the characteristic features of the external environment variability then we can state that the following.

The complexity of the external environment is the number of factors that the organization is required to respond to as well as the level of variability of each factor. More complicated is the work of the organization which is influenced by a greater number of factors.

The variability of the external environment is the speed at which changes occur in the environment of the organization. In some of them the external environment is too mobile (computer technology, chemical technology, pharmacy, biotechnology). The food and woodworking industry enterprises are characterized by less mobile external environment.

Uncertainty of the external environment is a relative amount of information on the external environment and the probability of its reliability. Organizations striving to reduce the level of uncertainty of the external environment can apply two strategies such as to adapt to change or influence the external environment in order to make it more favorable for its functioning. The first strategy is implemented through the creation of flexible organizational structures with a high degree of power decentralization. The leaders of such organizations should be able to use modern tools to predict future changes and to have market intuition. As a rule the second strategy is only applicable at large companies or those that are united to increase their capabilities. They can use advertising and media to influence the external environment and political activity to lobby their interests.

“Variability” of the external environment is characterized in terms of cyclicity or manifestations of the “new economy”.

The paradigm of cyclical changes in aggregate demand and supply, the volume of production and income and, accordingly, the state of the economy are the basis of the economic cycles and

economic conditions theory [Afanasyev N. & Rogozhin V., 2003]. Any system aspires to the stability and strives to avoid chaos. However, the laws of dialectics indicate the opposite position. Stability can't exist on its own without chaos and crisis. Stable situation and crisis are constant antagonisms in the development of any system. Historically the development of mankind was associated with a constant struggle with disagreements – wars, epidemics, natural disasters, etc.

On the other hand, the world economy has entered an era characterized by unbelievable rigidity of competition such as “commoditization” (the transformation of once unique products into ordinary ones) at rapid changes [Danylyshyn B., 2008]. The combination of all these manifestations is called the new economy. Here's how it is characterized: “When we talk about a new economy, we mean a world where people work by brains, not hands ... The world where innovations are more important than mass products. The world in which fast changes take place constantly. The world is so different that it can be described in one word – the revolution” [Wallersnight I, 2000].

In today's realities the question is not about adaptation to the external environment but how to adequately respond to their variability. It is impossible to quantify the level of “variability” or “rapid changes” in the external environment as this is a qualitative parameter that can't be evaluated. But we are inclined to think that this phenomenon can be described by the term variability.

This statement can be confirmed by the statistical interpretation of any changes, namely by variation in the difference of any indicator value in different units of the aggregate in the same interval of time. Variation is a necessary condition for the existence and development of mass phenomena. Definition of variation is necessary to the organization for selective observation, statistical simulation, and planning of expert surveys.

In terms of mathematical interpretation such changes can be described as a function variation. Further the numerical characteristic of the function with one real variable associated with its differential properties is called the function variation.

For a function with a segment on a real line in R^n is a generalization of the concept of the length of the curve.

It means that by using the functional approach to the planned indicator which we want to maximize in the process of implementing the development strategy we will be able to significantly increase the probability of this task under conditions of imposing the restrictions including the impact of external environmental conditions. To use a mathematical approach to quantify the impact of changes in the external environment it is necessary to systematize indicators that can describe the state of the main factors that affect the enterprise from the outside.

It is obvious that as a result of using the mathematical method for predicting changes in the external environment we will obtain a complex task but for solving it we will need to form a large database for a long period in order to avoid the error. The same process in physics is called the variation method.

The variation method is nonperturbative method of an approximate solution of a complex mathematical problem by its reduction to the problem of finding the minimum of a certain functional. Usually the variation method is applied in quantum mechanics to approximate the solution of the Schrödinger equation and to estimate the energy of the ground state and some excited states and based on the variation principle. This allows you to calculate approximate wave functions such as molecular orbitals. The method is to select a test function that depends on one or more parameters, and to find the values of these parameters in which the selected function will reach the minimum [Sommerfeld T., 2011. That is, we believe that the expression of the variability of external environmental

conditions can be replaced by the variation of external environmental conditions. This is a process that can be really evaluated. There is only a question that should serve as a function of this process.

Most authors argue that cyclicity is inherent in development. It is clear that the speed of changes is increasing but this was always the case. Even in the 1967 article “Modern Cycles and Crisis” is stated that “... the mechanisms of the cycle have changed a lot, but the form of the cyclic movement has still been preserved. Capitalism by its nature requires a cyclical movement can't exist without it and therefore can't get rid of it”.

If we consider the theory of cyclic development and take into account that any development takes place in a spiral then we can assume that we should use the interpretation of variation in terms of biology. Genetic variation occurs due to random mutations that occur in the genomes of organisms. Precisely such “mutations” can definitely explain the complexity of predicting changes in external environmental conditions. By having determined those indicators that have suffered the greatest deviation from the forecast we will have the highest probability of “mutations”. That is their influence will precisely require minimization.

The spiral is a curved line that makes a series of naturally changing turns around a certain point on a plane or around the axis [Dovbnaya, 2017]

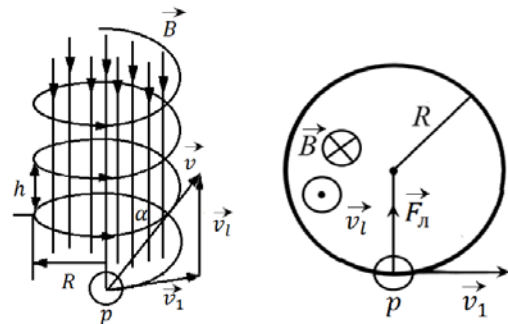


Figure 1. Model of developmental spiral

We assume that such spiral schematically reflecting the development should be screwed or a three-dimensional spiral. Such a form occurs in nature, the double double-stranded DNA and spiral (for example, alpha-helix) of the secondary structure of proteins are very well-known. Usually the screw line is divided into two types, cylindrical and conical, although the cylindrical screw line can be represented as a separate case of a conical spiral line with an infinitely distant vertex. In Cartesian coordinates, the cylindrical screw line is determined by a parametric formula:

$$\begin{cases} x = a \cos t \\ y = a \sin t \\ z = bt \end{cases} (2)$$

In vector form $r = r(t) = (a \cos t; a \sin t; bt)$, $0 < t \leq 2\pi$. (3)

The front projection of a cylindrical screw line is sinusoidal, and the horizontal is a circle. The scroll of a cylindrical screw line ($A_1, A_2, A_3, A_4, A_5, A_6, A_7, A_8, A_9, A_{10}, A_{11}$) is straight.

There are certain rules for constructing such a spiral. In terms of economics the construction of such a spiral will depend on a set of points that are described by certain coordinates. We need to identify these points by carrying out a retrospective analysis of the activity of the enterprise and the development of the external environment. In our opinion, ideally, there should be two spirals – the spiral of enterprise development, and the spiral of the development of the external environment. The accuracy of the start of a spiral depends on the number of points that the executor will be identified, that is, the indicators that will be taken into account as a result of taking into account the variation of the external environmental conditions.

6 Discussion

Despite a large number of the external environment analysis methods there is no single accepted method. All existing methods require an enterprise to retain highly qualified analyst in their staff who will constantly be able to analyze the enterprise external environment in order to strategic planning and continually adjusting the existing strategies to appropriate changes or to hire appropriate consulting groups. The costs of both options are not always admissible for the current economic situation at the domestic enterprise.

On the other hand even using one of them does not guarantee the high effectiveness of the strategy implementation due to changes in the external environment that are difficult or impossible to predict.

7 Conclusion

That is due to the complexity of the application of existing methods for predicting external environmental conditions at the macro level for the needs of the enterprise and due to the high probability of deviations occurrence from the planned indicators one should find the opportunity to consider other calculation theories.

We think that the solution to this situation is a visual simulation of development in the form of a spiral. But there should be two spirals, the spiral of enterprise development and the spiral of the development of the external environment. The spiral movement should be carried out through the fulfillment of certain conditions. The accuracy of the motion is due to a set of factors that are taken into account when forming the motion of the spiral. The task of the person who generates predictive indicators is to find the points of coincidence of the spirals for which it is necessary or vice versa it is not necessary to implement certain measures in order to achieve development.

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THE INFLUENCE OF MOVEMENT GAMES ON CHANGES IN COORDINATION SKILLS IN CHILDREN OF YOUNGER SCHOOL AGE

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Abstract: In their contribution, the authors approach the issue of changes in coordination skills in children of younger school age due to movement games. 40 children from the Roma settlement at the Primary School in Lomnička in the Stará Ľubovňa district in the eastern part of Slovakia participated in our research. The goal of the contribution is to implement motor coordination tests selected by us, abilities in the experimental and control group in children of the 4th year of primary education. At the same time, evaluate the body weight and body height of children with the simultaneous calculation of the Body Mass Index (BMI). We evaluate the obtained results on the basis of Student's t-test and Mann-Whitney U-test. Our experiment lasted 8 weeks, and we performed measurements for both groups at the beginning and at the end of the monitored period. We recorded the best performance improvements in both the experimental and control groups in the "catching the ball and then stopping it" test and in the test "jumping over the jump rope" in 30 s. Due to the increased interest in testing among children from the Roma settlement of Lomnička, we recommend that testing be carried out more often at this primary school.

Keywords: Movement games, children in primary education, motor tests, coordination skills.

1 Introduction

Movement games are natural activities for children and form an integral part of children's lives, whether in school or out-of-school environments. The biggest opportunity for the implementation of movement games, as deliberate movement activities with set and observed rules that bring joy and satisfaction to children, is created mainly in physical and sports education classes. Knowing the state of movement abilities of children of younger school age in primary education contributes significantly to its positive influence in terms of prevention and the goal of the set requirements for children. By looking for effective models for the development of movement skills in physical and sports education, we will help children discover the benefits of movement activities and the possibilities of enjoying them. Their development should take into account and respect the age and individuality of each child. We believe that among the factors that influence the entire process of motivating children to physical education and sports are primarily the quality and quantity of comprehensible information in everyday life, the climate of school and home, the teacher, coach and family, but also the child himself.

According to Opravilová (2016), play is one of the main activities of people. It is a broad term that can be defined from different perspectives. Some experts explain play as a manifestation of innate energy that a child needs to express. Others see play as an exercise in which children acquire skills they will need in life. Several opinions emerged that helped to understand play as an important and main activity in children's lives. The authors Lynch & Vargová (2020) state that play is one of the basic human activities that we mostly associate with early childhood. A child spends a significant part of his day playing, through play he satisfies his basic needs, this activity is a means of developing all aspects of his personality, through play he gets to know the world - he learns. Human play is an activity in which social relations between individuals are manifested. According to Gáborová & Porubčanová (2016), children play more and more with their friends, they are very active, they need continuous movement. They play in parCG, on climbing frames, they start showing interest in football and other sports. Preschoolers also like logic and board games.

The author Podprocká (2013) states that with each game, children develop certain competencies and overall the child's development is developed and guided. Comenius considered play as a need that supports the development of movement, sensory and mental abilities. This is also why our pedagogy considers play to be one of the main important tools and methods of education. Horváth et al. (2010) emphasizes that somatic and movement testing has a wide scope and at the same time affects the individual, school, region, education and health departments, their orientation, with important goals for a healthy lifestyle for the whole society. The author Šimonek (2018) is of the opinion that when determining children's talent for sports, not only the level of motor skills should be monitored, but also the level of motor competences manifested in basic locomotion walking, running, jumping, throwing, rolling a ball, jumping rope, jumping over an obstacle, etc. The state of gross motor skills usually reveals the quality of children's motor skills more than performance in tests of motor skills.

The importance of the teaching profession affects all areas of society's life, including our children's free time and their activities, including sports at school, but also outside of school. Therefore, several authors: e.g. Antala et al. (2018), Antala (2021), Belešová (2023 a, b), Benčuriková, & Labudová (2022, 2023), Horváth (2001), Koreňová, Severini & Čavojský (2023), Merica & Belešová (2022), Merica & Barnáková (2021), Severini & Kostrub (2018), Severini, Kožuchová & Brezovská (2021) emphasize that teachers significantly influence the development of education. upbringing and education. According to the authors Gáborová & Porubčanová (2016), Kostrub (2022), the teacher influences the nature and quality of the relationship with the students, conditions the atmosphere in the classroom, stimulates the students' interest - including their relationship to sports and active physical activity, their experience of life at school, the development of their knowledge and their entire personality. Other authors, e.g. Duda, Stula & Trzeciak (2023), Gregor (2013, 2017), Gregor et al. (2023), Harsa et al. (2023), Kampmiller & Vanderka et al. (2012), Kaplánová (2018), Ondrejková & Gregor (2023), Petrikán (2021), Sun (2013), recommend physical activities as part of a healthy lifestyle and emphasize the need for regular exercise in children from the earliest school age.

Movement skills, especially coordination skills and their development are brought closer in their work by the authors: Lednický (2005), Měkoto & Novosad (2005), Belej & Junger et al. (2006), Sedláček & Lednický (2010), Laczó et al. (2014), Šimonek (2012, 2018), Mačura et al. (2022) and others. And we must also not forget the fact that it is extremely important for every child to observe appropriate physical activity in conjunction with rational nutrition. In case, it is generally known that the exclusion or limitation of physical activity usually has a negative effect on human activities: physical fitness decreases, various diseases arise and aging processes are accelerated. On the contrary - active physical activity helps by activating the cerebral cortex, creating improved conditions for the development of thinking, creation, interactions and survival. These attributes are part of today's school in educating our children. In terms of the variety of games, there are different categorizations of games according to different criteria.

2 Methodology

Goal. The goal of the article is to evaluate and compare changes in motor performance and coordination skills in children of younger school age from a Roma settlement. At the same time, evaluate the body weight and body height of children with the simultaneous calculation of the Body Mass Index (BMI). The research sample consisted of 40 pupils of the fourth grade of the primary school in the Roma settlement of Lomnička in the district of Stará Ľubovňa. Our experiment lasted 8 weeks.

Tasks. Based on the goal, we set ourselves the following tasks: choose an elementary school to solve our problem, create a training plan with movement games (as an experimental factor), choose tests to determine and compare motor performance in coordination skills in children in the 1st level of elementary school, perform planned testing. Statistically process and evaluate the measured results.

Hypotheses. Based on the goal and tasks of the work, we established the following hypothesis (H1).

H1: We assume that after completing the 8-week program, motor skills tests will show us better results in the experimental group (with the addition of a training plan with movement games) compared to the control group for boys and girls in the 4th grade at the 1st level of the Elementary School in the Roma settlement in Lomnička.

Characteristics of the research object: Our research was attended by (40 children) from an elementary school in the Roma settlement of Lomnička, of which there were 20 boys and 20 girls. They were students of the fourth grade from the 1st level of the named primary school. The control group had 10 boys and 10 girls. The experimental group had 10 boys and 10 girls.

Data collection methods: to find out data about children's coordination abilities, we selected the following six (6) tests: Jumping over a rope in 30 s (Neuman, 2003), Catching a hung ball (Měkota, Blahuš, 1983), Balance test - Flamingo (Moravec et al. 2002), Stopping a rolling ball and stopping it on command by a student (Šimonek, 1999), Running to numbered balls (Měkota, Blahuš, 1983), Jumping from a high place for accuracy (Belej, Junger, 2006).

Methods of processing and evaluating the results: we statistically processed and evaluated the obtained measured data based on the statistical method: Student's T-test (parametric paired T-test), which compares the differences between two groups. Statistical significance was determined based on the $p < 0.01$, $p < 0.05$, $p < 0.1$ level of significance. Statistical tests can also be carried out in relation to the different study results of siblings within the same family. Comparison of statistical variables can be carried out in quantitative research using the Student's T-test, which is generally divided into two variants: one-sided or two-sided T-test (Kitchenham et al., 2016; Gauthier & Hawley, 2015). The T-test can be applied in statistical analysis under condition that the data meet the normal probability distribution. Otherwise, two-sided comparisons can be made using the Mann-Whitney test (Kitchenham et al., 2016). In pairwise comparisons, the Wilcoxon exact test is very often used with many applications - both in the technical and educational fields, e.g. (Barot et al., 2020; Cieslar et al., 2020).

3 Results and discussion

We present the results obtained from testing the motor skills of children in primary education in tables and graphs with a view to the established hypothesis (H1). From testing the hypothesis (H1) using Student's T-test, we confirm or not confirm the existence of statistically significant dependencies based on the $p < 0.01$, $p < 0.05$ level of statistical significance. At the same time, we present an overview of the results of the entrance and exit tests of motor tests before the start of the monitored period and after the 8-week period. The tables also include the average value of the achieved results, the standard deviation, the Student's T-test of the significance of the differences between two quantities, the range of variation and the Mann-Whitney U-test. The results section also contains an evaluation of the body weight and height of children with the simultaneous calculation of the Body Mass Index (BMI).

In tab. (1, 2, 3, 4) we present the somatic indicators and the Body Mass Index (BMI) of the group of children of younger school age that we are monitoring. The experimental group is denoted by the abbreviation: (EG) and the Control group is denoted by the abbreviation: (CG).

Tab. 1: Somatic indicators: boys (EG)

Name	Body height (cm)	Weight (kg)	BMI	Age (years)
D.O.	138	28	14,7	10
D.O.	133	31	17,5	11
J.O.	139	34	17,6	11
K.H.	133	29	16,4	11
D.M.	130	28	16,6	11
J.H.	130	32	18,9	12
D.M.	130	30	17,8	11
M.H.	128	29	17,7	11
A.M.	132	30	17,2	13
A.O.	148	37	16,9	13

Tab. 2: Somatic indicators: girls (EG)

Name	Body height (cm)	Weight (kg)	BMI	Age (years)
D.O.	133	28	15,8	11
J.M.	130	24	14,2	10
B.M.	130	25	14,8	11
K.M.	145	31	14,7	11
V.M.	134	30	16,7	10
J.M.	133	24	13,6	10
L.K.	154	50	21,1	10
V.H.	135	30	16,5	10
R.O.	141	29	14,6	11
A.O.	135	33	18,1	11

Tab. 3: Somatic indicators: boys (CG)

Name	Body height (cm)	Weight (kg)	BMI	Age (years)
B.O.	139	25	12,9	12
A.O.	136	32	17,3	10
R.O.	140	34	17,3	10
A.M.	131	27	15,7	10
S.O.	134	27	15,0	10
R.M.	128	22	13,4	10
D.M.	130	30	17,8	11
A.O.	138	32	16,8	11
P.H.	153	58	24,8	13
K.O.	135	30	16,5	10

Tab. 4: Somatic indicators: girls (CG)

Name	Body height (cm)	Weight (kg)	BMI	Age (years)
D.O.	138	28	14,7	10
D.O.	133	31	17,5	11
J.O.	139	34	17,6	11
K.H.	133	29	16,4	11
D.M.	130	28	16,6	11
J.H.	130	32	18,9	12
D.M.	130	30	17,8	11
M.H.	128	29	17,7	11
A.M.	132	30	17,2	13
A.O.	148	37	16,9	13

In the following tables (tables 5, 6, 7, 8, 9, 10) we present the results of individual tests of the boys' motor skills (EG) of our monitored group. In the tables, we present an overview of the input and output values achieved at the beginning of the monitored period and at the end of the monitored period (after 8 weecG). The tables include: Average value of the achieved results (\bar{x}), Standard deviation (S), Maximum value of performance (Max), Minimum value of performance (Min), U-test, T-test of significance of the difference between two quantities, Variation range (Vr).

Tab. 5: Jumping over a rope in 30 s: boys (EG)

Boys (EG)	Jumping over a rope in 30 seconds		Difference
	Input	Output	
D.O.	38	58	20
D.O.	63	66	3
J.O.	22	29	7
K.H.	43	55	12
D.M.	55	67	12
J.H.	59	60	1
D.M.	51	58	7
M.H.	68	70	2
A.M.	52	53	1
A.O.	47	50	3
\bar{x}	49,8	56,6	6,8
S	13,28	11,60	1,68
Max	68	70	2
Min	22	29	7
U-test	32,5		N
T-test	1,22		N
Vr	46	41	

Tab. 6: Catching a hung ball in 10 attempts: boys (ES)

Boys (EG)	Balls 10 attempts		Difference
	Input	Output	
D.O.	4	4	0
D.O.	1	6	5
J.O.	0	0	0
K.H.	0	2	2
D.M.	2	5	3
J.H.	1	7	6
D.M.	0	3	3
M.H.	0	1	1
A.M.	3	3	0
A.O.	0	2	2
\bar{x}	1,1	3,3	2,2
S	1,44	2,21	0,77
Max	4	7	3
Min	0	0	0
U-test	20		V
T-test	2,63		V
Vr	4	7	

Tab. 7: Test „Flamingo“: boys (EG)

Boys (EG)	Flamingo (number of mistakes)		Difference
	Input	Output	
D.O.	12	6	6
D.O.	2	1	1
J.O.	12	12	0
K.H.	3	3	0
D.M.	8	6	2
J.H.	9	6	3
D.M.	9	5	4
M.H.	9	8	1
A.M.	12	10	2
A.O.	12	11	1
\bar{x}	8,8	6,8	2
S	3,67	3,48	0,19
Max	12	12	0
Min	2	1	1
U-test	32		N
T-test	1,25		N
Vr	10	11	

Tab. 8: Catching the ball on the bench: boys (EG)

Boys (EG)	Catching the ball on the bench (cm)		Difference
	Input	Output	
D.O.	139	90	49
D.O.	60	40	20
J.O.	80	80	0
K.H.	80	90	-10

D.M.	120	90	30
J.H.	140	120	20
D.M.	168	100	68
M.H.	143	70	73
A.M.	143	125	18
A.O.	141	131	10
\bar{x}	121,4	93,6	27,8
S	35,50	27,43	8,07
max	168	131	37
min	60	40	20
U-test	26,5		N
T-test	1,96		N
Vr	108	91	

Tab. 9: Running to bases: boys (EG)

Boys (EG)	Running to bases (seconds)		Difference
	Input	Output	
D.O.	9,25	8,86	0,39
D.O.	9,76	8,15	1,61
J.O.	10,47	9,87	0,60
K.H.	9,30	8,90	0,40
D.M.	12,23	8,22	4,01
J.H.	8,66	8,35	0,31
D.M.	8,96	8,00	0,96
M.H.	8,44	8,29	0,15
A.M.	8,13	8,10	0,03
A.O.	11,08	10,45	0,63
\bar{x}	9,62	8,71	0,91
S	1,28	0,82	0,46
Max	12,23	10,45	1,78
Min	8,13	8,00	0,13
U-test	24		N
T-test	1,88		N
Vr	4,1	2,45	

Tab. 10: Jump to accuracy: boys (EG)

Boys (EG)	Jump to accuracy (cm)		Difference
	Input	Output	
D.O.	7	12	-5
D.O.	1	1	0
J.O.	12	10	2
K.H.	8	15	-7
D.M.	6	10	-4
J.H.	20	11	9
D.M.	15	15	0
M.H.	12	3	9
A.M.	8	10	-2
A.O.	7	6	1
\bar{x}	9,6	9,3	0,3
S	5,31	4,66	0,65
Max	20	15	5
Min	1	1	0
U-test	49		N
T-test	0,13		N
Vr	19	14	

In the previous tables (tables 5, 6, 7, 8, 9, 10), we presented the results of individual tests of the motor skills of boys (EG) from the elementary school in Lomnička, where we also present the following information: In the "Jump rope" test, one of the best results were obtained by the boy D.O., who improved his performance by 20 repetitions in the exit test. Also the boy K.H. and the boy D.M. improved their jump rope performance by 12 repetitions. The best results in this test were achieved by the boy M.H., who had the most repetitions. In the next test "Ball for 10 attempts", the boys achieved the following results: boy J.H. caught the most balls in the cup and he managed to do it 7 times out of 10 attempts. He improved his score by 6 catches over the entrance tests. The worst was the boy J.O., who did not improve at all and had zero catches during the entry and exit. Second best boy D.O. had an improvement of 5 attempts where he had 1 catch in the entry testing and 6 catches in the exit testing. In this

"Ball for 10 tries" test, we noted statistical significance at the 2.63 level.

The "Flamingo" test for this group of boys (EG) was weaker in terms of performance, because the number of errors in one minute was high. The boys who did the worst: J.O., A.M., A.O., considering that their number of mistakes was over 10 attempts. This test turned out to be statistically insignificant, even though we recorded improved performance in all boys (EG). The test "Catching the ball on the bench" was for the boy K.H. bad at the exit test, because it worsened in response by 10 cm. The best results of this test were the boys: D.M., M.H. and D.O. Although this test came out statistically insignificant - we noted improved performance in this test here. In the next test "Running to bases", the boy D.M. recorded the best performance and also achieved the shortest time. The boys who also did very well: D.O. and A.M. The "Jump to accuracy" test turned out to be the weakest in terms of results, and here we noted deteriorated results in several boys, where the boy K.H. worsened the result by 7 cm, boy A.M. by 2 cm, boy D.M. by 4 cm and a boy D.O. by 5 centimeters.

In the following tables (tables 11, 12, 13, 14, 15, 16) we present the results of the individual tests of the girls' motor skills (EG) of our monitored group. In the tables, we present an overview of the input and output values achieved at the beginning of the monitored period and at the end of the monitored period (after 8 weecG). The tables include: Average value of the achieved results (\bar{x}), Standard deviation (S), Maximum value of performance (Max), Minimum value of performance (Min), U-test, T-test of significance of the difference between two quantities, Variation range (Vr).

Tab. 11: Jumping over a rope: girls (EG)

Girls (EG)	Jumping over a rope in 30 seconds		Difference
	Input	Output	
D.O.	60	63	3
J.M.	26	31	5
B.M.	60	67	7
K.M.	66	66	0
V.M.	57	62	5
J.M.	45	50	5
L.K.	56	56	0
V.H.	65	75	10
R.O.	64	69	5
A.O.	60	70	10
\bar{x}	55,9	60,9	5
S	12,08	12,70	0,62
Max	66	75	9
Min	26	31	5
U-test	31		N
T-test	0,9		N
Vr	40	44	

Tab.12: Catching a hung ball in 10 attempts: girls (EG)

Girls (EG)	A ball in 10 attempts		Difference
	Input	Output	
D.O.	1	2	1
J.M.	2	4	2
B.M.	0	2	2
K.M.	0	1	1
V.M.	1	2	1
J.M.	0	2	2
L.K.	0	1	1
V.H.	2	2	0
R.O.	0	0	0
A.O.	0	1	1
\bar{x}	0,6	1,7	1,1
S	0,84	1,05	0,21
Max	2	4	2
Min	0	0	0
U-test	21		V

T-test	2,57		V
Vr	2	4	

Tab. 13: Flamingo: girls (EG)

Girls (EG)	Flamingo (number of mistakes)		Difference
	Input	Output	
D.O.	13	7	6
J.M.	8	7	1
B.M.	10	9	1
K.M.	3	1	2
V.M.	1	0	1
J.M.	6	6	0
L.K.	1	0	1
V.H.	2	2	0
R.O.	0	0	0
A.O.	1	0	1
\bar{x}	4,5	3,2	1,3
S	4,50	3,61	0,89
Max	13	9	4
Min	0	0	0
U-test	37,5		N
T-test	0,71		N
Vr	13	9	

Tab. 14: Catching the ball on the bench: girls (EG)

Girls (EG)	Catching the ball on the bench (cm)		Difference
	Input	Output	
D.O.	110	90	20
J.M.	120	80	40
B.M.	156	110	46
K.M.	130	112	18
V.M.	130	105	25
J.M.	103	78	25
L.K.	148	70	78
V.H.	112	86	26
R.O.	80	70	10
A.O.	143	60	83
\bar{x}	123,2	86,1	37,1
S	22,99	18,00	4,99
Max	156	112	44
Min	80	60	20
U-test	10,5		V
T-test	4,02		V
Vr	76	52	

Tab. 15: Running to bases: girls (EG)

Girls (EG)	Running to bases (seconds)		Difference
	Input	Output	
D.O.	10,74	9,02	1,72
J.M.	9,96	8,98	0,98
B.M.	10,75	9,22	1,53
K.M.	11,91	11,21	0,70
V.M.	12,25	10,17	2,08
J.M.	10,48	10,12	0,36
L.K.	11,47	10,47	1,00
V.H.	10,21	9,03	1,18
R.O.	12,34	10,63	1,71
A.O.	8,87	8,54	0,33
\bar{x}	10,89	9,73	1,16
S	1,10	0,88	0,22
Max	12,34	11,21	1,13
Min	8,87	8,54	0,33
U-test	21		V
T-test	2,59		V
Vr	3,47	2,67	

Tab. 16: Jump to accuracy: girls (EG)

Girls (EG)	Jump to accuracy (cm)		Difference
	Input	Output	
D.O.	11	12	-1
J.M.	13	9	4

B.M.	17	3	14
K.M.	8	7	1
V.M.	8	10	-2
J.M.	8	7	1
L.K.	8	13	-5
V.H.	6	5	1
R.O.	7	12	-5
A.O.	8	8	0
\bar{x}	9,4	8,6	0,8
S	3,33	3,23	0,10
Max	17	13	4
Min	6	3	3
U-test	46		N
T-test	0,54		N
Vr	11	10	

In the previous tables (tab. 11, 12, 13, 14, 15, 16) we presented the results of individual tests of the motor skills of girls (EG) from the primary school in Lomnička, where we also present the following information: the tested group of girls (EG) achieved better results in terms of statistical significance, compared to boys, because we recorded statistically significant results in only three tests, namely: "Running to basis", "Catching the ball on the bench and then stopping it" and the "Ball for 10 attempts" test. The best performance in the "Jump rope" test was achieved by the girl V.H. who had up to 75 repetitions in 30 seconds. The second most successful girl A.O. had 70 repetitions and improved her jump by 10 repetitions compared to the entrance tests.

In the "Catching a ball for 10 attempts" test, the tested girls (EG) recorded weaker performances, but the test result turned out to be statistically significant. We recorded the best result with the girl J.M (4 catches of the ball). The worst performance was recorded by the girl R.O., who did not catch the ball even once. Our girls (EG) performed better in the "Flamingo" test than the tested group of boys (EG) because they made fewer mistakes. The highest number of errors among girls in the entrance tests was 13, but in the exit tests there were only 9 errors. The girl R.O. did the best, because she had zero errors together with the girl V.M.

Another test "Catching the ball on the bench and then stopping it" turned out to be statistically significant for our girls (EG). The best improvement was achieved by the girl A.O., who improved her performance by 83 cm and at the same time was the best of the group of girls. Tab (15) showed us that the girls had a faster and better reaction, because each group improved their time. The girl V.M. improved her time by 2.08 seconds. and the least girl A.O. by 0.33 sec. The "Jump to accuracy" test was almost at the same level as for the boys, where four students worsened their result in the exit test. Girls: D.O., V.M., L.K. and the girl R.O. worsened their exit tests by 5 to one centimeter. The best result was the girl B.M., who missed the accuracy by only 3 cm.

In the following tables (tab. 17, 18, 19, 20, 21, 22) we present the results of individual tests of the boys' motor skills (CG) of our monitored group. In the tables, we present an overview of the input and output values achieved at the beginning of the monitored period and at the end of the monitored period (after 8 weeCG). The tables include: Average value of the achieved results (\bar{x}), Standard deviation (S), Maximum value of performance (Max), Minimum value of performance (Min), U-test, T-test of significance of the difference between two quantities, Variation range (Vr).

Tab. 17: Jumping over a rope: boys (CG)

Boys (CG)	Jumping over a rope in 30 seconds		Difference
	Input	Output	
B.O.	55	60	5
A.O.	57	60	3
R.O.	43	45	2
A.M.	60	63	3

S.O.	55	61	6
R.M.	51	51	0
D.M.	58	62	4
A.O.	26	28	2
P.H.	61	65	4
K.O.	15	18	3
\bar{x}	48,1	51,3	3,2
S	15,63	16,24	0,61
Max	61	65	4
Min	15	18	3
U-test	34		N
T-test	0,45		N
Vr	46	47	

Tab. 18: Catching a hung ball in 10 attempts: boys (CG)

Boys (CG)	A ball in 10 attempts		Difference
	Input	Output	
B.O.	3	0	-3
A.O.	0	3	3
R.O.	1	2	1
A.M.	2	2	0
S.O.	1	2	1
R.M.	0	1	1
D.M.	2	2	0
A.O.	0	1	1
P.H.	1	1	0
K.O.	0	1	1
\bar{x}	1	1,5	0,5
S	1,05	0,84	0,21
Max	3	3	0
Min	0	0	0
U-test	34,5		N
T-test	1,17		N
Vr	3	3	

Tab. 19: Flamingo: boys (CG)

Boys (CG)	Flamingo (number of mistakes)		Difference
	Input	Output	
B.O.	9	4	5
A.O.	15	7	8
R.O.	6	6	0
A.M.	11	4	7
S.O.	12	6	6
R.M.	8	6	2
D.M.	5	3	2
A.O.	5	4	1
P.H.	11	9	2
K.O.	7	4	3
\bar{x}	8,9	5,3	3,6
S	3,31	1,82	1,49
Max	15	9	6
Min	5	3	2
U-test	16,5		V
T-test	3,01		V
Vr	10	6	

Tab. 20: Catching the ball on the bench: boys (CG)

Boys (CG)	Catching the ball on the bench (cm)		Difference
	Input	Output	
B.O.	100	85	15
A.O.	119	75	44
R.O.	96	90	6
A.M.	98	90	8
S.O.	87	80	7
R.M.	97	100	-3
D.M.	145	125	20
A.O.	98	90	8
P.H.	145	120	25
K.O.	116	100	16
\bar{x}	110,1	95,5	14,6
S	20,67	16,23	4,44

Max	145	125	20
Min	96	75	21
U-test	30		N
T-test	1,76		N
Vr	58	50	

Tab. 21: Running to bases: boys (CG)

Boys (CG)	Running to bases (seconds)		Difference
	Input	Output	
B.O.	8,33	8,11	0,22
A.O.	8,26	8,33	0,07
R.O.	8,72	8,52	0,20
A.M.	9,99	7,87	2,12
S.O.	8,92	8,51	0,41
R.M.	7,95	7,70	0,25
D.M.	8,92	8,62	0,30
A.O.	9,42	10,37	-0,95
P.H.	9,39	9,01	0,38
K.O.	9,39	8,78	0,61
\bar{x}	8,92	8,58	0,34
S	0,63	0,74	0,11
Max	9,99	10,37	0,38
Min	7,95	7,70	0,25
U-test	32,5		N
T-test	1,12		N
Vr	2,04	2,67	

Tab. 22: Jump to accuracy: boys (CG)

Boys (CG)	Jump to accuracy (cm)		Difference
	Input	Output	
B.O.	5	0	5
A.O.	9	6	3
R.O.	8	5	3
A.M.	7	1	6
S.O.	7	5	2
R.M.	9	2	7
D.M.	8	6	2
A.O.	6	0	6
P.H.	7	4	3
K.O.	10	2	8
\bar{x}	7,6	3,1	4,5
S	1,50	2,37	0,87
Max	10	6	4
Min	5	0	5
U-test	4		V
T-test	5,06		V
Vr	5	6	

In the previous tables (tab. 17, 18, 19, 20, 21, 22) we presented the results of individual tests of the motor skills of boys (CG) from the elementary school in Lomnička, where we also present the following information: the boys (CG) achieved good results in the motor tests, but not as good as boys (EG). The results in the "Jump rope" test were weaker in boys (CG) than in boys (EG). The best improvement in this test was by the boy B.O. and only by 5 jumps, but the boy D.O. in the experimental group (EG) had an improvement in this discipline by 20 jumps. The results in the "Ball for 10 attempts" test were also worse for boys (CG) and the test came out as statistically insignificant. The best score had the student A.O. (three catches of the ball in the cup). Also, the results of boys (CG) in the "Flamingo" test were also worse compared to boys (EG). If we compare the arithmetic average, we can see an improvement of 1.6 average. Student A.O. was the most successful, improving the number of mistakes (by 8 less). The second boy S.O. had an improvement (6 fewer errors) and the boy B.O. (5 errors less). However, the T-test was statistically significant.

The results in the test "Catching the ball on the bench" were realized by the boys (CG) without major changes. The best results were achieved by the boy A.O., who improved his reaction by 44 cm, and the student P.H. by 25 cm. The "Running to the bases" test was statistically insignificant, due to the fact

that only one boy (CG) improved by more than one second and the other boys by less than one second. The worst was the boy A.O., who worsened his performance by 0.95 seconds. Boy A.M. improved his performance by 2.12 seconds, which was the best performance of the entire control group of boys (CG).

In the "Jump to accuracy" test, according to the average, the results were better in boys (CG) by 0.5 cm than in boys (EG). The best results were achieved by boys: B.O. and A.O., who reached exactly zero - that is, they were able to jump to the marked line exactly.

In the following tables (tabs. 23, 24, 25, 26, 27, 28) we present the results of individual tests of the movement skills of girls (CG) of our monitored group. In the tables, we present an overview of the input and output values achieved at the beginning of the monitored period and at the end of the monitored period (after 8 weeks). The tables include: Average value of the achieved results (\bar{x}), Standard deviation (S), Maximum value of performance (Max), Minimum value of performance (Min), U-test, T-significance test of the Difference of two quantities, Variation range (Vr).

Tab. 23: Jumping over a rope: girls (CG)

Girls (CG)	Jumping over a rope in 30 seconds		Difference
	Input	Output	
D.O.	55	60	5
K.Ž.	58	59	1
A.H.	63	69	6
D.O.	47	64	17
E.G.	43	45	2
N.O.	65	66	1
K.D.	61	66	5
N.O.	45	51	6
S.O.	47	70	23
T.O.	46	56	10
\bar{x}	53	60,6	7,6
S	8,31	8,08	0,23
Max	65	70	5
Min	43	45	2
U-test	24,5		N
T-test	2,07		N
Vr	22	25	

Tab. 24: Catching a hung ball in 10 attempts: girls (CG)

Girls (CG)	A ball in 10 attempts		Difference
	Input	Output	
D.O.	3	3	0
K.Ž.	0	1	1
A.H.	0	3	3
D.O.	0	1	1
E.G.	2	2	0
N.O.	1	1	0
K.D.	1	1	0
N.O.	0	0	0
S.O.	2	2	0
T.O.	0	1	1
\bar{x}	0,9	1,5	0,6
S	1,10	0,97	0,13
Max	3	3	0
Min	0	0	0
U-test	32,5		N
T-test	1,29		N
Vr	3	3	

Tab. 25: Flamingo: girls (CG)

Girls (CG)	Flamingo (number of mistakes)		Difference
	Input	Output	
D.O.	15	10	5
K.Ž.	9	9	0
A.H.	11	7	4
D.O.	7	4	3

E.G.	8	5	3
N.O.	5	7	-2
K.D.	5	5	0
N.O.	0	0	0
S.O.	12	9	3
T.O.	10	5	5
\bar{x}	8,2	6,1	2,1
S	4,23	2,96	1,27
Max	15	10	5
Min	0	0	0
U-test	32		N
T-test	1,28		N
Vr	15	10	

Tab. 26: Catching the ball on the bench: girls (CG)

Girls (CG)	Catching the ball on the bench (cm)		Difference
	Input	Output	
D.O.	103	110	-7
K.Ž.	125	120	5
A.H.	140	90	50
D.O.	95	110	-15
E.G.	99	92	7
N.O.	103	100	3
K.D.	102	100	2
N.O.	77	83	-6
S.O.	110	85	25
T.O.	133	128	5
\bar{x}	108,7	101,8	6,9
S	18,95	15,01	3,94
Max	140	128	12
Min	77	83	6
U-test	38		N
T-test	0,9		N
Vr	63	45	

Tab. 27: Running to bases: girls (CG)

Girls (CG)	Running to bases (seconds)		Difference
	Input	Output	
D.O.	9,37	9,12	0,25
K.Ž.	10,65	9,60	1,05
A.H.	8,95	8,85	0,10
D.O.	9,67	9,30	0,37
E.G.	9,39	9,23	0,16
N.O.	8,57	8,53	0,04
K.D.	11,58	10,04	1,54
N.O.	8,95	8,69	0,26
S.O.	8,84	8,13	0,71
T.O.	10,95	10,42	0,53
\bar{x}	9,69	9,19	0,5
S	1,01	0,69	0,41
Max	11,58	10,42	1,16
Min	8,57	8,13	0,44
U-test	35		N
T-test	1,28		N
Vr	3,01	2,29	

Tab. 28: Jump to accuracy: girls (CG)

Girls (CG)	Jump to accuracy (cm)		Difference
	Input	Output	
D.O.	10	10	0
K.Ž.	11	7	4
A.H.	3	3	0
D.O.	9	7	2
E.G.	6	1	5
N.O.	12	9	3
K.D.	13	9	4
N.O.	12	12	0
S.O.	7	5	2
T.O.	15	14	1
\bar{x}	9,8	7,7	2,1
S	3,61	3,97	0,36

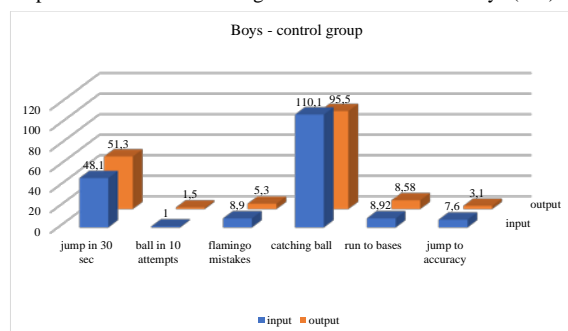
Max	15	14	1
Min	3	1	2
U-test	34		N
T-test	1,24		N
Vr	12	13	

In the previous tables (tables 23, 24, 25, 26, 27, 28) we presented the results of individual tests of the motor skills of girls (CG) from the primary school in Lomnička, where we also present the following information: girls (CG) were in the test results "Jump rope" better, because according to the average they had a better improvement in the number of jumps. Girl S.O. and the girl D.O. best improved their test performance. The other girls also had an improvement, but less. The results in the "Ball for 10 attempts" test turned out badly, because the improvement did not occur in 6 girls, which is 60% of the whole group. The best results were achieved by the girl A.H., who improved her successful attempts from 0 to 3. In the "Flamingo" test, girls (CG) achieved better results than girls (EG). We recorded the best results with the girl N.O., who had 0 errors in the input and output tests. Girls (CG): K.Ž., K.D. N.O. did not improve at all, because their difference was zero. They improved their maximum number of errors in this "Flamingo" test by 5.

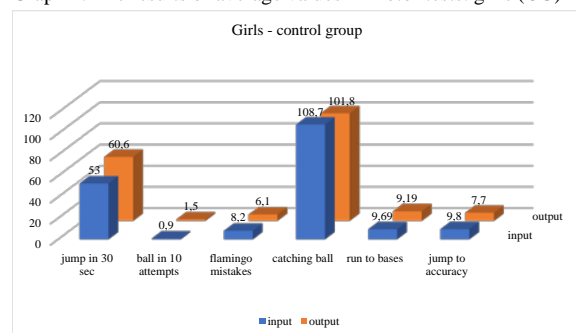
When observing the results in the test "Catching the ball on the bench and then stopping it", we note that the girls' results worsened: D.O. by 7cm, another girl also with the initials D.O. worsened by 15 cm, girl N.O. worsened by 6 cm. The best results were achieved by the girl A.H., who improved her catching reaction by 50 cm. In the "Running to the bases" test, girls (CG) achieved better results by an average of 0.66 seconds. Girl N.O. improved the least in this test by only 0.04 seconds. The best improvement was achieved by the girl K.D., because her output performance improved by 1.54 seconds, and the girl K.Ž. improved by 1.05 sec. The other girls improved by under one second. In the last test "Jump to accuracy" girls (CG) improved on average by 2.1 cm compared to girls (EG) who achieved an improvement of 0.8 cm. The best improvement was achieved by the girl K.Ž. and girl K.D. The girls did not improve at all in this test: D.O., A.H., and girl N.O.

In the following graphs (1, 2) we present the results of the average values in the motor tests of the group of children we monitored: boys and girls of the control group (CG).

Graph 1: The results of average values in motor tests: boys (CG)

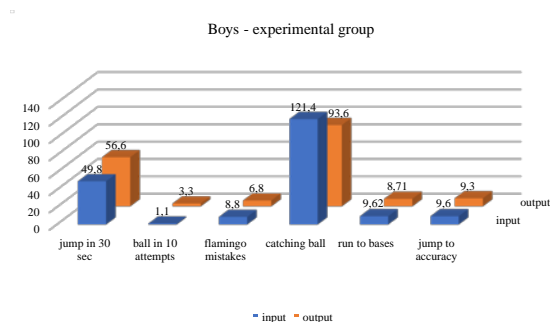


Graph 2: The results of average values in motor tests: girls (CG)

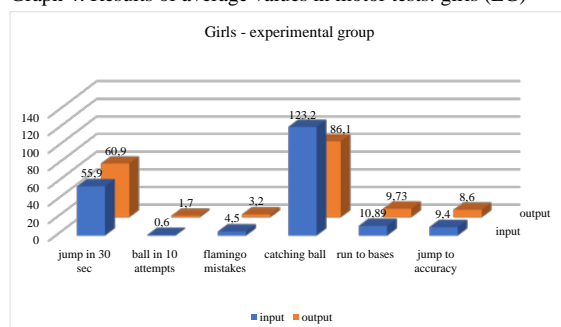


In other graphs (3, 4) we present the results of the average values in the motor tests of the group of children monitored by us: boys and girls of the experimental group (EG).

Graph 3: Results of average values in motor tests: boys (EG)



Graph 4: Results of average values in motor tests: girls (EG)



In the results of our motor tests presented in the graphs (1, 2, 3, 4), we noted alternately improved and worsen performances in these motor tests. We do not find a fully adequate explanation for this fact, but we believe that the results in the motor tests were influenced by the shorter duration of the experiment, as well as the smaller sample of probands - our children (40). At the same time, we add that despite some positive changes in the motor tests, we encounter statistically significant results, but also statistically insignificant results. The weakest results are found in each group, but in a different form. We present some of the following findings: Boys (EG) improved little in the "Run to the bases" test - only by 0.91 sec. Girls (EG) improved on average by only 0.8 cm in the "Jump to accuracy" test. Boys (CG) ended the worst in the "Run to the bases" test, where we recorded a small improvement, but only by an average of 0.34 sec. Girls (CG) achieved the smallest improvement in the "Running to the bases" test - only by 0.5 seconds.

4 Conclusion

In our article, we tried to describe the changes in coordination skills in children of younger school age due to the influence of movement games. 40 children from the Roma settlement at the Primary School in Lomnička in the Stará Ľubovňa district in the eastern part of Slovakia participated in our research. The goal of the paper was to implement the motor tests of coordination skills selected by us in the experimental and control groups of children in the 4th year of primary education. At the same time, evaluate the body weight and body height of children with the simultaneous calculation of the Body Mass Index (BMI). We evaluated the obtained results based on Student's T-test and Mann-Whitney U test. Our experiment lasted 8 weeks, and we performed measurements for both groups at the beginning and at the end of the monitored period. We recorded the best performance improvements in both the experimental and control groups in the "catching the ball and then stopping it" test and in the "jumping over the jump rope" in 30 s test. We note that these disciplines posed the least problem for them, since the ball in the family and the jump rope is a common thing for this group of students. However, we must take into account that the tested

children come from a disadvantaged environment, so they only had opportunities to improve their coordination in physical education and sports during school classes.

Due to the increased interest in testing among children from the Roma settlement of Lomnička, we recommend conducting testing at this elementary school more often. The achieved results show alternating improved and worsen performances in the motor tests determined by us. We do not find a fully adequate explanation for this fact, but we believe that the results in the motor tests were influenced by the shorter duration of the experiment, as well as the smaller sample of probands - our children (40). We dare to state that, despite some positive changes in motor tests, not all test results are statistically significant. At the same time, we recommend that the teachers of these children in the Roma settlement in Lomnička lead the children to exercise more and try to motivate them in all aspects to sports and develop their movement abilities and skills in physical and sports education classes. It is also important to lead these children to a healthy lifestyle and to show them the benefits of movement and sports, and at the same time to do more frequent input and output measurements in this school, which met with a positive response from these children.

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THE IMPACT OF PERSONALITY TRAITS ON COMPULSIVE BUYING BEHAVIOR OF CONSUMERS

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Abstract: The contribution addresses a highly researched topic that will always remain relevant. The trend towards online shopping is growing, and personality characteristics are important factors in shopping and consumer behavior. The aim of the contribution is to examine personality traits and their influence on compulsive online shopping. The analysis is conducted using SmartPLS from a sample of 203 Slovak consumers. These findings have important implications for the field of marketing and consumer behavior, where they can be utilized to formulate targeted strategies and interventions aimed at managing and reducing compulsive shopping. The results may also contribute to guiding further research efforts.

Keywords: compulsive online shopping, big five, consumer behavior

1 Introduction

Online shopping has become the primary mode of purchasing, occupying the majority of the consumer market (Lim & Kim, 2020). With rapid societal and economic development, consumer purchasing behavior has significantly changed, resulting in a sharp decline in planned purchases and a rapid increase in unplanned purchases (Luo et al., 2021). The emergence and reinforcement of a behavioral problem, characterized by a psychological need or urge to shop, have been observed by theorists and researchers (Müller et al., 2021). Consumer behavior can be categorized into planned, unplanned, or impulsive (Rahanatha et al., 2022).

2 Literature review

Impulsive buying, as a common behavior in everyday life, refers to unplanned consumer behavior influenced by external stimuli (Rook, 1987). According to Luo et al. (2021), impulsive buying occurs when purchasing behavior is driven by emotional factors. If impulsive buying is associated with emotions, it becomes random, unintentional purchasing (Kollat & Willett, 1967). Burton et al. (2018) suggest that impulsive purchases occur due to a sudden and strong emotional desire, characterized by reactive behavior with low cognitive control. Several authors indicate that impulsive buying is purchasing without intention (Dittmar, Beattie & Friese, 1995).

Sohn and Ko (2021) argue that although all impulsive purchases can be considered unplanned, not all unplanned purchases can be considered impulsive. This suggests that unplanned purchases are not necessarily accompanied by an urgent desire, which generally characterizes impulsive purchases. Impulsive buying leads consumers to purchase goods without hesitation (Kacen & Lee, 2002), resulting from promotion, where the consumer does not decide on purchasing before buying (Applebaum, 1951). People feel an urge to buy a product without considering why they need it and for what purpose. The urge is irresistible, and consumers may sometimes feel a loss of control. They pay less attention to the consequences of their behavior. Decision-making is usually short and spontaneous, as impulsive buying is dominated more by affective than cognitive processes. Consumers purchase unplanned goods (Vohs, Faber, 2007) and forgo optimal choices in the given situation (Baumeister, 2002). This tendency to shop spontaneously and without consideration can be explained by the immediate gratification it provides to the buyer (Pradhan et al., 2018). It is an irresistible force with an inability to assess its consequences. Despite being aware of the negative effects, the desire to satisfy needs is stronger (Meena, 2018).

Such loss of control, which can induce impulsive buying due to conflict between immediate reward and negative consequences, can become pathological or chronic (Pandya & Pandya, 2020). Impulsive buying tendencies can be triggered by a wide range of factors, including internal, external, or situational factors. External influences include factors such as culture, social context, and other marketing stimuli, while internal aspects relate to the processes occurring within the consumer themselves (Sofi, Najar, 2018). Characteristics of impulsive buying include being unpredictable, a sudden behavior usually occurring concurrently with an impulse, having relatively short duration, and consumers intending to make an impulsive purchase but not necessarily doing so based on external influences (Vohs, Faber, 2007).

The tendency for online consumption is increasing among the younger generation, which is more prone to impulsive buying for various reasons (Iyer et al., 2020). Impulsive buying tends to occur at the end of the teenage years or the beginning of the twenties (Black, Shaw, Allen, 2016). Impulsive behavior can be defined as consistent action that repeatedly occurs without leading to the desired reward or genuine pleasure (Shehzadi et al., 2016). Compulsive buying behavior (CBB), also known as shopping addiction, pathological buying, or compulsive buying disorder, is a mental health condition characterized by persistent, excessive, impulsive, and uncontrollable buying of products despite significant psychological, social, occupational, and financial problems (Müller et al., 2015). In one of the first comprehensive phenomenological descriptions of compulsive buying (CB), O'Guinn and Faber (1989) consider buyers compulsive when they are unable to control their impulse to shop, which permeates their lives and sometimes has serious consequences.

However, shopping can become harmful and destructive behavior for life when it becomes extreme and unmanageable, which can lead to "compulsive buying" (CB). According to Ridgway et al. (2008), CB has two components, namely obsessive-compulsive disorder and impulsive control disorder (OCD & ICD).

2.1 Personality Traits

Consumer characteristics related to impulsive buying have been the subject of many studies (Chavosh et al., 2011; Liao & Chuang, 2004). Spontaneous, strong urges to buy are associated with many factors, which can be divided into two categories: external situational factors and internal personality characteristics (Haq & Abbasi, 2016). Studies conducted by Miao et al. (2020) and Thompson and Prendergast (2015) demonstrate that several factors, including personality, trigger consumers' impulsive purchases.

The word "personality" derives from the Latin word "persona," meaning "to speak through." This Latin phrase refers to theatrical masks used by artists in ancient Greece and Rome. Although external appearance is significant for personality traits, it does not constitute the entire personality. Gangai & Agrawal (2016) define personality traits as relatively enduring characteristics of individuals that exhibit consistency throughout life and across different environments. Understanding the construct of personality is important to comprehend the relationship between personality and impulsive buying tendency. Interestingly, the approach to personality traits is gaining popularity through quantitative measurement (Solomon et al., 2012), with the most influential approach being the Big Five Inventory of personality traits (Feldman, 2018).

In the past, the five dimensions of personality, i.e., the Big Five personality traits, were examined in relation to their association with impulsive buying behavior (Badgaiyan & Verma, 2014).

The discovery of the five-factor model allowed researchers to focus on fundamental characteristic personality traits - extraversion, neuroticism, agreeableness, conscientiousness, and openness to experience (Feldman, 2018). Similarly, according to Saran et al. (2016), personal traits such as extraversion, agreeableness, conscientiousness, emotional stability, and openness influence unplanned purchases and impulsive buying behavior of individuals. Consumer behavior can also be predicted based on individual differences. Among the more stable individual differences over the lifespan are not only consumer attitudes, which are less stable, but also the aforementioned personality traits. Identifying personality components involved in purchasing behavior is a useful way to better understand the regularity or even eccentricity of purchases (Fenton-O'Creevy, Furnham, 2020).

Personality traits have a significant relationship with impulsive buying, as confirmed by the study by Gangai and Agarwal (2016). Some researchers (Doost et al., 2013) argue that almost all aspects of personality should be categorized using the concept of the Big Five and even suggest that the dimensions included in the Big Five model have a genetic basis (Esfahani Nasr et al., 2012). Several studies from different countries have shown that impulsive buying and personality traits influence the diversity of consumer purchasing behavior (Lippold et al., 2020; Shahjehan, 2012; Shehzadi et al., 2016). Agreeableness, neuroticism, and openness to experience are three personality characteristics associated with compulsive buying, with a mediating role in impulsive buying behavior (Shehzadi et al., 2016).

BFI

Understanding one's personality and what sets us apart from others can lead to better life decisions (Bergmann, 2017). Over the years, several tools have been developed to identify personality traits. These tools include the Myers-Briggs Type Indicator (MBTI) (Myers, McCaulley, 1985) or EPQ (Eysenck & Eysenck, 1975). In 1985, Costa and McCrae proposed that individual differences in personality characteristics generally reflect five broad dimensions of traits: neuroticism (N), extraversion (E), openness to experience (O), agreeableness (A), and conscientiousness (C). The Big Five personality model is probably the most widely used framework for explaining individual differences in populations and is based on five largely independent traits (McCrae, John, 1992). Subsequently, the revised NEO Personality Inventory (NEO PI-R) (Costa & McCrae, 1988) or The Big Five Inventory (Goldberg, 1993) was developed. John et al. (1991) created a new, concise measure that distinguishes BFI from other personality assessments, comprising 44 prototype items formed into short phrases. The model is widely used in studying human traits that influence purchasing behavior (Ayob, Wahid, Omar, 2022).

Neuroticism

It is generally acknowledged that neuroticism is the tendency to experience negative emotions such as anxiety, fear, sadness, anger, irritability, loneliness, dissatisfaction, and vulnerability, and that this factor is a response to various types of stress, illnesses, and their causes (Brandes, Tackett, 2019). Neurotic individuals tend to be abnormally sensitive and emotionally unstable (Shehzadi et al., 2016). Neuroticism was sometimes considered a positive personality trait (Hong, Dyakov, Zheng, 2020), but Nie et al. (2008) found that neuroticism is negatively associated with social adaptive behavior, while other dimensions play significantly positive roles. Neuroticism concerns individual differences in the tendency to experience and express negative emotions that are intense, enduring, relatively stable, but also susceptible to change (Shackman et al., 2016). It is conceptualized as a fundamental personality dimension that leads to individual differences from emotional stability to highly negative affect (Eysenck et al., 1985; Tackett & Lahey, 2017). Personality traits such as neuroticism exhibit continuity and changes throughout adolescence and adulthood, with the most significant changes occurring in young adulthood (Wrzus et al., 2021).

Neuroticism and the use of coping strategies such as avoiding problems are risk factors in relation to impulsive buying (Otero-

López, Santiago, Castro, 2021). Neuroticism is one of the empirically validated personality traits with a considerable amount of research supporting its heritability, childhood precursors, lifelong temporal stability, and universal presence (Widiger, 2009).

Extraversion

Some authors such as Gross and Proffitt (2013) or Gross and Medina-DeVilliers (2020) suggest that the basic social line is a function of personality traits related to social interaction, such as extraversion. Extraversion reflects our general tendency to seek out other people and communicate with them (Stephan et al., 2014). High levels of extraversion in individuals are manifested by sociability, an active life, and an approach to the social and material world, often experiencing positive emotions (Costa and McCrae, 2008). Extraverted personality concerns the individual's need for stimulation and interest in new stimuli. Impulsive buying is also characterized by a high or excessive interest in products and their stimulation. From this, we can infer that there is a positive relationship between extraverted personality and impulsive buying behavior (Wahyudi & Kurniawan, 2019). Badgaiyan and Verma (2014) pointed out that extraversion has a significant positive relationship with impulsive buying. These individuals tend to take risks, seek excitement, and uncertainty.

Openness

Openness is characterized by a person's tendency to seek new experiences and be willing to explore ideas, values, emotions, and sensations that differ from their previous experience or established preferences (McCrae, Costa, 1983). Individuals with high openness tend to be more adaptable, allowing them to navigate uncertain and complex situations more easily (Knaps, 2015). People who are open to experiences exhibit mental flexibility, cognitive curiosity, diverse interests, and a readiness to analyze the complex determinants of their decisions and the emotions of others (Costa, McCrae, 1988). The higher the level of openness to experience, agreeableness, and extraversion, the higher the level of shopping tendencies (Sofi, Najar, 2018). Some studies have been contradictory (Badgaiyan & Verma, 2014), and personality traits such as emotional stability, openness to experience, and agreeableness did not show a significant impact on impulsive buying behavior.

Agreeableness

Agreeableness is an interpersonal trait possessed by consumers. Consumers with high scores in this criterion have good protagonist interpersonal qualities, have a desire to always maintain positive relationships, are considerate, compassionate, polite, and cooperative. While consumers with low agreeableness exhibit opposite behavior. People with high agreeableness are more willing to suppress their impulsive nature when shopping because they can consider the consequences after making an impulsive purchase (Zuckerman, Kuhlman, 2000).

Conscientiousness

Individuals who possess this personality trait will often be more cautious when making decisions or choices. They have high self-control and can be trusted. Positive qualities include reliability, competence, industriousness, and goal-orientedness (McCrae, Costa, 1990). Conscientious consumers tend to plan ahead for product purchases, choose the appropriate product based on evaluation, and organize their shopping (Hendrawan, Nugroho, 2018). This trait is largely indifferent, not focusing too much on their life and goals to be achieved and is more energetic in interacting with others (John et al., 2008).

3 Methodology

The research sample consisted of 203 respondents, comprising 95 males and 108 females. The age of the respondents ranged from 18 to 64 years, with an average age of 33 years. The educational background of the respondents included 116 with secondary education and 87 with tertiary education. Data collection was conducted in February through an online questionnaire.

The objective was to evaluate the influence of personality traits using the BFI (Big Five Inventory) through 44 items structured with simple sentences and rated on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) on impulsive shopping, which was measured by COSS (Compulsive Online Shopping Scale). Manchiraju et al. (International Journal of Mental Health and Addiction, 1–15, 2016) published the Compulsive Online Shopping Scale (COSS) in the International Journal of Mental Health and Addiction (IJMHA). Manchiraju and colleagues adapted items from the seven-item Bergen Shopping Addiction Scale (BSAS) and its original set of 28 items to develop their measure of compulsive online shopping, adding the term "online" to each item (Griffiths et al., 2016).

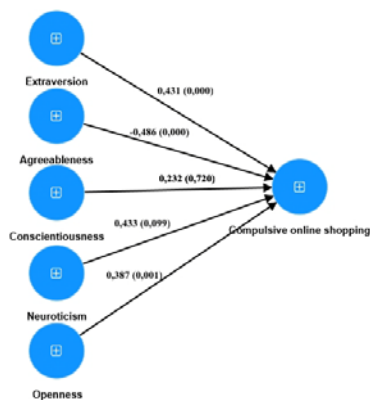
4 Results

Given the objectives of the contribution and the topic under consideration, we assumed that all five personality traits are related to compulsive online shopping. The proposed model of relationships focused on assessing all relationships and was verified through Path analysis by assessing Path coefficients, their significance, and model fit indicators. Path analysis is a statistical method used to examine the relationships between variables in complex models. This method allows for the identification of direct and indirect relationships between variables and provides a structured framework for testing theoretical models.



Graph 1 Path analysis - tested model
(Source: own calculation in SmartPLS 4)

The proposed conceptual model illustrates the influence of five personality traits on compulsive behavior. Several studies have hypothesized relationships between personality and compulsive behavior, but the results are inconclusive.



Graph 2 Path analysis – result model
(Source: own calculation in SmartPLS 4)

The presence of relationships between extraversion, agreeableness, and openness to compulsive behavior suggests

that certain personality traits may predispose individuals to such behavior. For example, extraverted individuals may be more inclined to seek stimulation and excitement through excessive consumption, while agreeable individuals may be more sensitive to social influences and pressures related to consumption habits. Identifying these specific personality traits associated with compulsive behavior provides valuable insights for understanding consumer behavior and designing interventions or strategies aimed at mitigating compulsive tendencies. However, further research is needed to explore additional factors and their interactions in shaping compulsive behavior among consumers. The suitability and reliability of the model were assessed using commonly employed coefficients, as depicted in Table 1.

Table 1. Fit indexes

Factor	SRMR	AVE	Cronbach	R-square
Extraversion		0.66	0.898	
Agreeableness		0.59	0.712	
Openness	0.07	0.62	0.976	0,48
Compulsive online shopping		0.69	0.819	

Fit indices are statistical indicators used to assess how well a proposed model fits empirical data. These indices provide information on how well the model aligns with observed data and whether its assumptions are met. Here are some of the most commonly used fit indices. Based on the values, the model with three influences of personality traits on compulsive shopping was confirmed. Model suitability is confirmed by SRMR < (0,08), AVE > (0,5), r-square 0,48 explaining 48% variance, VIF < (5), NFI > (0,9). In parentheses are critical values for assessing suitability.

Table 2. Displays individual statistically significant direct relationships.

	Path coeff.	T statistics	p value	Result
Extraversion → Compulsive online shopping	0,431	7.159	0,000	(+) posit.
Agreeableness → Compulsive online shopping	-0,486	7.859	0,000	(-) negat.
Openness → Compulsive online shopping	0,387	3.206	0,001	(+) posit.

The discussion about the influence of personality traits, such as extraversion and openness, on compulsive behavior is important for understanding the relationships between various factors and consumer tendencies.

Our results concerning our sample of Slovak consumers indicate that positive path coefficients are observed for extraversion and openness, suggesting that extraverted and open consumers tend to exhibit higher levels of compulsive behavior. Extraversion may be associated with a greater inclination towards seeking new experiences and stimulation, which may include excessive shopping in an attempt to satisfy this need. Similarly, open individuals may be receptive to new experiences and more impulsive when purchasing new and interesting products. Conversely, agreeable individuals may have a tendency towards lower levels of compulsive behavior. This result can be interpreted in relation to agreeableness, which may be associated with higher levels of empathy and consideration for the needs of others. These individuals may be less prone to impulsive shopping and may be more motivated by personal relationships and social bonds rather than material possessions.

Overall, this finding underscores the importance of personality factors in understanding consumer tendencies and compulsive behavior. Further research can further explore these relationships and contribute to a better understanding of how personality traits influence consumer behavior.

Finally, we assessed the differences in compulsive shopping between men and women using t-tests. TABLE 3 shows the results.

Table 3. Gender differences in compulsive online shopping

		Mean	SD.	t-test	p-value
Compulsive online shopping	male	1.561	1.052	1.096	0.025
	female	1.863	0.772		

Based on Table 3, we conclude that, according to our sample of consumers, women exhibit a higher tendency toward compulsive behavior. One possible explanation for this finding may be related to societal norms and expectations regarding gender and consumer behavior. Women may feel greater pressure or expectations to conform to certain standards of appearance, fashion, or lifestyle, which could contribute to increased compulsive shopping behaviors. Additionally, women may more frequently use shopping as a mechanism for coping with stress or emotional discomfort, leading to higher levels of compulsive behavior.

Furthermore, it is important to consider the influence of marketing and advertising strategies targeted specifically at women. Advertising often promotes consumerism and materialism, which may affect women differently than men and contribute to higher levels of compulsive shopping.

However, it is important to interpret these findings cautiously and consider potential limitations of the study, such as sample representativeness and the measurement of compulsive behavior. Further research is needed to examine the underlying mechanisms that influence gender differences in compulsive shopping and to determine if similar patterns exist in different populations and cultural contexts.

5 Discussion

When it comes to impulsive shopping, correlations were found in the research indicating that the higher the conscientiousness, reflecting a sense of responsibility and planning, the lower the tendency for individuals to engage in impulsive buying (Aquino, Lin 2023). Similarly, neuroticism and openness show similar correlations. Neuroticism and openness were confirmed in our study, as well as in previous research (Olsen et al. 2016; Miao et al. 2019, Fenton-O'Creevy, Furnham 2020). For compulsive buying, correlations are similar with the same personality factors correlating with impulsive shopping (Aquino, Lin 2023).

In the study by Badgaiyan and Verma (2014), personality traits such as emotional stability, openness to experience, and agreeableness did not show a significant impact on impulsive buying behavior, whereas extraversion exhibited a relationship, similar to ours and several other studies (Shahjehan et al., 2012; Bratko et al., 2013). This confirms the assertion that extraverted individuals have a greater tendency to take risks and seek uncertainty (Chen, 2011). Therefore, individuals with pronounced social and active nature are more prone to impulsive shopping (Badgaiyan and Verma, 2014).

Research conducted by Rohmah and Rahayu (2023) shows that personality traits tend to be associated with impulsive buying behavior, conscientiousness, and neuroticism, which was also confirmed by us, while openness to experience, extraversion, and agreeableness, on the contrary, have no significant relationship, which is in contrast to our results. In the study by Otero-López et al. (2024), the traits of neuroticism, conscientiousness, and openness to experience were confirmed to predict compulsive buying at statistically significant levels. The results of Hendrawan and Nugroho (2018) showed that extraversion and agreeableness partially influenced impulsive buying behavior, while conscientiousness, emotional stability, and openness to experience did not affect impulsive buying behavior.

Erlangga et al. (2022) studied the influences of internal variables neuroticism, conscientiousness, pleasure, and materialism on impulsive buying and found that all have a significant impact. We also agree with the research by Aquino, Lins (2023) regarding openness, which is positively associated with impulsive buying, but the results regarding conscientiousness are contradictory, while we found conscientiousness positively associated, they confirmed a negative association. The conclusions of the study by Rohmah and Rahayu (2023) indicate that extraversion, conscientiousness, neuroticism, and openness to experience have an impact on impulsive buying behavior, while agreeableness does not have an impact on impulsive buying behavior. The group of impulsive buyers achieves statistically significantly higher scores in neuroticism (Andreassen et al., 2015; Otero-López, Villardefrancos, 2013) and lower in conscientiousness and agreeableness (Otero-López, Villardefrancos, 2013; Wang, Yang, 2008). The results showed that neuroticism and the use of coping strategies such as avoidance of problems and pious desires are risk factors that increase the propensity for compulsive shopping and problem-solving. Cognitive restructuring and social support, as well as conscientiousness, are protective factors that reduce the likelihood of a consumer becoming a compulsive shopper (Otero-López, Santiago, Castro, 2021).

The research results are thus inconclusive. Considering the outcomes of our study and our sample of Slovak respondents, we indicate that extraversion, agreeableness, and openness are personality traits that influence the tendency towards compulsive shopping.

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Primary Paper Section: A**Secondary Paper Section: AE**

THE INFLUENCE OF WORKING CONDITIONS ON PRO-MIGRATION CONSIDERATIONS AMONG NURSING STUDENTS

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Abstract: Purpose of the article: to identify the pull factors of migration among nursing students and the impact of migration flows on the Slovak labour market with an aspect on the health care sector. Findings: Nursing students are most attracted to studying abroad by the following pull factors: legal norms, regulations and requirements for work performance, the behaviour of supervisors, relationships between colleagues and the favourable social climate in the country. Factors that are less influential are remuneration, education and a higher standard of living. Based on the answers of the respondents, a high percentage of considerations about looking for a job abroad were shown. Out of the 423 students, up to 80% of the respondents plan to go abroad for work. The current number of nursing students is not sufficient to cover the needs of the Slovak labour market in the health sector. The massive outflow of potential staff in hospitals exacerbates the staffing problems in hospitals.

Keywords: intention to leave, nursing students, working conditions of nurses, labour market, pull factors

1 Introduction

Migration of health workers is a relatively well-developed issue in terms of current scientific research, as evidenced by the number of published scientific studies (Hajian et al., 2020; Hajian et al., 2023; Mara, 2023; Boboc et al., 2024; Sax Dos Santos Gomes et al., 2024 and others). Although labour migration can generally be seen as one of the many effects of globalisation and an expression of individual free will, knowing what factors drive labour to decide to migrate is crucial. In the case of healthcare workers, job satisfaction or working conditions are often mentioned as one of the factors, which have been investigated in many scientific studies (Kurimoto et al., 2020; Kalinowska, Marciniowicz, 2020; Silva, Potra, 2021; Karadaş et al., 2022; Bragadóttir et al., 2023 and others). For regions and countries from which health workers emigrate due to job dissatisfaction, it is possible to speak of migration as a negative phenomenon. This is because it weakens the local health system, indirectly overburdens domestic health workers, and ultimately represents lost public funds invested in the training of the future workforce, which will return this investment in the form of work done in a country other than the home country. Therefore, it is logical that the affected countries are attempting to eliminate this negative trend by finding and implementing solutions that have proven to be pull factors in the countries where health workers immigrate most frequently - the issue of pull factors has been addressed in many scientific studies (Botezat and Ramos, 2020; Almansour et al., 2023; Kuhlmann et al., 2024).

However, in the context of this information, it is important to recognize that measures aimed at mitigating the outflow of health workers should not only affect those who are already an active part of the labour market, but also future workers, who are students in health professions. It is clear that potential health workers are already considering their professional future at the time of their preparation for the profession - whether it is the place of work or considerations about staying in the profession itself (Aydin et al., 2021; Kim et al., 2021; Visiers-Jiménez et al., 2022). Less obvious, however, is the influence of specific factors on students' considerations, which can be called pro-migration considerations. We do not know how specifically these students' reflections are influenced by working conditions and, for this reason, we do not know the parameters of the relationship between these two variables, which we consider as an interesting research problem. Determining the intensity of this relationship will help in identifying shortcomings in practice (in accordance with push and pull factor theory) and at the same

time suggest ways to address them. When solving the research problem, we use descriptive analysis, Bartlett's test of sphericity and KMO test to verify the suitability of the data for the use of factor analysis. The results of the research further specify the interrelationship between working conditions as factors that condition the emergence of nursing students' pro-migration considerations in the selected health care institution. The paper consists of an abstract, introduction, literature review, methodology and research section, conclusion and list of resources.

2 Literature review

When examining the impact of working conditions on the pro-migration considerations of nursing students, it is essential to consider the age factor. This is because, as a rule, they are members of younger generational groups, most often Z and millennials (Y). It is well known that these people (especially members of Generation Z) have lived most of their lives in a world marked by the emergence and rapid development of many globalising trends (social networks, information technology, affordable commercial travel, wide opportunities to study abroad, etc.). The volatility of an environment marked by constant change has inevitably necessitated a higher degree of flexibility on the part of these generational groups, which has been confirmed directly or indirectly by a number of studies in the meantime (Schroth, 2019; Tjiptono et al., 2020; Bulinska-Stangrecka, Naim, 2021; Roncak et al., 2021; Goryunova, Jenkins, 2023). In line with the above studies and the general social consensus, these are people who, thanks to the current opportunities, generally dare to travel more, study abroad, and often possess good language skills. These but also other characteristics of (especially) Generation Z - struggle for social change and social equality, striving for economic independence, striving for work-life balance, demanding flexible forms of work organisation, climate activism, etc. (Jung, Yoon, 2021; Bulinska-Stangrecka, Naim, 2021; Elenga, Krishnaswamy, 2023; Botezat et al., 2024) can therefore be considered as factors that also influence, to varying degrees, considerations of preferences regarding suitable places to live and work.

The mentioned specificity and basic characteristics of the members of the younger generations logically also affect nursing students belonging to the aforementioned generational groups. A study from the USA confirmed that low age and migration considerations correlate - younger people from the healthcare sector are more likely to consider migrating for work (Giraldo-Santiago et al., 2024). Experience of living outside their home country, the courage to travel, or time spent studying abroad, and acquired language skills can greatly facilitate and influence their decision on a suitable place to work, regardless of geography. However, the mentioned characteristics of Millennials and Generation Z themselves do not represent a reason for migration for work; they can be understood more as suitable predispositions for such a decision. Real factors of nursing students' pro-migration considerations can be considered as issues of so-called "push" and "pull" factors, which deal with the reasons and motives for work emigration and immigration and are elaborated on by many international studies (among the most recent are Adovor et al., 2021; Naval et al., 2024; Bunduchi et al., 2024; Boboc et al., 2024; Khan, 2024, and others). Specific are the so-called dyadic factors, which also influence migration considerations (Adovor et al., 2021).

The range of factors that determine the willingness or need of nursing students to emigrate for work can be very broad. It is evident that they are not only related to the quality and setting of the education system, but also to other social, socio-economic, environmental, political and legislative attributes of the home country, in line with the findings above regarding Generations Y and Z. Push factors (i.e. factors that stimulate the intention to leave the home country) include, for example, poor working

conditions or lack of career opportunities (Bunduchi et al., 2024). These findings are corroborated by other studies (Khan, 2024; Boboc et al., 2024; Naval et al., 2024), mentioning other factors such as job dissatisfaction, low salary, long working hours, but also political instability, corruption or poor quality health infrastructure and outdated health technologies (Konlan et al., 2023). Inadequate working conditions are also a major reason for considering leaving the profession according to studies by Park et al. (2019), Martinez et al. (2021), Çamveren, Kocaman (2021), İşsever, Bektas (2021) and others. Pro-migration considerations, however, are not necessarily supported only by negative perceptions of conditions in the home country - often the incentive is a better situation abroad (pull factors). A better situation can be understood as, for example, better salaries, a better working environment, better opportunities for professional development (Schumann et al., 2019; Domagała et al., 2022; Kuhlmann et al., 2024; Boboc et al., 2024) or a higher standard of living in the form of a higher quality of life (Pál et al., 2024). Satisfactory working conditions are a prerequisite for job satisfaction, which according to another study is negatively correlated with intention to leave (Salahat, Al-Hamdan, 2022). The results of multiple regression analysis of another study, in turn, suggest that nursing students' satisfaction with their personal practice experience is a significant predictor of consideration to remain in the profession (Kim et al., 2021). Thus, prevention of labour emigration requires, among other things, adequate systemic solutions and adjustment of personnel management processes in healthcare institutions (Poliakova et al., 2022).

Although knowledge about migration is generally based on the theoretical division of push and pull factors, their inseparability is evident. What may be considered a push factor in the home country may at the same time be a pull factor in the host country. Although both push and pull factors can be seen as a natural consequence of the continuity of social, socio-economic or political development, the immigration policies of individual countries are increasingly intervening in this issue. They can be referred to as targeted influences on migration balance. The impact of these factors on the brain drain from the healthcare sector and the attraction of highly skilled professionals is evidenced by several studies (Douaiher et al., 2018; Adovor et al., 2021), which often pose an ethical dilemma, as immigration-attractive countries gain necessary healthcare workers at the expense of countries from which these workers depart (Ferracioli, De Lora, 2015; Quamruzzaman, 2020), creating gaps in the healthcare sector in the countries of origin of migrants (Ondrusova et al., 2023). For these reasons, it can be stated that addressing this issue is constantly relevant and necessary. A research gap in the case of the present study is the absence of deeper knowledge about the factors that most intensively influence Slovak nursing students and stimulate them to consider job opportunities abroad. Based on the above, the aim of the research is to identify the pull factors from the field of working conditions acting as predictors of the pro-migration considerations of these students.

3 Objective and methodology

Research aim: To identify the pull factors of migration among nursing students and the impact of migration flows on the Slovak labour market with a focus on the health care sector.

Partial aims and objectives of the research part of the paper:

- analysis and collection of relevant scientific papers from the international scientific databases Web of Science and Scopus;
- extraction of variables from questionnaire data;
- analysis of variables through mathematical-statistical methods;
- interpretation of the results of the analysis and formulation of conclusions based on the findings.

Data collection: The questionnaire was designed for the purpose of the research: APVV-19-0579 titled "The Setting of Personnel

Management Processes in Hospitals and Its Impact on Migration of Doctors and Nurses to Work Abroad". The survey involved 423 nursing students from secondary and higher education institutions in Slovakia.

Methods used:

- Descriptive analysis - descriptive analysis were processed using graphs that reflect counts or percentages of primary and secondary data;
- Bartlett's test of sphericity, Kaiser-Meyer-Olkin test (KMO) - these tests provide information about the suitability of the data for the use of factor analysis - if the result of the KMO test is above the value of 0.7, the variables are suitable for the use of factor analysis; if the result of the Bartlett's test of sphericity is below the specified level of $\alpha = 5\%$, the variables are significant and are suitable for the use of factor analysis;
- Principal component factor analysis - using the selected method, hidden factors are identified and clustered into a smaller number - these factors represent a set of variables that share common characteristics; by extracting the factors, pull factors of migration in nursing students are identified. Given the structure of the factors and the sample of respondents, it is appropriate to use exploratory factor analysis to help identify hidden factors influencing nursing students' migration intentions.

4 Results of the study

In the research part of the study, the processed results are interpreted. The subject of the research was nursing students in Slovakia and the impact of their departure on the domestic labour market. The total number of respondents was 423 from universities and secondary schools. The obtained data were recoded into numerical values, later statistically evaluated.

Table 1: Evaluation of test results for the appropriateness of using factor analysis

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.855
Bartlett's Test of Sphericity	Approx. Chi-Square	681.242
	df	36
	Sig.	0.000

Source: own elaboration in SPSS, 2024

The Kaiser-Meyer-Olkin (KMO) test result is 0.855, where the data is appropriate and can be used in factor analysis. Bartlett's test of sphericity is below the $\alpha = 5\%$ threshold with a resulting significance level of 0.000. The results of both tests demonstrated the suitability of the data, thus the model can be considered suitable for use in factor analysis.

Table 2: Results of correlation matrix (R)

Extraction of main components				
Factors	own number	% of total variance	cumulative eigenvalue	cumulative %
F1	4.65	51.66	4.65	51.66
F2	1.06	11.79	5.71	63.44

Source: own elaboration in Statistica, 2024

The correlation matrix explains a number of common factors explained by the model. The Kaiser's criterion states that the eigenvalue must be greater than 1. In a correlation matrix with 9 variables, 2 grouping factors are identified, which explain 51.66% of the total variance. The selected variables are grouped using the principal component extraction method.

Table 3: Factor analysis of nursing students - identification of pull factors for migration

Variables - working conditions	Stress Factor: Varimax Normalized Extraction: Principal Components (Marked are > 0.70000)	
	Factor 1 - (workplace relations and organisational norms)	Factor 2 (remuneration system and workplace facilities)
Variable 1 - Organisation and working conditions	0.509374	0.182863
Variable 2 - Instrumentation and material equipment of health facilities	0.253921	0.761051
Variable 3 - Appraisal and remuneration for work	0.105546	0.887457
Variable 4 - Setting up professional and career development processes	0.453648	0.55311
Variable 5 - Legal standards, regulations and work performance requirements	0.768022	0.303419
Variable 6 - Supervisors' conduct and behaviour	0.865495	0.243004
Variable 7 - Relationships between colleagues	0.852759	0.156674
Variable 8 - Favourable social climate in the country	0.75124	0.26515
Variable 9 - Higher standard of living	0.511248	0.569945
Variance	3.432747	2.276949
% total variance	0.381416	0.252994

Source: own elaboration in Statistica, 2024

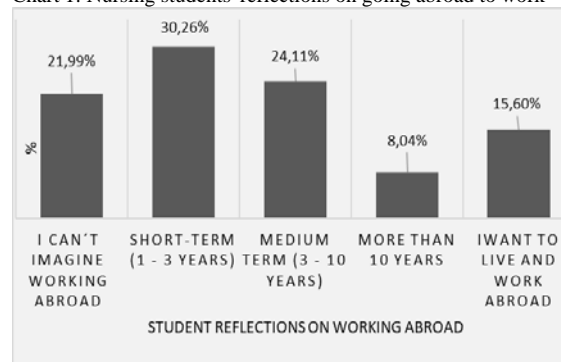
Using factor analysis, selected factors that have the greatest influence on nursing students' reflections on migration were grouped. In Factor 1 (workplace relations and organizational norms), the following variables were grouped using extraction: legal norms, regulations and job performance requirements (0.768022), supervisor's actions and behaviors (0.865495), relationships among colleagues (0.852759), and favorable societal climate in the country (0.75124). The results of factor rotation show that factor 1 accounts for 3.432747 of the total variance, which explains 22.27% with nine variables. These findings are in line with the results of several studies presented in the literature review section, e.g. Kim et al. (2021) or Poliaková et al. (2022), which, among other things, point precisely to the importance of pull factors such as good personal experience of work or the correct setup of personnel management processes in hospitals - these in fact fundamentally affect the requirements for job performance, the behaviour of supervisors, workplace relations or many other aspects.

Factor 2 (remuneration system and workplace equipment) is correlated with the variables: instrumentation and material equipment of health facilities (0.761051), evaluation and remuneration for work (0.887457). The results of factor rotation show that factor 2 accounts for 2.276949 of the total variance, which explains 2.52% for the nine variables.

The results demonstrate that the factors that most influence nursing students' pro-migration considerations are clustered in factor 1. To a lesser extent, they are also influenced by those that are grouped in factor 2. Factors that did not reach a value above 0.7 in the result are not significant for nursing students. Namely:

organization and working conditions, setting of professional and career development processes or higher societal level.

Chart 1: Nursing students' reflections on going abroad to work

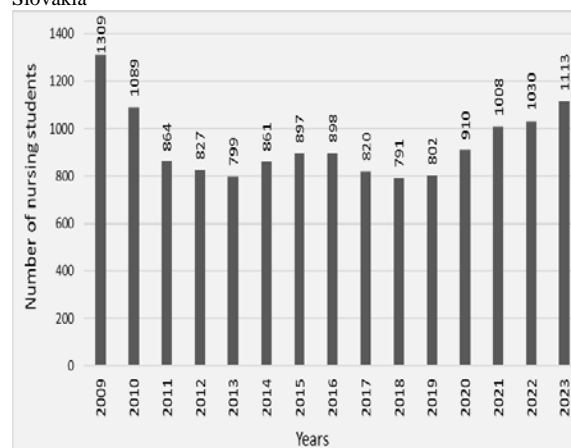


Source: own processing in Excel, 2024

Figure 1 interprets nursing students' reflections on their migration intentions. The questionnaire survey asked whether respondents were interested in working abroad. The representation of each response was processed as their percentage of the total 423 responses of the respondents. Out of the total, only 21.99% of the students are not considering working abroad. 62.41% want to work abroad for a certain period of time only, of which 30% want to work abroad for a short period of time (1-3 years), 24% for a medium period of time (3-10 years) and 8.04% for a long period of time (more than 10 years). 15.6% of the respondents want to stay abroad to live and work permanently. If 62.41% of the respondents (nursing students) decided to go abroad for work, the Slovak labour market would lose 288 people from universities who graduated and could work here.

The results of students' migration intentions by type of study also provide interesting findings. The number of secondary school student respondents to the questionnaire was 67 and the number of respondents in the position of nursing student in higher education was 356. The results of the response percentages show in more detail about pro-migration considerations. According to the results, as many as 77.61% of the respondents from secondary schools want to go abroad for work after graduation. According to the results of the responses of nursing students in universities, even as many as 80.45% of the respondents plan to leave after graduation. Thus, the total proportion of high school and college students who plan to go abroad for work is 80.38%.

Chart 2: Development of the number of nursing students in Slovakia



Source: own elaboration based on IZ data, 2024

Figure 2 shows the evolution of the number of nursing students in Slovakia after 2023. Secondary data are obtained from the Employment Institute portal and have been combined with primary data in the present research. The graph shows the

number of nursing students in universities. This section of people can be considered as a highly skilled workforce that has specialised clinical skills.

Table 4: Calculation of growth rate of nursing students

years	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
growth rate		-16.81	-20.66	-4.28	-3.39	7.76	4.18	0.11	-8.69	-3.54	1.39	13.47	10.77	2.18	8.06

Source: own elaboration based on IZ data, 2024

In 2010, the growth rate of nursing students (Table 4) slowed down by 16.81% year-on-year and by 20.66% in the following year. After a period of fluctuation of this rate between positive and negative values, it is only since 2019 that a continuous increase in the number of students is observed, the strongest in 2020 (13.47% compared to the previous year). Thus, until 2023, there are no recorded declines in the number of students as in the previous decade. However, the number of nursing students that could cover the needs of the healthcare labour market of the Slovak Republic has not yet been reached. In retrospect, looking back at the presented students' reflections on working abroad, it can be stated that a large number of students plan to go abroad to work for a limited period of time or want to stay there permanently, which, combined with the insufficient number of domestic graduates, represents a major problem in the near future. However, a partly positive finding is that the interest of young people in studying nursing has been increasing over the last 5 years. The question remains, however, whether this workforce will capitalise on its knowledge, experience and education in the form of work done at home or whether it will head for the foreign labour market.

Impacts and implications of nursing students' pro-migration intentions on the staffing of health care facilities

A total of 423 nursing students from secondary schools and universities were able to participate in the survey. As a result, a total of 62.41% of the students want to go abroad for work after graduation and another 15.60% want to stay there to live. This section quantifies the potential loss of manpower if the students' pro-migration intentions are fulfilled. According to the results of the questionnaire survey, a total of 288 university students and 52 high school students plan to go abroad for work. In the case of the 288 university students who plan to go abroad to work, after deducting from the current number of nursing students in the Slovak Republic (1113; Figure 2, year 2023), only 825 nurses would join the nursing profession after graduation. According to Jašková, labour migration is currently a serious economic, social and political problem. The issue of labour migration is also closely related to changes in the labour market (Jašková, 2024). It should be noted that the formulation of this assumption is based solely on the results of the presented questionnaire survey. Other alternative labour market losses may result from maternity leave or a change of work sector, which may result in an even smaller gain of nursing graduates in the healthcare labour market. According to Tupá (2020), a significant problem in the labour market is that many graduates are not employed in their graduate field or go abroad for work. This creates gaps in the health care sector (Ondrušová et al., 2023).

5 Conclusion

Workplace relationships and organizational norms are the most important factors for nursing students when considering migration. The compensation system and workplace facilities influence them to a lesser extent. Factors such as work organisation, career development or social level did not play a significant role in the case of the present research. It was found

that migration poses a significant risk to the Slovak health care system, as up to 62% of nursing students involved in the conducted research are considering working abroad and almost 16% are considering staying abroad permanently. The departure of almost a quarter of nursing graduates would mean the loss of more than 288 skilled workers for the Slovak labour market, exacerbating the already existing shortage of nurses. The situation is exacerbated by the stagnating growth in the number of nursing students in recent years. Although the growth rate has increased slightly again in 2021, it has still not been able to reach the level of previous decades and meet the needs of the Slovak healthcare labour market.

From the findings of the study, it can be concluded that measures need to be taken to increase the number of nursing graduates and implement measures to reduce their emigration abroad. There are several possible solutions which can be summarised in two areas:

- creating retention support programmes for nursing students (e.g. scholarship programmes for students);
- increasing the attractiveness of the profession and study programmes (e.g. information campaigns on the nursing profession and its benefits).

The departure of a young and skilled workforce has a fundamentally negative impact on the labour market for the future. Hospitals in Slovakia have been understaffed for a long time, and similar attrition continues to exacerbate the problem. In addition, there are also negative effects in the staffing of individual departments, where nurses work beyond their competences and may experience constant stress and discomfort at work, leading to further manifestations of their dissatisfaction. Thus, the issue of migration of health professionals from Slovakia ultimately also poses a major ethical problem (Ferracioli, De Lora, 2015; Quamruzzaman, 2020) - all the more serious because migration considerations are already present in nursing students, where the return on the investment made in their education is only envisaged in the future.

Research limitations: the research was conducted on a sample of 423 nursing students from secondary schools and universities. This means that the results do not generalize to the entire group of high school and university students. The research was not focused only on graduating nursing students, so it is possible that their reflections will differ in the future (as graduates).

The study also concludes with contributions to scholarship that may expand on the question of nursing students' migration intentions. Based on the findings, factors that influence nursing students were identified, with an emphasis on workplace relationships and organizational norms. These findings add to existing knowledge on the issue and contribute to the understanding of migration intentions. By quantifying the risk of migration to the Slovak health care system, the present study highlights the need for urgent solutions.

In addition to the scientific benefits, the study has practical benefits. Knowledge of pull factors allows employers and policy makers to understand why nursing students choose to seek work abroad, enabling them to implement strategies to retain these students in their country of origin.

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Primary Paper Section: A

Secondary Paper Section: AM, AO, FQ

THE POLITICAL FUNCTION OF PUBLIC FINANCE. THE POLAND EXAMPLE

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Abstract: The article concerns the function of public finance. The authors attempt to provide an answer as to whether, in addition to the classic functions of public finance – the allocative, redistributive and stabilizing functions – one can arrive at a claim that public finance also plays a political function. These reflections are based on the course of 2023 parliamentary elections in Poland and the analysis of election programs presented by the individual political parties. Extracted from the programs were all the promises which could impact the redistribution of public goods and services and would involve their public funding, as well as those which could impact the tax revenues of the state. The analysis leads to the conclusions that the scope of public spending and the degree of fiscalism were one of the main factors encouraging the voters to vote for a particular political party. Since election promises have a major impact on the election results and they can be turned into legal regulations impacting public budgets, the claim concerning the political function of public finance is justified.

Keywords: role of public finance, parliamentary elections, political role of finance

1 Introduction

Public finance is a fundamental branch of the economy which focuses on understanding how the policy of the government impacts the economy, in particular through the allocation and use of monetary resources in order to achieve social goals, such as economic stability, economic growth and security. This complex field includes several key theoretical principles and models which explain the nature of public revenue, spending, budgeting and the general impact of governments' actions on the economic dynamics. One of these theories is the theory of functions of public finance – functions understood as the execution of tasks in order to achieve the desired results. The groundwork for a discussion on this subject was laid by Richard Musgrave who, in "The Theory of Public Finance: A Study in Public Economy", a book published in 1959, defined the three basic functions of public finance (Musgrave, 1959). The first one, called allocation, concerns the role of the government in the provision of goods and public services. Musgrave pointed out that the provision of goods and services is a process shared between private and public entities. Private entities, however, are often incapable of providing certain goods at an optimum level, since they cannot or would find it difficult to charge consumers directly for its provision. The government's duty, therefore, is to ensure public goods, such as national defense, transportation, public parks and street lighting. These tasks are to be financed through taxes. The second function – the redistributive one, assumes that the government redistributes revenue in order to ensure equal distribution of resources. Musgrave claimed that market economy does not always lead to a desired distribution of revenue and wealth among the people. Therefore, through taxes and social welfare programs, the government can redistribute resources from the richer to the poorer, aiming at minimizing poverty and inequality and ensuring social security. Redistribution can be implemented through tax redistribution – progressive taxation of high income groups and ensuring subsidies for low-income groups, the use of progressive taxation to finance programs aimed at low-income groups; combining taxes on goods consumed mainly by high-income groups with subsidies to goods consumed by low-income groups. The third, stabilizing function, concerns the government's role in regulating the general level of economic activity in order to achieve macroeconomic stability. This includes the use of fiscal and monetary policy to control inflation, fight unemployment and stabilize the business cycles in the economy. By adjusting the governmental spending, taxes and money supply, the government can impact economic growth, stabilize prices and strive for balance in the labor market (Musgrave, 1959). These three functions impact one another in many fields, and it is necessary to fully understand them in order to shape economic policy. The allocative and distributive functions are carried out

through fiscal policy, which takes various forms. The stabilizing function is often implemented through the activity of the central bank.

Allocation, distribution and stabilization attributed to public finance by Musgrave have become the foundation of science and discussion about the public finance. The paradigm in the analysis of the relationship between public administration and the market. It has also been the basis for numerous other theories developing the particular elements of functions of public finance and the mechanisms involved. Wallace E. Oates developed studies on the search for optimal income distribution models and the division of fiscal responsibilities between the various levels of public authority, proving that public goods and services should be provided by the government level closest to the citizens (Oates, 1968). Albert Breton argued that distribution and allocation could be more effective in an environment of competition between the entities responsible for them (Breton, 1998). Paul Anthony Samuelson developed a theory of public finance on the basis of allocation and distribution, describing, e.g. the relationship between effectiveness and justice (Samuelson et al., 1998). Many other scholars who have contributed to the development of science of public finance by conducting their research and analyses, did so in the field of the three functions. They also constitute a didactic canon present in academic textbooks for law and economy students. The literature offers an expanded version of the aforementioned functions. Apart from the classic functions of public finance, Stanisław Owsiak also mentions the rescue (remedial) function of public finance. It stems from society's expectations amid economic collapse, financial sector crash or crises emerging from natural causes. One example of its implementation were the actions of the government during the COVID-19 pandemic (Owsiak, 2021). The literature also mentions the control function of public finance. It results from the redistributive function which is carried out using the form of monetary circulation, which allows for the registration of economic and social phenomena, and then their analysis and appropriate conclusions (B. Brzeziński et al., 2006). Among the functions of public finance management Andrzej Borodo also included the fiscal function, understood as providing the state or local governments with funds for the implementation of their tasks (Borodo, 2007).

The functioning of public finance system is closely related to the public administration system. The bodies and institutions of public administration are not only responsible for the allocation, distribution and stabilization of the state's economy, but also determine the directions of public policy. The leading policymakers of public administration are politicians who, as a result of elections, have been entrusted by society with the task of managing certain affairs. Can we then formulate a claim that public finance also plays a political role?

2 Public finance and the role of the government

The literature on the functioning of public finance is relatively short on the causes of certain solutions impacting the economy. The discussions rather concern the ways the governments should intervene in the economy as well as what they should tax, what expenditures they should make or what objectives they should promote (Afonso et al., 2020). It is also commonly accepted that the aim of the government's actions is the increased welfare of the entire society, economic growth and provision of security, in the broad sense of the word. The role of policymakers in this process is not easy. An increase in expenditures for the implementation of public tasks should be accompanied by an increase in the mandatory public financial levies. Insofar as the social expectations concerning the new, free public services keep growing and are generally accepted (Wagner, 1889), the implementation of the second element in the form of increased taxation is met with resistance on the part of those obliged to pay. The relationship between the state's level of taxation and the level of its expenditures demonstrates the economic model it adopted. At the beginning of the 20th century, when liberal

theories on the role of the state in economy were dominant, the tax income of European countries in relationship to their GDP was 8-12%. This amount was sufficient to carry out the basic functions, such as maintaining order and enforcement of property rights. However, after the widespread adoption of an economic model in the form of state interventionism, the taxation of the share in national income has significantly increased. In the case of the new industrialized countries, this share increased on average from ca. 12 percent in 1913 to even 50 percent in 2020 (Piketty, 2014). Factors which contributed to this growth were both political and ideological. The expectations of individuals toward the state have changed, resulting in the expansion of the public activity of the state into many areas which were previously the domain of the private sector. The redistribution of goods caused part of society to grow accustomed to the protective role of the state, not only in the realm of external security, but also the social one, in the field of public infrastructure, education, culture, etc. Social expectations toward the state are constantly growing. They are expressed in the desire to reduce the burden in the form of labor and the obligatory public levies. The issue of the maximum amount of working hours per week is one of the most important points on the trade unions' agendas. Another issue related to the amount of "mandatory work" is the question of retirement age. As the life expectancy of the citizens increases, the expenditures incurred by the pension funding institutions grow; in the face of financial crises they are seeking to raise the retirement age, which in turn meets with the general lack of social acceptance, similarly to lack of consent to the introduction of new taxes or other public levies. Social expectations can be defined by a simple rule of thumb – "we ask for as much as possible, we will give up as little as possible". The role of the government is the adequate balancing of the state's revenue and spending capacity. Most states do not perform this role particularly well, which can be demonstrated by the current level of debt of the particular countries. At the end of the second quarter of 2023 the relationship of public debt to GDP was 166.5% in Greece, 142.4% in Italy, 111.9% in France, 111.2% in Spain. The average value for all European Union countries was up to 83.1% (Eurostat, Euroindicators 2023). The democratic system of authority based on the cyclical opportunity to change the authorities as a result of the general elections of the legislative authorities, is not conducive to the policy of sustainable financial public economy. Those in power, wishing to continue to govern the country, are seeking political support, meeting the social expectations. The opposition, in turn, wanting to rule in the future, promises to meet the social expectations which the government is not ensuring. The voters to a significant extent consider whether political promises impacting public finance meet their social expectations and impact their private finances. In an opinion poll conducted after 2023 parliamentary elections in Poland, 52% of the respondents claimed that the economic program of the particular election committees impacted their political decisions, while 61% indicated that it was about their values and principles which the particular political parties represented (CBOS, 2023). At the same time only 32% of the respondents selected the answer concerning politicians' integrity as the basic factor influencing their decision. In view of this attitude of the voters, it is obvious that political parties will base their election programs to a great extent on promises related to the management of the state's financial affairs.

3 Materials and Methods

In order to examine the role of public finance in the process of governing and aspiring to gain power, the scope of proposals of political parties participating in the parliamentary elections in Poland, which took place on the 15th of October 2023, was analyzed. The analysis included the official election programs announced at program conventions of political parties which, as a result of the elections, introduced their deputies to the Polish parliament. Singled out from the programs were all the promises which impact the redistribution of public goods and services and need to be financed from public funds, as well as those which impact the state's tax revenue. The order of analysis of the

particular electoral committees is consistent with the order of results they achieved in the voting.

4 Election programs of political parties

The greatest number of votes in the elections to the Parliament of the Republic of Poland in the elections which took place on the 15th of October 2023 was won by the KW Prawo i Sprawiedliwość (Law and Justice Electoral Committee), which received 35.38% of the votes (National Electoral Commission, 2023). The Law and Justice party ruled Poland until 2023, having won the elections in 2015 and 2019. In its election program called "The safe future of the Polish people" (Law and Justice program, 2023) the party referred to its previous activity, which emphasized mainly the achievements in the scope of public finance reform, pointing out e.g. the sealing of the taxation system and the lowering of taxes. Other achievements included the "great social policy", "great local policy", "great developmental policy", "great security policy", "great anti-crisis policy", "great cultural policy and educational reform" and the "great agricultural policy". Of this list, the fiscal area is directly affected by the realm of the "great public finance reform", while the distribution area in varying degrees concerns the remaining "great policies". The program presents developmental perspectives for Poland until 2031, divided by the following issues: system; security; justice and civil rights; institutional reform of the European Union; financial security of Polish families and decent work; housing; healthcare, prevention and physical activity; education and intellectual resources of the young generation; culture; digitalization; infrastructural development; water; agriculture, energy and mining. From the aforementioned areas, the tasks significantly impacting public finance are the ones belonging to the category of "security", "financial security of Polish families and decent work", infrastructural development, as well as energy and mining. These areas entailed actions significantly burdening the state budget. For example, it was noted that from the 1st of January 2024 the previous "500+" benefit (childcare benefit in the amount of PLN 500 per month was paid for each child until the age of 18, regardless of the family's income. It was introduced by the Law and Justice government in 2016), will become an "800+" benefit (the increase in the benefit means additional cost for the state budget in the amount of PLN 24 billion, i.e. ca. EUR 5.6 billion). The security area mentioned the need for Poland to build "the strongest" land army in Europe. A number of big infrastructural investments was planned, too. The document was accompanied by an annex named "Strong economy, stable budget, safe Poland. Economic achievements of 2015-2023", including a number of statistical data concerning the state economy and its finance.

The second best result belonged to the Coalition Electoral Committee Koalicja Obywatelska PO .N IPL Zieloni (Civic Coalition PO .N IPL the Green Party), which gained 30.7 % of votes. The committee announced its election proposals in a document named "100 hard facts for the first 100 days of ruling!". The program includes 100 action objectives in the following areas: family, the youth, the elderly, women, entrepreneurs, healthcare, education, social policy, taxes, flats, energy, European Union, environment, secular state, agriculture, holding the PiS government accountable for its actions, lawfulness, security, national defense, non-governmental organizations, culture. From among the 100 election proposals, the implementation of 45 of them would involve an increase in budgetary spending. Particularly noteworthy are such proposals as: 0% loan for the purchase of the first flat; 30% pay raises for teachers; raising the tax-free amount in PIT from PLN 30 000 to 60 000; subsidies of PLN 600 for rental housing for the young; PLN 1500 monthly allowance for young mothers returning to the labor market, raising the amounts of the Alimony Benefit Fund; raising the amount of funeral allowance; one month free of social security contributions for entrepreneurs, vacation benefit for entrepreneurs in the amount of half the minimum wage. The Civic Coalition program also included references to fiscal policy in the form of announcements to reduce some of the tax benefits, e.g. lowering the VAT rate to 8% for "beauty" services, partial

abolition of capital gains for savings and investments; introducing 0% VAT rate for public transportation services (Civic Coalition program, 2023).

The third highest result in the parliamentary elections belonged to the Coalition Electoral Committee Trzecia Droga Polska 2050 Szymona Hołowni - Polskie Stronnictwo Ludowe (Third Way, Szymon Hołownia's Poland 2050, Polish Peasant Party) with the support of 14.4% of the voters. The committee promised to implement 12 "guarantees". These were: a simple and stable tax system, voluntary social security contributions for micro-companies at a risk of insolvency, 6% of GDP for education, improved access to healthcare, replacing the 500+ benefit with family-friendly tax reliefs; strengthening women's rights; supporting agriculture, investing in green energy, introducing personal assistants for the disabled; improving access to housing, including students' dormitories for 1 zloty, pay rises in the budgetary sector, development of the Polish defense industry. Out of 12 proposals mentioned above, 9 involves an increase in public spending. These include, e.g.: pay rises for employees in the budgetary sector; introduction of the "dormitory for 1 zloty" program; increasing the spending on education to 6% of GDP, increasing the spending on healthcare to 7% of GDP, changes in the healthcare contribution for entrepreneurs. The program also includes the idea of reorganization of the Polish tax system by centralizing the existing premiums and taxes on labor into one tax. It also includes a proposal to change the mechanism of public expenditure in the area of family benefits, from the previous formula of monthly benefit in the amount of PLN 500 per each child in the family, to the introduction of family-friendly tax reliefs in the PIT tax (Third Way Coalition and the PSL program, 2023).

The Nowa Lewica (New Left Party) Electoral Committee was supported by 8.61% of the voters. The party's election program included the following 17 areas: good work; science, research, innovations; liberal and friendly school; green deal; profitable agriculture; fair economy, stable finance; transportation; equality and respect; secular state; strong Poland insStrong EU; diplomacy and cooperation; secure Poland; healthcare for everyone; safe senior citizens; social policy, support for the disabled; law and justice; housing as a right, not a product. On the whole, the aforementioned areas included 155 initiatives. 70 of them concern the redistribution policy. The ones which could have the biggest impact on the public finance realm include: the proposal of the lowest pay in the budgetary sector being not less than 130% of the minimum pay in the economy; increasing the spending on research and development to the level of 3% of the GDP; a common scholarship program for all students in the amount of PLN 1000 a month; free lunches for schoolchildren; additional 1 bn. PLN a year for farmers' insurance; local transportation for PLN 59 a month; guaranteeing healthcare spending at the level of 8% of the GDP; reimbursement of all prescription drugs so that they cost no more than 5 zlotys; a voucher worth PLN 500, provided every two years to each senior citizen for holidays; building 300 000 flats for low cost rental. With regard to the increase of tax revenue the electoral committee of the New Left offered to "collect money from the market – but from those who have it, not from pensioners and employees", suggesting the introduction of a tax on excessive profit of fuel and energy companies; introducing a progressive PIT scale, taxation of digital corporations. Nevertheless, the program also indicated the need to lower the VAT rate (New Left program, 2023).

The last of the committees which introduced its deputies to the Polish parliament after the 2023 elections was the Konfederacja Wolność i Niepodległość Electoral Committee (Confederation, Freedom and Independence) which gained 7.16% of the voters' support (currently in Poland, a threshold of 5% of the vote for parties and voters' electoral committees and 8% for party coalitions applies nationwide in parliamentary elections). The program of this committee for 2023 parliamentary elections was expressed in eight areas. They constitute separate chapters of the "Constitution of freedom" – a program presented in June 2023. These are: taxes, EU policy, education, immigration, energy,

food, housing and healthcare. Each of the pillars includes detailed assumptions. Contrary to previously analyzed election programs, the Confederation's program mainly emphasizes the state's fiscal policy, so as to mitigate it significantly. It announced a liquidation of a number of taxes – including the tax on civil law transactions on real estate contracts; local fees as well as taxes and charges included in the energy price. It mentioned also an increase in the amount free of tax in the PIT tax up to 12 times the minimum wage, introduction of flat rate tax in PIT with the tax rate in the amount of 12%, liquidation of capital income tax; reduction of VAT and excise tax rates for fuel purchases, liquidation of VAT and CIT tax for mines and liquidation of emissions fee. Confederation also proposed changes to the social security system, consisting in entrepreneurs having the right, not a duty, to use this system. As far as the redistribution function of the state is concerned, the Confederation program mentioned the need to increase expenditures on state defense. In other public which are the domain of the state, Confederation provides for an introduction of a model based on competitiveness, e.g. in healthcare and education (Confederation, Freedom and Independence program).

An online portal devoted to finance, money.pl, included information on the estimated sum of the burden on the public finance system of the promises made by electoral committees at the time of the election campaign (money.pl. 2023). According to this information, the promises of the Law and Justice Electoral Committee were estimated at PLN 157 bn., Civic Coalition Electoral Committee at PLN 120.3 bn., Third Way, Polish Peasant Party Electoral Committee at PLN 126 bn., and Confederation, Freedom and Independence Electoral Committee at PLN 182.1 bn.

5 Conclusion

The issue of functioning of the state in the field of public finance management was one of the main topics on the Polish political scene before the 2023 parliamentary elections. It focused mainly on various promises for the funding of new benefits, increasing the financing of the current public tasks or decreasing the applicable fiscal burdens. The promises made were of a general nature, with no detailed information on how the objective was to be achieved. The information concerning the increase in public spending did not include the content concerning the sources of funding (or the content was vague). On the other hand, the information concerning the decrease in fiscal burdens did not indicate how to fund the current public task in the view of loss of their source of funding. Public finance became an object of a political game, an area of election promises, in a vast majority of cases leading to the improvement of circumstances for the individual. There were no slogans about the need to limit budgetary deficit, seek budgetary balance, increase the retirement age or limit social benefits, which is what should be discussed from the perspective of responsible financial management. The discussion was dominated by the policy of subjecting the public finance sector to the particular objectives of the particular political parties. The classic functions of the public finance – allocative, redistributive and stabilizing functions, were reduced to a role subservient to the interest of a political party.

Can we therefore speak of a political function of public finance? According to the authors, such a claim is justified. Election promises impacting public finance are transformed (although not always) into legal solutions applied by the government and are aimed at securing the voters' support.

This does not only concern Poland, but can be seen in all democratic countries. The political function of public finance to a great extent impacts the present condition of the state's public economy. Guided by the need to please the voters, the decisions made have a significant impact on the scale and level of redistributive and allocative actions. The principles of rationality of public economy, in particular just before the elections, lose to populist political decisions. The result of the race to win the voters' favor is a permanent increase in the public debt, i.e. transferring the effects of the decisions to the next generations.

In this respect the political function of public finance has a negative meaning, criticized by finance professionals, but expected by the majority of voters.

The political function is expressed by impacting the condition of public finance in the direction deemed as desired by the public authorities or candidates for these roles, in order to secure social support. According to the authors the political function of public finance ought to be implemented within the principles of financial law which constitute the mechanisms of the state's economic security, such as the limit of public debt to GDP or the amount of budgetary deficit. Moving beyond these principles can be a threat to the state's economic security.

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ENHANCING PROFESSIONAL SOCIAL WORK EDUCATION: ADOPTING THE CAPABILITY PHILOSOPHY IN ENGLAND'S EDUCATIONAL SYSTEM

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Abstract: This study evaluates the integration of the Professional Capability Framework (PCF) in England's social work education and its potential applicability in the Czech Republic. As England has advanced its social work training through holistic approaches and continuous professional development [1], this paper explores the feasibility of adapting such reforms to enhance the Czech educational system. By conducting a comparative analysis, the research identifies gaps in the Czech framework and suggests tailored adaptations from the English model. This streamlined examination not only furthers the international discourse on social work education but also proposes actionable strategies for cross-cultural educational enhancements.

Keywords: Social Work Education, Professional Capability Framework, Educational Reform, Holistic Approach, Continuing Professional Development, Cross-Cultural Analysis, Policy Adaptation.

1 Introduction

Social work education in the UK originated from a rich tradition of community-based initiatives and extensive case support delivered by charitable organizations. Initially, university programs were established to equip workers - formerly known as settlement workers or charity workers - with essential skills in administration and psychological theories. Notably, collaborations with institutions like the University of Birmingham and the London School of Economics facilitated these educational efforts, offering a range of qualifications in areas such as youth and community social work, as well as roles within organizational settings like hospitals and government offices [2].

Historically, the term "social work" in England encompassed a broad spectrum of job roles and positions, many of which today might not be recognized under the same term. The lack of a standardized qualification path in social work meant that, until the late 20th century, aspiring social workers could achieve certification through various educational levels—from secondary schools and colleges to master's degrees at universities [3].

Despite numerous efforts to standardize social work education in England throughout its history, a persistent diversity in educational models continues to characterize the British approach to this day. The distinctiveness of the British model was highlighted in 1989 when the European Union (EU) advocated for the mutual recognition of social work education programs that involved at least three years of professionally oriented undergraduate study. However, England's social work qualifications, which did not conform to this EU standard, were not recognized in other EU member states [4].

2 Evolution of Social Work Education in England: Policy Reforms and Regulatory Developments

Significant shifts in education policy occurred with the enactment of the Care Standards Act 2000, which set prerequisites for social workers' qualifications and led to the creation of the General Social Care Council (GSC). This body ensured the protection of the title 'social worker' for registered individuals. By 2003, the GSC began registering qualified social workers, marking 'social worker' as a protected title in England. The first social work programs under these new regulations launched in September 2003, emphasizing competence-based standards. The media spotlight on the tragic deaths of children under child welfare supervision, notably Peter Connelly in 2007, spurred reviews of professional training and educational frameworks [6][7][23].

In response to these concerns, the Social Work Task Force was established in 2009, which led to a scaling back of the General Council's functions by 2010. Regulatory responsibilities were

transferred to the Health and Care Professions Council in 2012, which maintained oversight of social work education until 2019, when Social Work England, a government-led body, took over.

The Task Force's investigations culminated in 15 recommendations in 2009, profoundly influencing educational practices. These changes ranged from curriculum overhauls to the implementation of a supervised year for new social workers, and the creation of the Academy of Social Work. The Academy, designed to foster broad professional development, does not serve an educational or regulatory role; instead, it aims to articulate and share the profession's distinct disciplinary perspective. Notably, these reforms introduced a shift towards an education philosophy grounded in a professional competency framework [8].

3 Implementing the Professional Competency Framework: A Holistic Approach to Social Work Education

The working group's recommendation led to the establishment of the Professional Competency Framework in England in 2012. This framework, progressively implemented across the social work sector, from initial training to advanced programs for strategic staff, aims to link and unify skills training and foster coherent professional growth and learning [1].

A key feature of the framework is its coverage of both initial qualification training and ongoing professional development, providing a comprehensive set of generic professional competencies that establish consistent expectations for social workers throughout their careers. While the framework does not specify the practical knowledge and skills needed for each job, it serves as a foundational guide for designing and delivering educational activities across a social worker's career path [9].

The framework facilitates the integration of educational initiatives, continuing professional education, and practice through five distinct routes. It introduces a capabilities model, outlines nine professional domains, integrates assessment and learning strategies, works across four levels of qualification, and adopts a developmental approach to both initial and ongoing social work education [10].

Additionally, the framework's general assumptions make it applicable across all specializations and roles within social work. It supports adherence to professional regulatory requirements and describes a range of roles for social workers, enhancing lifelong career development. The framework's alignment with the Global Definition of Social Work and the Association of Social Workers' Code of Ethics underscores its relevance and adaptability. As a 'living' document, it continues to evolve with the profession, aiming to improve practice and support ongoing professional development [11].

Developed in response to critiques of the rigid, bureaucratic nature of competency-based standards, the framework adopts the capability approach. This approach defines capabilities as the integrated application of knowledge, skills, personal qualities, behaviors, understandings, and values across both familiar and complex, changing circumstances. By replacing the competency model with a holistic, integrative, and developmental model, the framework aims to better prepare social workers for diverse challenges, emphasizing ethics and continuous professional growth. The ongoing debate around the distinction between skills and competences highlights a broader agreement that a focus on capabilities can better reflect a social worker's potential for future learning and professional development [12] [13].

In essence, the competences outlined in the framework not only legitimize social work activities but also empower social workers to assume greater responsibility as they gain experience and enhance their professional expertise, enabling them to

effectively navigate and impact complex, uncertain contexts [14] [1].

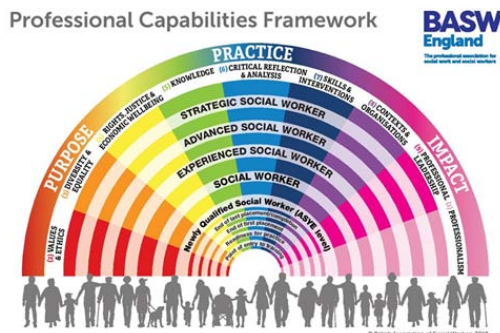
3.1 The Evolution and Structure of the Professional Competency Framework in Social Work Education

The Professional Competency Framework, visually represented by concentric circles divided by bisections as depicted in Figure 1, outlines the progression of competencies in social work education. Introduced in 2012 and updated periodically, the framework's layers signify the developmental stages of competencies, while the segments highlight specific competencies. This chapter examines the state of the framework as updated until 2018, detailing its role in guiding social workers through three key phases: initial qualification training, an assessed and assisted first year of employment, and ongoing professional development throughout their careers.

The diagram's colored sections illustrate the nine domains of the framework, which correspond to various levels of experience and are designed to equip social workers with the competencies required to handle increasing levels of difficulty and complexity in their roles. The framework facilitates transitions between experience levels based on the social worker's capability to manage issues varying in complexity, risk, and responsibility across different professional contexts. As of 2018, the framework also incorporates three 'superdomains'—Purpose, Practice, and Impact—that categorize the nine domains into broader areas of focus [1].

A key advantage of this framework is its emphasis on professional development rather than specific job roles, providing a flexible structure that helps both social workers and managers understand expected competencies at various levels. This flexibility supports social workers in leveraging their unique strengths and ambitions, promoting continual professional growth and the attainment of advanced skills applicable in leadership and educational roles [15].

Figure 1 Framework of professional capabilities



3.2 Structuring Competencies in Social Work: The Integration of Superdomains within the Professional Competency Framework

The Professional Competency Framework organizes social work competencies into three interrelated superdomains—Purpose, Practice, and Impact—each encapsulating core aspects of social work's mission, execution, and outcomes. The Purpose superdomain centers on the profession's fundamental purpose, values, ethical principles, and philosophies. Practice amalgamates specific domains detailing essential skills, knowledge, intervention methods, and critical thinking capabilities necessary for effective social work. The Impact superdomain focuses on competencies related to leadership, professionalism, and the ability to drive change within organizational settings.

These superdomains do not merely segment the framework into discrete categories; instead, they permeate all areas, demonstrating the interconnected nature of competencies in social work. For instance, Impact is not only about leadership but also encompasses interventions and skills, linking directly to

the Practice superdomain. Similarly, the professionalism inherent in the Purpose superdomain is foundational to all aspects of social work practice.

The framework's nine core domains further elaborate on these competencies: 1) Professionalism, 2) Values and Ethics, 3) Diversity and Equality, 4) Rights, Equity, and Economic Security, 5) Knowledge, 6) Critical Reflection and Analysis, 7) Intervention and Skills, 8) Context and Organization, and 9) Professional Leadership. Each domain is intricately connected to the superdomains, illustrating the framework's comprehensive approach to defining and advancing the competencies required for proficient practice in the field of social work [1].

3.3 The Developmental Trajectory in Social Work: Levels of Experience within the Professional Competency Framework

The Professional Competency Framework delineates a comprehensive developmental trajectory for social workers, covering both pre-qualification and post-qualification phases to guide professional growth through structured experience levels. The pre-qualification phase is structured into four levels: 1) commencement of training, 2) readiness for entry into practice, 3) completion of first practice, and 4) completion of final practice. Subsequently, the post-qualification phase progresses through five stages: 1) assessed and assisted first year in employment, 2) qualified social worker, 3) experienced social worker, 4) advanced social worker, and 5) strategic social worker [16].

This framework serves as an alternative to the national social work job standards in England, providing a unique perspective by articulating competency levels specific to various job roles within the social work field. For instance, a social worker might possess the competencies required for an advanced practitioner yet may be performing in a role typically expected of an experienced social worker. This differentiation has practical implications, influencing job descriptions and appraisal schemes as employers increasingly integrate the Framework into formal assessments and role expectations [15].

4 Enhancing Early Career Development in Social Work: The Assessed and Assisted Year in Employment

In response to the 2009 Task Force recommendation, the introduction of an 'assessed and assisted year in employment' represents a significant stride in supporting the transition of recent social work graduates into the professional field. This initiative, referred to here as the assisted year, is mandated for all newly qualified social workers through their initial employers. It encompasses a structured blend of support and rigorous assessment aligned with national professional standards. This critical phase allows newly qualified social workers to solidify their academic training within real-world practice settings, thereby fostering the development of practical skills and professional confidence at the onset of their careers. Additionally, to facilitate the implementation of this program, the government offers financial subsidies to employers, ensuring that the assisted year is both effective and widely adopted [8].

Furthermore, the landscape of social work education in England has been dynamically enriched by the introduction of various alternative qualification models in recent years. This expansion is largely fueled by the increasing demand for skilled social workers. These alternative pathways not only diversify the educational options available but also aim to address the specific needs and challenges of the rapidly evolving social work profession, providing more tailored and accessible routes into the field.

5 Diversifying Pathways to Professional Qualification in Social Work

The traditional university-based training system in social work education in England, grounded in the Framework and Standards for the Professional Qualification of Social Workers, has been

complemented by innovative training models to meet the evolving needs of the sector.

5.1 Apprenticeship Models

Supported by Skills for Care, a group of employers has championed an apprenticeship model certified by the Institute for Apprenticeships. This model not only adheres to specific standards that regulate the training process but also integrates direct social work practice with academic learning, culminating in an examination before an external board. Particularly suited for individuals already employed in social services, this apprenticeship pathway allows participants to earn a Bachelor's degree and qualify for social work practice, thereby providing a practical, work-based route to professional qualification [17].

Additionally, current government initiatives have introduced fast-track programs such as Frontline, Step Up to Social Work, and Think Ahead. These programs are designed for university graduates from non-social work disciplines, offering an accelerated route to obtain social work qualifications. These fast-track options respond to the urgent demand for social workers by shortening the time frame required to transition into the field, thereby rapidly augmenting the workforce with qualified professionals. This approach not only facilitates a swift entry into the profession but also leverages the diverse backgrounds and experiences of participants, enriching the practice of social work [18].

5.2 The Intensive Training Model for Child Protection Social Workers (Frontline)

Introduced in 2014, this specialized training model for social workers in child protection illustrates an innovative approach to professional education. The program begins with an intensive five-week summer school hosted by a university, where participants gain essential skills and knowledge pertinent to the field of child welfare. Following this preparatory phase, trainees are grouped in teams of four and assigned to social protection departments. Here, they engage directly with children and families, working under the guidance of seasoned social workers [23]. This hands-on training ensures that upon successful completion of their first year, participants achieve a Bachelor of Social Work degree and gain registration as professional social workers.

The subsequent phase of the program sees these graduates continue their professional journey within social work departments, where they pursue a Master's degree in social work. This model not only accelerates the training process but also addresses the urgent need for qualified child protection social workers. Each year, the program attracts an increasing number of candidates, reflecting its effectiveness and the growing demand for specialized training in this critical area of social work [17].

On the other hand, it is obvious that students will not be able to acquire skills and knowledge for all the specific and different groups of children they may encounter in the exercise of social and legal protection in a short time [24].

5.3 "Step Up to Social Work": An Accelerated Interdisciplinary Training Program for Social Work in England

Since its inception in 2010, the "Step Up to Social Work" program has represented a pivotal shift in social work education, offering a 14-month accelerated pathway to a bachelor's degree in social work. This program contrasts with other fast-track initiatives like Frontline by providing a bachelor's qualification rather than a master's, catering specifically to graduates from non-social work disciplines who possess prior experience with children, young people, and families. The curriculum integrates theoretical education provided at universities with intensive, practical field experience.

Designed in close collaboration with employers, Step Up facilitates a unique educational environment where practicing

social workers and academics jointly contribute to the training process. This collaborative approach is credited by the program's designers for significantly hastening the educational trajectory compared to traditional university-based models. The program's reach and impact have markedly increased over the years; it started with 42 local authorities participating in its first year and expanded to include 136 by 2020, covering 89% of all local authorities in England. This expansion underscores the program's effectiveness and the strong demand for innovative, interdisciplinary training models in the field of social work [17].

5.4 "Think Ahead": A Specialized Training Program for Mental Health Social Workers

"Think Ahead" is a tailored two-year training program initiated as a modified version of the Frontline model, specifically designed for graduates from non-social work disciplines who aspire to specialize in mental health social work. The program commences with a six-week summer school that equips students with the foundational knowledge and skills necessary to enter the mental health workforce. This preparatory phase is followed by a year of intensive, hands-on training within community-based services catering to individuals with mental health issues.

During this first year, students work in small groups under the guidance of an experienced social worker, handling progressively challenging caseloads—from an average of 21 cases in the first half of the year to 35 in the latter half. The supervising social worker retains ultimate responsibility for these cases, ensuring professional oversight and learning continuity for the students. Upon completing the first year, participants earn a Bachelor's degree in social work and gain eligibility for registration as professional social workers.

The second year of the program offers the participants an opportunity to secure paid positions while they continue their education towards a Master's degree in social work. This structured approach not only provides the necessary academic credentials but also embeds practical, real-world experience, making it a comprehensive training model for future mental health social workers.

Currently, it is not well explored how these fast-track methods of educating social workers will impact their professional identity [25]. It is, however, very likely that this accelerated method of education will affect the ability to form complex professional judgment and assess the nature of a social problem in its entirety.

6 Continuing Professional Development in Social Work: Autonomy and Accountability in England

Continuing Professional Development (CPD) is mandated in England as a core requirement for maintaining registration with the regulatory body, ensuring that practicing social workers meet ongoing professional standards. This system is distinctively designed to emphasize broader professional development rather than mere educational attainment. The onus of determining the content of CPD activities lies with individual social workers, based on a presumption that they are best positioned to identify their own developmental needs. This approach is widely regarded as beneficial, reinforcing professional autonomy and encouraging personal responsibility for career-long learning [19].

During the annual registration cycle, social workers engage in various developmental activities, the details of which are recorded in an online account. At the cycle's end, each social worker must affirm their completion of the required CPD activities through this account. To ensure compliance and quality, approximately 2.5% of registered social workers are randomly selected by the regulator each year to undergo a detailed review of their documented CPD activities.

CPD in social work extends beyond formal training and coursework. It encompasses a variety of activities that social workers believe will enhance their professional capabilities and enrich their practice. These activities might include engaging

with feedback from peers, supervisors, and service users, reflecting on client complaints, or consuming professional literature and multimedia resources like podcasts and articles. The integration of self-reflection and feedback is a critical component, underscoring the comprehensive nature of CPD as a tool for continuous improvement and adaptation in social work practice [20].

7 Comparative Analysis of Social Work Education: England and the Czech Republic

Social work, inherently a socially constructed profession, exhibits significant variations in its structure and educational approaches across different nations due to cultural, societal, and policy influences [21]. In England, the field of social work not only garners substantial public attention and support but is also prominently influenced by public discourse often sparked by high-profile tragic events. This heightened visibility has contributed to a well-established and comprehensive institutional framework for social work that includes entities such as Social Work England and the Academy. Such structures, which are deeply embedded in the professional landscape of England, starkly contrast with the situation in the Czech Republic, where the institutional base for social work is considerably less developed and lacks analogous professional bodies.

The diversity of educational pathways in England is another distinguishing feature when compared with the Czech system. In England, this diversity includes an array of training models, from traditional university degrees to more recent accelerated courses designed to quickly address shortfalls in qualified social work professionals. These "crash courses" are a response to the urgent demand in the labor market and represent a pragmatic, albeit controversial, approach to workforce development. While effective in swiftly augmenting the number of practicing social workers, this strategy may not necessarily serve as a sustainable or replicable model for other contexts, such as in the Czech Republic.

Furthermore, a significant evolution in the English social work educational paradigm is the emphasis on a professional capabilities model. This model advocates for lifelong professional development, emphasizing continuous learning, professional autonomy, and the adaptive capacity of social workers. This approach seeks to equip social workers with the resilience and competence necessary to navigate the complexities of modern societal needs and challenges.

These divergences in social work education frameworks between England and the Czech Republic highlight the influence of societal values, government support, and professional regulation in shaping the training and practice of social workers. Understanding these differences is crucial for fostering dialogue on best practices and potential reforms in social work education globally, particularly in how professional capacities are developed and sustained throughout a social worker's career [11].

8 Strategic Recommendations for Enhancing Social Work Education in the Czech Republic

- A. Establishment of a Professional Regulatory Body: Drawing from the English model, the Czech Republic could benefit from establishing an independent regulatory body for social work. This body would set standards, oversee professional qualifications, and ensure the quality and ethics of practice across the country.
- B. Development of Diversified Educational Pathways: To address diverse learning needs and career aspirations, the Czech Republic should consider implementing a variety of educational pathways similar to those in England. This could include traditional university programs, vocational training, and accelerated courses for career changers, thus broadening access to the profession.
- C. Introduction of a Capabilities Framework: Adopting a professional capabilities framework could significantly enhance the quality of social work education and practice

in the Czech Republic. This framework should focus on continuous professional development, adaptability, and a holistic approach to social work that integrates theory with practice.

- D. Government Support and Public Awareness Campaigns: Increased government support for social work programs, coupled with public awareness campaigns, could elevate the profile of social work in the Czech Republic. Highlighting the critical role of social workers in society and ensuring adequate funding for education and professional development would help attract more individuals to the field.
- E. Collaboration with International Experts: To foster best practices and continuous learning, partnerships with international universities and professional bodies could be established. This would allow for the exchange of knowledge, educational resources, and innovations in social work education and practice.

Implementing these recommendations could help diversify and strengthen the social work education system in the Czech Republic, making it more responsive to the needs of society and aligned with international standards. While these recommendations aim to advance social work education and practice, they must be implemented with a keen awareness of professional boundaries, which are essential for protecting both clients and social workers. Professional boundaries help define the limits of relationships and interactions in social work, ensuring that they remain beneficial and non-exploitative [22].

9 Final discussion: Professional Identity and Boundaries Issue

The introduction of varied educational pathways and practice settings can create environments where boundary and identity issues might arise more frequently. For example, accelerated courses and on-the-job training programs, while beneficial for rapid qualification, might not provide sufficient depth in training about professional identity and boundaries. This could lead to challenges in practice where social workers may inadvertently overstep professional limits due to a lack of comprehensive training.

To mitigate these risks, it is critical that training programs, whether academic or vocational, incorporate robust modules on professional boundaries. These should cover scenarios that social workers are likely to encounter in different settings, from clinical to community-based environments. Educators and supervisors must emphasize the importance of boundaries in maintaining the integrity and effectiveness of social work practice.

Continuing professional development (CPD) programs should include refresher courses on professional boundaries to help experienced practitioners navigate complex and evolving social interactions. This is particularly vital in a field where social workers frequently deal with vulnerable populations and ethically challenging situations.

The strategic enhancement of social work education in the Czech Republic, coupled with a strong emphasis on professional identity and boundaries, will not only elevate the practice but also ensure it is conducted within a framework that protects and benefits all stakeholders. By fostering a robust educational system and clearly defined professional standards, the Czech Republic can better prepare its social workers to meet the challenges of a demanding and ever-changing social landscape.

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Primary Paper Section: A

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DECISION-MAKING OF DEVELOPERS IN THE IMPLEMENTATION OF RESIDENTIAL DEVELOPMENT PROJECTS IN THE CZECH REPUBLIC ENVIRONMENT

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Abstract: The research was conducted with the aim of analyzing the aspects that enter into the decision-making process of developers in the field of residential construction in the Czech Republic. To ensure the representativeness of a diverse range of companies active in the real estate market, a suitable group of respondents was carefully selected. The survey provided a sufficiently representative sample, based on which the key factors influencing the decision-making in the implementation of development projects were identified. The research found that developers primarily focus on seeking profitable opportunities, and their decision-making process is predominantly aimed at achieving financial gain. In this decision-making, they also consider other factors, such as mortgage interest rates, the quality of newly built homes with an emphasis on energy efficiency, and the use of modern technologies.

Keywords: Deciding on housing construction, housing construction, economic area.

1 Introduction

The issue of apartment construction has become a societal problem in recent years, making it essential for entities in the Czech Republic to examine this issue in all its aspects and evaluate both the positive and negative impacts of proposed solutions. The aim of this contribution is to identify the decision-making processes of individual developers in the implementation of their residential-focused construction projects in the Czech Republic. The survey was conducted using a questionnaire to identify factors that influence decision-making on development projects. The results of the questionnaire were evaluated to determine correlations that could contribute to a better understanding of the decision-making process of developers, who play a key role in the real estate market and thus affect the overall economy.

1.1 Literature review

In the Czech legal system, the term "real estate" is defined as follows: "Real estate is a specific kind of property. According to a settled definition, it refers to land or a building permanently attached to the ground with a solid foundation" (§ 119 of the Civil Code 40/1964 Coll.). The new Civil Code No. 89/2012 Coll. expands this definition by including in the concept of land the space above and below the surface, buildings on the land, and other facilities, excluding temporary structures, including what is planted in the land or attached to the wall. According to § 598 of the New Civil Code, real estate precisely refers to lands, underground constructions with an autonomous purpose, including the in rem rights to them and rights that the law declares as real estate.

Subsequently, it is necessary to focus on the concept of real estate price. The new Civil Code No. 89/2012 Coll. defines the price or value of an item as follows: "The value of an item, if expressible in money, is called price. The price of an item is determined as the usual price, unless agreed otherwise or established by law." The code also defines an extraordinary price: "An extraordinary price of an item is determined with regard to specific circumstances or to special popularity caused by random characteristics of the item." In the context of the real estate market, an extraordinary price can be described in such a way that the property has additional elements that standard real estate does not have, such as address, facilities, or location on the top floor of a building. In this case, the price is determined in a different way, specifically by the so-called added value of the property, which is our definition of an extraordinary price. Although the term real estate is clearly defined in Czech law, the real estate market does not have a clear definition. The market can be defined in several ways. Samuelson and Nordhaus in their

book *Economics* (2007) describe the market as "a place where buyers and sellers meet, and through their trade determine the price and quantity of a good." In the case of the real estate market, this good is property, either residential or commercial space, which differ in size, quality, design, price or rent, purpose of use, associated services, and other factors.

The buyer of real estate can be either a natural or a legal person involved in the acquisition of properties. The motivation for such a purchase can vary, but most commonly, we encounter two main approaches: buying real estate for personal use, such as for living or business purposes, and buying real estate as an investment.

Conversely, the sellers of real estate are those who offer properties for sale during a given period. The reasons for selling can again vary.

It is also important to define the term "development company" from the perspective of the supply side in the real estate market. This company represents the main organizer of construction, preparing, organizing, and managing the sale or lease of a given building. A development company does not use the building itself and usually does not provide it with financial resources. The term "developer" is used by Meluzín and Zeman (2009) in the sense of a construction organizer, while Achour (2005) emphasizes that a developer is an investor in the project, not the final user. Development companies may also provide financing for the purchase of real estate and participate in the leasing or management of properties after construction is completed. In conclusion, a development project, as the outcome of a development company's activities, is characterized by high initial costs invested in the purchase, reconstruction, or construction of the property. These costs are subsequently recovered in the case of a sale through the purchase price or in the case of a lease through rental income. Given the high initial costs, financing of development projects is addressed in the preparatory phase, most often through external sources.

For development companies to introduce new offerings in the real estate market, a number of legal requirements must be met. One of these requirements is obtaining a building permit for a specific project. The Act on Spatial Planning and Building Code No. 183/2006 Coll. defines a building permit as a document required by the builder for the construction of a house or significant modifications. This law sets the rules and conditions for granting a building permit. In the following text, we will work solely with the term "building permit," and it is clear that when a building permit is included in statistical data, it meets legal requirements.

In this context, a building permit is understood as a building permit with binding conditions for the execution and use of the building according to the Building Act (Act No. 183/2006 Coll. on Spatial Planning and the Building Code). The building authority ensures the protection of societal interests during the construction and use of the building, ensures the complexity of the construction, compliance with general technical requirements for construction, and minimizes the negative impact of the building and its use on the environment. Just as with construction contracts, the development of building permits can be used to estimate future trends in construction production (businessinfo.cz, 2020)

In implementing new residential construction, it is also important to focus on the project management of the given development company itself. There are many factors that influence project management, and each company's management approaches these factors differently. It is crucial to draw from past experiences and continuously improve all processes to avoid potential losses and failures within the project or the company as a whole, as poor decisions can be existentially crucial for the

company in some cases. As Figurska (2016) emphasizes in her study focused on the capital and real estate market, the effort to predict future market developments is key for every management and its decision-making. This prediction is based on analysis and is influenced by monitoring factors that can affect market development. It is important to declare and define the standards and factors with which analyses work, and with which potential management counts.

Contrary to the publication mentioned above, Kubík (2014) states that one of the main assumptions of strategic management is monitoring the competition and applying such measures to remain competitive. His article practically uses Porter's analysis, which will be applied to multiple enterprises. His conclusions declare that it is very important for management to focus on competitive rivalry and the increasingly strong bargaining power of customers. If a company notices a declining trend in competitive rivalry, it should use this situation to its advantage and focus on differentiation and enhancing its competitiveness. His practical part focused on a company outside the real estate market, SCHOTT, which specializes in manual assembly of products made from industrial optical fibers. Generally speaking, his conclusions apply to management decisions in any enterprise, and therefore these factors need to be considered.

As Ginzburg (2018) mentions in his article focused directly on the construction industry: The construction industry has many driving forces, with investments being the foremost among them. The larger the investment, the more significant is the assessment of the construction itself and the construction process. An investor decides to invest based on the assessment of the construction plan, organizational skills and plan, and technological reliability. Rapid development of technologies and tools for managing construction plans obliges the investor and his team to create new approaches. The authors of the article suggest considering the above very carefully when identifying, analyzing, and subsequently managing the net risks of the project. Net risks are defined as risky events that, when they occur, have either a negative or, in the best-case scenario, a neutral impact on the given construction plan. Considering net construction risks at various stages of construction production allows for a much better consideration of the given project. Thus, the investor can quickly decide to invest in the project and assess possible additional construction costs because he is able to predict and prevent the occurrence of some of these risks for different construction phases.

An interesting article focused on marketing in the real estate market describes Arndt (2017). Together with co-authors, they focused on research into the extent to which a potential buyer can be influenced by a real estate agent. Their results declare that for buyers, it is not crucial whether the given agent is from the specific locality or not. Arndt in his publication states that their results showed gender and marital status as less significant factors. He recommends that real estate agents should mainly use targeted marketing since their customers look in the same segment and have similar views.

As stated by Petr Kouřil, the director of the development company Bouwfonds ČR bytová výstavba, s.r.o. (E15.cz, 2021), for selecting a suitable location, we use a model that has proven itself over many years of activity in the field of residential living both in the Czech Republic and in other countries where we operate. If I were to briefly summarize our approach, the final decision on the suitability of a given location is always preceded by an analysis of the local market from a marketing and sales perspective. We examine the location in terms of transport services, service offerings, the environment, and also the demand for the given type of housing. Furthermore, we compare our project with competing projects, customer requirements, and the price level of apartments offered in the given city. We also focus on future development possibilities of the area and potential opportunities for cooperation with local business partners. Of course, we also conduct an economic analysis. We calculate the expected return on investment time, project profitability, financing methods, etc. If the analysis results show good

potential, the project usually gains support from our parent company, and we begin to work on it. To the criteria that have always been important in deciding on a new project, such as location, transport services, service offerings, apartment layout, etc., new criteria are now being added. These include determining the suitable size of the project, as people nowadays prefer more intimate projects with a smaller number of apartments. Furthermore, it is necessary to carefully consider prices, as they must reflect the new market situation, and last but not least, it is essential to respond to the more demanding requirements from clients.

The topic of selecting a location for a development project is also addressed by the development company EURO DEVELOPEMENT, a.s. on their website (euro-development.cz, 2023): Larger development companies have their own departments (divisions) for purchasing and selecting properties, while smaller ones may turn to specialized financial advisors for advice. What is crucial when purchasing a suitable plot? Development companies primarily look at the appearance of the location and its surroundings, transport accessibility, and public amenities. And, of course, the corresponding price. It is always necessary to consider how many other projects are in the vicinity and what the interest is in the particular location. An economic balance sheet and a complete assessment are created for each potential plot. A developer usually has a clear idea of whether they plan to build expensive apartments or, conversely, attract with a low price. However, some seek advice from professional firms for selecting a location.

As Pozdílková and co-authors (2020) state in their article focused on monitoring apartment prices in various locations of the Czech Republic, there are locations that show higher stability in future development and time series monitoring, thereby exhibiting less price volatility. This article drew data from the largest Czech real estate advertising portal sReality.cz, monitoring data from July 2018 to December 2019. A very interesting comparison, for example, was between Prague 10 and Žďár nad Sázavou. In this case, the impact of tightening conditions for obtaining mortgage loans was compared. The article clearly confirms that one of the key factors for the construction of apartment buildings is the construction location, which can ensure a certain stability in the pricing strategy process for the sales of individual apartment units.

2 Methodology

The aim of the conducted research was to focus on the specific practices and behaviors of decision-makers when assessing the implementation of a development project. The main goal was to identify suitable indicators for evaluating the feasibility of the investment.

For the implementation of the research, respondents who are actively involved in new construction, especially residential properties in the domestic market, were approached. Their portfolios included apartment buildings with ten to fifty units, with a sales value ranging from 80 to 200 million Czech crowns. The selection of respondents was deliberately focused on smaller investors who do not have established processes and teams specializing in the evaluation of investment opportunities. These were predominantly investors with their own construction companies or those who manage their own property and use new residential construction to evaluate and enhance their investments.

To determine suitable respondents, the public database Orbis Europe, which provides detailed information about business entities in Europe, was used. The defined parameters included:

- The territory of the Czech Republic, classification CZ-NACE 4120 (construction of residential and non-residential buildings),
- Conditions for limited liability companies,
- With revenue ranging from 3,500,000 to 8,000,000 euros.

After applying these parameters, 339 business entities were identified. However, it's important to emphasize that upon verification of a randomly selected 34 companies from this group, it was discovered that up to 70% of the companies, according to their own statements, engage in activities different from development construction. This finding led to an adjustment of the sample, and the resulting selection corresponds to 30% of the originally defined set.

To calculate the number of samples in the sample set, the formula (Singh 2014) was used:

$$\text{Sample size} = \frac{\frac{z^2 \cdot p_v(1-p)}{e^2}}{1 + \left(\frac{z^2 \cdot p_v(1-p)}{e^2 N} \right)}$$

where:

- N is the number of companies in the total set,
- z is the Z-score for the corresponding level of significance,
- p is the standard deviation (50%),
- e is the margin of error (5%).

The calculation then is:

$$\text{Sample size} = \frac{1,96^2 \cdot 0,5(1-0,5)}{1 + \left(\frac{1,96^2 \cdot 0,5(1-0,5)}{0,05^2 \cdot 102} \right)} = 80,71 \approx 81 \text{ companies}$$

Assuming a 10% margin of error, the number of companies would be reduced to 40. The questionnaire was primarily completed by respondents in person or distributed to other employees in the company who are responsible for making decisions about undertaking or not undertaking potential investment projects. A total of 36 specific individuals who are well-informed and knowledgeable about the domestic market were approached.

Before creating the questionnaire, primary research in the form of structured interviews with developers was conducted. The aim of this research was to identify key variables and factors that are crucial for developers in the implementation of development projects. The first part of the research focused on questions such as:

- What issues does a developer address?
- What are the key variables considered? Are they, for example, price development, interest rates for clients, reputation among clients, or trends in housing?
- What approaches and strategies do developers have when implementing projects?
- What is the main goal for developers? Is it profit, prestige, differentiation from competitors, or the satisfaction of future clients?
- What tools and strategies does a developer use to influence the success of a project?
- And other questions that emerged from ongoing conversations.

After completing the first part of the primary research – structured interviews, secondary research was conducted, summarizing the current state of knowledge on the issue and scientifically confirming or refuting information obtained from the interviews. Thanks to the information gathered, a questionnaire was created that should help answer primarily the research questions listed below.

1. To what extent does competition in a given location influence your decision-making when choosing a location?
2. To what extent does the potential difficulty of obtaining a building permit in a given location influence your decision-making when choosing a location?
3. How important is the use of modern technologies in the project without impacting the financial side of the project?

4. How much do you prefer using external financial resources in the form of a loan over involving another investor when purchasing land for construction?
5. To what extent do you prefer financing the construction of the project with your own financial resources and eliminating loans?
6. To what extent is the implementation of modern technologies within the project important to you, regardless of its financial impact?
7. To what extent is the energy efficiency of the project important to you in the context of expected profit or interest?
8. How does the average wage of residents in the Czech Republic or in a specific location influence your decision-making on the price of apartment units?
9. How much does the level of mortgage interest rates influence your decision-making on the price of apartment units?
10. To what extent do you prioritize the satisfaction of neighboring entities (neighbors, neighboring homeowners' associations) at the expense of your profit or interest?

3 Research results

The individual research questions will be evaluated solely through verbal comments. The order of the questions in the evaluation will be preserved as they were defined in the previous part of the questionnaire. The construction of the questionnaire reflects the importance of individual aspects from the author's perspective, meaning that questions focused on key aspects will be ranked before questions that are less significant.

The location for potential construction is among the most important parts of the decision-making process. A graphical representation is provided in the following chart.

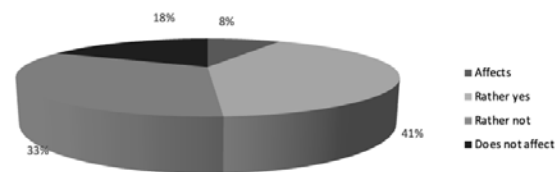


Figure 1. Location selection

From the survey results, it can be concluded that from the investor's perspective, the location is not considered a key factor. Positive responses to this question constitute less than half of the answers, and approximately one-fifth of the respondents expressed zero interest in location, indicating that it is not decisive for them. This fact suggests that other factors will likely be more important in investment decision-making. This tendency will probably be supported by further responses.

The second group of questions addressed the issue of obtaining building permits, which had previously been identified in the literature review as a key problem that can significantly extend the duration of implementation or even hinder the progress of the project itself. The responses to this question are particularly interesting because less than half of the respondents consider this issue to be crucial, while about one-third of the respondents indicated that it somewhat influences. More detailed information is graphically illustrated in the following chart.

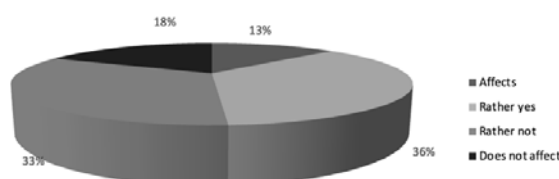


Figure 2. The difficulty of obtaining a building permit

This situation can be explained by developers, due to their experience and knowledge of the environment, choosing locations where they have a good understanding of legislative issues. It would only be speculative to assume that they may have professional teams for whom this phase is not a problem, thereby differentiating them from the general population.

Given the boom and general use of modern technologies, this question is also considered in the questionnaire. Here, the results align with expectations for the first time. More than half of the developers consider the use of new technologies in their decision-making, but only for approximately one-sixth of them is this factor crucial. There likely exists a dependency on the location where the use of modern technologies is necessary due to the surrounding environment, while in other locations, this need not be considered.

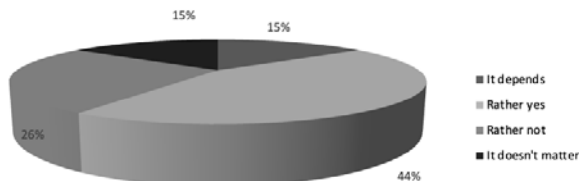


Figure 3. Use of modern technologies

Regarding the method of financing, most developers prefer financing through loans. The co-participation of an investor is not strictly required, as no response reflects a preference for investors only. The detailed distribution is presented in the following chart.

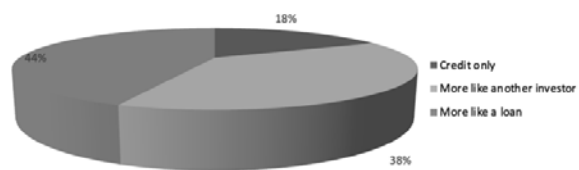


Figure 4. Funding preferences

An even more significant correlation can be observed in the next part of the survey. When it comes to sources of funding, two-thirds of developers prefer external sources, specifically loan financing. Only about one-third would opt for a larger share of their own resources. Like in the previous question, there is no response that would prefer exclusively their own resources. The responses to questions regarding project financing options are consistent, with developers generally preferring a greater involvement of external financial resources. Details are illustrated in the following chart.

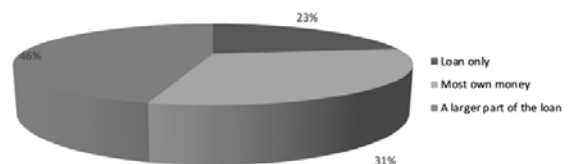


Figure 5. Comparison of another investor and the use of credit

The questionnaire also explored the relationship between desired profit and the use of modern technologies. The results show that the respondents' answers are divided into very similar groups. Approximately half prefer to prioritize achieving profit, while the other half would favor the use of more modern technologies. It is interesting to compare these results with the previous question regarding the relationship of modern technologies irrespective of profit impact. When the reality of using modern approaches meant a reduction in potential profitability, investors reduced their preference by 17%. The preference for modern technologies considering profit drops to merely 5%. It should be noted that the questionnaire survey was conducted in a

somewhat different situation than the current energy market scenario. Therefore, it can be assumed that the current situation, given the higher impact of purchase price by energy efficiency, might have partially changed these preferences. Another chart more accurately represents the values.

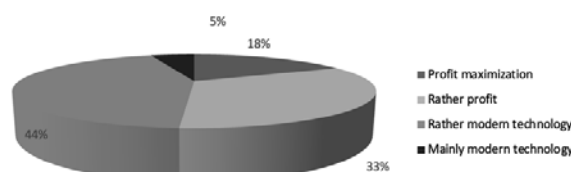


Figure 6. Modern technology in relation to profit

The profit generated from the realization of a development project can be linked to the energy efficiency of the project. As mentioned in the previous text, this factor is currently very relevant. When creating the questionnaire, it likely was not considered as crucial, which is reflected in the structure of the responses. From the perspective of the person implementing the project, the energy efficiency of the project is not a crucial indicator that would have a significant impact on decision-making. The following chart shows that the various response options are practically represented by the same percentage share.

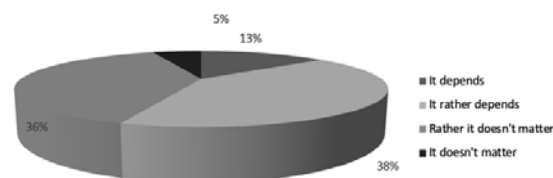


Figure 7. Energy intensity of the project (PENB) in relation to profit

The group of individuals for whom energy efficiency is a decisive factor is relatively small. Similarly, for those indicating partial influence, the difference is only two percentage points in favor of the response "somewhat influences."

The macroeconomic question regarding the relationship between price and average wage showed that most developers do not feel that a change in average wage would have a fundamental impact on their pricing decisions. Only a third are influenced by it, and only eight percent significantly. Detailed numerical values are presented in the chart.

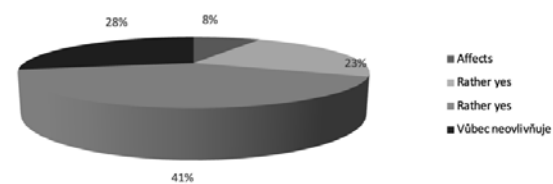


Figure 8. The effect of average wages

This finding can be interpreted to mean that demand for the offered product is relatively unaffected by changes in customers' incomes, suggesting a low income elasticity value. Customers, therefore, prefer to purchase newly built apartments regardless of potential fluctuations in their incomes. This market is characterized by greater stability during possible economic crises compared to the consumer goods market. The current market situation seems to confirm this stability.

Another macroeconomic factor is the level of interest rates, which was translated in the questionnaire to the average mortgage interest rate. In this area, the situation differs from that of average wages. Approximately half of the respondents state that the level of interest rates affects the final price of their projects. However, a negligible portion of developers consider

this variable significant, with the numerical value being only five percent. It can be assumed that a developer who has been selling newly built apartments to customers without using mortgage financing for a long time may not consider potential changes in the mortgage market as key. As already explained, developer customers will be differentiated, but a significant portion likely is not affected by changes in the mortgage market. Further details are recorded in the attached chart.

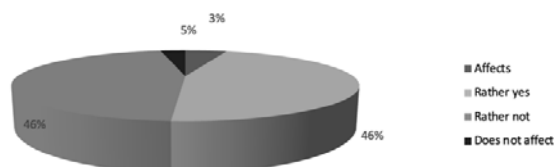


Figure 9. The effect of the amount of interest on mortgage loans

The last part of the questionnaire addressed the relationship between developers and the social environment. The question that reflected this issue focused on whether developers would prefer to achieve profit or the satisfaction of the surrounding community. The results of this section confirm previous findings, as nearly three-quarters of respondents prioritize profit. Only three percent of respondents expressed a pure orientation towards the satisfaction of the surrounding community. Details can be observed in the attached chart.

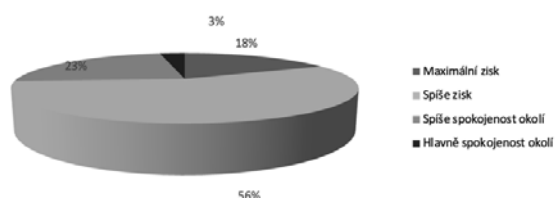


Figure 10. Relationship to surroundings

4 Discussion

Many authors have addressed these aspects. Kubík (2014) dealt with the topic of competitiveness and location selection. According to him, monitoring competition is a key strategic assumption for business success. The author points out the strengthening position of customers, who are able to negotiate better. Our research found that location is a significant but not crucial factor. Less than half of the respondents reacted positively to the question of the importance of location, indicating that a broader spectrum of factors enters into the decision-making about location, which needs to be further explored.

Another aspect is obtaining building permits, which can be a key factor in a developer's decision-making. Our research showed that the difficulty of obtaining building permits is a crucial aspect for a third of developers. In a global comparison, the Czech Republic ranks among the countries with a difficult process of obtaining permits, which can significantly affect the project's economy. Vilémová (echo24.cz, 2020) emphasizes that in some cases, obtaining a permit can take up to ten years, significantly affecting the project's economy. According to the Doing Business ranking by the World Bank, the Czech Republic is ranked 127th out of 185 countries in the speed of processing construction permits. The difficulty of obtaining permits can vary regionally, affecting an investor's decision-making in implementing a development project.

In some cases, the research monitored developers' decision-making in two different situations. The first situation represented a scenario where their decision would affect the final profit, while the second situation was characterized by their decision having no impact on the financial side of the project. This approach aimed to identify the nature of developers' decision-making and their reactions in an ideal construction environment.

Ideal conditions include low competition, low-interest rates, low construction costs, and high selling prices.

The research revealed that the trend of using modern technologies is starting to become a relevant topic for developers, especially in the context of desired profit. It is becoming increasingly clear to developers that following modern trends is key to maintaining competitiveness. Modern technologies can contribute to the successful realization of a project, facilitate and streamline construction, risk management (Ginzburg, 2018), or increase the project's attractiveness to potential clients, for example, through energy efficiency. On the other hand, it must be considered that modern technologies can mean additional costs that may limit the project's budget.

Financing was another key topic, focusing on methods for securing funds for the initial acquisition, i.e., purchasing land, as well as financing the construction itself. There are several approaches to this issue. Some developers try to cover everything from their own financial resources, often an approach of large, already established market players. This method is economically demanding. Another option is the use of external financial resources, either through a bank loan, which is associated with certain conditions, or through the involvement of another investor. An advantage of financing using external sources is also the theoretical perspective, where the cost of debt is lower than the cost of equity because the required return on equity is higher than the interest rates of bank loans (Koh, 2019). The purchasing power of potential clients is a key factor in determining the success or failure of a given project. The creditworthiness of clients is influenced by many factors, including their wages, savings, management, current interest rates, and others. When setting the pricing strategy of a project, it is important to consider the individual conditions of the given locality, including the average monthly wage, which affects market dynamics (Hlaváček, 2010). Price differences can be apparent between different localities in the Czech Republic, reflecting local employment opportunities, civic amenities, and thereby the level of wages in the area.

5 Conclusions

The research focused on analyzing the decision-making of developers in the area of residential construction in the Czech Republic. To represent the diverse portfolios of companies operating in the real estate market, appropriate respondents were carefully selected. The survey provided a sufficiently representative sample, based on which the main factors influencing the decision-making in the implementation of development projects were identified.

The research found that developers pay considerable attention to seeking profitable opportunities, and their decision-making is primarily oriented towards achieving financial gain. In this process, they consider other aspects, such as mortgage interest rates, the quality of newly built homes with an emphasis on energy efficiency, and the use of modern technologies. The average wage in the locality does not have a significant impact on their decision-making. Although choosing a suitable location is part of their decision-making process, it is not one of the most dominant factors. This decision is connected with other aspects, such as the difficulty of obtaining a building permit. In the construction or acquisition of investment projects, most developers prefer external financing, with loans and other investors being the preferred forms. This research constitutes only one part of a broader project aimed at an in-depth analysis of the decision-making process of developers in residential construction, which will be followed by future publication.

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Primary Paper Section: A

Secondary Paper Section: AH, AE, AP, JN

IMPACT OF THE COVID 19 PANDEMIC ON THE NUMBER OF INSOLVENCIES IN THE CZECH REPUBLIC

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Abstract: This research aims to determine whether the covid 19 pandemic affected the bankruptcy of companies for which insolvency proceedings were initiated, or whether it was detectable from their financial statements that the companies were headed for bankruptcy even before the covid 19 pandemic. Part of the research was an evaluation of the economic status of the investigated companies using selected prediction models, i.e. financial analysis tools, from 2016 to 2021.

Keywords: covid 19, insolvency, financial analysis, predictive models

1 Introduction

Insolvency is a specific type of court proceeding in which the debtor's bankruptcy is to be resolved. What constitutes bankruptcy is defined by Act No. 182/2006 Coll., the Act on Bankruptcy and Methods of its Resolution (Insolvency Act) (1). According to the Insolvency Act, a debtor is bankrupt if it is insolvent, i.e. it has multiple creditors (i.e. two or more), has monetary obligations for more than 30 days past due and is unable to meet these obligations. The law also defines when a debtor is unable to meet his obligations. A debtor is deemed to be unable to pay its monetary obligations if it has stopped paying a substantial part of its monetary obligations, or has failed to pay them for more than three months after the due date, or if it is not possible to obtain satisfaction of some of the outstanding monetary claims against the debtor by enforcement of a judgment or execution, or has failed to comply with the obligation to submit the lists required by the insolvency court. Insolvency proceedings in the Czech Republic are in principle public, where all relevant information for creditors or other persons concerned is publicly available in the insolvency register. The Insolvency Register therefore serves as a source of information on the declared solvency status of the debtor. The court enters the commencement of insolvency proceedings in the Insolvency Register, in principle, on the basis of an insolvency petition filed by the creditor or debtor, on the date on which the insolvency court receives such a petition (1). The aim of this research is to determine whether the covid 19 pandemic had an impact on the bankruptcy of the companies studied, or whether it was detectable from the financial statements that the companies were already heading towards bankruptcy before the covid 19 pandemic. In order to meet the objective of this research, data from the insolvency register on debtors who were subject to insolvency proceedings during the period under review will be examined. The pre-insolvency financial health of the firms under study can be assessed mainly from their financial statements, i.e. balance sheet, profit and loss account and cash flow statement.

2 Theoretical Background

During the period of the covid 19 pandemic, government-wide measures were often introduced in the Czech Republic, which affected business activities across sectors quite significantly. Crucial measures from the perspective of Czech businesses were already introduced in early 2020, notably a ban on cultural, sporting and social events of over 30 people, a ban on the public in selected establishments and marketplaces, as well as emergency measures regulating retail sales, a ban on travel to and from the country and many others (2, 3). These measures, combined with the downturn in demand for goods and services, have significantly affected the performance of the affected industries, and contributed to a broader societal depression. This trend has, of course, had an impact on gross domestic product growth, which recorded 3% growth for 2019 but a negative 5.5% result for 2020. By 2021, there has already been a significant recovery, to 3.6% GDP growth (4). The Czech Ministry of Industry and Trade reacted relatively early to the growing

problems of Czech entrepreneurs and rushed in with numerous support programmes. For example, the COVID II programme was designed to help finance small and medium-sized entrepreneurs with the guarantee of the Czech-Moravian Development Bank and also offered a contribution of up to CZK 1 million towards the interest paid. COVID III aimed to help improve the availability of operational financing for entrepreneurs employing up to 500 employees, other targeted COVID programmes were introduced for the individual sectors most affected by covid measures, e.g. COVID-Culture, Sport, Gastro, Accommodation (5). Last but not least, the Antivirus programme for employment protection was created by the Ministry of Labour and Social Affairs. The Antivirus program saved jobs at a time when they were most at risk. It succeeded in limiting the incipient labour market crisis and kept unemployment at record lows. In total, Antivir managed to support 1 073 133 workers, each of whom was paid an average of more than 4 months wage compensation thanks to the Ministry of Labour and Social Affairs. (6). The programme contributed to the retention of jobs for 37% of employees working in the private sector. Thanks to these measures and the previous economic upturn, it could have been expected that the number of limited liability companies and joint stock companies subject to insolvency proceedings would not grow exponentially. In order to assess whether these companies had already gone into insolvency as a result of their pre-Covid action, or only as a result of the Covid 19 pandemic, it is necessary to assess their financial health over a sufficiently long period of time into the past when there was no indication of their plight. In order to assess the health of a company, financial analysis methods are used, among other things. The most comprehensive methods are the so-called indicator sets, otherwise known as bankruptcy or creditworthiness models. The biggest advantage of bankruptcy model methods is their simplicity. The observed data are easy to interpret and grasp even for users who do not have expert information in the field of economics and business management. The biggest disadvantage of bankruptcy models is undoubtedly the inaccuracy of the data (7, 8). Svatošová (9) describes bankruptcy models as methods through which it is possible to predict and warn in time of an approaching adverse financial situation of the analysed enterprise. The purpose of the functioning of these methods is to monitor the behaviour of individual indicators. According to Knápková et al. (10) the role of bankruptcy models is to reveal whether the enterprise could be affected by bankruptcy in the future. The cause of bankruptcy is often problems with the amount of net working capital, profitability of own resources and/or liquidity problems. There are a number of such models. For the purpose of this research, four models have been selected that the authors consider sufficiently predictive and for which indicator sets have been developed that reflect the environment of emerging Eastern European economies. The first model used is the Altman model. The Altman model is one of the most widely used bankruptcy models and is based on the so-called discriminant analysis. The result of this model reveals the financial situation of the company. A very good financial situation is indicated by a z-score exceeding 2.99, the neutral phase is made up of a range of 1.81-2.99, and major financial difficulties burden the firm if it has a z-score below 1.81 (10, 11). The equation is based on the following indicators:

$$X(1) = (\text{current assets} - \text{current liabilities}) / \text{total assets}$$

$$X(2) = \text{retained earnings} / \text{total assets}$$

$$X(3) = \text{earnings before interest and tax} / \text{total assets}$$

$$X(4) = \text{market value of equity} / \text{book value of total debt}$$

$$X(5) = \text{sales} / \text{total assets}$$

The equation for calculating the Z score is as follows:

Equation 1: Altman Z score

$$Z - \text{score} = 0.717 \times X1 + 0.847 \times X2 + 3.107 \times X3 + 0.420 \times X4 + 0.998 \times X5$$

Source: 10.

Another model used was the IN05, which was built by the Neumaier for the specific conditions of the Czech market. This system reflects the uniqueness of Czech accounting standards and the Czech economy. The IN05 index is ideal for a quick assessment of the financial status of a company, suppliers, customers or competitors. This model is completely objective and accurate, but its shortcoming is the single-number result, which makes it difficult to detect any potential problem. If IN05 comes out below 0.9, the company has an 86% probability of bankruptcy. A range of 0.9 to 1.6 is illegible for a firm but shows room for improvement. For a firm with a result above the 1.6 threshold, there is a 67% chance that it creates value (12). The equation for the calculation is as follows:

Equation 2: Index IN05

$$IN05 = 0.13 \times \frac{\text{total assets}}{\text{foreign capital}} + 0.04 \times \frac{EBIT}{\text{interest expense}} + 3.97 \times \frac{EBIT}{\text{total assets}} + 0.21 \times \frac{\text{total sales}}{\text{total assets}} + 0.09 \times \frac{\text{current assets}}{\text{current liabilities}}$$

Source:12.

Taffler model has taken several forms over the years. However, the most widely used version was created in 1977. It is a model that works on the basis of multivariate discriminant analysis and is based on working with four indicators. These ratios are denoted R1-R4. R1 is the ratio of pre-tax results to current liabilities. R2 is current assets divided by foreign resources. R3 is the ratio of current liabilities to assets and R4 is the ratio of total sales to total assets. (13). Svatošová (9) explains the resulting values as follows. If TZ is higher than 0.3, it indicates the financial stability of the firm. The grey zone has been set in the range of 0.2-0.3 and if the result of TZ is lower than 0.2, the enterprise is at risk of bankruptcy.

The equation is based on indicators:

R1 = profit before tax / current liabilities

R2 = current assets / foreign capital

R3 = current liabilities / total assets

R4 = total sales / total assets

The equation for the calculation is as follows:

Equation 3: Taffler model

$$TZ = 0.53 \times R1 + 0.13 \times R2 + 0.18 \times R3 + 0.16 \times R4$$

Source: 13, 9.

The last model used is Kralicek Quick test. The Kralicek Quick test is based on four basic indicators which are classified after evaluation and finally the results of the whole test are assessed using a simple arithmetic average. By evaluating the financial stability of the company and profitability, we assess the overall situation of the company. The test consists of four basic indicators, namely:

1. equity quotas = equity/total balance sheet,
2. debt maturity with CF = short-term + long-term liabilities / current CF amount,
3. return on assets=EBIT/total assets
4. profitability of sales = CF / (sales of own products and services + sales of goods) (14, 15).

Then, after calculating the above indicators, it is necessary to evaluate the results using Table 1.

Tab. 1: Kralicek Quick test test evaluation

V.N.	- 1 -	- 2 -	- 3 -	- 4 -	- 5 -
	Very good	Good	Middle	Bad	Insolvent
1.	>30%	>20%	>10%	≤10%	≤0%
2.	<3y.	<5y.	<12y.	≥12y.	>30y.
3.	>15%	>12%	>8%	≤8%	≤0%
4.	>10%	>8%	>5%	≤5%	≤0%

Source: 14.

3 Research methodology and data collection

This research relies on primary data collection of a sample of 639 companies, of which 568 were limited liability companies and 71 were joint-stock companies. The primary sample consisted of 1054 companies that were subject to insolvency

proceedings during the period under review, but only for 639 could the calculations of financial ratios be performed and only for these were complete and properly completed financial statements available. It should be noted that not all indicator sets use the same data sources, so the number of companies examined varies from model to model. The data extraction from insolvency registers was carried out over the period 2023 to capture as many proceedings as possible given the lag between the actual status of companies and the initiation of insolvency by the court. The data download was done manually with a filter set for only active insolvency proceedings in the period from the beginning of 2019 to the end of 2021. During this period, there were the aforementioned 1054 active insolvency proceedings on joint-stock companies and limited liability companies throughout the Czech Republic. To assess the health of the companies, financial statements for all 1054 companies were obtained from the Amadeus database. Corporate health was assessed using Altman's Z score model, Taffler's model, Kralicek Quick test and IN 05 model. Companies whose health could not be assessed due to the nature of the available data were subsequently excluded from the measurement. The period for which the health of the companies was assessed was from 2016 up to and including the end of 2021. In order to refine the information on the selected companies, data was also obtained from the Czech Statistical Office. The analysis of this data revealed that the largest number of companies came from the Capital City of Prague and this number accounted for just under half of all companies surveyed. The next highest number of companies in insolvency came from the Moravian-Silesian Region and the South Moravian Region. Thus, 67% of all insolvencies in the sample took place in these 3 regions. The distribution of the number of insolvencies among the other regions did not show large differences. An overview of the number of individual insolvencies per region is shown in Table 2. This distribution of insolvencies can be explained mainly by the size of the regions in question, where the three largest cities of the Czech Republic are located, and also by the number of companies that have their headquarters or branches there. The location of these cities is also an important strategic advantage, as they are connected to the backbone national infrastructure and thus it is easier for companies to conduct their business activities from there. Another characteristic observed was the type of business activity, which can be identified using the NACE code in the business register. The main business activity and secondary activities were observed. Of the selected companies, 94 were engaged in wholesale trade excluding motor vehicles, followed by real estate, catering and hospitality, construction of buildings and others.

Tab. 2: Number of companies per region

Region	Count of IN
Capital City of Prague	285
South Bohemian region	21
South-Moravian region	71
Karlovy Vary Region	11
Vysocina region	18
Hradec Kralove region	22
Liberec region	20
Moravian-Silesian Region	73
Olomouc region	22
Pardubice region	19
Pilsen Region	11
Central Bohemian Region	28
Usti Region	21
Zlin Region	17
Grand Total	639

Source: Authors, 2024.

The detailed breakdown of companies by NACE code of the main business activity is shown in Table 3. Again, the most common secondary activities were wholesale and retail trade, real estate activities and other professional, scientific and technical activities. Secondary activities were repeated for a number of companies and the highest number of repetitions was wholesale and retail trade, with 440 and 290 hits respectively.

Tab. 3: Top main business activities based on NACE classification

Name of NACE codes	Total
Wholesale, except motor vehicles	94
Real estate activities	56
Catering and Hospitality	54
Construction of buildings	43
Land and pipeline transport	39
Other professional, scientific and technical activities	39
Specialized construction activities	32
Retail trade, except motor vehicles	31
Manufacture of metal structures and metal products, except machinery and equipment	28
Production of food products	19
Architectural and engineering activities; technical tests and analyses	18
Plant and animal production, hunting and related activities	16
Wholesale, retail and repair of motor vehicles	11
Repairs and installations of machines and equipment	9
Collection, collection and disposal of waste, treatment of waste for further use	9
Activities in the field of information technology	8
Advertising and market research	7
Financial intermediation, except for insurance and pension financing	6

Source: Authors, 2024.

4 Research results

A total of 639 selected joint-stock companies and limited liability companies were surveyed. Their financial statements were subjected to an in-depth financial analysis and the data obtained was then used to calculate 4 sets of ratios. These were the Altman model, the IN05 model, the Taffler model and the Kralicek Quick test. For each model, the reports of all companies that duly filed their reports and published them in the Amadeus database at least between 2016 and 2021, when the period under study ended, were analysed. However, as the resulting tables show, it was not always possible to perform the calculations due to the absence of some parts of the statement. The numbers of resulting calculations may therefore vary for each year under review.

As shown in Table 4, a total of 428 companies could be analysed using Altman's model in 2016; in that year, 265, or 62%, could be assessed as financially strong, 41, or 10%, were in the grey zone, and 122, or 29%, were already candidates for bankruptcy. In 2017, it was possible to analyse even more of these selected companies, a total of 464. 301 of them, or 65%, were financially strong, 45, or 10%, were in the grey area and 118, or 25%, were candidates for bankruptcy. In 2018, most of the companies had assessable published accounts from the period under review. The total number was 448 companies, where 318, or 66%, were financially strong, 42 or 9%, were in the grey zone and 124, or 26%, were bankruptcy candidates. These years were generally considered to be years of strong economic growth not only in this country but also in the related European economies, which may be the reason why the number of financially strong companies increased and those companies that had not achieved the best results in previous periods were able to temporarily emerge from their financial problems. A downward trend can be observed in 2019, when the declining demand for goods and services in neighbouring Germany and other related economies had already started to show and Czech companies were facing an economic downturn. The number of companies that could be described as financially strong fell to 448, where 282, or 63%, were financially strong, 28, or just 6%, were in the grey zone, and 138, or 31%, were candidates for bankruptcy. The years 2020 and 2021 marked a period for the Czech economy, and not only for it, in which a number of sectors found themselves in financial distress. These factors in particular, but also others, such as the unpreparedness of local entities, may have been the reason why, in 2020, the number of companies that were

financially strong fell again to a total of 242, or 56%, furthermore 35, or 8% of the companies were in the grey zone and 153, or 36%, of them were candidates for bankruptcy. In 2021, there was both a decrease in the number of companies in the sample that provided their statements and a significant decrease in the number of those that were financially strong. The number of financially strong companies was 172, or 52%, 33, or 10%, were in the grey zone and 127, or 38%, were candidates for bankruptcy.

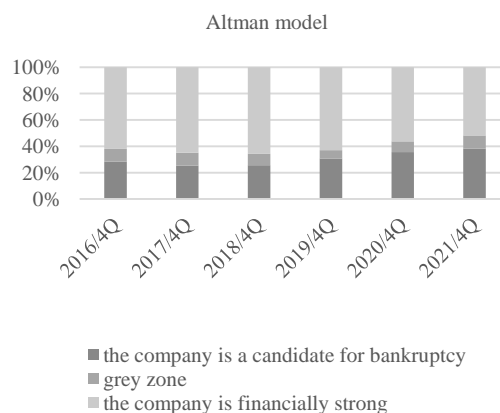
Tab. 4: Research results for Altman model

Altman	candidate for bankruptcy	grey zone	the company is financially strong	Total
2016	122	41	265	428
2017	118	45	301	464
2018	124	42	318	484
2019	138	28	282	448
2020	153	35	242	430
2021	127	33	172	332
2016	29%	10%	62%	100%
2017	25%	10%	65%	100%
2018	26%	9%	66%	100%
2019	31%	6%	63%	100%
2020	36%	8%	56%	100%
2021	38%	10%	52%	100%

Source: Authors, 2024.

Graph 1 shows the evolution of the financial situation of all the companies monitored in each individual year. The graph shows that there has been some increase in the number of companies in financial difficulties. For most of them, it was not apparent from their financial statements that insolvency proceedings were imminent.

Graph 1: Evolution of the financial situation of the Altman model sample



Source: Authors, 2024.

The results of the calculations using the IN05 model are shown in Table 5.

Like Altman's model, the IN05 model classifies companies into those that create value, are in the grey zone, or are headed for bankruptcy. This model had the fewest usable statements of any company. Crucially, a number of companies had no interest expense or other value required for the calculation in their statements. According to this model, in 2016, out of 185 companies, only 50, or 27%, had value, 36, or 19%, were in the grey zone and 99, or 54%, were bankrupt. Year 2017 brought the total number of assessable companies to 206. Of these, 60, or 29%, were of value, 39, or 19%, were in the grey zone and 99, or 52%, were bankrupt. 2018 had the highest number of assessable returns. A total of 222 companies were assessed for financial health. Of these, 63, or 28%, were value, 47, or 21%, were in the grey area and 112, or 50%, were heading for bankruptcy. The year 2019 again saw a lower number of total assessable statements of 184 companies. 40 companies, 22%, still

constituted value, 27, 15%, were in the grey zone and 117, 64%, were heading for bankruptcy. In 2020, there was a sharper reduction in assessable statements to 144. Of these companies, 21, or 27 %, were still of value, 22, or 15 %, were in the grey area and 101, or 70%, were bankrupt. In the last year, the lowest number of assessable statements was only 99. 14 companies, 14 %, were still of value. 13 companies, 13 %, were already in the grey zone and 72 companies, 73 %, were in danger of bankruptcy.

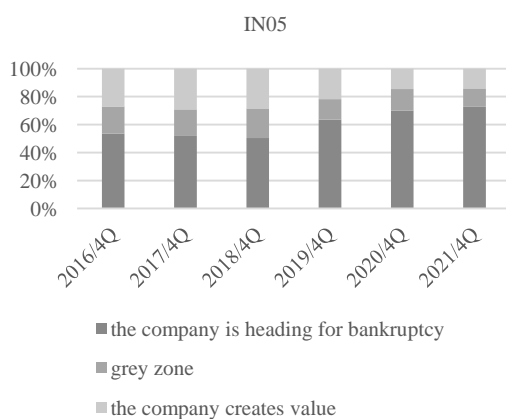
Tab. 5: Research results IN 05 model

IN05	is headed for bankruptcy	grey zone	form the value of	Total
2016	99	36	50	185
2017	107	39	60	206
2018	112	47	63	222
2019	117	27	40	184
2020	101	22	21	144
2021	72	13	14	99
2016	54%	19%	27%	100%
2017	52%	19%	29%	100%
2018	50%	21%	28%	100%
2019	64%	15%	22%	100%
2020	70%	15%	15%	100%
2021	73%	13%	14%	100%

Source: Authors, 2024.

Graph 2 shows the evolution of the sample of companies using the IN05 model. In contrast to the previous model, this one gives a rather more pessimistic assessment of the financial situation of the companies concerned in the period under review. The companies that constituted the value were in the minority in all years, and the majority were those that were heading for bankruptcy or already fell into the so-called grey zone, which portends a difficult financial situation heading towards bankruptcy in the near future.

Graph 2: Evolution of the financial situation of the observed sample of companies in the IN 05 model



Source: Authors, 2024.

The Taffler model was another one that was used to examine the financial health of companies. The Taffler model divides the results into two possible developments. Companies may be in a situation where they are unlikely to go bankrupt or, conversely, in a situation where there is a high risk of bankruptcy. Even in this model, it was not possible to work with data from all companies, as some did not properly disclose their statements. For example, the profit or loss or current liabilities were often missing. Whether the companies did not fill in these data intentionally or by accident cannot be determined. According to the Taffler model, 268 companies were assessable in 2016. 75, or 28%, were in a situation where bankruptcy was unlikely and 193, or 72%, were at high risk of bankruptcy. In 2017, 285 companies were assessable, of which 93, or 33%, were not bankrupt and 192, or 67%, faced a high risk of bankruptcy. In 2018, the number of companies was the highest, 310 in total.

104, or 33%, did not face bankruptcy and 195, or 67%, did. The year 2019 brought another significant drop in the number of companies to 270. 65 companies, 28%, were in good financial health, but 195, 72%, were already very likely to go bankrupt. In 2020, the number of companies facing bankruptcy increased further. Of the 270 companies, 165, or 76%, were bankrupt. 65 companies, or 24%, were very likely to go bankrupt. The absolute lowest number of companies submitted statements in 2021, only 202. 37, or 18%, did not face bankruptcy and 16,5 or the remaining 82%, faced a high risk of bankruptcy.

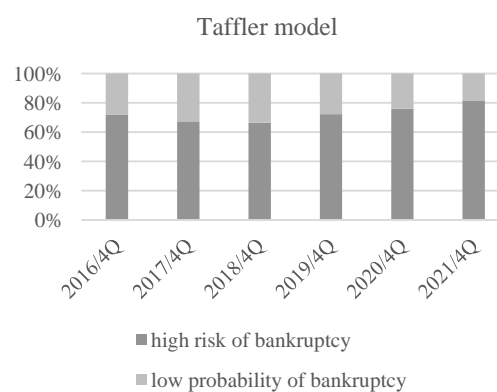
Tab. 6: Research results Taffler model

Taffler	high risk of bankruptcy	low probability of bankruptcy	Total
2016	193	75	268
2017	192	93	285
2018	206	104	310
2019	195	75	270
2020	205	65	270
2021	165	37	202
2016	72%	28%	100%
2017	67%	33%	100%
2018	66%	34%	100%
2019	72%	28%	100%
2020	76%	24%	100%
2021	82%	18%	100%

Source: Authors, 2024.

Graph 3 shows the evolution of the sample of companies using the Taffler model. Here again, a limited number of companies were evaluated due to missing data as mentioned above. Even so, the results show that the number of viable companies decreased with the advent of the pandemic and that a large number of companies that were still in business in 2018 were bankrupt in 2021 and this corresponds with their initiated insolvency proceedings.

Graph 3: Evolution of the financial situation of the sample of Taffler model companies



Source: Authors, 2024.

The last model used to assess the financial health of the companies was the Kralicek Quick test. This test assesses the health of a company on a scale of 1 to 5, where 1 indicates very good health and 5 indicates an insolvent company. Table 7 shows the resulting scores for all the companies studied. This model was able to assess the second largest number of companies overall after the Altman model. In particular, the limitation of the assessability of this model was the debt maturity indicator.

In 2016 it was possible to assess 305 companies, of which 28 companies, or 9%, received a grade 1 (insolvent), 57 companies, or 19%, received a grade 2 (poor), the largest number of companies, 118 companies, or 39%, received a grade 3 (medium), 101 companies, or 33%, received a grade 4 (good), 0 companies received a grade 5 (very good). In 2017, the final grades were determined for 324 companies. 29 companies, or 9%, received a grade 1 (insolvent), 76 companies, or 19%,

received a grade 2 (poor), 120 companies, or 37%, received a grade 3 (medium), 92 companies, or 28%, received a grade 4 (good) and 7 companies, or 2%, received a grade 1 (very good). In 2018, 32, or 10% of companies, received a grade 1 (insolvent), 64, or 20%, received a grade 2 (poor), 127, or 39%, received a grade 3 (medium), 100, or 31%, received a grade 4 (good) and only 2, or 2%, received a grade 5 (very good). In 2019, the number of companies monitored has decreased to 279. A total of 18, or 6% of the companies, received a grade 1 (insolvent), 47, or 17%, received a grade 2 (poor), 114, or 41%, received a grade 3 (medium), 99, or 35%, received a grade 4 (good) and 1 company received a grade 5 (very good). In 2020, 233 companies were assessable. 11, or 5%, of companies received a grade 1 (insolvent), 33, or 14%, received a grade 2 (poor), 108, or 46%, received a grade 3 (medium), 79, or 34%, received a grade 4 (good) and 2, or 1%, received a grade 5 (very good). In the last year under review, the number of companies that had not yet published statements from which calculations could be made was 168. Of these companies, 7, or 4%, were rated 1 (insolvent), 20, or 12%, were rated 2 (poor), 66, or 39%, were rated 3 (medium), 73, or 43%, were rated 4 (good) and 2, or 1%, were rated 5 (very good). Table 7 summarises the data for the companies surveyed. According to these results, it is evident that a significantly larger number of the companies surveyed were still in good financial condition during the economic upturn. However, in the period of the covid, the number of financially healthy companies dropped significantly and the number of those that still published full statements or had their statements usable for calculations also decreased.

Tab. 7: Research results Kralicek Quick test

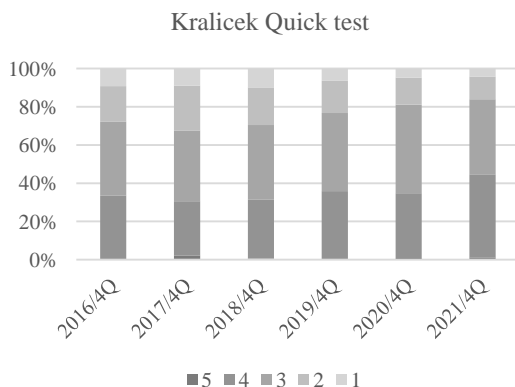
Kralicek Quick test	5	4	3	2	1	Total
2016	1	101	118	57	28	305
2017	7	92	120	76	29	324
2018	2	100	127	64	32	325
2019	1	99	114	47	18	279
2020	2	79	108	33	11	233
2021	2	73	66	20	7	168
2016	0%	33%	39%	19%	9%	100%
2017	2%	28%	37%	23%	9%	100%
2018	1%	31%	39%	20%	10%	100%
2019	0%	35%	41%	17%	6%	100%
2020	1%	34%	46%	14%	5%	100%
2021	1%	43%	39%	12%	4%	100%

Source: Authors, 2024.

Graph 4 shows how negatively the onset of the covid 19 pandemic affected the sample of companies.

Most of the companies scored rather well in the early years under review, whereas the number of companies declined during the pandemic.

Graph 4: Evolution of the financial situation of the observed sample of companies in the Kralicek Quick test test



Source: Authors, 2024.

5 Conclusion

The aim of this research was to determine whether the covid 19 pandemic had an impact on the bankruptcy of the companies studied, or whether the financial statements showed that the companies were already heading towards bankruptcy before the covid 19 pandemic. The financial statements of these companies, i.e. balance sheet, profit and loss account and cash flow statement were analysed using selected sets of ratios or prediction models. A total of 4 models were used to assess the financial health of the companies under study. The models used are widely recognized and have a predictive power. These were the Altman model, the IN05 model, the Taffler model and the Kralicek Quick test. The period under study was chosen between 2016 and 2021 to assess whether the companies were already showing some financial problems in the period before the Covid 19 pandemic, which was characterised by a significant economic upturn, or whether their financial situation was already showing signs that they might go into insolvency proceedings. From the analyses carried out, it can be concluded that all the models show a worrying trend in the financial development of the companies studied, i.e. that indeed the general economic shutdown, government measures, the downturn in household demand and other factors had a direct impact on their financial health. Clearly, in 2016, 2017 and 2018, a much larger proportion of the companies surveyed are still able to pay their liabilities and are not heading towards bankruptcy; by the end of 2019, a reduction in the number of viable companies can already be seen, and in 2020 and 2021, the number of companies heading towards bankruptcy or in the so-called grey zone is increasing significantly. The limitations of this research can be seen in particular in the nature of the data that can be obtained from public sources, as not all companies, although legally obliged to do so, publish their accounts in full.

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Primary Paper Section: A

Secondary Paper Section: AG, AH

NEWER ASPECTS OF HIERARCHICAL, GENERIC AND HEURISTIC APPROACHES IN LAYOUT SOLUTIONS, DIMENSIONS OF CREATING A NORMATIV BASIS FOR SUSTAINABLE DEVELOPMENT OF PRODUCTION AND LOGISTICS

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This paper is a part of research project VEGA, grant No. 1/0465/23 Generic, convergence and model approaches of environmental production and logistics in business development in Slovakia.

Abstract: The presented scientific paper arises mainly in the context of solving current issues, problems of theory and practice of entrepreneurship. In particular, in the field of dispositional solutions, dimensions of the formation of normative basis of sustainable development in the field of production and logistics. It is an expression and continuation of the previous opinion, thought march, experiential expression of the authors on the issue. It focuses mainly on the current challenges associated with the development management of production and logistics, on the parameters that will need to be respected and, to a greater extent, applied in the future. It is also a response to the fact in the sense that the results of research, predispositions in the field are insufficient. Especially in terms of the approach to solving the problems of the normative base, not only in the responsible authorities, institutions in this area, but also in the business units themselves.

Keywords: innovations generics and heuristics access, production, logistics, development management, business

1 Introduction

Newer, participatory solutions are based more on knowledge, results and experiences that have been and are being applied today. They mainly talk about interpenetration and synergy, proportionality and parallelism, which ultimately also express a certain result, a degree of satisfaction, a desired marginal utility. Particularly in the very short term on the boom of innovative, technological, organizational, especially information development. Generically, hierarchically and multidisciplinary, this is perfectly fine. Contributing to this at the present time is the heuristic, which has been placed by Archimedes on the pedestal of the so-called active theory of the investigation of phenomena and processes.

In addition, there is also the topical aspect of sustainable development. Not only in general, but also on the parameters of its development in specific sectors, industries, other areas, also sustainable development strategies, which are related to the integration of objectives, policies, tactical and operational management in the field, programmes, integration of the information system, market and customer conditions. Priorities should be focused and strengthened especially in the area of "generational" responsibility, environmental limits, holistic approach in solving current problems, preference for prevention, reduction of material, energy intensity of systems in production, consumption, logistics processes. These are also permanent processes that touch the field of standardization, unification, standardization, inheritance of processes (elements) mainly in business units. But also in the policy of the authorities, supranational institutions, organizations, which "statistically" direct the measures for the improvement of the whole system in the field of sustainable development on our planet. Our researches so far have confirmed to us that anomalies and disproportionality exist in this field. Mainly in expertise, opinions, statements. How to unify, synergize this is a question of *Quatuo quo*, but rather *Quo Vadis*?

The decisive problem of the topic of the scientific paper from our point of view to solve is the subsequent formation of the normative basis of sustainable development of production and logistics in the current business conditions, along with sustainable development of environmentalism. It is certainly true that there are currently available ISO series standards in the field of quality, creation and protection of the environment, safety, health, information systems. They are referred to as basic

conditions, principles, standards of documents created and based on the joint results of science, technology and practice, and aimed at achieving the optimal degree of organization in specific contexts.

Another category of standards is their procedural and institutional approach, the way they are applied in a particular company, business. The formal approach must be fulfilled, implemented, but the informal aspect of application is questionable. In terms of mandatory regulations, „legal norms“ are the rule. Informal organisation, rules especially in specific business cases, may not be respected especially in the case of external audits. A frequent problem arises: between respecting the system or taking it away. In our opinion, this is also a fundamental problem. The majority of business units today are more inclined towards the internal audit method, emphasising their own, voluntary tools, and development rules in the context of such decision-making. However, formal rules are crucial.

2 The current state of the issue

The text of the scientific paper in this chapter will be devoted not only to the circumstances that led us to its elaboration, but also to the current, dispositional, opinion platform in the theory, practice of entrepreneurship, professional opinions and experience in the area under study. Mainly, as it also follows from the title of the scientific paper, to emphasize the newer approaches in the intentions of the hierarchical, generic, also heuristic approach in the dispositional solutions, dimensions of the creation (improvement) of the normative basis of sustainable development of production and logistics. Not only at the supranational level, but especially in the conceptual positive solutions, possibilities of business units. Conceptualizing the state of the art in the researched area was quite challenging in that we realized the insufficient level of process, integrative, strategic, tactical, operational management, as well as the professional characteristics of research and quality. Also in other aspects, which in the scientific paper we will mention only in the following contexts (assumptions): computerisation (automation and digitisation), HR, marketing, innovative development, external and internal parameters of development.

The answer to the mentioned „insufficient level“ in the field of creating and improving the normative base, the conditions of implementation, is mainly that the pioneering works are almost already a thing of the past, and the newer views are quite or substantially different from the original, classical ideas in terms of parameterization. These, however, must be considered, in our opinion, as a substantial contribution, because they have created further prerequisites in the basic moments, the intentions of further development. Classical theory has confirmed that we can and must further develop the modern characteristics. This is certainly true; we must not forget it. The shift is whether we are able to assess and respect, to confront these conditions in a modern context. This shift has created quite a big gap between planning and reality, between a relative and pragmatic approach, between the degree of immediacy, the relative consistency of processes, especially in development applications.

Considering the topic and the verification of the scientific contribution in that the field of sustainable development (environmentalism) of production and logistics is one that deserves much more attention in the given intentions. Especially in the hierarchical structure, generics, heuristic approach. Our effort in this part of the scientific paper will not be the time horizon (although it is quite substantial), rather we will draw attention to the reality, predispositions, experiences, opinions, professional flexibility in the theory and practice of business. Especially on the categories *Status Quo*, *Quo Vadis* (to persist, to continue?). These are quite essential, determining clues at national and supranational level. We can say that none of the

mentioned issues, circumstances are close to the optimum in the field. At the supranational level, institutions, it is rather a way to determine the rules, conditions for further implementation of processes in the examined area. It is not related, in our opinion, to the time horizon. Parameters in terms of time horizon, forecasts, assumptions of realization are constantly changing. Although they are set for a longer period (2035, 2040, even 2050), and supposedly will bring changes, they are not substantiated in essence and at all. The forecasts, the development strategies, the tactical management are only defined in general terms for a given area of numbers, which is at odds with what it should look like in, say, forty years' time. Even in representative institutions, they cannot express more precisely the future situation, the solutions in the considered area of research and practice.

For the time being, we only wish to confront and give our views on the current essential state of dealing with the issue at home and abroad. We first assume that our views will be taken into account by the future opponent(s). Taking into account the classics, also modern conditions, initiatives in the field, we will first emphasize the positive, but we will also list the negative factors (indicators, parameters) of the rate or efficiency of the processes that are the subject of the investigation of our scientific paper. We have partially published them in the previous several scientific papers of the department, university textbooks, monographs. There are several of them, we refer in this case to the website.

1. Positive indicators (parameters) include:

- their previous justification, enrichment in favor of the laws of organization, arrangement of the production process and logistics, synergization,
- newer propositions in the change of the elements of the production system and logistics in the enterprise, business,
- degree of immediacy especially with regard to classical and modern factory,
- degree of usefulness, variability, the so-called "zero point" and its other propositions, optimal solutions, costs, efficiency,
- development processes, normative basis in production and logistics, sustainable development, environmental aspects,
- meanwhile, the question of "racia", which is being investigated, ranges between the hierarchical, generic and heuristic approach emphasized by us in the dispositional solutions, dimensions of the creation and improvement of the normative base of sustainable development in production and logistics.

2. Negative indicators (parameters) include:

- efficiency rate, profitability of processes at supranational, national level,
- conditions in terms of generic, hierarchical, heuristic approaches, solutions in the given area,
- inventory management, their capitalization and reassessment in terms of the existing approach, also the commitment of current assets, inflation,
- the relative consistency of the environment-production-logistics triangle that we have mentioned and emphasised,
- inertia versus future development,
- insufficient organisational solutions, organisational modelling.¹

3. Several underappreciated aspects are also touching from a professional point of view:

- the level, the method, the presented aspects, the solution of in-house management, production management,

consequently logistics, also the characteristics and development of the human factor, especially in connection with the ongoing automation, the digitalization of Industry 4.0 processes and the ongoing Industry 5.0,

- the tightening of the integration processes in the field of sustainable development, which undoubtedly includes not only production, but also logistics and environmental management in business development.

Drawing attention to this topic of the scientific paper, we would like to further state that few scientific, professional articles have been published in scientific circles in Slovakia in the context of science, research, and the creation of a normative basis for the sustainable development of production and logistics. Some of them only partially dealt with this issue, but not in accordance with the normative base, methods, assumptions of its solution. More recent views (see more details) of the solution are given in the paper in the authors' note or by citation 6. Obviously, we had a reason, also dispositional, to approach the problem not only in the research work but also in the pedagogical activity, to create a framework for the students who worked on the solutions, seminars, also in the normative field, based on their future profile.

As for the foreign authors, companies, they rather argue that the aspect of normative base is not crucial for them. They are guided (as in legal issues) by the fact that the multiplicity of states and institutions in the process is unlimited. While there are general rules for doing business, each business entity can adapt them (including in normative activity) according to its own rules. This applies to the continent, but also to the pillars of management, which include elements of the American and Japanese, but also the Chinese, as well as the management of the so-called Asian tigers. Also as a result of this, certain rules of normative bases will be judged in favour of behaviour in the intentions of business entities.

This is just to underline the idea that the creation and continuation of processes in this area can also be read in an international context, especially in conditions of globalisation of markets and customers. And in symbiosis not only with national, but also regional, national markets. We have deliberately focused the space in this paper only on the possibility of sustainable development of production and logistics. Suggestions and recommendations will be conveyed in the results and discussion section of our scientific paper. To the decisive idea in this part of the chapter we would like to add that the pioneering work in this field is the monograph by Tomek, J. – Tomek, G.: Normative basis of production management. Although it was written and published in a certain period of time, in our opinion it belongs to the pioneering literature in terms of not only classical but also contemporary understanding of processes. Unfortunately, at that time the authors were probably not yet familiar with such processes, disciplines such as logistics, sustainable development, environmental management. However, we are grateful to them for the fact that today we can move up the ladder on the basis of their initiatives.

3 Methodology and research methods

We have made an authorial agreement not to go beyond the predispositions that are set for composition, methodology, and rules that are expected of a scientific paper for its publication, although the requirements are different. We did not conceive of a paper with this title randomly. Especially in terms of normative activity, associated hierarchical, generic, heuristic approaches, dispositional solutions in the sense of sustainable development of production and logistics. Our perspective in identifying the main goal, participatory sub-goals and hypotheses will be rather narrowed in that it will provide opinions, thoughts on how to proceed further in terms of conceptual propositions. It will point out the existing shortcomings, especially in the field of rules, development and improvement of the normative base in the specific area: environment - production - logistics, synergisation of procedures. The main objective of the scientific contribution is to respond in an inspiring, professional and natural way not

¹ See more details:

Dupař, A.: *Logistika*. Bratislava: Sprint dva, 2019. 288 p.

Dupař, A. et al.: *Manažment výroby*. Bratislava: Sprint 2, 2019. 365 p.

Dupař, A. – Rakovská, J.: *Vnútroodnikový manažment výroby*. Bratislava: Vydavateľstvo Ekonóm, 2010. 199 p.

only to the current changes, issues of development of theory and practice of entrepreneurship at home and abroad, in the international context, on the basis of the collected body of knowledge in research, predictive and comparative analyses, with the possibility of proposing on this basis of their own views and experiences and directions for improving the processes in the area under study.

In the initiatives and coherence to the main objective of the scientific paper, we would also like to mention the following sub-objectives of the work:

- to maintain consistency in the classical, modern investigation of the development process in the field in question (hierarchy, generics, heuristics) in relation to the current problems of development in the field under study,
- to accept, in certain dimensions, also the previous experience, which was and is part of the permanent development,
- to point out that partial solutions are not decisive in the hierarchical structure for the fulfilment of synthetic, integrative development in a given area,
- the same applies to the development of processes,
- to confront our intentions and ideas with the current situation at home and abroad, especially in the initiatives on the topic of the presented scientific paper.

Given the topic of the paper, also the predisposition and consideration of time parameters, a spectrum that is essentially known to us, we will probably be more cautious in that the hypotheses and their formulation will not be what is crucial for us. Perhaps in another paper that will follow up on just this currently addressable aspect. The methodology and working methods of conceiving a scientific paper are determined by the propositions and rules that arise from the nature of the treatment imposed on this kind of work. We continue them by highlighting, for the time being, the methods of investigation that we have used in the following text. These include the following:

- First of all, the classical ones, which include: analysis, synthesis, induction, deduction, comparison of interviews, mind maps. They appear not only in the previous sections of the text, but are part of the subsequent results and discussion.
- Hierarchical and generic structures are also essentially classical. However, their significance and platform is in the organizational structuring. The organizational approach as a domain is also for us a way of expression, a guide to further solutions.
- We want to express the approximation approach mainly in cases where the approximation approaches the solution of a more complex problem.
- The heuristic way, or the way of joint ideas, dialectical paradox, pause, incompetence and so on.

4 Results and discussion

The normative basis in development, not only in terms of globalisation, internationalisation, markets and customers, but also in business, suddenly seems to have fallen away. There are attempts to bring it back naturally, through the emphasis on standardisation, unification, normalisation and the inheritance of processes. However, these are just words that experts (not institutions) say bring little to the functioning of the system. The unifying feature of the content articulated and the meaning important in this area are the general and fundamental principles. Also the formulas themselves, the indicators, which in fact cannot be corrected very much. As the experts put it, not even on a system with a target focus on automation, digitalization of processes (Rathouský, B. – Jirsák, P. – Staněk, M., 2017), but also before (Gibson, R. et al., 1998), on the economy. This dilemma is complexly conditioned by the increasing uncertainty, discontinuity, chaos and paradox of the post-industrial world, the

democratization of power, the transformation of large corporate organizations and their nation states into a global network.²

But there are other dilemmas that we will mention without quotation because they express our own abilities and feelings. We have already mentioned some of them in the previous text. On the basis of the above, our results of the work and discussion will be directed towards highlighting them:

- general rules of conception of the terms: norm, normative base, systemic behaviour in the field of sustainable development (environmentalism) in production and logistics,
- application tendencies, conceptual proposal of hierarchical, generic and heuristic approach in the processes of development of the normative base improvement in the field of our research.

The processes of change (of entities) in the normative sphere are constant, they need to be changed, improved. This thesis forces us to do what we have not yet emphasized. Mainly in that we need to define quite clearly what is a norm, a normative base, a set of norms. A standard is a prescription, a rule binding for use in some well-defined area in a legal form. Each sector uses valid standards developed for individual products (mechanical, chemical, food, etc.).³ We would like to note in this connection that already at that time standards were specified not only for trade unions, but for branches of industry. A standard is a document approved by a competent authority, providing rules, guidelines or characteristics for activities or their results for general and repeated use. It is based on the common results of science, technology and experience, and is optimally beneficial to the public. The types of standards are: (1) an international standard adopted by an international standardisation organisation and in the public domain, (2) a European standard adopted by a European standardisation organisation and in the public domain, (3) a Slovak technical standard which is in the public domain and valid in the Slovak Republic.⁴ There is indeed a shift in the platform of opinion, but again so general that business units are not focusing only on standardisation.

This ambiguity also creates a problem for us as authors in that the facts in the field need to be recertified, to be commented on responsibly. As we have also stated, especially at the level:

- international organisations, institutions that deal with this,
- at supranational level,
- at the level of national economies,
- at the level of the major business players at home and abroad.

A special treatment area in these contexts is environmental science and transport. The former is associated with standards that are overcome from day to day, not to mention the periodic shifts of years, of seasons. We dare to say that this is a so-called deadlock, compounded by the statements of European and other global institutions, which, even in prediction or in random processes, cannot responsibly assess and empirically justify the consequences for the development and life on our planet. What is lacking is not only decisive strategic decisions, tactics, but, above all, an operational approach. It is clear that even the 2030 Environment Strategy will not help us. Significant problems arise, particularly in the areas of environmental creation and protection, waste management, groundwater and surface water protection, and renewable energy sources.

Also for these reasons, every good opinion is very important. We believe that understanding should be sought at the level of national economies, of business entities, rather than at a

² See more details:

Gibson, R. et al.: *Nový obraz budoucnosti*. Prague: Management Press, 1998. 261 p.
Rathouský, B. – Jirsák, P. – Staněk, M.: *Strategie a zdroje SCM*. Prague: C. H. Beck, 2017. 272 p.

³ Michník, E. et al.: *Ekonomická encyklopédia*. Bratislava: Sprint, 1995. pp. 210.

⁴ Sivák, R. et al.: *Slovník znalostnej ekonomiky*. Bratislava: Sprint dva, 2011. pp. 210, 212.

supranational, international level. Especially not in ways of centralisation, but in decentralised approaches, informal organisation. Recent surveys confirm that a relatively large proportion of the population distrusts the laws, norms, rules, measures and regulations that have been and are currently being adopted by the institutions that “put them into practice”. We see the perspectives of hierarchical, generic and heuristic approaches in the dispositional solutions of creating a normative basis for sustainable development of production and logistics in the following levels:

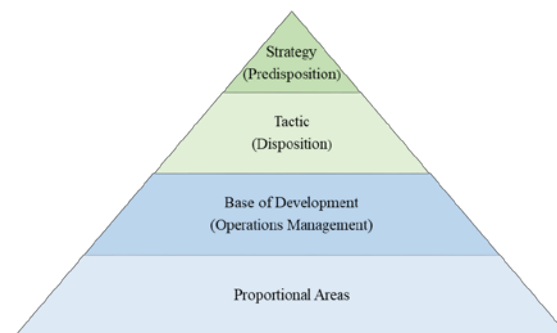
1. To retreat in the field of hierarchical structures (vertical and horizontal organization) to the position of flat organizational structures, especially in the sense of matrix, divisional or other type, for example, fractal and virtual enterprise or enterprise without borders.⁵ In view of the foregoing and the above, there is certainly a greater opportunity to address aspects of future normative activity in the areas we have presented. In this way, the principle, the way of decentralisation and decision-making can also be accepted.
2. To make and rethink the transition from Euro-American to Japanese management in that the element of decentralisation, management and especially motivation to work will be the decisive momentum of synergy (synergisation) between employees and top management.
3. Emphasize and increasingly apply the principles, methods, competencies, causal systems, management concepts of Kaizen, OPT, MRP, network analysis and others related to Industry 4.0 or Industry 5.0 in the theory and practice of business.
4. Of course, also in relation to heuristics (“I found, I discovered”) and its dispositions, which we have already mentioned, especially the method of pause, dialectical paradox, incompetence, postponed ideas. Moreover, also deriving from the classics, but included in this field: the Delphi method and also the organisational modelling favoured by us.

At the beginning of this part of the scientific paper we would like to mention that it was obviously essential for us to make the reader understand that standardization, unification, normalization, inheritance are natural attributes of development processes, entrepreneurship, also the basis for normative activity. Even in what we have not quite mentioned, this includes technical-economic standards, principles, assumptions and methods of their creation, predispositions, management by cost, control and their eventual „rebirth“. Also so-called change management, which, in the event of non-conformity in the production process, but also in other categories, pushes back all planned and other activities to the pre-production stages. This can also happen to large companies that have underestimated the subsequent normative basis and setting of any parameters in the pre-production stages. It is said that the so-called model coupling in this area is unlimited. This is mainly related to the constitution of parameters that are 'tailor-made'. An example is intradepartmental production management.⁶ Each business unit carefully protects its secrets (Bata management system). It is, after all, also the experience and knowledge of the work: Čuba, F. – Divila, E. (1989): *Paths to Prosperity*. Prague: Svoboda, 1989.⁷ The 2030 Agenda, with its 17 Sustainable Development Goals, presents a clear vision for industries and organisations to ensure economic, social and environmental well-being.⁸

The organisational model in Figure 1 is based on the refinement of parameters in the strategic, tactical and operational approach (research) in the field. We think it will be inspiring in what we

have also highlighted in the previous sections of our scientific paper. In particular, in that in the strategy, disposition (tactics) and operational management base we will also indicate the prerequisites, aspects of further comprehensive and integrative development of the transformation process in the studied area.

Figure 1: *Organisational model, pyramidal structure and hierarchy parameters, strategies, disposition, process development bases, integration of sustainable production and logistics development*



Source: own elaboration taking into account the views of prof. Dupař

1. Strategy (Predisposition): overall potential, classical and modern factors of sustainable development of production and logistics.
2. Tactic (Disposition): actual solutions and concepts with respect to time, parameterization of problems, predisposition of solutions at supranational level, institutions and with variation to the normative base in business units.
3. Base of Development (Operations Management): Adapting to the parameters of the formal or informal organization's initiatives, to the regulations of higher institutions, but also to the processes of creating one's own normative base, development and competitiveness to date.
4. Proportional Areas: legislation, transition from centralization to decentralized solutions, innovation, quality, technological development, setting own technical sustainable parameters of production and logistics of business units with the possibility of reasonable costs.

Using the organizational model in Figure 1, we want to express the consistency of our views, assumptions for further refinement of the normative base, also with respect to economic propositions. We see the complexity of the above model mainly in the following:

- in each of the areas we are studying (environment, production, logistics) there are a number of opinions, statements that can be generalized, but they lack a predisposition, an economic expression, a way and adequacy of their justification,
- it is rather presented with the term standardised, which we consider less adequate, and due to the fact that it focuses only on actual and potential problems in the field,
- business units, not to mention tradesmen in general, agricultural and food processing entities (although the Slovak Republic has some of the strictest standards in the European Union in this area), are essentially bypassing them,
- the legislative measures do not yet address even the method of communication, let alone the measures that are natural measures, the methods of implementation in the area we are studying.

There are other predispositions that we want to emphasize to this model, to indicate:

- To follow the idea of Status Quo or Quo Vadis? These are in fact two different counterpoints. However, we think that

⁵ Dupař, A.: *Logistika*. Bratislava: Sprint dva, 2019. pp. 225-236.

⁶ Dupař, A. – Rakovská, J.: *Vnitropodnikový manažment výroby*. Bratislava: Vydavateľstvo Ekonóm, 2010. pp. 7-20.

⁷ Čuba, F. – Divila, E.: *Cesty k prosperitě*. Prague: Svoboda, 1989. 254 p.

⁸ Richnák, P. – Fidlerová, H.: *Impact and Potential of Sustainable Development Goals in Dimension of the Technological Revolution Industry 4.0 within the Analysis of Industrial Enterprises*. Energies : [Journal of Related Scientific Research, Technology Development, Engineering, and the Studies in Policy and Management]. XV. issue 10. Basel: MDPI, 2022. pp. 1-20.

in a certain sense the processes need to be continued, to follow a continuum.

- A complex issue is the subsequent formulation and refinement of so-called standards, especially international auditing standards. That is to say, standards that have been radically guided in their development up to now and are still guided today by unwritten rules, directives and decrees that, for example, are no longer even in force. They even refer only to references or notes on the Internet.

5 Conclusion

The scientific paper (also with the opinions of our former supervisor prof. Dupař) was moved to a special level in that it is an expression of our long-lasting work and joint expressions and reflections also at the previous joint department. The world needs to be brought into other transformations, such as we have only recently dealt with (the coronal crisis) and are currently dealing with (war conflicts). They have cost us and are costing us enormous financial resources, which could be used, for example, for the development of the outlined issues under consideration. The spontaneity of our views at the end of the paper leads (also on the basis of the models presented) to the following statements:

1. The world, our planet in the area under study, also the institutions and bodies involved and their powers need to be brought into different transformations, conditions than are being addressed (proposed) at present. Mainly by changing the parameters that will respect the territories (regional development), the predispositions, the mass consequences, the initiatives in favour of globalisation and internationalisation of development in the area under study.
2. Long-term commitments in the area under review must be based mainly on strategic, tactical objectives, but also on operational research, initiatives and respect for their timeframe. We found that in the proposed time horizons, the predisposition was poorly forecasted, designed. Especially in climate, not to mention production, logistics, internal parameters. The same question comes back to how to organise it. Globally or regionally? Our proposal is more towards territorial integrity, towards regions which, in their resolutions, will respect the rules of quality, sustainability, process development.
3. Another and very serious problem in this area is market and customer ambiguity. It concerns not only uniformity but also standards, which, for example, are quite different in a nearby territory. The issue is not only the US, the EU, Japan and Asian countries, but also compliance with the rules of common practice in the areas of quality, sustainability, environmentalism, production development and logistics. Changing the rules over time must address these areas, especially probability theory.
4. The above-mentioned treatment of the common markets in this area does not give us any effect. It does not concern the unity, the norms of the states in the vicinity. It also includes the current standards of states, which, in the consistency of green transposition, do not apply, for example, in the area of waste management, the circular economy.
5. We are aware that our research results are only a fraction of the situation, which will contribute to the development of further reflection and debate in the field. Especially in the conditions of changing views in the triangle: environment - production - logistics, and especially in the synergy effect.
6. We also believe that artificial intelligence should be "excluded" in predicting future decisions in this process and the area under study. Especially its method, implementation, possible application. Especially regarding the characteristics of the original and modern factors and the development of the above-mentioned triangle.
7. The paper is crucial in that it dimensions the view from strategic, tactical management to operational research to the creation of a normative basis for sustainable production and logistics development.

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PRIVATE EXPERT OPINION – LEGAL FRAMEWORK AND MEANING

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Abstract: The Slovak law on expertness defines an expert opinion, determining who can venture it and how to bring it before the court. Yet, do the courts consider expert opinions as their own? The presented study explores the incentives to commissioning expert opinions and the legal environment of this institute. The community of experts has found flaws in the legislation governing expert opinions, arguing that experts tend to bias their opinion in favour of the client and break the oath they took on behalf of the law. Although the Slovak legislation sets parameters to avoid abuse or defamation of the expert opinion, the judicial practice will show if the degree of acceptance of this opinion is higher than in countries with non-enacted legislation on these opinions despite their wide use in legal proceedings.

Keywords: expert opinion, expert, public authorities, legislation on expertness.

1 Introduction

In past, the law regulating expertness in the Czech and Slovak Republic was governed by Act No. 36/1967 Sb. stipulating:

- public authorities could delegate too complicated issues to judges, general attorneys, officials, etc.
- an expert in a particular area, knowledgeable of the law on expertness, performed expert activities

The legislation concerning experts imposed fundamental rules for creating, performing and terminating an expert's entitlement. The law distinguished experts and schools of expertness, entrusting experts only with simple tasks, leaving jobs requiring research and development to the schools (Act No. 141/1961 Sb. as amended the Criminal Code).

The legislation concerning expertness vested chairmen of regional courts with appointing experts and the Ministry of Justice with electing academic workers in the Czech Republic. The law set the requirements for entering an expert into the register of sworn experts, considering the expert's nomination unclaimed. The specialist had to meet specific conditions, including Czech or Slovak citizenship, competence to perform legal acts, integrity, his name could not be crossed out from the register of sworn experts for longer than three years, sound knowledge and experience, personality traits suitable for being an expert and his approval of the appointment. The law also governed that the specialist had to take an oath before entering the register. The legislation also stipulated the performance of expertness activities, obliging the expert to be responsible, impeccable and free of bias.

The law further governed the expert's fee, suspending and terminating his right to perform expertness activities, stipulated separately in the legislation. Sec. 24 and 25 (this time solely in the Czech Republic) were incorporated into the law to lay down the ad hoc appointment of experts. In the penultimate part, the legislation governed administrative infractions committed by experts (individuals) and schools of expertness (legal entities), followed by general, interim and final provisions. The activities of experts and schools of expertness were regulated by the relevant legislation, i.e. a regulation complementing the Act on Experts and Interpreters.

In Slovakia, the Act from 1967 was replaced by Act No. 382/2004 Sb. the Act on Experts, Interpreters and Translators as amended on 26th May 2004. Since its effect, the Act has been amended (directly or indirectly) more than ten times.

The Act preserved the obligation of expert subjects to support the decision-making of public authorities. However, the Act changes the concept of an expert in expertness activities and an informed layman into a professional expert in the relevant law, i.e. a specialist in expertness activities and the law.

The law governs requirements for performing expertness activities, rights and obligations of experts, requirements for expertness schools to operate, competence of the Ministry of Justice in its activities and rights and obligations of the client.

The legislation governs expertness activities in legal proceedings and before another public authority or for individuals or legal entities if required by a specific regulation. An expert is an individual or legal subject registered as a forensic expert or unregistered if appointed under Sec. 15 of the Act on Experts. When performing expertness activities, experts must abide by generally binding legislation.

In specific parts, the legislation governs requirements for activities of experts and relative schools, registering individuals or legal entities as forensic experts, specialists at expertness schools, performing expertness activities, expert's fees, termination of the entitlement, administrative infractions and penalties. The law regulates the performance of expertness activities irrespective of the expert opinion being commissioned by a public authority or a private client. In such a case, the expert shall abide by the generally binding legislation, i.e. the Act on Experts, Interpreters and Translators as amended. Expert opinions are governed by Sec. 209 of the Civil Procedure Code, under No. 160/2015 Sb. (civilný sporový poriadok).

§ 209 Act No. 160/2015 Sb. splits into three paragraphs:

(1) A private expert opinion is submitted by a party without the court requesting it.

Although governed only by the Civil Procedure Code, the private expert opinion is also admissible in criminal and administrative proceedings. The Criminal Code (Act No. 301/2005 Sb. – the Criminal Code) and Administrative Procedure Code (Act No. 71/1967 Sb. on administrative proceedings, the Administrative Procedure Code) allow litigants to submit an expert opinion not required by the instituted public authority.

(2) If the complaint contains a private expert opinion including all prerequisites and a determination that the expert is aware of the consequences of filing a perjured report, the expert opinion has the same validity as a report produced by a specialist appointed by the court.

The legislation puts the private expert opinions on the same level as an opinion commissioned by a public authority if containing an expert determination. Yet, there have been many cases when the court, besides the conclusions of the expert opinion, takes into consideration whether the expert opinion was made at the court's request or privately. This situation may lead to a biased judgement against the privately made report. Although the court may ignore the private expert opinion or question its relevance in many cases, the defence can sometimes blame itself for misunderstanding the 'expert' question or choosing poor tactics when defending the client.

(3) If a private expert opinion is being made during the proceedings, the expert may inspect the files or get the necessary information for producing the report otherwise.

The availability of the information and protection of the expert is governed by separate legislation, entitling the specialist to obtain all the data needed for compiling an expert report and get the data and evidence from the client who does not belong to judicial or public authorities and has not submitted the evidence yet.

The article explores the possibilities of commissioning private expert opinions and related legislation within the Slovak body of laws.

2 Materials and Methods

When considering a position of forensic experts in Slovakia, we must study, besides relevant Slovak literature, expert opinions from developed countries, including articles indexed in the Web of Science or Scopus.

We use content analysis for data collection, inspecting laws governing private expert opinions, i.e. 382/2004 Sb. as amended, its statutory instruments and relevant legislation (Criminal and Civil Procedure Code and the Rules of Administrative Procedure). We also explore the global trends in the expert's responsibility presented in scholarly journals, using formal logic methods of data processing: analysis, synthesis, generalization, deduction, abduction, comparison, observation, etc.

3 Results

3.1 Legislation on commissioning and using private expert opinions

Act No. 382/2004 Sb. governs the creation, performance, termination, administrative infractions and penalties of expertness activities, stipulated in Sec. 17 of the Act:

- Clause 1. Expert opinions may be submitted in writing, or orally in the proceedings before the court or other public authorities to be recorded.
- Clause 2. The pages of the expert opinion in a documentary form shall be numbered, bound and tied by a string. The loose ends of the string shall include a sticker, equipped by the expert's seal appendant to the document. Appendices to the document do not have to be numbered.
- Clause 3. If the expert opinion is submitted in an electronic form, each copy shall include a certified electronic signature or seal and a stamp containing the date of the execution.
- Clause 4. A written copy of the expert opinion contains a front page, introduction, opinion, conclusion, and appendices to ensure the reviewability in court and the expert determination.
- Clause 5. Clause 5 defines all mandatory parts of the expert opinion.
- Clause 6. The expert determination is integral to an expert opinion, including the expert's ID, specialization, the serial number of the act under which the expert opinion is qualified and the declaration of the expert that he/she is aware of the consequences upon delivering a false expertise
- Clause 7. Upon the request of the client, the expert confirms, completes in writing or explains details of the expert opinion.
- Clause 8. The expert completes the expertise without undue delay, claimless to a fee if its completion leads to removing methodological and formal errors herein.
- Clause 9. The completion of the expert opinion must not change the original purpose of the document.
- Clause 10. The expert shall keep a duplicate of the submitted expert opinion in writing, signed with his/her handwritten signature or certified electronic signature or certified seal provided with a certified stamp containing the date of the execution for a duration of 10 years.

The parameters of the expert opinion are governed by Regulation No. 228/2018 Sb., introduced by the Ministry of Justice under Act No. 382/2004 Sb. Sec. 19 of Regulation governs the structure, front page and content of the expert opinion:

- Clause 1 outlines the front page of the expert opinion (suggested in Appendix No. 5 of Regulation) and refers to the structure of the expertise (Appendix No. 6), including patterns for expert reports in civil engineering, realty valuation, psychology and counselling psychology.
- Clause 2 lays down the rules for making copies of the expertise.

Expert and private expert opinions are governed by the following legislation:

- Act No. 160/2015 Sb., Civil Procedure Code:
 - § 187 Means of evidence involve expert evidence proceedings and opinion
 - Fourth title:
 - § 206.
 - § 207 expert evidence proceedings allow the court to establish expert evidence as a means of evidence
 - § 208 the performance of expert evidence involves a written execution of the report so that the court may hear the expert.
 - § 209: private expert opinion involves a report delivered by a party without the court's order
- Act No. 301/2005 Sb., Criminal Code:
 - § 36 Defence lawyer may not be an attorney engaged by the court as an expert to the litigation.
 - § 53 The authorized representative of the participating person and the aggrieved party may not be a person engaged by the court as an expert to the litigation.
 - Third title:
 - § 142 expert activities: in criminal proceedings, the presiding judge engages an expert in delivering an expert opinion.
 - § 143: involves engaging an expert, school of expertness and establishes the procedure of appointing an ad hoc expert
 - § 144: deals with a potential conflict of interests an expert may be exposed to
 - § 145: producing an expert opinion and hearing the expert involves setting out the fundamental rules and implementation of the expert opinion and hearing of the expert
 - § 146 errors in the expert opinion: this section establishes the procedure in the event of a questionable expert opinion
 - § 147 expert opinion provided by a school of expertness: this section defines a situation when a school of expertness is engaged in producing an expert opinion.
- Act No. 71/1967 Sb., Administrative Procedures (Civil Procedure Code):
 - § 34 Evidence: the expert opinion is considered evidence.
 - § 36: If an expertise on essential facts is required, the administrative authority appoints an expert
 - § 39 An affirmation made before an administrative authority shall not replace an expert opinion
- Related legislation

3.2 Expert opinion commissioned by a private client

An expert is a person with profound knowledge, experience, education, professional practice or skills in a field beyond the purview of a reasonable person. Unlike witnesses allowed to testify only to things they saw, experts are entitled to give testimony in litigation based on their specialization (The Role of Expert Witnesses in Civil Litigation – Baker Law Group, 2023).

A growing complexity of legal disputes in construction engineering led to an increased demand for expert witnesses in various aspects of judicial proceedings. Experts appointed by the parties have become common when considering cases from many fields, including technical, scientific, legal, valuation and quantity analysis. Expert witnesses must express an objective expert opinion on issues essential for settling the case and which are beyond the knowledge and expertise of the court. Experts are appointed either by one or more parties or a court. Increasing demand for expert evidence in civil proceedings and business arbitrations compels authorities to focus more on the duties of a forensic expert, including sanctions arising from their non-performance (Expert Witness Duties in Construction Disputes, 2023).

An expert opinion may be commissioned by a public authority, individual or legal entity, resting on a concise definition of the issues the expert will be dealing with. Experts are not entitled to respond to legal issues of the case. The Register of Forensic Experts administered by the Ministry of Justice of the Czech Republic (The Register of Experts, Interpreters and Translators) can be instrumental in finding a relevant specialist, or we can address a registered institute or school of expertness. When no expert is registered for the field, or the expertise of the specialist is exceptionally costly or delicate to make, public authorities may appoint a person not included in the register of forensic experts to deliver an expert report (Expert Opinions and All You Need to Know | Articles, 2023). Although clients requesting an expert opinion are predominantly individuals, expert activities have been governed by the same legislation since 1967, when the state was the only applicant for expert reports (The New Legislation Leaves Expert Witnesses Uninterested, Authorities Cry for Forensic Psychologists and Sexologists | Business, 2019). Expert opinions are nowadays chiefly requested by individuals or the private sector trying to settle property, matrimonial or inheritance disputes, tremendously boosting the demand for expert services. The rapid economic growth or changes in the business environment encourage people to buy or sell real estate, make investments, merge companies or reassess the business value, only stressing the notable lack of field specialists.

If a public authority commissions an expert opinion, the appointed expert must not refuse it, subject to the following circumstances: a) serious health issues; b) serious family issues; c) unexpected employee's duties; d) other adverse circumstances; or e) if the legislation decides otherwise. If a private (individual or legal) entity commissions an expertise, the appointed expert may refuse to perform the task for any reason. The public authority of a state other than the Czech Republic is deemed a private person, releasing the specialist from the duty to comply (Vladimír Sharp, 2022). The right to refuse to produce an expert opinion when commissioned by the private sector encourages free enterprise, allowing forensic experts, who are also entrepreneurs, to decide for whom and under which conditions they are willing to work. Private subjects must count on the possibility of an expert's refusal, although well-paid and given enough time to deliver a quality report.

Expert opinions may be required in the civil, administrative and criminal proceedings. In civil judicial proceedings, the court may only hear the expert, or request an affirmation or opinion. An expert opinion in writing may be reviewed by another specialist or a specialized institute. The judge may impose a duty upon anybody to consult an expert, submit necessary documents and explain the matter. In the administrative proceedings, although all expert reports are predominantly in writing, an expert could also be heard. The same applies to criminal proceedings, where the specialist dictates his conclusions in a report. Experts are entitled to inspect the files, be present at the hearing, ask questions and suggest producing further evidence (Expert Opinions – Znalci.com, 2023).

An expert opinion made by a court or party-appointed specialist party is responsible for its credibility and truthfulness. According to the legislation, expert reports must include a clause informing that the expert is aware of the consequences of not delivering a veracious document, impairing the integrity of the proceedings. An expert opinion commissioned in Italian criminal proceedings should provide further evidence on the case requiring technical, scientific or artistic knowledge. This procedure involves analysing and expressing opinions, leading to the settlement of the case (Regulations Governing Expert Evidence Commissioned by a Court or Party in the Italian Criminal Process, 2023). According to (Court-Appointed Experts | Office of Justice Programs, 2023), Rule 706 of the Federal Rules governs that federal courts appoint experts, empowering judicial authorities to impose measures for decision-making. The judicial order to designate an expert is issued before judicial proceedings commence. The court has unfettered discretion over selecting an expert, including a party-

agreed specialist or court, profession or academy-appointed expert. The court and expert communicate in writing or at a conference where all parties may be present. The expert must inform the parties about his findings through a written report, statement or testimony at the public court hearing. The expert may be called on to testify and undergo cross-examination. The expert is entitled to indemnification via means stipulated in the legislation or agreed upon by the parties together with other expenses. The duties of a court-appointed impartial expert may include investigating facts, examining physical evidence, collecting information, performing preparatory tests, inspecting the institution, evaluating documentary evidence and participating in the settlement.

A court may appoint a forensic expert to consider the facts relevant to the expert's competence, including cases of civil procedure and criminal law where the designation is compulsory (as governed by the judiciary). Experts may be appointed for preliminary or pre-trial proceedings, making no significant difference for civil, criminal or administrative proceedings. The litigants may designate a specialist whenever they want. An expert opinion made by a forensic expert (a specialist registered in the Register of Forensic Experts) appointed by a litigant is equal to an opinion given by a court-appointed specialist if it contains an expert's clause stating that the expert is aware of the consequences when giving false testimony (§ 127a the Civil Procedure Code; § 110a the Criminal Code). Although the litigants do not have to follow any specific procedure when appointing an expert, the opinion must inform that the expert is entitled to the expert's fee, independent of the result of the expertise. The specialist must not be the same person for both litigants (European E-Justice Portal – Find an Expert, 2023). Although appointing and employing forensic experts observes general rules, relevant factors and procedures may influence public and private authorities when receiving and discussing expert reports. While legislation may also significantly affect public authorities, private subjects enjoy more flexibility in appointing and cooperating with forensic experts.

The Anglo-American legislation allows the courts to rely heavily on forensic experts as witness specialists when settling disputes. Experts, required to be unbiased and independent, do not directly work for the court, but attorneys-at-law, who want to win the litigation for their clients (Fairley & Huber, 2021); i.e. it is lawyers (private subjects) who commission expert opinions in the Anglo-American legal system.

The Anglo-American and Czech legislation follow the same ethical standards obliging forensic specialists to non-disclosure, irrespective of the situation. Experts are obliged not to disclose any facts learnt when and after performing the expertise. Only the client may release the specialist from the duty of non-disclosure (Duties – Experts, 2023), preventing the leak of sensitive information and enhancing the credibility of expert opinions.

Expert reports commissioned by private subjects and public authorities differ in several ways, e.g. entitlement to an expert's fee. In the event of the private sector, the expert is entitled to the expert's fee under an agreement with the client; otherwise, the expert's fee is subject to the relevant legislation of Regulation on the Expert's Fee. A public authority always abides by Regulation (Vladimír Sharp, 2022).

The Czech legislation regulates expert's fees and expenses related to expert opinions, governing that forensic specialists may be rewarded under a contract with the client or Act on Forensic Experts and Regulation No. 504/2020 Sb., on the Expert's Fee. If a court or public authority, including administrative bodies, commissions an expert opinion, the appointed expert is entitled to a fee according to the legislation. Besides the expert's fee, the specialist is also entitled to compensation for cash expenses and a loss of time, including travelling expenses. Court-appointed experts are entitled to advance money to compensate for their costs. The costs of civil proceedings involve expenses related to the performance of expert opinions. While the successful litigant is entitled to the

reimbursement of costs, partial achievement means that the court either fairly redistributes the reimbursement of costs or declares that neither litigant is entitled to any compensation. The costs of criminal proceedings, including execution proceedings, are paid by the state. If the defendant was found guilty upon final and conclusive judgement, he/she is liable to reimburse the costs to the state, including the cases when the expert opinion was paid by a lump-sum payment. The costs exceeding the limit are paid by the state. The costs of the expert opinion not required by the state, subject to exception, are not covered by the state (European E-Justice Portal – Find an Expert, 2023).

The Czech legislation governs the reward system and costs related to expert opinions in a specific way. If a public authority, e.g. a court or an administrative body, commissions expertise, the forensic expert is not entitled to a contractual fee but is rewarded according to the legislation. On the other hand, court-appointed specialists are entitled to advance payments for their expenses, allowing them to cover costs related to producing the opinion as soon as the proceedings commence. The civil proceedings involve the costs of the report in the costs of proceedings, including the compensation for the successful litigants. In criminal proceedings, the state covers the costs, which shall be reimbursed by the defendant if found guilty. Forensic experts commissioned by public authorities are not entitled to contractual fees, which may discourage them from cooperating with government bodies and attract them to more lucrative contractual earnings.

All clients shall abide by Regulation No. 502/2020 Sb. § 40, governing the duties of the clients. The customer shall ask pertinent, not trivial (a query readily answered by anybody) or legal questions, which should be directed to a law firm. Clients shall inform the expert of the purpose of his opinion and communicate the facts relevant to the credibility and trustworthiness of the report (Reading Expert Opinions, 2023). Experts shall work independently and not under the influence of other persons, threatening the credibility of the report. When performing expertise, experts shall not be subordinate to another person. On the other hand, specialists must remain unbiased towards the client, any other litigant or party, attorney, public authority or the case (Vladimír Sharp, 2022). These restrictions ensure the credibility and trustworthiness of expert opinions, preventing public authorities or private subjects from abusing the process.

Police, as a public authority, gave information about using expert opinions when investigating crimes, including bodily harm. The information about criminal activities spans from 1st January 2022 to 5th December 2022. Forensic experts were engaged in 22.2% of the notifiable cases of bodily harm under § 146 of the Criminal Code. MUDr., as a forensic specialist, was appointed in 20.8% of the notifiable cases. Police asked coroners about the cause of the bodily injury in 100% of the cases. No case involved an opinion on self-defence as a cause of the injury (0%). Asking about a serious bodily injury occurred in 37.4% of the cases where grievous bodily harm was possible but had not happened. Given the experts' varied specializations, no concise methodology for commissioning expert opinions exists (Commissioning Expert Opinions – Police of the Czech Republic, 2023). The Czech police authorities have not set official rules for commissioning expert opinions.

Civil proceedings entrust forensic experts with many essential tasks, including streamlining complex information. Specialists must decode complicated data and present them intelligibly to the judge and jury, involving the clarification of technical terms and processes, e.g. when considering medical malpractice. Experts also voice opinions. Unlike non-expert witnesses, who testify only to the seen facts, specialists express their professional opinion on the submitted evidence. For example, an accident reconstruction expert may confirm or challenge the allegation in the case. Forensic specialists also set professional standards to prevent professional malpractice. Experts also clarify whether the defendant followed the generally established procedures in the field. In civil proceedings, where monetary

compensation is required, economic and financial experts are essential for calculating the damage caused by violating the contract or injuring a person (The Role of Expert Witnesses in Civil Litigation – Baker Law Group, 2023); the litigants rely heavily on expert witnesses, helping them defend in the case. Medical litigations involve medical examiners and coroners voicing opinions on the cause of the injury, the likelihood of long-term detrimental effects or the adequacy of provided medical care. The process of determination involves the medical report as an independent expert opinion or review of medical documentation and transferring the information between the parties (Eskay-Auerbach, 2019). Civil and criminal proceedings discriminate between attending physicians and independent reviewers in terms of the Bar and patient's duties. The attending doctor tends to defend the patient's interests, inclined to depart from an unbiased opinion, which requires strict objectivity. The misunderstanding of possible partiality may lead to misinterpretation, unduly influencing the decision of the court. *Westerhoff v. Gee Estate* case from Canada (Waldman et al. 2020) shows how providers of medical services misrepresented crucial information.

In conclusion, appointing and rewarding forensic experts depends on whether the public or private sector is the client. The former has often limited funds, commissioning expert opinion only if necessary. Public authorities abide by the relevant internal regulations on appointing and rewarding forensic experts, usually varying from those of private subjects. Private bodies are not financially limited when commissioning expert opinions, using the services of forensic specialists even when not necessary. This rule does not apply universally.

4 Discussion and Conclusions

The article aimed to assess the possibilities of commissioning expert opinions and relevant legislation in Slovakia, fulfilling our research aim.

Unlike, among others, the Czech Republic, the Slovak legislation on expertness activities permits the private sector to appoint an expert. Upon considering the client's inducement to commission expertise, public authorities must deem the private expert opinion as if commissioned by a public body.

The incentives to call upon an expert involve the following scenarios. Firstly, the court does not accept the view of one party, asking technical questions in a way the litigant does not like. In such a case, the participants or their attorneys-at-law appoint an expert who will professionally consider the case in favour of the client, shed new light on the matter and twist the course of the proceedings.

Private subjects often appeal to experts to help explain a complex problem during the proceedings. Considering the issue trivial, the court may reject the litigant's request to call upon a specialist, compelling the party to appoint an expert privately to clarify the matter. Secondly, a litigant may plead intentional or unintentional bias or prejudice by a court or public authority. In such a case, new expertise sheds new light on the issue and materially corrects the report commissioned by the court or public authority. The expert is not entitled to consider the formal correctness. The legislation does not govern who can commission an audit opinion. Many cases in the administrative procedure have seen an expert appointed by a party only to delay the proceedings until the lapse of time; i.e. the public authority, which must consider the submitted report, acts under time pressure and cannot resolve before the legally prescribed deadline.

Upon producing the expert opinion, the party submits the document to the court or another public authority for consideration.

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Primary Paper Section: A

Secondary Paper Section: AG

COMPARATIVE ANALYSIS OF FEAR IN SHAKESPEARE'S MACBETH AND MIYAZAKI'S CHIHIRO

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Abstract: This article presents an analysis of the psychological impacts of fear in Shakespeare's *Macbeth* and Miyazaki's *Spirited Away* as depicted through the characters' actions through a Psychoanalytic lens. Drawing upon the relationship between fear, power, and identity, this study delves into how fear operates as a driving force in shaping the trajectories of these protagonists' lives – how Macbeth's descent into tyranny and moral decay is traced back to his initial fearful response to the prophecies while Chihiro's journey through the supernatural realm of the bathhouse serves as a foundation for her transformation, wherein her confrontations with fear lead to a recalibration of her self-perception and agency.

Keywords: Shakespeare; Macbeth; Miyazaki; Spirited Away; Foucault; Psychoanalysis; Fear Power; Identity.

1 Introduction

Shakespeare's play, *Macbeth*, is often taken as a literary masterpiece. Through its pages, the Bard conveys a wide range of human motivations and emotions. Be it Lady Macbeth's greed, Macbeth's pride or, indeed, both their ambition, Shakespeare was able to depict the follies of having any emotion to the extreme. Through the creative inlay of the plot, *Macbeth* also serves as a depiction of fear in the eponymous play. Hayao Miyazaki's 2001 motion picture *Spirited Away* similarly serves as a beautiful blend of realism and fantasy. Through its layers of cultural depictions, it tells the tale of a young Chihiro's adventures in a Japanese bathhouse for supernatural beings. This young girl is separated from her parents and is made to work in order to free both herself and her family. She is initially terrified of the creatures surrounding her and it is this fear that keeps not only her, but also the audience, bound to this fantastic location.

One of the themes in both the stories above revolve around the idea of fear as an overbearing and all-encompassing emotion which leaves little room for freedom or growth. Whether it was Macbeth's initial hesitation to murder his King, Lady Macbeth's resulting trauma or Chihiro's trepidation of being alone, all three characters are held prisoner to their circumstances due to their fears. However, while both King and Lady Macbeth let fear consume them, Chihiro is able to face her fears and thereby escape from her own prison. Indeed, the Japanese title of Miyazaki's animation, *Sen to Chihiro no Kamikakushi*, translates to the gods mysteriously abducting a human soul who has angered them in some way. This implies a feeling of ill will toward the human who, in this case, is Chihiro and her parents. It is thus highly plausible that a young girl would be terrified of an angered god.

It can then be seen that there are many forms of fear, as represented in the works above. Whether a man, woman or child, fear can keep a steady grasp on one's sensibilities and better judgement. Macbeth is afraid of the consequences of his actions and then is fearful of the prophecy which predicts his death. Lady Macbeth become psychotic and paranoid once the 'deed' is done. Chihiro is afraid of moving to a new city and of the strange and powerful creatures in the bathhouse. Each of these characters contend with their individual forms of fears in their own ways. Macbeth sets out to kill all those who may kill him in the future and Lady Macbeth takes her own life. However, young Chihiro is able to face her fears and overcome them at every turn. These are the characteristics that make a protagonist ever-lasting in the eyes of the audience.

By facing her fears, she is not only able to remove its power over her, but she is able to leave the supernatural bathhouse having grown into a more mature individual. The subtle differences in the choices made by the characters designed by Shakespeare and Miyazaki's depiction of a young girl reflects the worst and the best in humans and their preconceived notions of fear, ambition and courage.

1.1 Review of Literature

Shakespeare's *Macbeth* is one of the most widely read works of the Bard. As mentioned above, the characters within this play demonstrate a level of complexities in their mental make-up that was hitherto unheard of. As such, a few scholars have written psychoanalytical examinations on each of the characters in the play, most notably on Macbeth and Lady Macbeth (Khikani, 2023; Elenany, 2015; Churchill, 2015; Blum, 1986). Khikani's (2023) in-depth review proposes that, since humans are akin to animals who are driven by instinct and drive, those drives are often aggressive and exponential in nature. However, Elenany (2015) argues that since the human psyche is developed from a young age, it would be imperative to examine the motivations, goals and aspirations of each individual. Thus, the unconscious of the characters have to be studied using the psychoanalytical lens. Indeed, people tend to react in different ways when faced with difficult situations. Churchill (2015) purports that both Thane and Lady Macbeth's fear and grief became more 'annihilatory' rather than 'transformative'. On the other hand, Blum (1986) further settles the need for 'psychoanalytic insights' as it is only with these insights that both the 'primitive and advanced aspects of the human psyche' are discovered.

On the other hand, Miyazaki's creation *Spirited Away* occupies a unique position within the realm of Japanese animation, boasting a rich and multifaceted discourse that accompanies its narrative tapestry. Each character embedded within the fabric of this tale contributes to a resonant realism, a testament to Miyazaki's storytelling prowess, enabling audiences to establish a profound identification with these personas, even as they emerge as supernatural entities rooted in a distinct cultural milieu. This dynamic interplay has engendered a multitude of scholarly explorations focused on the psychoanalytical aspect underpinning the complex personas crafted by Miyazaki.

In an insightful psychoanalytical exploration, Athira (2023) illuminates the transformative arc of Chihiro's character. Although initially portrayed as a young and somewhat immature girl, Chihiro's journey through arduous trials serves as an alchemical crucible, forging her into a poised and self-reliant young adult. This metamorphosis underscores the profound impact of adversity in shaping one's character and fortitude. This perspective is echoed by Sun (2020), who discerns a poignant undercurrent within Chihiro's familial dynamics. He further contends that the root of Chihiro's immaturity lies in her parents' inadvertent failure to provide the requisite support in her time of need. Rather than empathetically acknowledging her sense of isolation upon departing from her long-time friends, Chihiro's parents manifest an unintended neglect, thereby setting the stage for Chihiro's solitary odyssey. This mirroring of Chihiro's parental experiences is further extrapolated through the prism of Yubaba's authoritarian parenting style, characterized by a domineering influence that resonates with insights presented by Papastavros (2021).

Fear, according to Foucault, establishes a precarious dynamic wherein an individual's perception of self-worth becomes entwined with their capacity to accommodate and succumb to fear's dominion (Kelly, 2020). In this vein, fear becomes a pernicious force when it evolves beyond a mere emotional response and transmutes into a defining facet of one's identity. Macbeth's tragic trajectory attests to the corrosive nature of such

fear-induced identity entanglement. His dread of the prophetic revelations, coupled with the allure of power, sets in motion a series of transgressions that not only lead to his moral decline but also cement his inexorable fate. Macbeth's inability to reconcile his fear with his burgeoning ambition drives him further into the abyss, ultimately culminating in his downfall. His fearful submission to the prophecy becomes the fulcrum upon which his actions pivot, inexorably leading to his tragic demise.

Conversely, Miyazaki's portrayal of Chihiro presents an illuminating counterpoint to Foucault's premise. Chihiro's journey unfolds as a narrative of fear transformed into empowerment through her tenacious defiance of fear's grasp. The spectral realm of the bathhouse, wherein Chihiro finds herself, symbolizes the domain of her fears, both tangible and intangible. While her initial hesitations and anxieties hold her captive within this ethereal plane, her transformative evolution is catalysed by an astute realization: fear's dominion can only hold as long as she allows it to shape her identity. Chihiro's resolve to confront her fears head-on, exhibited in her determined descent down the rotting stairs, serves as a pivotal turning point. Through this courageous confrontation, Chihiro reclaims agency over her own narrative, thereby breaking the shackles of fear's control.

The dichotomy between Macbeth and Chihiro offers a compelling study in the contrasting trajectories that fear can engender. Macbeth's fearful capitulation ultimately seals his fate, an embodiment of Foucault's assertion of fear's power when permitted to define one's identity. In contrast, Chihiro's emancipation from fear's grasp underscores the potential for resilience and personal growth when fear is acknowledged, confronted, and ultimately overcome. Her narrative serves as an eloquent testament to the transformative potency that lies in embracing fear as a catalyst for change.

The narrative tapestry of *Spirited Away* is intricately woven with threads of identity formation, ideological maturation, and moral development, all orchestrated through the prism of Chihiro's tumultuous journey. This confluence of psychological nuances and existential dilemmas necessitates a psychoanalytical vantage point to unearth the intricate tapestry of emotions underpinning every consequential action and pivotal decision. This thematic tapestry is deftly illuminated through the works of Swale (2015) and Brockmann (2008), who articulate the profound relevance of the psychoanalytical approach in unravelling the multidimensional layers of *Spirited Away*.

Spirited Away stands as a remarkable testament to Miyazaki's ability to interweave narrative depth with a palette of human experience. The scholarly works with its psychoanalytical examinations reflect the profound impact of Miyazaki's creation, inviting us to traverse the labyrinthine corridors of the human psyche as illuminated by the transformative journey of Chihiro and her supernatural companions.

1.2 Methodology

Shakespeare's renowned work *Macbeth* stands as a quintessential masterpiece by the Bard, resonating widely among literary enthusiasts. Within the fabric of this play, the characters unveil a profound depth of psychological intricacies, hitherto unparalleled. This has spurred a corpus of scholarly discourse, particularly of psychoanalytical nature, focused on distinct characters, with Macbeth and Lady Macbeth taking centre stage (Khikani, 2023; Elenany, 2015; Churchill, 2015; Blum, 1986). Khikani's (2023) scholarly analysis offers a comprehensive perspective, suggesting that human behaviour, akin to animal instinct, often exhibits an inherent aggressiveness driven by primal instincts. Elenany's (2015) discourse, conversely, emphasizes the necessity of probing the motivations, goals, and aspirations that evolve from early stages of human psyche development. Thus, a psychoanalytical lens is imperative for unveiling the characters' unconscious facets.

The diversity of human responses to adversity remains a central theme. Churchill (2015) posits that Thane and Lady Macbeth's experiences of fear and grief lean toward a state of 'annihilation' rather than transformation. In contrast, Blum (1986) underscores the indispensability of 'psychoanalytic insights' in excavating both primitive and sophisticated dimensions of the human psyche. *Macbeth* entwines a tapestry of human intricacies, inviting meticulous psychoanalytical scrutiny to fathom the depths of character motivations and responses to the challenges they confront. The scholarly discourse underscored by previous scholars accentuate the value of psychoanalysis in deciphering the intricate facets of human nature portrayed within the play.

Similarly, Miyazaki's *Spirited Away* is one of the only Japanese animations to have an extensive discourse attached to its name. Each of the characters within the story brings a grounded reality which helps the audience in identifying with each of the characters, even if most of them are supernatural creatures from a different culture. It is for this reason that there have been a number of works on the psychoanalytical aspect of many of Miyazaki's characters. Through her psychoanalytical study, Athira (2023) asserts that although Chihiro may have been a young immature girl in the beginning of the story, the struggles that she faces builds her character into becoming a confident and independent young adult. This is further supported by Sun (2020) who adds that it was in fact the parents who were not able to provide the support that Chihiro needed. That, rather than understanding and appreciating the fact that their daughter felt lonely after leaving all her friends behind, they instead ignored Chihiro and her words. This is also reflected in Yubaba's parenting style which is very controlling and dominating (Papastavros, 2021). Additionally, since there is a clear question of identity and development of ideologies and principles in *Spirited Away* as depicted by Chihiro, it becomes imperative to use a psychoanalytical approach to fully comprehend the vast myriad of emotions that go behind every action and decision in the story (Swale, 2015; Brockmann, 2008).

Given the considerations, it becomes not only a compelling pursuit but also an intellectual imperative to meticulously discern the intricate nuances of fear that shape the experiences of the protagonists in both the theatrical and cinematic works. However, to achieve a profound and comprehensive comprehension of these fear-induced attributes, a more exhaustive exploration is warranted, particularly through an analytical lens inspired by Kelly's (2020) interpretation of Foucault's psychoanalytical framework. This analytical framework holds the potential to unveil a deeper and more nuanced understanding of the multifaceted impacts of fear, encompassing both its detrimental and potentially transformative dimensions.

The critical psychoanalytical approach, as elucidated by Foucault within Kelly's (2020) discourse serves as a potent tool for dissecting the distinct attributes and consequential decisions enacted by the characters across both the theatrical and cinematic versions. Employing this approach allows for an incisive exploration of the underlying character traits and intricate personalities that drive the characters to undertake their pivotal actions. Indeed, this analytical method holds the capacity to elucidate the 'psychological reality' (Hossain, 2017) of fictional characters, enabling a comprehensive deconstruction of their motivations and aspirations.

Furthermore, while Foucault's stance on the Freudian Psychoanalytical Criticism Approach may be characterized by ambivalence, he contends that the integration of 'existential phenomenology' can furnish a more comprehensive elucidation of 'certain dimensions of the human experience' (Kelly, 2020). In essence, this approach posits that characters within a literary or cinematic narrative possess their own latent "unconscious internal states that motivate [their] overt actions" (Sollod, 2008). Consequently, a judicious and scholarly examination of these characters, illuminated through the lens of Foucault's psychoanalysis, can unravel the profound interplay between fear, motivation, and courage in the face of adversity.

Thus, a meticulous critical inquiry into the motivations, decisions, and psychological underpinnings of the protagonists within both the theatrical play and cinematic masterpiece stands poised to elucidate not only the destructive ramifications of fear but also the indispensable role that courage assumes in navigating dire circumstances. This article offers an opportunity to glean insights into the human psyche, discerning the intricate interplay between internal fears and outward actions, ultimately enriching our comprehension of the complexities of human behaviour and the tenacity required to confront and overcome adversity.

2.1 Fear of the Unknown

Within the context of the Bard's intricate theatrical composition, the character of Macbeth emerges as a distinguished military leader whose valorous accomplishments culminate in a notable elevation to the esteemed rank of Thane, an honour conferred upon him in recognition of his triumphant battlefield exploits in the service of his Sovereign (Chakraborty et al., 2023). The narrative unfolds as a series of fateful events, catalysed by the convergence of ambition, treachery, and the abuse of power.

Notably King Duncan, a figure of wisdom and benevolence, extends his gratitude and recognition to Macbeth, choosing to honour both him and his esteemed kinsmen through a visit to the general's home. However, it is at this pivotal juncture that the sovereign's trust is tragically betrayed, as the idyllic façade crumbles to unveil a malevolent design. Macbeth's transformation from a valiant defender of the realm to an agent of treachery is catalysed by the manipulative machinations of Lady Macbeth, an ambitious and cunning character who skilfully exploits her husband's vulnerabilities and fears to orchestrate the regicide (Schein, 2018).

The Bard's masterful portrayal of Macbeth's transformation from heroic general to willing pawn in a web of ambition-fuelled manipulation stands as a poignant exploration of human frailty and the complexities of moral compromise. Lady Macbeth's role as the manipulative architect of Macbeth's downfall exemplifies the multifaceted interplay between ambition, power, and the darker facets of human nature. As their tragic trajectory unfolds, the narrative underscores the enduring relevance of Shakespeare's themes, serving as a timeless reflection on the intricate labyrinth of human motivations and the consequences of yielding to baser instincts.

At the beginning of the play, Macbeth's psychological state is marked by a palpable sense of trepidation, leading him to grapple with the intricate moral and existential dilemmas that unfold before him. Although renowned for his valour and dauntless presence on the battlefield when confronted with mortal adversaries, Macbeth's apprehension is distinctly conspicuous when confronted with ethereal forces, visions, and prophetic revelations that transcend the realm of the palpable and concrete (Anderson, 1963). This internal conflict stems from his innate aversion to stepping into uncharted territories of the metaphysical, where his authority and dominion are rendered ineffectual, and the parameters of control become enigmatic and elusive.

Indeed, Macbeth's title of Thane and an esteemed warrior underscores his unwavering adherence to principles of honour, chivalry, and virtuous intentions, values that resonate deeply within the ethos of his societal context. This valiant disposition finds resonance in his profound reluctance to commit acts that would transgress the sacrosanct norms governing guest hospitality and protection. Macbeth's disagreement at the prospect of perpetrating violence under the very roof he safeguards, and against a guest granted his sanctuary, stems from an innate reverence for the sanctity of his residence and his concern over invoking divine retribution for such an audacious transgression.

Furthermore, Macbeth's internal turmoil is further exacerbated by the gravity of his contemplated act. The assassination of his

own sovereign, King Duncan, constitutes an act of unparalleled magnitude and transgression, bordering on the harrowing realm of patricide (Chakraborty et al., 2023). The prospect of regicide resonates with implications that transcend mere mortal criminality, delving into the annals of moral degradation and the subversion of societal foundations. Macbeth's acute awareness of the enormity of this transgression contributes to the complex interplay of his fear, conscience, and ethical considerations.

Within the intricate tapestry, an additional layer of fear pervades the protagonist's psyche – one that stems from the apprehension of assuming the weighty mantle of kingship and the consequential responsibility of guiding an entire realm. Macbeth's unease and hesitance in the face of this impending role cast a revealing light on the complexities of his character, elucidating an internal struggle rife with uncertainty and self-doubt.

The looming prospect of ascending to the throne, a position that demands not only political authority but also the devotion and allegiance of an entire populace, weighs heavily on Macbeth's mind. As he grapples with the notion of replacing the king, he envisions himself as a pivotal figure; endowed with the onerous duty of inspiring, directing, and safeguarding his subjects. This envisioned role as a revered leader, whose directives would be embraced by the entirety of the realm, presents a formidable challenge that resonates with Macbeth's inherent trepidation and self-doubt.

Amidst his remarkable prowess on the battlefield and his display of martial valiance against human adversaries, Macbeth is confronted with a distinct form of anxiety when contending with the nebulous future that awaits him. This anxiety emerges from a perceived inadequacy in his own abilities to fulfil the profound obligations associated with rulership. The spectre of doubt casts its shadow over Macbeth's self-perception, as he grapples with the nagging notion that his inherent talents might prove inadequate for the multifaceted role he is poised to undertake.

Macbeth's inner turmoil is emblematic of a profound internal dialogue, one that underscores the multifaceted dimensions of his character. His fear of assuming a position of leadership is a testament to his nuanced persona, reflecting an acute awareness of the colossal challenges that come with the sovereignty he is destined to embrace. This apprehension not only adds depth to his portrayal but also serves as a poignant exploration of the psychological intricacies that drive his actions and decisions throughout the course of the narrative.

Thus, Macbeth's initial hesitance and profound trepidation in embracing the course of action set before him represent a multidimensional psychological struggle, emblematic of his internal strife between the corporeal and the ethereal, the moral and the transgressive. His palpable aversion to engaging with the intangible forces of the supernatural and his unwavering commitment to values of honour and sanctity exemplify the intricate web of emotions and moral principles that animate his character. Additionally, Macbeth's trepidation regarding his imminent ascent to kingship imparts an additional layer of complexity to his character, unveiling a narrative thread intricately woven into the thematic tapestry of Shakespeare's timeless tragedy. This portrayal captures the essence of Macbeth's internal struggle, as he grapples with the spectre of leadership and the profound responsibilities that accompany it. The looming prospect of regicide, with its connotations of divine retribution and moral desolation, further compounds the complexity of Macbeth's inner turmoil, weaving a compelling narrative tapestry that explores the depths of human fear, morality, and the inexorable consequences of fateful decisions.

The cinematic masterpiece *Spirited Away*, crafted by the visionary director Hayao Miyazaki, unfolds with a poignant exploration of fear as embodied by the protagonist, Chihiro. Within the film's evocative narrative, Chihiro's initial apprehensions are poignantly validated, casting a spotlight on

the profound themes of vulnerability, isolation, and the inexorable journey toward self-discovery.

At the film's inception, Chihiro's apprehensions crystallize in a heart-wrenching form, vividly capturing the precariousness of her predicament. The foundation of her fear is meticulously laid as her parents, disregarding her cautious admonitions, recklessly tread into an otherworldly realm brimming with supernatural entities. This pivotal moment becomes a harrowing testament to Chihiro's justified anxieties, as the thoughtless actions of her parents irrevocably propel her into a realm of uncertainty, bereft of the familiar and infused with the unknown (Sun, 2020).

Chihiro's ensuing solitude, exacerbated by her parents' transformation into pigs, thrusts upon her a mantle of profound responsibility, a burden emblematic of her transformation from passive observer to active participant. Her initial fears of abandonment and vulnerability, which initially seemed rooted in the realm of imagination, materialize into tangible threats, starkly juxtaposed against her desperate quest to secure her parents' salvation and regain a semblance of normalcy. This convergence of fear and determination presents an enriching tapestry that navigates the intricate realm of the human psyche, underscoring the profound emotional turmoil that defines Chihiro's journey.

Miyazaki's masterful storytelling augments Chihiro's fear with thematic depth, intertwining it with the overarching motif of growth and empowerment. As Chihiro confronts the abyss of the supernatural realm, her fear acts as a crucible, forging an unwavering resolve to overcome her uncertainties and emerge as a tenacious and resourceful protagonist. This transformation, born out of her need to confront her deepest fears head-on, underscores the indomitable human spirit and the transformative potential latent within every challenge.

Spirited Away thus stands as a poignant meditation on the nuances of fear, channelled through the lens of Chihiro's multidimensional character. Her initial apprehensions, crystallized through her parents' heedless actions, mirror the universal human experience of confronting the unknown. Yet, her journey of self-discovery and empowerment reveals the capacity of fear to serve as a catalyst for growth, ultimately metamorphosing into a force that propels her towards transcendence. Through this prism, Miyazaki deftly elevates Chihiro's fear from a mere emotional response to a powerful conduit for narrative resonance, underscoring the intricate intersection of emotion, transformation, and the enduring resilience of the human spirit.

In much the same way, the 2001 film also unveils an analogous introspective narrative, as it commences by acquainting the audience with a disconcerted Chihiro grappling with a potent amalgamation of emotions. Her countenance is marred by palpable apprehension, a sentiment borne out of her impending transfer to a new school, accompanied by the attendant anxiety of forging and nurturing unfamiliar acquaintances and new friendships. This opening sequence artfully captures the intricate emotional terrain of a young Chihiro, whose inner landscape is traversed by trepidation, uncertainty, and the challenges inherent to adapting to unaccustomed circumstances.

Chihiro's psyche is also beset by a profound unease stemming from the sudden and transformative shifts that have come to define her existence. A notable facet of her turmoil is encapsulated in her family's relocation to an entirely new urban zone (Yama, 2018). This overarching transformation acts as a catalyst for Chihiro's initial reticence and unease, serving as a fertile ground upon which her fears grow. The film deftly captures her relatable reactions, which manifest as expressions of her genuine humanity. Her candid declaration, asserting a preference for her prior residence and a reluctance to embrace her new surroundings, underscores her vulnerability and authenticity. In this portrayal, Miyazaki orchestrates a vivid tableau that encapsulates the fragile nature of identity and the innate fear of displacement, effectively harnessing these motifs

to enrich the emotional depth of Chihiro's character (Yoshioka, 2014).

It is within this contextual framework that Miyazaki deftly weaves a thematic narrative thread addressing the profound experience of loss – a theme that resonates not only with Chihiro's relatable journey but also with the broader human experience. The fear of loss, whether it be a loss of familiarity, relationships, or one's own sense of self, finds poignant expression through Chihiro's emotional odyssey. Her initial aversion to change and her reluctance to relinquish the familiar conveys a universal sentiment, one that speaks to the innate human inclination to cling to the known and struggle with the uncertainties of the new. This nuanced portrayal of Chihiro's internal struggle transcends the boundaries of animation, serving as a resonant and relatable exploration of human psychology.

While the film adaptation adeptly mirrors the thematic preoccupation observed within the literary realm, it also etches a compelling portrayal of Chihiro's emotional journey as she confronts the multifaceted challenges posed by transition and transformation. Through her apprehensions and reactions, the film unearths profound reflections on identity, fear, and the irrevocable shifts that shape the human experience. By distilling these complex emotions into a relatable and poignant narrative, Miyazaki encapsulates the essence of the human condition, fostering a profound resonance that traverses cultural and temporal boundaries.

2.2 Acceptance of Fate

Both Macbeth and Lady Macbeth in Shakespeare's *Macbeth* face their own trials and tribulations on their paths to success. Just before King Duncan's regicide, Lady Macbeth's internal landscape is fraught with a palpable sense of fear, a sentiment born from the gravity of the impending act and the disruption it heralds within the fabric of her moral compass. This uneasiness, however, is navigated with a resolute determination, emblematic of her steely ambition and her unwavering resolve to seize control of the situation (Moonik et al., 2020). It is this indomitable ambition that propels her to orchestrate the heinous act while manipulating her naïve husband and his actions. This trajectory of Lady Macbeth's character is marked by a sharp descent from the zenith of ambition to the nadir of guilt. As the consequences of their malevolent actions mount and the weight of their transgressions becomes insurmountable, Lady Macbeth finds herself ensnared in a web of remorse and trauma. The trauma of her involvement gnaws at her conscience, ushering forth a psychological descent that culminates in her own tragic demise and captures the relentless and corrosive progression of guilt as it erodes her once unshakable resolve (Moonik et al., 2020).

Similarly, the character of Macbeth emerges as an embodiment of fear, revealing a complex interplay between manipulation, ambition, and the inexorable forces of destiny. His journey stands as a compelling exploration of the intricate ways in which fear can become both a weapon and a formidable adversary, ultimately shaping the trajectory of his tragic fall.

Macbeth's manipulation of fear is illuminated as a chilling echo of his wife's earlier machinations. Akin to Lady Macbeth's strategic exploitation of his vulnerabilities, Macbeth harnesses fear as a mechanism to consolidate and assert his dominion over the realm he rules, exercising his authority through a reign of terror (Lemon, 2008). His calculated elimination of perceived obstacles on the path to his aspirations showcases the potency of fear as a tool of control, underscoring his descent into a tyrannical and fear-driven governance.

On the other hand, even as Macbeth wields fear as a means of control, he himself becomes ensnared in the suffocating grip of his own trepidations. The haunting prophecy articulated by the three witches, foretelling his demise at the hands of a man 'not born of a woman', serves as a catalyst for his own descent into an abyss of paranoia and terror (Williams, 1982). This ominous

prophecy unearths his innate vulnerability, as he becomes consumed by the fear of encountering an adversary capable of circumventing the natural order of birth. Macbeth's subsequent cascade of actions reflects a desperate endeavour to preempt this ominous destiny, leading to a merciless campaign of ruthless slaughter, targeting perceived threats with indiscriminate brutality, even extending to women and children. Amid this fear-fuelled campaign, Macbeth's tragic arc reaches its extreme with the brutal massacre of Macduff's innocent family – a grim act that catalyses and crystallizes the convergence of his fears and his eventual undoing. This merciless act stands as a testament to the depth of Macbeth's desperation and underscores the inexorable trajectory set in motion by his fear-driven actions. The poignant tragedy of his character lies not only in his manipulation of fear but also in his own profound susceptibility to its grip, rendering him a victim of his own relentless descent into paranoia and self-destruction.

Shakespeare's *Macbeth* therefore serves as a profound meditation on the multifaceted dimensions of fear, personified through the intricate evolution of both Macbeth and Lady Macbeth's characters. The Bard masterfully probes the depths of the human psyche, revealing the volatile interplay between ambition's allure and the haunting shadow of remorse, thus elevating *Macbeth* into a timeless contemplation of the human condition. Macbeth's utilization of fear as a tool of control, juxtaposed against his own tormenting fears, provides a poignant commentary on the potent and intricate role that fear plays within the human psyche. As Macbeth's journey unfolds, fear emerges as a force both wielded and endured, underscoring the narrative's timeless resonance and the enduring capacity of Shakespeare's work to illuminate the intricate depths of the human experience.

In the context of Miyazaki's *Spirited Away*, the transformative journey of the protagonist, Chihiro, presents a profound exploration of multifaceted fears that span from the loss of identity to the fear of the unknown and impending loss. Chihiro's character arc is artfully woven into the narrative fabric, evoking a compelling portrayal of personal growth and resilience in the face of adversity. Chihiro's emotional landscape is intricate and marked by a series of formidable challenges. Her apprehensions, which include a tangible sense of loss of identity, a palpable fear of relinquishing the known and familiar, and an innate dread of venturing into uncharted territories, collectively embody a range of profound human anxieties. However, what truly distinguishes Chihiro as a resilient and mature young woman is her unwavering determination to confront these fears head-on.

Central to Chihiro's journey is her willingness to transcend the boundaries of her own fears. Her resilience is poignantly depicted in a pivotal moment where she ventures down a rotting and foreboding flight of stairs, an evocative metaphorical representation of her descent into the unknown abyss. This courageous act is a testament to her character's development, signifying her newfound ability to navigate uncharted waters despite the overwhelming presence of fear. In facing these decaying steps, Chihiro not only confronts her own fears but also symbolically asserts her agency over her destiny.

This transformative process of confronting fear and embracing the unknown acts as a crucible for Chihiro's growth. Her journey, depicted through this lens, illustrates the transformative power of resilience, tenacity, and an indomitable spirit in the face of adversity. As she grapples with the loss of her conventional identity and navigates through the labyrinthine uncertainties of the supernatural realm, Chihiro's evolution from an apprehensive girl to a poised and empowered young woman serves as an inspirational embodiment of the human capacity to overcome fear and emerge stronger on the other side.

Chihiro's ingress into the otherworldly bathhouse in the narrative not only showcases the depth of Chihiro's own apprehensions and anxieties but also serves as a lens through which to explore the reciprocal trepidations held by the denizens

of the supernatural realm. Indeed, this multifaceted convergence of unease underscores the film's thematic exploration of the interplay between the known and the unknown, and the intricate dynamics that unfold as two dissimilar worlds collide.

Hartman's (2017) examination poignantly draws parallels between Chihiro's personal uncertainties and the unease that her presence invokes within the supernatural beings inhabiting the bathhouse realm. Much akin to her own aversion to abrupt life changes, including her relocation to an unfamiliar city, Chihiro becomes a harbinger of discomfort and fear for the residents of the mystical abode. This symbiotic unease is rooted in the intricate interweaving of fears - Chihiro's anxiety of the unfamiliar mirrors the realm's inhabitants' trepidation of the potentially disruptive influence that an uninitiated human child might wield in their midst.

The narrative subtlety of this thematic resonance is manifest in the palpable atmosphere surrounding Chihiro's initial interactions within the bathhouse. Her arrival disrupts the established equilibrium of the supernatural realm, eliciting wary glances and hushed exchanges amongst the ethereal denizens. This subtextual tension underscores the nuanced exploration of fear as a unifying thread that binds both Chihiro and the fantastical inhabitants of the bathhouse. This juxtaposition of apprehensions serves as a catalyst for character development and mutual understanding. Chihiro's own journey of self-discovery compels her to confront her fears, fostering her transformation from a timid and vulnerable child to a resolute and empowered young woman. In parallel, the inhabitants of the bathhouse confront their own biases and misgivings, transcending initial reservations to forge a meaningful connection with Chihiro.

This exploration transcends mere narrative exposition, emerging as a thematic cornerstone that underscores the film's exploration of growth, empathy, and the remarkable potential for transformation that emerges when confronting shared apprehensions. The convergence of Chihiro's personal anxieties with the realm's collective apprehensions offers a profound meditation on the universality of fear and its remarkable ability to forge unexpected bonds and catalyse profound change.

A discerning analysis Miyazaki's work also unveils a fascinating thematic evolution that transcends the initial appearances of the supernatural characters. While the ethereal denizens of the narrative's mystical realm may initially project an aura of fearsome and even aggressive attributes, a deeper exploration reveals a profound transformation, wherein their personas evolve to encompass elements of vulnerability, docility, and kindness in response to the presence and influence of the film's central protagonist, Chihiro. This evolution serves as a testament to the film's intricate narrative craftsmanship and its thematic exploration of growth, empathy, and the fluidity of identity.

Napier's (2006) insightful analysis unveils a nuanced portrayal of this dynamic, highlighting the symbiotic relationship that takes shape between the supernatural characters and the resolute and assertive Chihiro. Her journey from timidity to maturity plays a pivotal role in shaping the character dynamics within the narrative. While initially projected as imposing and potentially dangerous entities, the supernatural beings gradually shed their initial veneers of fear-inducing traits in the face of Chihiro's transformative presence.

An illustrative embodiment of this thematic evolution is encapsulated in the character of Yubaba, the formidable overseer of the enigmatic bathhouse. Chihiro's initial encounters with Yubaba are characterized by an air of apprehension and intimidation. However, as the narrative unfolds, the layers of Yubaba's own complexities are gradually unveiled. Papastavros (2021) deftly explicates the underpinnings of Yubaba's actions, shedding light on her seemingly harsh confinement of her son Boh to a solitary chamber within the bathhouse. This ostensibly severe act is revealed to be rooted in Yubaba's own deeply ingrained fears and anxieties for her child's safety and well-being. This revelation imparts a poignant depth to Yubaba's

character, transforming her from a mere villainous figure into a multifaceted persona driven by maternal concerns and vulnerabilities.

Furthermore, this narrative trajectory underscores the film's thematic exploration of the malleability of fear and its profound influence on character dynamics. Chihiro's steadfast determination and burgeoning maturity serve as catalysts for the supernatural beings' gradual evolution. As her interactions with these entities deepen, their fear-inducing facades are stripped away, revealing their inner vulnerabilities and fostering a newfound understanding between Chihiro and the denizens of the bathhouse.

Intricately woven into the film is also a thematic tapestry that transcends mere narrative confines, delving into the psychological and emotional depths of its central protagonist, Chihiro. The enigmatic bathhouse within the film emerges as a multifaceted crucible of growth, a transformative space where Chihiro's journey is artfully interwoven with her confrontation of fears, acquisition of knowledge, and profound maturation.

The bathhouse, a central locus of the narrative, assumes a fundamental role in Chihiro's transformative odyssey. This enigmatic realm functions not merely as a physical setting, but rather as a crucible of psychological evolution, where Chihiro's innate fears and apprehensions are confronted and ultimately transmuted. Akin to a metaphorical chrysalis, the bathhouse encapsulates Chihiro's transition from naivety to wisdom, mirroring her path from vulnerability to resilience. Wu et al. (2022) aptly analyses the bathhouse as a symbolic 'womb' for Chihiro, where she navigates the intricate labyrinth of her fears, anxieties, and uncertainties. Within this metaphorical womb, Chihiro embarks on a profound journey of self-discovery and personal growth, undergoing a metamorphic process akin to that of embryonic development. As she grapples with the challenges posed by the bathhouse's denizens, her introspective journey mirrors the gestation of a newly formed individual, marked by periods of introspection, adaptation, and eventual emergence into a world transformed by her newfound resilience.

The bathhouse, in its complex interplay of supernatural beings and myriad challenges, becomes an experiential canvas upon which Chihiro's character evolves. Her engagement with the enigmatic creatures residing within the bathhouse facilitates a remarkable transformation, whereby initially perceived threats gradually evolve into allies and teachers. As Chihiro overcomes her initial trepidations and forges connections with the inhabitants, the bathhouse transcends its mundane facade to serve as a realm of allegorical significance, a microcosm of Chihiro's personal and psychological evolution. Moreover, the bathhouse encapsulates the thematic resonance of facing fears as a catalyst for growth. Chihiro's journey within its confines is a testament to the adage that true growth emerges from confronting one's deepest fears. Her steadfast determination to traverse the labyrinthine corridors of the bathhouse and embrace the challenges within reflects her inherent resilience and capacity for personal development.

The bathhouse within *Spirited Away* functions as an intricate tableau of metamorphosis, a domain where Chihiro grapples with her fears, learns profound life lessons, and emerges as a more empowered and self-assured individual. As the bathhouse assumes the role of a transformative crucible, Chihiro's journey becomes a compelling portrayal of the human experience, wherein confronting and transcending fears serves as a conduit for personal evolution. Through her trials and triumphs, Chihiro traverses the labyrinthine corridors of the bathhouse, ultimately emerging as a beacon of resilience, wisdom, and self-discovery.

3. Conclusion

Fear as a potent and destructive force serves as a poignant common thread interwoven between Shakespeare's *Macbeth* and Miyazaki's *Spirited Away*. Both works intricately delve into the multifaceted dimensions of fear, elucidating its corrosive

influence on characters' psyches and the transformative potential inherent in confronting and overcoming such fears.

At the beginning of their respective narratives, Macbeth, Chihiro, and even Lady Macbeth stand as embodiments of the human psyche confronted with the paralyzing grip of fear. Each protagonist is thrust into an unfamiliar realm, their prior certainties and comforts giving way to an unsettling and unknown landscape. This shared beginning, characterized by trepidation and vulnerability, sets the stage for a profound exploration of how fear manifests and exerts its influence.

Shakespeare's Macbeth, propelled by the seeds of ambition and the prophetic instigation of the three witches, finds himself ensnared in a web of fear. As he grapples with the harrowing implications of the witches' predictions, Macbeth's fear metastasizes, catalysing a series of nefarious actions driven by his desperate quest to thwart the ominous prophecies. The initial fear of the unknown and the potential loss of power manifests as a self-fulfilling prophecy, culminating in an inescapable cycle of paranoia, violence, and moral decay.

Similarly, Chihiro's entry into the enigmatic world of *Spirited Away* marks the commencement of her odyssey into the realm of fear. The sudden and bewildering transformation of her parents, the unfamiliarity of the bathhouse, and the presence of formidable supernatural beings collectively contribute to her profound sense of vulnerability and anxiety. Unlike Macbeth, Chihiro's narrative trajectory diverges as she embarks on a transformative journey of self-discovery, courage, and resilience. Her willingness to confront her fears head-on engenders a process of empowerment and enlightenment. As she negotiates her fears with unwavering resolve, Chihiro navigates her path toward emotional growth and self-actualization.

While the characters' initial encounters with fear are comparable, the divergent paths they traverse in response to fear's influence are emblematic of the thematic nuances delineated by Shakespeare and Miyazaki. Macbeth succumbs to his fears, allowing them to transform him into a tyrant consumed by paranoia and brutality. In stark contrast, Chihiro emerges as an embodiment of resilience, embodying the potential for growth through the deliberate confrontation and transcendence of fear.

Fear, as Foucault suggests, intertwines an individual's self-worth with their submission to fear's dominion. This turns fear into a destructive force when it becomes integral to one's identity. Macbeth's tragic path exemplifies this, driven by dread of prophecy and lust for power, leading to moral decline and his demise. In contrast, Miyazaki's Chihiro defies fear's grip, her journey evolving from fear to empowerment. The bathhouse represents her fears, and her transformation begins when she acknowledges fear's hold on her identity. Chihiro's resolution to face her fears marks her turning point. She regains narrative agency, unshackling from fear's control. The dichotomy of Macbeth and Chihiro reveals how fear's influence can diverge. Macbeth's surrender seals his fate, illustrating Foucault's concept of fear defining identity. Conversely, Chihiro's liberation highlights resilience through confronting and surmounting fear. Her story exemplifies the power in embracing fear for transformative change.

Foucault's exploration of fear's dominion as a function of identity provides a nuanced lens through which to dissect the trajectories of Macbeth and Chihiro in the realms of *Macbeth* and *Spirited Away*. The interplay between fear, identity, and agency unfolds as a salient thematic thread that underscores the dichotomous ways in which fear can shape destinies. While Macbeth's tragic spiral illustrates the perilous consequences of fear's unchecked dominion, Chihiro's liberation through confrontation demonstrates the potential for fear to serve as a transformative force, fostering personal growth and emancipation from its stifling grasp.

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Primary Paper Section: A**Secondary Paper Section: AJ, AL**

THE IMPACT OF THE PLURILINGUAL APPROACH TO LANGUAGE TEACHING ON LEARNERS' COMPETENCE IN INTERLINGUISTIC MEDIATION

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Abstract: The paper examines the impact of plurilingual teaching on the ability of secondary school students to mediate interlinguistically. The objective of the presented study was to investigate the effectiveness of the plurilingual approach and its influence on students' abilities to transfer information obtained in one language to another. The seventh graders (n=22) were divided into two groups: the experimental group (11) and the control group (11). The intention was to identify the extent to which the plurilingual approach can enhance one mode of communication (mediation). Furthermore, the experiment initiated in 2022 permitted a comparison of the students' achievements in mediation with other abilities that were developed intentionally over a two-year period. This correlation serves to reinforce the reliability of the results.

Keywords: interlinguistic mediation, plurilingual approach, plurilingualism, translanguaging

1 Introduction

The communicative approach, sometimes known as communicative language teaching (CLT), is commonly used as an umbrella term to outline a major shift in language teaching in Europe in the 1970s. In contrast with previous language education focused on language systems, CLT puts an emphasis on how these systems are employed in real-life communication. In consistency with other CLT proponents, Savignon (2001) asserts that the primary objective of CLT is the enhancement of functional language proficiency through learner participation in communicative situations. The concept of communicative competence, consisting of linguistic, sociolinguistic, discourse and strategic competences that are interrelated, has been operationalized in language teaching, or better to say, language learning as learner needs and learning styles are analysed, contributing substantially to the focus on a learner.

The introduction of the Common European Framework of Reference for Languages: Learning, teaching, assessment (Council of Europe, 2001), commonly called the CEFR, has enabled language educators to integrate different views on language competence, providing them with a comprehensive description of the components of language proficiency at all levels and a range of skills. The notions of plurilingualism and pluriculturalism occurred in the original CEFR, reflecting linguistic and cultural diversity in multilingual and multicultural Europe, and became the starting point for the development of descriptors presented in the Common European Framework of Reference for Languages: Learning, teaching, assessment. Companion Volume (2020). As stated in the Guide to Action-oriented, Plurilingual and Intercultural Education (Council of Europe, 2023), the goal of this holistic approach to language education is to encourage language teachers and learners to appreciate linguistic and cultural diversity „as a source of educational enrichment“ (Council of Europe, 2023, p. 1).

Another significant shift in language education, presented in the CEFR, was a new classification of the traditional model of four skills (listening, reading, speaking and writing). In the light of the intricate nature of communication, communicative language activities are categorised into four modes: reception, production, interaction and mediation. While the former three were adequately described in a number of descriptive scales in the original document, the latter was developed subsequently, with specific scales of mediation presented in the CEFRCV (2020). There are many different aspects of mediation, which are interrelated and cannot be separated from one another.

In Slovakia, the concept of mediation has just started to be discussed. However, not many studies can confirm the significant impact of employing this concept in language

teaching. The study tries to answer the following research questions:

RQ₁: What impact does the plurilingual approach have on learners' ability to mediate interlinguistically?

RQ₂: Does the ability of learners to mediate interlinguistically correlate with other abilities measured in the experiment?

2 Review of Literature

In the 1970s, communicative language teaching was rapidly developing. Two distinct schools of thought regarding how communicative theory should be employed in practice emerged: the strong form of CLT (learning a language by using it) and the weak form of CLT (learning a language and then using it). However, currently there are many sets of practices that characterize current communicative language teaching as CLT theory draws on various educational paradigms and diverse resources. According to Richards (2006), current practices in communicative language teaching embrace the active engagement of learners in meaningful communication, providing opportunities for learners to negotiate meaning, viewing communication as a holistic process calling upon the use of several language skills in integration, considering errors as a natural way of acquiring a target language and developing own routes to language learning. The concept of learner autonomy covers effective learning and the use of communication strategies, viewing self-assessment as a natural way for further improvement and considering collaboration and sharing with others as a natural source for enhancing learner language learning. In addition to the typical characteristics of CLT, which include authenticity, contextualization and the utilization of real-life scenarios, Savignon (2001) expands the scope of CLT to encompass process-oriented, task-based and discovery-oriented approaches.

The Council of Europe have been concerned with encouraging, supporting, and coordinating the efforts of member states to improve language learning through national and international cooperation of governmental and non-governmental institutions to meet the needs of a multilingual and multicultural Europe to communicate with each other across linguistic and cultural boundaries. The CEFR (2001) emphasizes international mobility and close cooperation between the member states and promotes mutual understanding, tolerance, and respect. Translated into 40 languages and adopted as a reference by almost all countries in Europe and several beyond, a survey held in member states in 2006 suggested that the CEFR had become the most influential publication in language education in Europe, and its impact continues as a stimulus for language educational reforms or new curricula development (Council of Europe, 2023).

2.1 New Concepts in the CEFR

While the original CEFR (2001) introduced the majority of its core concepts, its primary use pertains to the alignment of national educational curricula and local final examinations with the CEFR levels and specific scales as an external reference point. The CEFRCV, published in 2020, presents the concepts of action orientation, social agency, and the scales for mediation and plurilingualism, which were developed and refined between 2014-2016.

An action-oriented approach posits that a learner is to be regarded as a social agent, requiring the capacity to perform actions in language. North (2014, p. 107) emphasizes that this approach “propagates language learning for a social purpose, not as an intellectual pursuit”. An action-oriented approach used in language teaching can be characterized by the terms of naturalistic communicative action, free use and tasks. The task-oriented approach is also referred to as „the deep-end approach“ (Brumfit, 1980; Brumfit, 1984). This alternative approach to a

traditional approach involves the presentation of language, pair work to improve fluency, and the use of the target language in broader tasks (North, 2014). Ellis (2003) defines a task as a work plan that prioritizes meaning and real-world processes of language use, engaging cognitive processes. Such activities may involve any of the four language skills and have a clearly defined communicative outcome (Ellis, 2003, p. 10). In the action-oriented approach, since language itself is generated by action, language tasks are driven by action and in turn require an action (Richer, 2009).

In accordance with the CEFR, Piccardo and North (2019) regard language learners as social agents who are encouraged to embed those speech acts and those usages in a socially and culturally realistic context through real-life tasks, in which the aforementioned ones are meaningful as tasks are as authentic as possible. The tasks are intended to facilitate the acquisition of the target language, requiring learners to engage with the language in a manner that activates the necessary skills and strategies.

Tasks should be designed in a way that allows for both situational and interactional authenticity (Piccardo & North, 2019). While situational authenticity relates to the accuracy with which tasks represent language activities from real life, interactional authenticity implies the naturalness of the interaction between learner and task and the mental processes accompanying it (ALTE, 2011). Piccardo (2014) presents an initial attempt to capture the complexity of the action-oriented approach, which encompasses a variety of elements. These elements are presented in three concentric circles surrounding the core language learning. The outer circle encompasses feedback, assessment tools, self-assessment, formal and informal assessment, and peer assessment. The middle circle, in contrast, synthesizes the key aspects that characterize the action-oriented approach, namely competencies and communicative activities, autonomy, intercultural awareness, tasks, the cognitive strategic dimension, the social dimension, and plurilingualism. The inner circle contains the core methodologies.

2.2 Plurilingualism and Translanguaging

The CEFR (2001, p. 163) presents a definition of plurilingual and pluricultural competence as „the ability to use languages for the purposes of communication and to take part in intercultural interaction“. A language user is viewed as a social agent with proficiency in several languages, not at the same level, and with experience in several cultures. In the past, different languages and related cultures were typically taught in isolation, with a compartmentalized approach; however, the concept of plurilingual and pluricultural competence views a language user as a person who can use the skills and strategies, developed in one or two languages, in different social situations in another/other languages. Piccardo and North (2019, p. 217) view plurilingualism as “a dynamic competence, in which capacities in one language or variety may be very different to those in another language but make up one holistic communicative repertoire”. In accordance with the learner as a social agent in the action-oriented approach, the CEFR (2001) posits that the objective of language education is to cultivate a linguistic repertoire in which all linguistic abilities are represented (Council of Europe, 2020).

The scales that enable language educators to introduce the concept in the national curricula or to broaden the perspective of language education with the acknowledgement and value of the linguistic and cultural diversity typical for the current world focus on building on pluricultural repertoire, plurilingual comprehension and building on plurilingual repertoire (Council of Europe, 2020).

In the integrative approach, the use of several languages concurrently, a phenomenon known as translanguaging, plays a pivotal role. As stated by Galante (2019), despite certain similarities, the term translanguaging should be distinguished from the term code-switching. Code-switching is said to

strengthen the perception of languages as isolated, non-related codes, whereas translanguaging is said to view them as part of one linguistic repertoire. Similarly, Garcia and Lin (2016) view translanguaging as a heteroglossic and dynamic mode of communication, implicit in the integrated linguistic system of a plurilingual individual.

The term *translanguaging* was used for the first time in Wales and was suggestive of pedagogical procedures used in the 1990s, in which students alternately used different languages in productive and receptive activities, for example, they read the text in English and wrote about it in Welsh. It was only later when the term started to qualify the way in which plurilingual individuals and communities communicate (Garcia & Wei, 2014). Garcia and Wei (2014) call attention to the concept of translanguaging based on the language perception that is fundamentally different from its perception in the 20th century: it is an epistemological change contingent on the ways of communication in a contemporary, strongly globalized, and technical world.

The use of translanguaging in its original form is the way of teaching during which students are provided with information in one language and are consequently expected to produce their performance in another language. Baker (2001) views this way of teaching as desirable in bilingual education while teaching technical subjects. According to his view, one of the advantages is better and more profound comprehension of the subject matter based on dealing with it in two different languages. Another advantage can be seen in improving language skills and abilities in a less-acquired language. In the Slovak educational context, the utilisation of translanguaging in this manner does not appear to be possible at present. However, it is a potential approach to employ when teaching technical topics at a particular language level. The drawbacks include teachers who commonly command only the foreign language they teach, and therefore, they cannot include such activities in their teaching. Stathopoulou (2013) views mediation as one form of translanguaging.

2.3 Mediation

While mediating, a person takes the role of an intermediary, mostly between two or more people who cannot communicate directly due to various reasons (CEFR, 2001). In contrast with production and interaction, a language user does not express their ideas. The CEFR (2001, p. 87) distinguishes between two types of mediation:

- a) spoken mediation, which includes simultaneous interpretation, consecutive interpretation, and informal interpretation, for example, while communicating with foreign tourists, in social situations for friends, family members, clients, etc.;
- b) written mediation, including word-by-word translation, artistic translation, paraphrasing, core text summarizing, etc.

The CEFR CV (2020) introduces the concept of mediation in its broad-spectrum use. In mediation, a language user is viewed as a social agent who creates bridges and helps construct or convey meaning either within one language or more languages or across modalities. Mediation is central to acting as a social agent, which is conceptually central to socio-constructivist and sociocultural theories of language education (Piccardo & North, 2019). Dendrinos (2013) emphasized that the role of an intermediary is not to produce text that is meaningfully equivalent and similar to the original text in form. An intermediary produces their text, selecting important content from the text and choosing an appropriate form. They are entitled to alter the discourse, genre and linguistic register. The approach described above is employed in the study.

From the perspective of using one or more languages, Beacco et al. (2016, p. 56) differentiate two types of mediation:

- a) intralinguistic mediation (input and output texts are in the same language);
- b) interlinguistic mediation (input and output texts are in different languages).

While interlinguistic mediation deals with the transfer of ideas from the source language into a target language, intralinguistic mediation can take its course in the following ways:

- a) utilizing an alternative communication channel (e.g. summarizing the keystone, essence, and core of the phone call in face-to-face communication);
- b) employing alternative vocabulary – primarily utilizing a different register or style, paraphrasing, and simplifying;
- c) expressing the main ideas in a specific manner due to the context provided;
- d) sharing selected information or speech to meet the context provided (Dendrinos, 2006, p. 20).

The CEFRCV (2020) posits that mediation is a pivotal element in the teaching process, extending beyond the interaction between teacher and learner to encompass that between learners themselves. In the relatively cultural and linguistic homogenous environment of the Slovak schools, intralinguistic mediation occurs in everyday life contexts. However, every individual encounters foreign cultures and their representatives due to globalization and advances in information-communication technologies. This enables interlinguistic mediation to be used. In the context of mobility, university students are enabled to participate in study exchange programmes at foreign universities. Teams of big companies are of international origin, and communication is held between employees in local branches situated in different countries. It seems prudent to integrate interlinguistic mediation into foreign language teaching.

In sociocultural theory, mediation is essential for the co-construction of meaning (Piccardo & North, 2019). As presented in the CEFRCV (2020), mediation is an everyday activity when acting as an intermediary between individuals with no common language (interlinguistic mediation), as well as an intermediary between individuals sharing the same language when processing the content of unknown text or topic for them (intralinguistic mediation). In the CEFRCV (2020), the complexity of the concept was facilitated through three broad categories: mediating texts, mediating concepts, and mediating communication.

Since translation was mentioned in the CEFR (2001) as one activity of mediation, applied linguists supported the idea of using translation activities in language classes. As proposed by Zvereva and Chilingaryan (2019), translation should have its place in language education; however, in a different way as used in the grammar-translation method. They imply that translation enables learners not to use a target language appropriately nor to develop communicative skills. Nevertheless, they consider it a useful and naturally practical activity, which is increasingly vital in communication in the modern globalized world. This translation is designated as a pedagogical translation, which can serve as a foundation for communication activities. When students work in groups, they can engage in discussions about the meanings of specific words and identify suitable equivalents, utilizing the translation. Consistently, Moe et al. (2015, p. 89) argue that translation activities should be viewed as a communication activity, which enables students to use a language authentically and employ several language skills and cognitive processes.

The CEFRCV (2020) presents the key concepts for the scale referring to translating a written text in speech or writing, which seems to be the reproduction of the substantive message of the source text rather than translations expected from professional translators. Therefore, the key concepts operationalized in the scale include the comprehensibility of the translation, the extent to which the original formulations and structure influence the translation and the capturing of nuances in the original. However, the quality of translating a written text depends on the reference level.

Dendrinos (2013) proposes to start teaching mediation in the following steps: to start training at a lower proficiency level, during which it is important to transfer from the target language to the mother tongue (not vice versa). Gradually, it is necessary to include the comparison of expressing the same content in both languages to enable learners to understand that the structure and form of verbalizing the same content in different languages can differ. Later, searching for essential information in more complex texts and expressing the main idea of the text is trained until learners will achieve free speaking or writing based on a text in another language.

3 Methodology

The study employed a mixed-method research methodology to explore the impact of plurilingual education on students' ability to use interlinguistic mediation. In this mixed-method design, two data collection tools were used: a qualitative analysis of students' performances and quantitative data.

3.1 Participants

The participants were seventh formers, with English achieved at reference level B2, studying it four lessons per week, and German at A2+ (three lessons per week). The total number of participants (22) was divided into two groups: an experimental group (11), comprising six females and five males, and a control group (11), represented by three females and eight males. Upon commencement of the experiments, the participants were between the ages of 14 and 15. At the time of testing, they had reached the age of 16 and 17, respectively. All participants spoke Slovak as their first language and had been studying English for nine years, with German being their second foreign language for six years.

3.2 The Experiment

The students of the *eight-year gymnázium* started to learn English during their primary education in Year 3, achieving level A1 in different primary schools. When they were admitted at the *eight-year gymnázium*, they started to learn German. Two years ago, they were invited to participate in the experiment, the main goal of which was to measure the impact of plurilingual and pluricultural concepts in language teaching on the learners' ability to develop linguistic and cultural repertoire in German, using the acquired language skills and learning strategies in English. Other data from the experiment are used in the correlation process.

One of the activities planned within the experiment, which commenced in September 2022, was to assess the impact of the plurilingual approach on the development of interlinguistic mediation. A group of students with the same background (English competence at level A1 and without any competence in German) was divided into two groups: experimental and control. The experimental group was instructed by a teacher with a qualification in teaching both English and German. The role of the teacher was to facilitate the acquisition of German through the implementation of the plurilingual approach. In addition to the various activities that reinforced the concept of plurilingual education, the students' abilities to mediate inter-linguistically were evaluated qualitatively using the analytic scale (Appendix A).

The data collection process involved the rating of students' performances by two professionally trained teachers. The ratings were then calculated, and the raters were required to justify their decisions in order to facilitate the final decision-making process. In order to ascertain reliable responses to the research questions, the quantitative data obtained from students' performances in interlinguistic mediation were compared with other quantitative data collected from students' written performances and the scores achieved in the test in the final stage of the experiment. Correlation is a statistical measure that indicates the extent to which two or more variables fluctuate in relation to each other.

The Pearson correlation coefficient was chosen due to its ability to measure linear correlation between two sets of data.

4 Results

RQ1: What impact does the plurilingual approach have on learners' ability to mediate interlinguistically?

In order to obtain accurate data, it was essential to conduct a quantitative analysis of learners' performances in interlinguistic mediation. The students' ability to mediate interlinguistically was judged by matching their performances against the judgement scale descriptors, indicating the transfer of information from one language into another. The scale was employed in the international online workshop, "Exploring ways to test mediation and plurilingual/pluricultural skills in the classroom", which was held on 18th July 2021. The learners' performances were judged in four qualitative aspects: task achievement, range, accuracy and register.

The task (Appendix B) was achieved by all the students from the experimental group. Only one student in the control group was unable to fulfil the criteria based on the established descriptors. This student demonstrated a significant difficulty in transferring the majority of the required information from English into German. In his talk, he discussed the topic of traveling but was unable to present the specific details he had read in the English reviews of the hotel. Instead, he was discussing his travel preferences and was able to convey only one message regarding the limited functionality of the hotel's wireless internet connection.

The experimental and control groups exhibited a notable disparity in the scope of their achievements. A student was deemed to have fulfilled the task if they were able to transfer at least some of the information presented in the task. The descriptors of the lowest band matched the performance of one girl from the experimental group and eight students from the control group. The second band required the mention of the majority of the required information, which was achieved by three students from the experimental group and three students from the control group. The highest band encompasses the descriptors referring to the transfer of all the requisite information. Seven students in the experimental group and no students in the control group were able to provide all the relevant information.

In terms of linguistic range, the reference level employed for evaluating student performance was A2. At this level, it is not anticipated that learners will utilize complex grammatical structures or advanced vocabulary beyond that observed at B2. While mediating, eight students from the control group and one student from the experimental group demonstrated a limited range of grammar and vocabulary, as described in band 1. These students used simple words and simple sentences, with some even using isolated phrases. In task completion, an appropriate range of vocabulary and compound sentences was demonstrated by nine students from the experimental group and three students from the control group. The vocabulary and grammar used enabled them to convey the majority of the required information. Only one student in the experimental group demonstrated the capacity to utilize complex grammar and a sophisticated command of lexis.

The most problematic area was the same in both groups: accuracy. The assessment scale indicates that even the student at the lowest level employs grammatical phenomena and vocabulary with quite a high degree of accuracy relevant to level A2, with only occasional errors that may impede comprehension. Consequently, as many as eight students in the control group failed to meet even the basic requirement for accuracy. It was frequently observed that the students were unable to isolate German from English (*nein private beach, *gut location, *ich finde this hotel nicht so gut, *das Hotel hat gut balcony, *das Schwimmbad ist nicht open, *While we essen, Mann spielt on piano). This inability to differentiate between the two languages

was accompanied by deficiencies in vocabulary. Some words were expressed with incorrect descriptions (*gutes Frühstück = *gut Morgen Essen, der Klavierspieler = *die Mann an die Klavier*). Incorrect words (**Das Hotel hat schwierig Wi-Fi, *Sie bieten Zimmers mit Meer Augenblick*) or non-existent words (**Hotelpersonellen, *Busbahn*) were also used. The most prevalent errors in grammar were related to the use of incorrect articles and incorrect inclination (**das Parkplatz kostet 12 Euro, *gut Platz für Hotel, *Hotel hat ein schönes Blick*), as well as mistakes related to incorrect verb conjugations (**Du braucht Auto, *Das Frühstück sind super*) or incorrect word order (**Die Hotel also hat ein Pool*). As evidenced by the examples, a considerable number of sentences exhibited multiple errors, encompassing both lexical and grammatical deficiencies. In several instances, the errors in question already posed a challenge to comprehension.

All the students in the experimental group achieved the minimum criterion of accuracy. However, eight students in the control group failed to do so. In the experimental group, four students demonstrated an ability to use vocabulary and grammar mostly correctly, although errors were occasionally made, which may have affected comprehension. Three students in the control group demonstrated the use of grammar and lexis at the same level. Correct use of lexis and grammar, with the avoidance of errors that would have interfered with comprehension, was demonstrated by seven students from the experimental group, whereas none from the control group exhibited such proficiency. The most prevalent errors pertained to the incorrect use of endings for adjectives (**das leckeres Essen, *keinen private Strand*), as well as the misalignment of word order in the subordinate clauses (**..., dass man im Restaurant muss warten*), and the misuse of prepositional phrases (**Man muss für den Kellner lange warten.*). In the case of the latter error, a negative transfer from English (*wait for*) can be identified in the example above, which is indicative of a transfer of linguistic structures from the source language to the target language. This phenomenon persists to some extent in students who have been taught using the plurilingual approach, despite the teacher's efforts to highlight the differences. The use of both advanced vocabulary and complex grammar with minimal errors was demonstrated by only one student in the experimental group, whereas none of the control group exhibited such proficiency.

In the judgement, the final qualitative aspect pertained to register. Three students from the control group, who communicated solely by verbatim naming of facts derived from the hotel reviews, were unable to interact and therefore failed to achieve the basic performance level. This necessitates the selection of an appropriate degree of formality in the language used, which is contingent upon the communication situation. It could be observed that five students from the control group and one student from the experimental group were able to select the appropriate linguistic register. The most prevalent errors pertained to the use of formal greetings (e.g. „Guten Tag“ and „Auf Wiedersehen“) or the inclusion of expletives, despite the informal nature of the communicative context (conversing with a friend). The appropriate language and a degree of formality were employed by three students from the control group and eight students from the experimental group, in accordance with the communicative situation. In some instances, the use of formal language or expressions (e.g. „ich würde gern sagen“) was observed with a low frequency. One student employed the address „Lieber Helmut“, which is typical of written communication but not of spoken discourse. Two students from the experimental group demonstrated a comprehensive understanding of the appropriate linguistic register, whereas none of the students from the control group exhibited this ability. A qualitative analysis of the data indicates that the students in the experimental group, who were systematically trained to mediate, exhibited significantly greater efficiency and quality in transferring information from one language to another than their counterparts in the control group. The assessment scale for learner performance in transferring information from one language to another specifies three levels for each qualitative aspect (task completion, extent, accuracy, and register). The

analysis revealed that the majority of students in the experimental group could be ranked one level higher than the majority of students in the control group for each qualitative aspect.

Most students from the experimental group (63.6%) could transfer all the required information from English into German in contrast with the students from the control group whose performances were aligned with band 2 (72.7%) as they could transfer only part of the information. A comparable disparity is evident in the qualitative aspect of range, with the majority of students in the experimental group (81.8%) employing complex language, whereas the extent of language used by the control group was considerably constrained. The most striking difference was observed in the domain of accuracy, with the majority of pupils in the control group (72.7%) failing to meet even the minimum criterion. This result is consistent with the control group's low success in solving the language use tasks in the post-test, as well as the low accuracy ratings in their argument compositions. In contrast, the majority of students in the experimental group (63.6%) demonstrated correct use of grammar and lexis without such errors that would impede comprehension. Additionally, in the domain of linguistic register, the majority of students (45.4%) in the control group selected inappropriate linguistic devices, whereas the majority of pupils in the experimental group (72.7%) selected language that was mostly appropriate to the communicative situation. In light of the aforementioned findings, it can be posited that the implementation of a plurilingual approach to teaching has a considerable and positive impact on students' interlinguistic mediation skills, in accordance with the initial research question.

RQ2: Does the ability of learners to mediate interlinguistically correlate with other abilities measured in the experiment?

In order to address RQ2, it was necessary to obtain quantitative data related to students' performances in the field of interlinguistic mediation. The scale used for the qualitative analysis was also employed as a means of quantification of the results. For each qualitative aspect, students whose performances matched the descriptors of the lowest band were attributed one point, those matching the second band two points, and those matching the highest band three points. Consequently, the maximum achievable score was 12 points. Those students whose performances did not meet even the lowest criteria were attributed a score of zero. Subsequently, the data was compared with the data retrieved from a didactic test and students' written performances, which had been a part of the experiment (Table 1).

The didactic test comprised three distinct tasks, each designed to assess a different language skill. The listening comprehension task was a dichotomous one, comprising eight items. The reading comprehension task was also dichotomous, with 12 items, while the language in use task was a multiple-choice one, with 20 items. The test corresponded to the level A2 of the Common European Framework of Reference for Languages (CEFR). The writing task required the creation of a letter to a student magazine, as detailed in Appendix C.

The evaluation was conducted in an analytical manner, with a focus on four qualitative aspects: task achievement, organization, grammar, and vocabulary. For each of these aspects, students could achieve a maximum of five points, which equates to the maximum number of points for the entire essay, which was 20.

The correlation between learners' ability to mediate interlinguistically and the quantitative data obtained from their written performances, as well as the scores achieved in the test, was statistically tested using the Pearson's correlation coefficient (r). The coefficient can take on values between -1 and 1. A value of -1 represents a very strong negative correlation, while a value of 1 represents a very strong positive correlation. The closer the value is to zero, the weaker the correlation. The results of the statistical test indicate a strong positive correlation between students' ability to mediate and their written performances ($r(9)$

= .85, $p < .001$) and between students' ability to mediate and their test results ($r(9) = .87$, $p < .001$). The p -value is used to assess the significance of the correlation analysis. If the p -value is less than 0.05, the correlation coefficient is deemed to be statistically significant. In both cases, the p -value was less than 0.001, indicating that the results were statistically significant.

Tab. 1: Students' Results – Mediation, Written Performances, Test

Student	Mediation	Written performance	Test
Student 1	9	17	33
Student 2	5	9	21
Student 3	10	17	35
Student 4	7	10	30
Student 5	9	12	32
Student 6	7	10	28
Student 7	9	12	28
Student 8	10	20	36
Student 9	10	18	34
Student 10	8	12	29
Student 11	9	16	37

The above-mentioned findings allow us to draw the conclusion that the results of learners' ability to mediate interlinguistically are strongly correlated with other data collected in the experiment, namely the results of students' written performances and their test results.

5 Discussion

The countries that initiated the incorporation of mediation as a subject for instruction and assessment were Germany and Greece. The concept was introduced into the German national educational standards for foreign language education in 2003 (Kolb, 2016), with a focus on spoken interpretation and written translation from one language to another, as well as summarisation and paraphrasing of texts from one language into another. In the Greek context, linguistic mediation was described in line with the CEFR CV (2020), which views language learners as social agents who help convey meaning either through collaboration or encouragement of others to construct new meaning and pass on new information in an appropriate form (Dendrinos, 2024). The introduction of mediation in both forms (intralinguistic and cross-linguistic) was facilitated by a high-stakes foreign language examination, known as the KPG, an acronym for the Greek state certificate in language proficiency, entitled *Kratiko Pistopiitiko Glossomathias* (Dendrinos & Karavas, 2013).

The concept of cross-linguistic mediation is applicable in numerous multilingual countries across Europe. In light of the current global phenomenon of mass migration, it is reasonable to encourage communication involving different languages in today's multilingual and multicultural societies. Such circumstances present a challenge to countries that find themselves in a position of initial contact or those that are perceived as desirable destinations. In response to this challenge, these countries have implemented measures to facilitate the learning of foreign languages, thereby enabling students to be educated in multilingual classes.

Nevertheless, the circumstances in Slovakia are unique due to a number of factors that must be taken into account when evaluating the country's stance on the matter. The relatively modest size of the Slovak Republic means that it does not experience a significant inflow of migrants who wish to remain in the country and pursue their education there. In addition to Slovak-speaking students, primary and secondary schools are predominantly attended by students of other Slavonic languages. The similarities between the languages facilitate the integration of students, with few obstacles to overcome.

The second issue is that the educational system presents languages in isolation. Consequently, the majority of educators

are only able to attain proficiency in one language and the associated cultural context, having pursued their studies in this field at the university level. A further noteworthy factor is that English is the primary foreign language taught in schools, with few exceptions. This has resulted in a situation where students' preferences have led to a particular focus on this language, which has had an adverse impact on the learning of other foreign languages.

In this context, the presented study represents an initial investigation into the potential of mediation as a pedagogical tool for facilitating the acquisition of target languages. The results permit the formulation of a positive conclusion regarding the enhancement of interlinguistic mediation abilities through the application of plurilingual teaching. The findings of this study can contribute significantly to the ongoing professional discussion on plurilingualism, as evidenced by the recently introduced national curriculum for lower-secondary education in Slovakia.

6 Conclusion

A new vision of language, the learner and the way in which learning happens has the potential to move a static vision of language education towards its dynamic dimension. The concept of mediation is closely related to the concept of „languageing“. Mediation appears to be fundamental to all learning, as it is crucial to understanding, meaning making and collaborating, which are central features of acting as a social agent. This therefore supports a dynamic vision of meaning as it is constructed and mediated in action. Due to the inherent complexity of the concept, our study contributes only to one aspect of the mediation of a text. Nevertheless, it is crucial to highlight the potential of the concept of mediation to stimulate innovation and reform in language education.

It is important to acknowledge that this study on the efficacy of the plurilingual approach was constrained in several respects. Firstly, the study was conducted in a single class, which limits the generalisability of the findings at this stage. Nevertheless, it constituted the inaugural attempt in the Slovak educational context. Secondly, the study did not present all the activities that the students had to undertake in order to experience the plurilingual approach to language learning. This may be useful for language teachers who are at the crossroads of moving from a static view of language education towards more dynamic ones. Despite these limitations, the findings of this study indicate that new challenges should be addressed to raise language teachers' awareness of the mediated and complex nature of language learning. This is of significant importance in improving language teaching.

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Primary Paper Section: A

Secondary Paper Section: AM

Appendix A: Judgement Scale Descriptors

Qualitative aspect	Descriptors
Task achievement	Includes some information required by the target audience and the task Includes most information required by the target audience and the task Includes all information required by the target audience and the task
Range	Uses limited lexical and grammatical range Uses appropriate lexical and grammatical range Uses vivid, sophisticated lexis; complex yet appropriate grammar
Accuracy	Mostly uses lexis and grammar correctly, errors occasionally impede understanding Uses lexis and grammar correctly, errors don't impede understanding Uses precise lexis and complex yet appropriate grammar, very few errors
Register	Chooses formality and language partly corresponding to audience and genre Chooses formality and language mostly corresponding to audience and genre Chooses formality and language fully corresponding to audience and genre

Appendix B: Mediation Task

You want to travel to a seaside resort with a friend from Germany who does not speak English. You have chosen a hotel and found a couple of reviews written in English. Based on the reviews, inform them about the advantages and disadvantages of the hotel and explain to them why the hotel is suitable for you.

Appendix C: Written Performance Task

A German-speaking school magazine has announced a competition for the best essay (100 – 150 words) on young people's travel preferences. Write an essay (in German), including the following points:

- Do you prefer travelling to the seaside or to the mountains?
- Which means of transport do you prefer to use? Which of them don't you like?
- What type of accommodation do you prefer? How is it equipped?

SOCIAL-EMOTIONAL HEALTH OF GIFTED CHILDREN

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Abstract: Giftedness is a biologically given trait, primarily denoting a designation for a high level of intelligence. It is essential to support gifted children whether in the family or in school. Supporting the gifted is also related to their level of social-emotional health. The main goal of research was to find out the level of social-emotional health of gifted children. We also tried to find out relationships between domains in the questionnaire named Social-Emotional Health Survey (SEHS-S). Our research sample consisted of 71 intellectually gifted participants. The average age of participants was 12.59 years. There were students from grades 1 to 4 of the 8-year secondary school. The level of social-emotional health in the study sample was in the lower average range.

Keywords: giftedness, gifted pupils, social-emotional health

1 Introduction

Giftedness is a summary of inclinations, innate endowments, manifestations of the level and specifics of innate predispositions, the existence of internal conditions for the achievement of excellent results in activity (Laznibatová, 2012a). Social-emotional health is a state of subjective well-being and impacts a person's optimal functioning in life. In the following chapters, we will discuss the concepts of giftedness and social-emotional health and research on giftedness in the context of social-emotional health.

1.1 Giftedness

Giftedness results from a dynamic and interactive process, it manifests itself in abilities expressed in the cognitive domain, cognition, understanding, thinking, academic achievement, and creativity (Laznibatová, 2012b).

Winnerová (1996) distinguishes several types of giftedness: global giftedness, mathematical-linguistic giftedness, logical-mathematical giftedness, verbal-linguistic giftedness. Dočkal and Duchovičová (2017) list the following types of giftedness: giftedness for sport and movement, artistic giftedness, rational (intellectual, academic giftedness), practical giftedness, creative giftedness, and general giftedness. Sternberg (2000) differentiates three basic types of giftedness: analytical, synthetic and practical giftedness. Our research deals with participants with general intellectual giftedness, while the Dictionary of Psychology (1987, in Laznibatová, 2012a) states that an intellectually gifted child is a child with an IQ above 130.

According to Hříbková (2009), gifted children's cognitive characteristics include the following: Children use encyclopaedic resources and modern technologies. They are interested in cause-and-effect relationships, recognize relationships between phenomena and identify inconsistencies. These children are sensitive to the existence of problems; they can generalise correctly and quickly, and they have developed critical thinking, manifested by a tendency to doubt. The gifted children have polemic and increased self-criticism and a rich vocabulary; they use abstract concepts, they are guided by their own criteria when evaluating their own and other's results, and have a more prolonged concentration of attention.

The creative characteristics of gifted children include that they easily develop imagination and phantasy and are intellectually playful and curious. These children can absorb new information and like to learn; they are flexible in thinking, and their ways of solving problems and tasks are original.

Regarding emotional characteristics, the gifted children have a higher need for emotional support and emotional acceptance. They are sensitive and they appear less emotionally mature than their peers. These children are impulsive and expressive when

defending their views, and are attracted to the aesthetic side of things.

Social characteristics include the need for freedom, liberty, activity. The gifted children attract attention from the environment, and they usually have an extreme position in the group of peers. They have either high or, on the contrary, very low social skills. These children boldly present their opinions and resolutely defend them within the group. They seek out older children for communication and are socially naive and gullible, some gifted children have problems with self-confidence and inadequate self-image formation (Hříbková, 2009).

Gifted people are endowed with extraordinary qualities but also with extraordinary problems they have to cope with in their lives (Dočkal et al., 1987). The problems of the gifted people include sleep disorders, behavioural disorders, uneven development of giftedness, lack of self-esteem, and others, such as pronunciation disorders, specific learning disabilities, and various types of disabilities (Dočkal, Duchovičová, 2017). It happens that gifted children under the influence of social stereotypes suppress their talents and giftedness so they are not different from the majority (Vernon, Adamson, Vernon, 2014).

Qualities such as willpower, ambition, and appropriate social conditions and opportunities are necessary for innate abilities to translate into performance (Szobiová, 2004).

1.2 Social-emotional health and support of gifted children

To realise giftedness, support for gifted individuals is essential. In addition to the child's exceptional intellectual abilities and strengths, such as executive motivation, environmental factors including support within the child's family, school, peer group, political, economic, social and legal institutions, and last but not least, luck at crucial times in life (i. e. the child is in the right place at the right time), are also important (Tannenbaum, 1991). Mudrák (2015) sees the gifted children as part of a social system. In order for giftedness to develop, the following factors and their interaction are vital: above-average ability level (Gagné, 2004), motivation, i. e. whether the children want to engage in a particular activity and believe that they will succeed in it (Elliot, Dweck, Covington, 2007), optimal educational development, and the closest social context such as parents and teachers.

In the family, the following factors influence the children: the parenting style, the stimulus of the home environment, the socioeconomic status of the family, mutual support of family members, the level of anxiety of the parents and the performance-oriented atmosphere. At the same time, children feel the impact of the diversity of their parent's interests, the parent's stress levels, their personality characteristics, as well as parent-child interactions, e.g. encouragement of curiosity, speech stimuli, the method of reward, and the parents' attitudes toward their children's giftedness (Laznibatová, 2012a). There should be stable relationships in the family, the child should feel safe and secure, and the family should provide a background to exercise their dispositions connected with giftedness (Mudrák, 2015).

It is crucial to support the gifted children not only in the family but also in school. The teacher's attitude toward the gifted child is vital because the teacher also influences the position of the gifted pupil in the peer group (Hříbková, 2009). The supportive environment is related to the social-emotional health of gifted children.

1.3 Social-emotional health

Mental health belongs to the official health policy priorities in most countries. In the last decades, we have registered a trend of increasing mental health problems in children and adolescents. In recent years, there is also increase in socio-pathological

phenomena such as suicidal attempts and completed suicides in the generation of adolescents. There is evident an increase in aggression, violence, bullying, cyberbullying, increase in substance and non-substance addictions, loss of life involvement, apathy, resignation, demotivation, and absence of social and emotional competences for functioning in everyday life (Gajdošová et al., 2018). These phenomena are essential to take into account (not only) in gifted individuals, whose characteristic feature is sensitivity or even hypersensitivity and perceptivity, which may be related to the higher susceptibility to the above problems of current children and adolescents.

Parents and educators aim to raise a psychologically healthy personality capable of living a satisfying and fulfilling life (Gilman et al., 2014), linked to a sense of personal well-being. Keyes (2002, in Furlong, 2014) states that the absence of a psychological disorder is not associated with a sense of personal well-being. Being mentally healthy does not mean not having a disorder, but it also implies the presence of something positive.

The World Health Organisation defines mental health as a state of physical and mental well-being in which a person is aware of his or her abilities, can cope with the usual stresses of life, and can work productively and successfully (WHO, 2001).

Positive psychology plays a vital role in the study of mental health, dealing with concepts such as mental health, joy, and mental freshness. It aims to explore and find resources for achieving overall psychological well-being, the well-being of an individual or a group of people. Positive psychology marked a shift from psychology's original focus on psychopathology towards the strengths and abilities of the individual (Park, Peterson, Seligman, 2004).

Positive psychology is devoted to research in three areas:

- subjective (well-being, the experience of well-being and life satisfaction);
- individual (positive qualities such as courage, love and perseverance);
- social (social responsibility, relationships contributing to happiness).

Strengths such as hope, enthusiasm, gratitude, and love are related to levels of overall personal and life well-being (Park, Peterson, Seligman, 2004).

Positive psychology emphasises the social dimension of psychological life and the influence of social factors on a person's mental life and on building the best qualities of life (Seligman, 2002; Krivohlavý, 2015).

Within positive psychology, a frequently discussed topic is social-emotional health. It is a state of subjective well-being and impacts a person's optimal functioning in life. Social health is an individual's ability to establish and maintain close and positive relationships with his or her environment. Emotional health includes the ability to regulate emotions effectively. It is a set of processes responsible for monitoring, evaluating, and modifying emotional reactions to achieve a specific goal (Thompson, 1994). Social and emotional health are interrelated and interact with each other.

We can divide factors that influence social-emotional health into internal and external, with internal factors including genetic dispositions, temperament, and health problems. External factors include parenting style, possible psychological disorders in the family, environmental risks (Calkins, 2004), school environment and teacher personality.

Covitality is a synonymous term for social-emotional health, a term introduced by Furlong in 2013. Covitality implies the presence of positive traits in an individual. The harmonious progression of the different dimensions of covitality is a prerequisite for satisfactory physical and psychological health. A more significant number of positive factors in a child's life is a

better prerequisite for his/her optimal physical development and social-emotional health. Covitality represents a predictor of good social and emotional health in a child due to the combination of multiple positive characteristics compared to the presence of only one (Furlong et al., 2014).

According to Furlong (2014), children's and adolescent's strengths and positive characteristics include gratitude, optimism, enthusiasm, and excitement, which are also part of the construct of covitality.

1.4 Research aim and research questions

Our research aimed to determine the level of social-emotional health in pupils of a secondary school for gifted children. In addition, we investigated the relationships between the particular domains in the Social-Emotional Health Survey. For this reason, it is a quantitative, correlative and exploratory research.

Based on the literature reviewed, we set the following research questions:

1. What is the level of social-emotional health among the gifted children in the selected research sample?
2. Are there relationships between the particular domains in the Social-Emotional Health Survey?

2 Methodology

2.1 Research population

The research population consisted of 71 pupils from a school for gifted children. The pupils were from grades 1 to 4 of the 8-year secondary school. The average age of the participants was 12,59 years. The most frequently occurring value concerning age was 12 years, with the most participants at this age. The minimum age was 11, and the maximum age was 15 years. The median age was 13 years. The selection of the research population was intentional.

2.2 Research method

The Social-Emotional Health Survey, which includes social and emotional skills, is used to measure covitality. In our research, we used a version of the questionnaire for older school age (from grade 6 in primary school to grade 4 in secondary school) called Social-Emotional Health Survey (SEHS-S) (Furlong et al., 2014).

The covitality index has four domains, and each domain has three indicators:

- emotional competence (emotion regulation, self-control, empathy);
- engagement in everyday life (optimism, enthusiasm, gratitude);
- self-belief (self-awareness, self-efficacy, perseverance);
- belief in others (family support, school support, peer support) (Social-Emotional Health Survey SEHS-S, Furlong et al., 2014).

Within emotional competence, good emotional regulation represents an indicator related to acquiring emotional and social competences that lead to a better life for the individual. Poor emotional regulation may predict problematic behaviour in childhood and adolescence (Calkins, 2004). Part of emotional competence is empathy, which Krivohlavý (2015) sees as an emotion with a strong social focus. It shows us what it means to be a human among humans. Krivohlavý (2015) defines gratitude as part of the domain of everyday life engagement. It is an ethical emotion, a joyful state associated with empathy and altruism and manifested by positive emotions such as happiness, respect, esteem and hope. Gratitude is also a motivating factor that stimulates prosocial acting. It is a gift, a force for living and an essential mental health factor. Applying knowledge of gratitude finds use in pedagogy and the school environment.

People are not born with gratitude; they acquire it throughout their lives.

The Social-Emotional Health Survey provides insight into children's psychological schemas. It shows how to optimally build their personalities, in which areas of mental health and social-emotional competences lie their strengths, and where they have reserves and weaknesses or shortcomings (Gajdošová et al., 2018).

Furlong (2016) reports that on a relevant school population of 14 171 secondary-school students in California, USA, by measuring the internal consistency of the responses obtained, they found a Cronbach 's alpha reliability of 0,95 for all racial groups of the school population.

3 Results

The overall level of social-emotional health in the research population of gifted children in our research reached the value of $M=103.08$, i. e. the lower average range. The mean value was $Me=101.00$ and the most frequently occurring value was $Mo=124.00$, i. e. the higher average range. The minimum value was at the level of 63.00, and the maximum value was at 133.00.

The domain belief in others (BIO) achieved the highest value (27.30), and the domain engagement in everyday life (ENL) achieved the lowest value (23.79) in the Social-Emotional Health Survey.

Tab. 1: Descriptive statistics for the Survey SEHS-S

	BIS	BIO	ECO	ENL	TOTAL
Average	25,56	27,30	26,44	23,79	103,08
Median	26,00	28,00	28,00	25,00	101,00
Mode	24,00	28,00	27,00	27,00	124,00
Standard deviation	4,49	4,87	5,19	7,01	16,38
Obliqueness	-0,23	-0,59	-0,74	-0,07	-0,16
Sharpness	-0,52	0,45	-0,26	-1,01	-0,79
Minimum	16,00	13,00	15,00	11,00	63,00
Maximum	35,00	36,00	35,00	35,00	133,00

To better clarify the internal structure of the Social-Emotional Health Survey, we focused on detecting and verifying the correlations between the particular domains.

Moderately strong correlations in the Social-Emotional Health Survey are between the domains of self-belief (BIS) and belief in others (BIO) ($r_s=0.460$, $p=0,000$); between the domains of self-belief (BIS) and emotional competence (EC) ($r_s=0.466$, $p=0,000$), and between the domains life engagement (ENL) and self-belief (BIS) ($r_s=0.486$, $p=0,000$). A strong correlation is between the domains of life engagement (ENL) and belief in others (BIO) ($r_s=0.533$, $p=0,000$).

Tab. 2: Correlations between domains in the Social-Emotional Health Survey (SEHS-S)

Spearman's correlation matrix for SEHS-S domains

	BIS	BIO	ECO	ENL	TOTAL
BIS	rs				
	p	-			
BIO	rs	,460**			
	p	0,000	-		
ECO	rs	,466**	,298*		
	p	0,000	0,012	-	
ENL	rs	,486**	,553**	,358**	
	p	0,000	0,000	0,002	-
TOTAL	rs	,770**	,719**	,696**	,822**
	p	0,000	0,000	0,000	0,000

Explanatory notes: r_s =Spearman 's correlation coefficient, i. e. the higher the value, the stronger the correlation between the dimensions. The coefficient also indicates substantive

significance. P = p-value, it is statistical significance, and if $p<0.05$, then we talk about statistical significance.

The overall level of Cronbach 's alpha on the Social-Emotional Health Survey is 0.896, where one dimension, belief in others (BIO), has a level <0.7 , i. e., that dimension has lower reliability.

4 Discussion

Our research aimed to investigate the level of social-emotional health among the pupils in a school for gifted children. We also investigated the relationships and correlations between the domains in the Social-Emotional Health Survey (SEHS-S).

With the first research question, we wanted to determine the overall level of social-emotional health in gifted children, which was in the lower average range in our research sample, but the value tends towards the higher value of the lower average range ($M=103.08$). The domain of belief in others (family support, school support, peer support) achieved the highest value in social-emotional health in gifted pupils, and the lowest value was in the dimension of life engagement, i. e. optimism, enthusiasm, and gratitude.

We formulated the second research question to clarify the internal structure of the Social-Emotional Health Survey (SEHS-S). We investigated whether there are correlations between particular domains in the Social-Emotional Health Survey. We found that there are moderate correlations between the domains of self-belief and belief in others, between domains of self-belief and emotional competence, and between the domains of engagement in everyday life and self-belief. A strong correlation is between engagement in everyday life and belief in others. When a pupil believes in himself/herself, this is related to the tendency to believe in others. Self-belief is also related to emotional competence, i. e., the ability to regulate emotions, self-control and empathy. Self-belief is related to life engagement, i. e., optimism, enthusiasm and gratitude, which are essential traits related for experiencing a better life and feeling life and personal well-being. Belief in others (family support, school support, support from friends) may influence higher engagement in everyday life, i. e., optimism, enthusiasm and gratitude.

Majerčáková Albertová (2019) investigated the social-emotional health of students in early adolescence concerning school inclusion, prosocial behavior, and student personality. The author found that the level of school inclusion, social-emotional health and prosocial behaviour of pupils in grade 5 of the selected primary schools is at the average level.

The research conducted in 2019 found that pupils of a private primary school with inclusive education possess a level of social-emotional health $M=108.74$, i. e., in the range of higher average (Bisaki, Gajdošová, Sodomová, 2019).

In Slovakia and in European countries, several research studies have been conducted in the field of social-emotional health concerning various constructs. For example, in Lithuania, Petruitytė (2018) investigated the relationship between social-emotional health and empathy and between particular domains of both constructs. The sample consisted of 300 participants aged 12-15 and 300 participants aged 16-18. The research took place in nine schools in Lithuania. The research confirmed numerous positive correlations between the particular domains of both questionnaires. It was evident that social-emotional health positively correlated with the domains of empathy, such as imagination, perspective-taking, and empathic concern.

Petruitytė, Guogienė, and Rimienė (2019) found positive correlations between social-emotional health and self-esteem and empathy. The sample consisted of 935 adolescents aged 12-18. The strongest predictors of social-emotional health were empathic concern, self-esteem, and perception of one 's future (perspective-taking).

4.1 Limitations of research and future research aims

We had the intention to recruit a larger number of participants. There are not numerous studies on the topic of social-emotional health of the gifted, so we could not rely on research in this area.

We would like to conduct further research in other schools for gifted children to provide them with research results so that they can improve the conditions for the education of the gifted and their well-being and socio-emotional health. Research results would be interesting also for parents of gifted children.

5 Conclusion

There is a lack of research on giftedness, and it seems vital to realise research on giftedness and gifted children, as new and up-to-date research contributes to better support for the gifted population in families and schools.

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Primary Paper Section: A

Secondary Paper Section: AN

EMOTIONAL HABITUAL SUBJECTIVE WELL-BEING IN SELECTED LESSONS AMONG SECONDARY SCHOOL STUDENTS

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Abstract: The paper focuses on finding the relationships between the frequency of experiencing positive and negative emotional states, students' subjective evaluation of the subjects of mathematics, Slovak language and literature, English language, civics and physical education in terms of their popularity, difficulty and importance, and school achievement in these subjects. The research population consisted of 168 (100%) pupils second and third-year pupils of a secondary vocational school in Žilina. The research included: the Subjective Emotional Habitual Well-being Questionnaire (Džuka, Dalbert, 2002) and the Attitudes to Learning Subjects Questionnaire for Pupils (Hrabal, Pavelková, 2010). The most important results of the research revealed that the teaching subject of mathematics was rated the worst in all the surveyed items. Pupils perceived mathematics as the least favourite subject, the most challenging, the least important. They had the worst average school achievement in it, experienced the most negative and least frequently positive emotional state of all the subjects studied. English was the most significant teaching subject. Physical education was the most popular subject taught to the students. Pupils' attitudes towards the subjects taught did not change much over time, being stable and unambiguous. Only the subject of mathematics, which current pupils perceived to be less popular and less important than in the past, showed a change. We found a high correlation between the frequency of experiencing a positive state of mind and the popularity of the assessed teaching subjects in mathematics and physical education.

Keywords: emotional habitual subjective well-being, difficulty of teaching subjects, popularity of teaching subjects, school achievement, teaching subject, relevance of teaching subjects, pupil

1 Introduction

A school is a complex system, and many factors influence its functioning. According to Hulan and Dzuriková (2007), we can say that school should build a sense of human dignity and respect in children. Acceptance of the child and unconditional acceptance is also important. Pupils spend much time in school, getting into pleasant but also unpleasant and stressful situations, which they experience very intensely (Roľková, 2018). Emotional subjective well-being, according to Diener and Lucas (2000), Brzákova Krelková (2013), such as a good psychological state, including all the positive and negative evaluations that people make in their lives and their personal emotional reactions to experiences, as a correlation between the presence of positive relationships, the absence of negative affects and satisfaction with pupils' lives is important because it affects pupils' quality of life, behaviour and also educational outcomes (Foglová & Tomšík, 2017). The pupils' subjective perception of the teaching subject influences their motivation and attitude towards the teaching subject, which is, however, also determined by the social representation (reputation) of the teaching subject in the population (Hrabal & Pavelková, 2010).

In psychological research (Džuka & Dalbert, 1997; Brzákova Krelková, 2013; Valihorová, 2020), we can meet with the naming of a positive mood of a person using the concept of happiness, subjective well-being or satisfaction. Blatný, Dosedlová and Kebza et al. (2005) use the term subjective well-being, psychological or mental well-being. Other terms used are life satisfaction, mental health or happiness. In the Czech literature, the term personal well-being describes this phenomenon (Plevková & Peráčková, 2016). Subjective well-being consists of components such as satisfaction with life (overall evaluation and assessment of one's own life), satisfaction with significant areas of life (e.g. family, work, finances), positive emotions - experiencing pleasant emotions and moods, and low levels of negative affects - a little bit unpleasant moods and emotions (Foglová, 2018).

Subjective well-being and school

Subjective well-being also influences pupils' school performance, affecting their overall quality of life, behaviour and educational outcomes. Pupils with high subjective well-being are rated highly positively by teachers. Foglová and Tomšík (2017) confirmed in their research that high personal well-being is a very stable variable concerning pupils' school achievement. According to the authors, teachers play an essential role in creating opportunities for their pupils to be successful and should consider the findings that pupils should be happy in school and consequently will achieve higher school success.

Research on the human psyche highlights the interconnectedness of emotions and cognitive processes (Petlák, 2018). Pupils tend to perform better and learn more when they enjoy their school experiences. Conversely, if they do well and experience success in school, they are likelier to feel happy there (Vendel, 2018). School subjective well-being is crucial for pupils because it affects their overall quality of life, behaviour and educational outcomes (Foglová & Tomšík, 2017). Subjective well-being influences students' interest in school, motivation to learn, influences their success, achievement, engagement in the learning process and their satisfaction at school (Štrpková & Roľková, 2020).

It is crucial to consider the pupil's relationship to the subject, as this will also determine the pupils' emotional attitude towards the course of the lesson (Petlák, 2018; Urbanovská, 2006; Ryšavá, 2015; Antala, Šimonek & Čillík et al., 2012).

Fear, anxiety, anger, and worry about the future are emotional states that produce increased levels of the stress hormone noradrenaline in the adrenal medulla (Petlák, 2018). Even negative emotions can affect the learning outcome in a good way, but they only impact the learning outcome, not the learning process itself. It results in subsequent problems, such as forgetting the learnt topic. School should be a safe place without violence, aggression, severe conflicts and stress because all these factors slow down or even prevent the learning process (Roľková, 2020). Negative emotions block the pupil's thought activities and the progress of cognitive processes, and fatigue occurs earlier (Urbanovská, 2006).

Pupils' attitudes to subjects

The students' subjective perceptions of the subject can influence their attitude, motivation, or experience of overload or boredom. Each subject creates unique situations that require different work by the teacher and the pupils. The subject fulfils its function when it conveys information to pupils, enabling them to lead a satisfying personal life and succeed professionally. For a subject to fulfil this function, pupils must find it attractive (it should be popular with them), easy but not too easy, and they should be aware of its importance, especially in future careers. For example, in subjects described as unpopular and difficult but highly important (mathematics, mother tongue), if pupils are aware of the importance of the subject, they consider it essential to master it and are open to the teacher's motivational influence (Pavelková, Škaloudová & Hrabal, 2010). The teacher's role is to eliminate any adverse influences related to the teaching process so that the subjective perception of a particular subject does not have a possible negative impact on the pupils' health or their future lives, for example, by limiting the choice of future profession (Cibulková, 2018). Pupils' subjective attitudes towards subjects have not changed much over the years, except for attitudes towards foreign languages and civics, which pupils favour more than in the past (Pavelková & Škaloudová, 2006). Enjoyment of the subject is defined as the emotional experience of the subject and in the subject. It represents both a prerequisite and a result of motivation for the learning activity. The teaching subject can also be perceived as a favourite by pupils because of

its low demands. Therefore, it is impossible to draw conclusions about teaching effectiveness reflected in pupils' academic performance unequivocally based on the subject's popularity alone. If pupils perceive the subjects positively, the teachers have sufficiently motivated them and have thus fulfilled part of their pedagogical mission. The low popularity of the teaching subject indicates a kind of aversion, negative emotions and withdrawal (Hrabal & Pavelková, 2010).

From the subjective evaluation of the subject's difficulty by the students, it is possible to obtain information about its performance in terms of the adequacy of the requirements, content and performance objectives. It is an experienced and perceived difference between the pupil's realised capabilities and the teacher's requirements and performance. If the teacher creates good conditions and prerequisites for pupils to solve even complex tasks, they will not experience them as too demanding. A medium level of difficulty in the subject is optimal. Increasing the difficulty of a subject has a positive effect only if it does not reduce pupils' motivation, the popularity of the subject and the intensity of pupils' preparation for other subjects. Pupils' data on the difficulty of the subject compared to other subjects is considerably stable (Hrabal & Pavelková, 2010).

We can understand the relevance of the teaching subject as a motivational resource in terms of its application in society and its importance for achieving one's own goals in the future. Asking about the significance of the teaching subject ascertains the subjective meaning of an individual's activity. Pupils of the second grade at primary school should already be able to judge to what extent a subject of teaching benefits them, bringing a gain for their life perspective and personal growth. Awareness of the importance of a particular subject is an essential component of motivation towards it. The popularity of a teaching subject with an intensely experienced meaning indicates the optimal motivational action of the teacher. However, high popularity associated with low relevance may signal cheap popularity given, for example, by the low difficulty of the teaching subject (Hrabal & Pavelková, 2010).

The characteristics of the teaching subject mentioned above depend on the social representation (reputation) of the teaching subject in the population and the individual student's subjective experience. The pupils' perception of the teaching subject reflects in their attitude towards the teaching subject. This attitude is further influenced by how successful or unsuccessful pupils are in the subject (Hrabal & Pavelková, 2010).

The relationship between popularity, difficulty and importance of the subject

When interpreting students' attitudes towards subjects, it is necessary to consider the correlation of the assessed parameters, especially the relationship between the popularity and the difficulty of the subject. The growth of both these indicators is positive. It shows how the teachers can manage the tension between the demands (effort, energy expended) on the one hand and the positive experience (attractiveness of the activity) on the other hand through their pedagogical acting. Challenging subjects are usually not popular, and pupils are likelier to underperform in them (Hrabal & Pavelková, 2010).

The more challenging the subject, the less popular it is. Such subjects include, for example, mathematics and mother tongue. A similar trend applies to medium popular and medium challenging subjects such as English. The more popular a subject is in pupils' eyes, the more important it is to them, and the more important it is to them, the more they like it. The moderate link between popularity and perceived importance holds for subjects that are perceived to be popular (most educational subjects) and subjects that are perceived to be less popular (mathematics). There is little dependence and a less stable link between the difficulty of a teaching subject and its importance. There was only a weak to moderate correlation between popularity and school achievement in a subject. Thus, it is not the case that if

pupils have good school achievement in a subject, they will also like it. It is impossible to say that pupils who do poorly in a subject also find it difficult and, conversely, pupils who do well in a subject find it easy. There is only a weak link between the importance of the subject and school achievement (Hrabal & Pavelková, 2010).

Pupils have different attitudes to the subject depending on their abilities, interests or family background. The attitude of the school class towards the subject or the teacher's influence is also crucial. The more moderate the school grade, the more likely the subject will be considered easier and probably more popular, but its importance is likely to decrease (Hrabal & Pavelková, 2010). Based on the theoretical and empirical findings of, for example, Džuka and Dalbert (2002), Pavelková and Škaloudová (2006), Hrabal and Pavelková (2010), Foglová and Tomšík (2017), Petlák (2018), Vendel (2018), Cibulková (2018), we have identified the following research objectives:

- to find out the subjective attitudes of secondary vocational school pupils towards the subjects mathematics, Slovak language and literature, English language, civics and physical education in terms of their popularity, difficulty and importance,
- to find out the academic achievement of secondary vocational school pupils in mathematics, Slovak language and literature, English language, civics and physical education,
- to find out the frequency of emotional habitual subjective well-being of secondary vocational school pupils expressed by the frequency of positive and negative emotional states in the subjects of mathematics, Slovak language and literature, English language, civics and physical education,
- to identify possible differences in the subjective evaluation of the subjects mathematics, mother tongue, English language, civics and physical education between pupils of a secondary vocational school in the Slovak Republic in 2021 and pupils of grammar schools in the Czech Republic in the years 2005-2007,
- to identify possible differences in school achievement in the subjects of mathematics, mother tongue, English language, civics and physical education between pupils of a secondary vocational school in the Slovak Republic in 2021 and pupils of grammar schools in the Czech Republic in 2005-2007,
- to find out the possible relationship between the frequency of emotional habitual subjective well-being of secondary vocational school students and their subjective evaluation of the subjects of mathematics, Slovak language and literature, English language, civics and physical education,
- to find out the possible relationship between the frequency of emotional habitual subjective well-being of secondary vocational school pupils and their academic achievement in the subjects of mathematics, Slovak language and literature, English language, civics and physical education.

Based on the objectives presented, we established the following research questions:

RQ1: How do secondary vocational school pupils subjectively evaluate the subjects of mathematics, Slovak language and literature, English language, civics and physical education in terms of popularity, difficulty and importance?

RQ2: What educational results (average school achievement) do pupils of secondary vocational school achieve in mathematics, Slovak language and literature, English language, civics and physical education?

RQ3: How do secondary vocational school students subjectively experience the subjects of mathematics, Slovak language and literature, English language, civics and physical education?

RQ4: Is there a difference in the subjective evaluation of the subjects of mathematics, mother tongue, English language, civics and physical education between pupils of a secondary vocational school in the Slovak Republic in 2021 and pupils of grammar schools in the Czech Republic in 2005-2007?

RQ5: Is there a difference in school achievement in the subjects of mathematics, mother tongue, English language, civics and physical education between pupils of a secondary vocational school in the Slovak Republic in 2021 and pupils of grammar schools in the Czech Republic in 2005-2007?

RQ6: Is there a correlation between the frequency of emotional habitual subjective well-being of secondary vocational school students and their subjective evaluation of the subjects of mathematics, mother tongue, English language, civics and physical education?

RQ7: Is there a correlation between the frequency of emotional habitual subjective well-being of secondary vocational school pupils and their academic achievement in the subjects of mathematics, Slovak language and literature, English language, civics and physical education?

2 Methods

The research population comprised 168 (100%) participants, students of the Secondary Vocational School of Agriculture and Rural Services in Žilina. 83 pupils (49.40%) attended the second, and 85 pupils (50.60%) attended the third school grade. A total of ten school classes (five second-grade and five third-grade classes), in which pupils took the same subjects in a given school year: mathematics, Slovak language and literature, English language, civics and physical education, participated in the questionnaire survey. Of the 168 (100%) participants, 29 (17.26%) were boys, and 139 (82.74%) were girls. The mean age of the participants was 17.13 ± 0.71 years.

We chose the questionnaire method to obtain the necessary data. We administered the questionnaires to the students in an online form. The research participants were informed about the primary aim of the work, voluntariness and anonymity of the provided data. Instructions for completion were in the introduction of the questionnaire. The demographic data in the questionnaire consisted of information about the gender, school grade, and age of the participants. We used the following research methodology:

The students' subjective well-being was measured using the SEHP Emotional Habitual Subjective Well-being Questionnaire (Džuka & Dalbert, 2002).

To determine pupils' attitudes towards the evaluated subjects, we used the Attitudes towards Subjects Questionnaire for Pupils (Hrabal & Pavelková 2010).

In order to compare the subjective attitudes of pupils towards subjects in our research with the subjective attitudes of pupils towards subjects that were analysed in the research in 2005-2007, we used the reference standards presented by Hrabal and Pavelková – *Postoje k předmětům – referenční normy – gymnázium* (Attitudes towards subjects – reference norms – secondary grammar schools, Hrabal & Pavelková, 2010). These norms represent the research results carried out in the last four years of grammar schools in the Czech Republic. Since the subject assessed in the reference standards is the Czech language and, in our research, the Slovak language and literature, we compare these subjects in the context of the mother tongue taught in the country.

The collected data were processed using SPSS statistical program and Excel. We interpreted correlation coefficients according to Hinkle, Jurs and Wiersma (1994).

3 Results

In RQ1, we asked how secondary vocational school students subjectively evaluate the subjects of mathematics, Slovak language and literature, English language, civics and physical education in terms of popularity, difficulty and importance. Based on the obtained data, we can express the following characteristics of the subjectively evaluated subjects in terms of their popularity, difficulty and importance by the pupils of secondary vocational school:

Students subjectively rated mathematics as a subject they disliked (AM = 3.92; SD = 1.16) and found it challenging (AM = 2.12; SD = 1.03); it was partially significant for students (AM = 3.43; SD = 1.06). The Slovak language and literature subject was a moderately popular (AM = 2.85; SD = 0.71) and moderately challenging (AM = 2.86; SD = 0.66) subject among pupils. Pupils also rated it subjectively as an important teaching subject (AM = 2.14; SD = 0.83). The English language was subjectively rated as a moderately popular (AM = 2.71; SD = 1.19) and moderately challenging (AM = 2.71; SD = 1.06) teaching subject by pupils. At the same time, pupils considered it an important teaching subject (AM = 1.70; SD = 0.94). Civics was moderately popular (AM = 3.13; SD = 0.96), moderately challenging (AM = 3.30; SD = 0.79), and partially important (AM = 3.17; SD = 0.94) to students. Students reported physical education as a favourite (AM = 2.39; SD = 1.02), easy (AM = 3.83; SD = 0.95), and partially significant subject (AM = 2.87; SD = 1.09).

In RQ2, we asked what educational results the pupils of the secondary vocational school achieved in mathematics, Slovak language and literature, English language, civics and physical education. Based on the research results, we can say that pupils achieved the worst academic achievement in the assessed subjects in mathematics (AM = 2.75; SD = 1.05). In the Slovak language and literature, pupils had similar learning results (AM = 2.25; SD = 0.95) as in English (AM = 2.27; SD = 0.91). In civics, pupils had the second-best academic achievement (AM = 1.79; SD = 0.78) after physical education (AM = 1.8; SD = 0.44), in which pupils had the best school marks in the last end-of-year report card.

In RQ3, we sought to answer the question of how secondary vocational school students subjectively experience the subjects of mathematics, Slovak language and literature, English language, civics and physical education. In mathematics, pupils experienced more often a negative emotional state (AM = 2.52; SD = 1.22) and less often a positive emotional state than in the other subjects assessed (AM = 1.66; SD = 0.68). In the Slovak Language and literature subject, students sometimes experienced a positive (AM = 2.85; SD = 0.90) and rarely a negative emotional state (AM = 2.06; SD = 1.11). In the English language, students experienced positive (AM = 3.10; SD = 1.24) more often than negative emotional states (AM = 1.88; SD = 0.95), similar to the civics (positive emotional states: AM = 2.71; SD = 1.19; negative emotional states: AM = 1.57; SD = 0.71). In physical education, students often experienced positive (AM = 3.70; SD = 1.31) and seldom negative emotional states (AM = 1.73; SD = 0.85).

Physical education was the most positively subjectively evaluated and experienced teaching subject by secondary vocational school pupils. On the other hand, mathematics was the worst subjectively evaluated and experienced teaching subject. Pupils perceived mathematics as the least liked subject (AM = 3.92; SD = 1.16), the most challenging (AM = 2.12; SD = 1.03), the least important (AM = 3.43; SD = 1.06). They achieved the worst arithmetic mean in it (AM = 2.75; SD = 1.05), experienced the most frequent negative emotional states (AM = 2.52; SD = 1.22), and the least frequent positive emotional states (AM = 1.66; SD = 0.68) among all the subjects studied. These findings are alarming as mathematics is an integral part of a person's life, and a negative attitude towards mathematics can be a limiting factor in a young person's choice of future college and career.

Overall, in the subjects of mathematics, Slovak language, English language, civics, and physical education, students were more likely to experience positive (AM = 2.88; SD = 1.15) than negative emotional states (AM = 1.87; SD = 0.82).

Table 1 compares the ranking of the subjects of mathematics, Slovak language and literature, English language, civics and physical education by popularity among pupils of grammar schools in the Czech Republic in 2005-2007 and pupils of the secondary vocational school in the Slovak Republic in 2021.

Table 1: Comparison of the popularity of teaching subjects in the Czech Republic (2005-2007) and the Slovak Republic (2021).

Popularity of the teaching subject	CZ 2005-2007		SVK 2021	
	teaching subject	AM	teaching subject	AM
1.	PE	1,8	PE	2,4
2.	EL	2,3	EL	2,7
3.	CZL	2,4	SL	2,8
4.	SS	2,7	SS	3,1
5.	MATH	2,8	MATH	3,9

Legend: 1. = the most popular subject, 2. = the second most popular subject, 3. = the third most popular subject, 4. = the fourth most popular subject, 5. = the least popular subject, AM = arithmetic mean, MATH = mathematics, SL = Slovak language and literature, CZL = Czech language, EL = English language, SS = civics, PE = physical education, CZ = Czech Republic, SVK = Slovak Republic

Table 2 compares the ranking of the subjects of mathematics, Slovak language and literature, English language, civics and physical education by difficulty for pupils of grammar schools in the Czech Republic in 2005-2007 and pupils of the secondary vocational school in the Slovak Republic in 2021.

Table 2: Comparison of difficulty of teaching subjects in the Czech Republic (2005-2007) and the Slovak Republic (2021).

Difficulty of the subject	CZ 2005-2007		SVK 2021	
	teaching subject	AM	teaching subject	AM
1.	MATH	2,4	MATH	2,2
2.	EL	2,9	EL	2,7
3.	CZL	3,0	SL	2,9
4.	SS	3,3	SS	3,3
5.	PE	4,2	PE	3,8

Legend: 1. = the most difficult subject, 2. = the subject ranked second in terms of difficulty, 3. = the subject ranked third in terms of difficulty, 4. = the subject ranked fourth in terms of difficulty, 5. = the least demanding subject, AM = arithmetic mean, MATH = mathematics, SL = Slovak language and literature, CZL = Czech language, EL = English language, SS = civics, PE = physical education, CZ = Czech Republic, SVK = Slovak Republic

In RQ4, we wanted to find out whether there is a difference in the subjective evaluation of the subjects of mathematics, mother tongue, English language, civics and physical education between pupils of a secondary vocational school in the Slovak Republic in 2021 and pupils of grammar schools in the Czech Republic in 2005-2007. Based on the results of the research, the order of the evaluated subjects in terms of popularity was the same among secondary vocational school pupils in 2021 in the Slovak Republic as among grammar school pupils in 2005-2007 in the Czech Republic. We observed the difference for the subject of mathematics, which was subjectively rated as a moderately popular subject (AM = 2.8) by pupils of grammar schools in the Czech Republic in 2005-2007, while in 2021, it was rated as an unpopular subject (AM = 3.9) by pupils of a secondary vocational school in the Slovak Republic (Table 1). The ranking of the rated subjects in terms of difficulty was the same for the compared pupils (Table 2). We recorded differences in the item of the importance of the teaching subject. In both groups compared, pupils ranked English as the most important subject (CZ, AM = 1.3; SVK, AM = 1.7) followed by their mother tongue (CZ, AM = 1.9; SVK, AM = 2.1). We found that secondary vocational school pupils in the Slovak Republic considered civics (AM = 2.9) and physical education (AM = 3.1) more important subjects than mathematics (AM = 3.43) compared to pupils in grammar schools in the Czech Republic (SS, AM = 2.8; PE, AM = 3.1; MATH, AM = 2.4).

Table 3 shows a comparison of the ranking of the subjects of mathematics, Slovak language and literature, English language, civics and physical education by school achievement for pupils of grammar schools in the Czech Republic in 2005-2007 and

pupils of a secondary vocational school in the Slovak Republic in 2021.

Table 3: Comparison of school achievement in teaching subjects in the Czech Republic (2005-2007) and the Slovak Republic (2021).

School mark in the subject	CZ 2005-2007		SVK 2021	
	teaching subject	AM	teaching subject	AM
1.	PE	1,1	PE	1,2
2.	SS	1,9	SS	1,8
3.	EL	2,2	SL	2,3
4.	CZL	2,3	EL	2,3
5.	MATH	2,5	MATH	2,8

Legend: 1. = the subject with the best school achievement, 2. = the subject with the second best school achievement, 3. = the subject with the third best school achievement, 4. = the subject with the fourth best school achievement, 5. = the subject with the worst school achievement, AM = arithmetic mean, MATH = mathematics, SL = Slovak language and literature, CZL = Czech language, EL = English language, SS = civics, PE = physical education, CZ = Czech Republic, SVK = Slovak Republic

In RQ5, we asked whether there is a difference in school achievement in the subjects of mathematics, mother tongue, English language, civics and physical education between pupils of a secondary vocational school in the Slovak Republic in 2021 and pupils of grammar schools in the Czech Republic in 2005-2007. We observed minimal differences in the assessed parameters. As in the past, pupils in the Czech Republic had the worst school achievement in the subject of mathematics (CZ, AM = 2.5; SVK, AM = 2.8) and the best school achievement in the subject of physical education (CZ, AM = 1.1; SVK, AM = 1.2) (Table 3). Typical pupils' largely stable attitudes are associated with each subject.

Table 4 shows the correlations between the frequency of experiencing a positive state of mind and the subjectively rated popularity, difficulty and importance of the subjects of mathematics, Slovak language and literature, English language, civics and physical education by secondary vocational school students.

Table 4: Correlation between the frequency of experiencing positive moods, popularity, difficulty and importance of teaching subjects.

	popularity of the subject		difficulty of the subject		importance of the subject	
	r	r ²	r	r ²	r	r ²
MATH	-0.79	0.62	0.55	0.30	-0.58	0.34
SL	-0.61	0.37	0.16	0.03	-0.27	0.07
EL	-0.67	0.44	0.34	0.12	-0.43	0.18
SS	-0.70	0.48	0.27	0.07	-0.48	0.23
PE	-0.74	0.55	0.46	0.21	-0.55	0.30

Legend: F+ = frequency of experiencing positive mood, r = Pearson's correlation coefficient, r² = coefficient of determination, MATH = mathematics, SL = Slovak language and literature, EL = English language, SS = civics, PE = physical education

Table 5 presents the correlations between the frequency of experiencing a negative mood and the subjectively rated popularity, difficulty and importance of the subjects of mathematics, Slovak language and literature, English language, civics and physical education by secondary vocational school students.

Table 5: Correlation between frequency of experiencing negative mood, popularity, difficulty and importance of the subjects.

F-	popularity of the subject		difficulty of the subject		importance of the subject	
	r	r ²	r	r ²	r	r ²
MATH	0.64	0.42	-0.52	0.27	0.40	0.16
SL	0.30	0.09	-0.26	0.07	0.11	0.01
EL	0.56	0.31	-0.48	0.23	0.39	0.15
SS	0.38	0.15	-0.38	0.14	0.29	0.08
PE	0.43	0.19	-0.44	0.19	0.24	0.06

Legend: F- = frequency of experiencing negative mood, r = Pearson's correlation coefficient, r² = coefficient of determination, MATH = mathematics, SL = Slovak language and literature, EL = English language, SS = civics, PE = physical education

In RQ6, we wanted to determine the possible relationship between the frequency of emotional habitual subjective well-being of secondary vocational school students and their subjective evaluation of the subjects of mathematics, Slovak language and literature, English language, civics and physical education.

We found a moderately strong correlation between the frequency of experiencing a positive state of mind and the popularity of subjectively rated subjects in the subjects of Slovak language and literature ($r = -0.61$) and English language ($r = -0.67$). The value of $r = -0.70$ found in the teaching subject of civics is on the borderline of moderate and high correlation. We observed a high correlation between the teaching subjects of mathematics ($r = -0.79$) and physical education ($r = -0.74$). We found a moderately strong correlation between the frequency of experiencing a positive state of mind and the subjectively rated difficulty of the subjects of mathematics ($r = 0.55$). For the other rated teaching subjects, we observed only a weak correlation. We found a moderate correlation between the frequency of experiencing a positive state of mind and the subjectively rated importance of the teaching subject in mathematics ($r = -0.58$) and physical education ($r = -0.55$). For the other assessed teaching subjects, we observed only a weak correlation (Table 4).

We found a moderately strong correlation between the frequency of experiencing a negative state of mind and the popularity of the subjectively rated subject of mathematics ($r = 0.64$) and English ($r = 0.56$). For the other rated teaching subjects, we found only a weak correlation (Table 5). We found a moderately strong correlation between the frequency of experiencing a negative state of mind and the subjectively rated difficulty of the subject of mathematics ($r = -0.52$). For the other rated teaching subjects, we observed only a weak correlation. There was only a weak correlation between the frequency of experiencing a negative state of mind and the importance of the subjectively assessed teaching subjects in all the assessed subjects (Table 5).

We observed the highest coefficients of determination for the correlation between the frequency of experiencing a positive state of mind and the popularity of the subject of mathematics ($r^2 = 0.62$) and physical education ($r^2 = 0.55$) (Table 4) and for the correlation between the frequency of experiencing a negative state of mind and the popularity of the subject mathematics ($r^2 = 0.42$) (Table 5). The coefficient of the determination reached low values for the other variables assessed. Other factors, which could be identified in further research, also impact the emotional habituation of subjective well-being in the classroom and the students' subjective evaluation of the subjects taught.

In mathematics and physical education, the frequency of pupils' emotional habitual subjective well-being (positive state of mind) is related to the subjective evaluation of the teaching subject by secondary vocational school pupils in terms of their popularity.

Table 6 shows the correlations between the frequency of experiencing positive and negative moods and school achievement in the subjects of mathematics, Slovak language

and literature, English language, civics and physical education by secondary vocational school students.

Table 6: Correlation between frequency of experiencing positive and negative moods and school achievement in school subjects.

F+	school achievement		F-	school achievement	
	r	r ²		r	r ²
MATH	-0.51	0.26	MATH	0.34	0.12
SL	-0.19	0.04	SL	0.35	0.12
EL	-0.38	0.14	EL	0.42	0.18
SS	-0.16	0.03	SS	0.27	0.07
PE	-0.29	0.08	PE	0.32	0.10

Legend: F+ = frequency of experiencing positive mood, F- = frequency of experiencing negative mood, r = Pearson's correlation coefficient, r² = coefficient of determination, MATH = mathematics, SL = Slovak language and literature, EL = English language, SS = civics, PE = physical education

In RQ7, we wanted to determine the possible relationship between the frequency of emotional habitual subjective well-being of secondary vocational school pupils and their school achievement in mathematics, Slovak language and literature, English language, civics and physical education.

We found a moderately strong correlation between the frequency of experiencing a positive state of mind and school achievement in mathematics ($r = -0.51$). For the other subjects assessed, we observed only a weak correlation. There was only a weak correlation between the frequency of experiencing negative mood and school achievement in all subjects assessed (Table 6).

The research instrument, the Emotional Habitual Subjective Well-being Questionnaire (Džuka & Dalbert, 2002), showed high-reliability values for both positive and negative students' moods in all the subjects assessed ($\alpha = 0.80$ to 0.94). Our instrument had high internal consistency and reliability across items.

4 Discussion

We wanted to find an answer to the question of how students of secondary vocational school subjectively evaluate the subjects of mathematics, Slovak language and literature, English language, civics and physical education in terms of popularity, difficulty and importance. Pupils subjectively evaluated mathematics as unpopular and challenging; it was partly important for pupils. Pupils rated the subject of Slovak language and literature as a moderately popular and moderately challenging subject. At the same time, pupils subjectively rated it as an important subject. Pupils subjectively rated English as a moderately popular, moderately challenging and essential subject. Civics was moderately popular, moderately challenging and partly important to pupils. Pupils rated physical education as a popular, easy and partly significant subject. Pupils perceive subjects in school very individually. Each subject is unique and requires specific work by the teacher, especially with pupils' motivation. The pupil's subjective representation of the teaching subject (the idea of the subject) influences the pupil's attitude and motivation towards the subject (Pavelková, Škaloudová & Hrabal, 2010; Hrabal & Pavelková, 2010).

We asked what educational results the pupils of the secondary vocational school achieved in mathematics, Slovak language and literature, English language, civics and physical education. We found that pupils achieved the worst academic achievement in the assessed subjects in mathematics and the best in physical education. Pupils achieved better learning outcomes in the popular and easy subjects than in the unpopular and challenging subjects. However, it is not generally the case that subjects in which pupils achieve well are also popular. It is also impossible to say that pupils with poor school achievement in a particular subject also subjectively evaluate it as challenging and, conversely, that pupils with good school achievement consider the subject easy (Hrabal & Pavelková, 2010).

We were also looking for an answer to the question of how the pupils of secondary vocational school subjectively experience the subjects of mathematics, Slovak language and literature, English language, civics and physical education. In mathematics, pupils experienced a negative emotional state more often and a positive emotional state less often than in the other subjects assessed. Pupils sometimes experienced positive and rarely negative emotional states in Slovak Language and literature. In English, pupils sometimes experienced positive and almost never negative emotional states, similar to civics. In physical education, pupils often experienced a positive and rarely a negative emotional state. A positive emotional state of mind promotes the optimal functioning of cognitive processes and has an impact on the learning process and school success of pupils (Petlák, 2018; Petlák, 2020; Urbanovská, 2006; Urbanovská & Škobrtal, 2012). Physical activity has a significant impact on the level of subjective well-being; it has both short-term and long-term beneficial effects on well-being, namely, it positively affects mood, self-esteem, anxiety, depression, pressure, tension, and perception of stress (Plevková & Peráčková, 2016).

We also wanted to find an answer to the question of whether there are differences in the subjective evaluation of the subjects mathematics, mother tongue, English language, civics and physical education between pupils of a secondary vocational school in the Slovak Republic in 2021 and pupils of grammar schools in the Czech Republic in 2005-2007. The attitudes of the secondary vocational school participants towards the popularity, difficulty and importance of the assessed subjects in the Slovak Republic replicated to a large extent the results of methodologically identical but older studies from grammar schools in the Czech Republic (Hrabal & Pavelková, 2010). The subjective evaluation of the subjects of Slovak language and literature, English language, civics and physical education by secondary school pupils did not change significantly. We found the only significant change in pupils' subjective attitudes towards the popularity and importance of the subject of mathematics. In earlier research from 2005-2007 in the Czech Republic, pupils described the subject of mathematics as moderately popular and essential, and in 2021 in the Slovak Republic as unpopular and partly important. Pupils' attitudes towards mathematics have worsened, which may again be related to the aforementioned mathematical anxiety (Cibulková, 2017). Hrabal and Pavelková (2010) write that typical pupils' attitudes are more or less stable and unambiguous and are related to each subject. Pavelková and Škaloudová (2004, 2006) noted similar results of the survey of pupils' attitudes towards teaching subjects as in the research carried out in the 1980s.

When comparing school marks in the end-of-year report cards for the subjects assessed, pupils in both countries achieved almost identical learning outcomes.

At the same time, we asked whether there is a difference in school achievement in the subjects of mathematics, mother tongue, English language, civics and physical education between pupils of a secondary vocational school in the Slovak Republic in 2021 and pupils of grammar schools in the Czech Republic in 2005-2007. We observed only minimal differences in the assessed parameters. As in the past, pupils in the Czech Republic had the worst school achievement in mathematics and the best school achievement in physical education. Typical and mainly stable attitudes of pupils (Hrabal & Pavelková, 2010) are related to individual subjects, which is probably also reflected in the school achievement of the evaluated subjects.

We wanted to investigate the possible relationship between the frequency of emotional habitual subjective well-being of secondary vocational school students and their subjective evaluation of mathematics, Slovak language and literature, English language, civics and physical education.

We found a moderately strong correlation between the frequency of experiencing a positive mood and the popularity of subjectively evaluated subjects in the subjects of Slovak language and literature and English language. The value found in

the teaching subject of civics is on the borderline of moderate and high correlation. We observed a high correlation in the teaching subjects of mathematics and physical education. We found a moderately strong correlation between the frequency of experiencing a positive state of mind and the subjectively rated difficulty of the teaching subject in the teaching subject of mathematics. We found a moderately strong correlation between the frequency of experiencing a positive state of mind and the subjectively rated importance of the teaching subject in mathematics and physical education.

We found a moderate correlation between the frequency of experiencing negative moods and the popularity of subjectively rated subjects in mathematics and English. We found a moderately strong correlation between the frequency of experiencing a negative state of mind and the subjectively rated difficulty of the teaching subject in mathematics. We found only a weak correlation between the frequency of experiencing a negative state of mind and the importance of the subjectively rated teaching subject in all subjects assessed. We observed the highest coefficients of determination for the correlation between the frequency of experiencing a positive state of mind and the popularity of mathematics and physical education. A similar correlation was between the frequency of experiencing a negative state of mind and the popularity of mathematics. From our findings, we can hypothesise that in mathematics and physical education, there is a correlation between emotional experience and subjective evaluation of the selected teaching subjects, mainly in terms of their popularity (Vendel, 2018; Foglová, 2018; Foglová & Tomšík, 2017). Subjective well-being also influences pupils' ability to cope with risky situations (Pilková & Valihorová, 2019). Other factors, such as the social representation of the subject in the population, also impact the experience of positive and negative moods during the lessons and pupils' subjective evaluation of the subject. Based on their experiences, teachers and pupils create subjective images of teaching subjects' difficulty, interestingness and social significance (Hrabal & Pavelková, 2010).

We asked whether there is a possible relationship between the frequency of emotional habitual subjective well-being of secondary vocational school students and their academic achievement in the subjects of mathematics, Slovak language and literature, English language, civics, and physical education. We found a moderately strong correlation between the frequency of experiencing a positive state of mind and school achievement in mathematics. For the other assessed teaching subjects, we observed a weak correlation. We found a weak correlation between the frequency of experiencing a negative mood and school achievement in all assessed subjects. Experiencing a positive and negative state of mind in a teaching subject had no clear correlation with school achievement. Although studies report that school subjective well-being influences learning outcomes (Foglová, 2018; Foglová & Tomšík, 2017), there are likely other factors influencing the assessed variables that would be worthy of further investigation in the future.

In the following section, we present the limitations of the research we have designed, as well as recommendations for future research: non-homogeneous research population in terms of gender, administration of questionnaires only online, the use of reference standards of pupils' subjective attitudes towards subjects from grammar schools in the Czech Republic, assessment of subjective emotional well-being in selected classes in secondary vocational school's second and third grades only, assessing only the frequency of experiencing positive and negative states of mind. In the future, we recommend researching a population with equal representation of both genders. Further research must compare the variables under study among the same type of secondary schools in the Slovak Republic. Therefore, we recommend that future longitudinal research compares the variables under study over a more extended period, for example, at the beginning and end of the study, i.e., in the first and fourth grades.

5 Conclusion

Answering the research questions was in line with the findings of several authors: Abu-Hilal (2000), Pavelková and Škaloudová (2004, 2006), Hrabal and Pavelková (2010), Gaotlhobogwe, Laugharne and Durance (2011), Bačová and Leláková (2014), Cibulková (2017, 2018), Foglová and Tomšík (2017), Foglová (2018), Bücker, Nuraydin and Simonsmeier et al. (2018), Steinmayr, Heyder and Naumburg et al. (2018), Mazana, Suero Montero and Olifage (2019), Pitoňáková and Augustínová (2022) and others.

The results of our research can serve as a basis for teachers' self-diagnostic work and thus can help to improve their professional competences and optimise teaching. In the future, we consider it beneficial to conduct further research that would focus on a deeper investigation of the factors influencing the experience of positive and negative emotional states in the lessons and the subjective evaluation of teaching subjects by pupils. It is also crucial to conduct more research on the issue of pupils' negative attitudes towards mathematics and the more frequent experience of negative moods in this subject.

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Primary Paper Section: A

Secondary Paper Section: AN

DO BELIEFS IN CONSPIRACY THEORIES SPREAD THROUGH SOCIAL MEDIA AFFECT WORK PERFORMANCE? A SURVEY OF MEMBERS OF THE MILITARY FORCES

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Abstract: Conspiracy theories spread through social and other media often bringing easy explanations of events that cannot be easily explained. Beliefs in conspiracy theories may lead to simplified and radical viewpoints that can negatively influence one's behavior and actions. The paper analyzes the association between beliefs in popular conspiracy theories spread through social media and work performance using the results of an authors' test of conspiracy theories applied to a sample of 178 students of the Faculty of Military Leadership, University of Defence in Brno, Czech Republic. The students were selected as representatives of high-profile professions that should be trained to deal with potential disinformation and conspiracy theories. The assumption was that the students would be generally immune to the impact of conspiracy theories. The analysis did not confirm a hypothesis that individuals with top work performance are less prone to beliefs in conspiracy theories than individuals with solid/poor work performance. The findings confirm the necessity to systematically train people working in high-profile professions to work with available information and deal with potential disinformation and conspiracy theories. The findings are useful in the HR management practice of organizations that care about the professional qualities of their people and encourage further research on the origin, spread, and impact of conspiracy theories in the workplace.

Keywords: conspiracy theories, work performance, management, military forces, Czech Republic

1 Introduction

Conspiracy theories are known as meaningful explanations of difficult-to-understand events helping people to make sense of changes around them (Allington et al., 2021). Such events may be political, economic, social, technical, cultural, natural, or other, and their explanations are often associated with the belief that certain events result from a secret conspiracy by some powerful group of conspirators who hide something very important from the public and manipulate the public with some negative intent (Apatov and Grimes, 2019). This brings the belief that nothing happens by chance and that there are bad people who mean bad things to good people (Mourad et al., 2020).

Many people are not interested in conspiracy theories at all. Other people, on the other hand, have unlimited faith in conspiracy theories. And some people use conspiracy theories to their advantage (Bessi et al, 2015). In other words, what some perceive as complete nonsense, others perceive as a clear thing, and some can benefit from it 5. (Boulianne and Lee, 2022). Conspiracy theories often take on a life of their own. They spread quickly and are hard to disprove (Bram, 2021). They serve mainly both people who feel a lack of information about events explained by them, and people who desire to achieve uniqueness and exceptionality through them (Cinelli et al., 2022). However, some people share conspiracy theories just for fun, as they find them exciting (Clarke, 2002).

The most famous conspiracy theories, such as the flat Earth concept, the moon landing, the UFO existence, the JFK assassination, Princess Diana's death, the events of September 11, 2001, the COVID-19 pandemic, and many others, are widely spread as a cultural phenomenon (Coady, 2007). Similar conspiracy theories are very difficult to disprove, while their persistence may be associated with many negative social effects (Douglas et al., 2016). Some sound like complete nonsense, but some others are very believable and attract the attention of many

people who find in them both an explanation and excitement (Douglas and Leite, 2017). These are mostly connected with events that people experience directly or indirectly in some way (Douglas et al., 2017). They usually contain signs of truth and reinforce the beliefs of the people who believe in them or spread them with other supporting evidence. In today's world of social media, it's easier than ever (Douglas and Sutton, 2018). Individuals obtaining information primarily or exclusively from social media appear to be more prone to conspiracy beliefs than other individuals obtaining information from various sources (Douglas et al., 2019).

When people feel uncertain due to some unpleasant events, they welcome clear explanations that bring them peace of mind (Douglas, 2021). When something scares people, they want to believe that it cannot be true, which makes them more vulnerable to various conspiracy theories (Dow, 2021). From a workplace perspective, beliefs in conspiracy theories about some unforeseeable and unprecedented events, such as the COVID-19 pandemic affecting millions of people worldwide, may also have serious work performance consequences (Enders and Smallpage, 219). Different viewpoints on the origin and solution of certain events, such as the outbreak of the coronavirus pandemic and the introduction of restrictive measures, can lead to disagreements and disputes, which can negatively affect workplace communication and cooperation and so the work performance of both individuals and teams (Enders et al., 2020).

Dealing with the spread of conspiracy theories in the workplace is relevant both for stable high work performance as well as for positive external impacts (Enders et al., 2023). This seems to be particularly important in the case of people working in high-profile professions, such as civil servants or members of the police and military forces. They work with sensitive information, make critical decisions, and influence other people's opinions, behaviors, and actions. Therefore, they should be highly immune to the influence of conspiracy theories.

Following known empirical findings about conspiracy beliefs, social media, and work performance, the paper aims to analyze the association between beliefs in popular conspiracy theories spread through social media and work performance using a sample of students of the Faculty of Military Leadership, University of Defence in Brno, Czech Republic representing members of high-profile professions.

First, a literature review is provided on the origin of conspiracy theories, the spread of conspiracy theories through social media, the prevention of conspiracy theories, and the effect of conspiracy theories in the workplace. Second, the paper's methods are defined and the way of applying an authors' test of conspiracy theories to the sample of students of the Faculty of Military Leadership, University of Defence in Brno, Czech Republic is described. Third, the authors' results are analyzed. Fourth, the authors' findings are discussed. Finally, conclusions about the main findings and suggestions are made.

2 Literature Review

The issue of conspiracy theories attracts constant attention from the public and researchers alike as evidenced by the number of published scientific articles. Most of them deal with the essence of conspiracy theories, especially with their origin, spread, and impact on society. Conspiracy theories are traditionally interpreted as an undesirable phenomenon (Federico et al., 2018), associated with the origin and spread of misinformation, propaganda, and mistrust in existing public institutions and current scientific knowledge (Frenken and Imhoff, 2021). The producers and propagators of conspiracy theories are seen as individuals with an irrational tendency to continue to believe in their conspiracy theories (Garcia et al., 2020). On the other hand, there are opinions that this traditional interpretation of conspiracy theories should be revised and that conspiracy

theories should be seen on a case-by-case basis (Green and Douglas, 2018). Conspiracy theories are not always a product of irrational thinking (Green et al., 2023). They may be a product of both extremist as well as mainstream ideologies and their producers and propagators may be absolute amateurs as well as generally respected representatives of intellectual and public institutions (Green and Douglas, 2018). This indicates that essentially no conspiracy theory should be dismissed without considering the relevant evidence (Grodzicka, 2021). At the same time, it is evident that there are conspiracy theories that certainly cannot be considered harmless, as they are associated with propaganda, reluctance, prejudice, violence, crime, or disengagement (Enders and Smallpage, 219).

2.1 The Origin of Conspiracy Theories

Conspiracy theories arise particularly in crisis times when people experience feelings of uncertainty, anxiety, and threat (Grodzicka and Harambam, 2021). People's belief in conspiracy theories seems to deepen when people try to understand the surrounding events, when they need to feel safer, or when they want to attract more attention (Bram, 2021). Some people also accept or reject certain conspiracy theories on purpose based on political, ideological, and other interests (Boulianne and Lee, 2022). Beliefs in conspiracy theories are typical of people suffering from mental disorders, perceptual disorders, or personality disorders (Douglas et al. 2016). Beliefs in conspiracy theories are also encouraged by various ideologies, whether political, religious, or scientific (Hagen, 2022). Conspiracy theories in this case help to advance certain interests and achieve certain goals (Harambam, 2021). Sharing conspiracy theories may bring some social benefits to individuals in the short term, although in general, sharing conspiracy theories is viewed negatively in society (Hart and Greather, 2018). Some short-term benefits of believing in conspiracy theories include finding one's sense of meaning and purpose, justifying one's beliefs, excusing one's behavior, encouraging one's self-esteem, and satisfying one's excitement. Many people find conspiracy theories believable and attractive, despite their long-term negative social effects (Douglas and Leite, 2017). A short-term reduction in feelings of uncertainty, anxiety, and threat due to conspiracy beliefs may, on the contrary, be replaced by a long-term intensification of feelings of uncertainty, anxiety, and threat (Dow et al., 2016). Paradoxically, these unpleasant feelings can further intensify the need for conspiracy beliefs, thus closing a vicious circle of the need to share conspiracy theories (Grodzicka and Harambam, 2021).

Beliefs in conspiracy theories are generally attributed to the irrationality of conspiracy believers who either do not see or do not want to see all the available facts (Mourad et al. 2020). In other words, conspiracy theories do not originate and spread just because of the irrationality of the people who believe in them. Beliefs in conspiracy theories result from both a general tendency toward conspiracy thinking (Imhoff and Lamberty, 2017), which may have roots in early childhood experiences (Imhoff, 2022), as well as life beliefs resulting from life experiences (Jolley and Lantian, 2022). Beliefs in conspiracy theories can be motivated by feelings of existential threat and failure to satisfy basic life needs as a result of unfavorable political, economic, and social developments (Krauk et al., 2021) as well as social ambitions (Lantian et al., 2017). People desiring higher social status may be more motivated to engage in conspiracy thinking than people concerned about their social status (Lantian et al., 2018). So, conspiracy thinking can motivate individuals to positive action to meet their needs and interests, whether personal or professional (Liekfett et al., 2022). On the other hand, rooted conspiracy thinking does not reduce feelings of an existential threat but instead may encourage further conspiracy thinking (Kauk et al., 2021).

2.2 The Spread of Conspiracy Theories through Social Media

One of the progressive ways of spreading conspiracy theories is social media, such as Facebook, Instagram, YouTube, Twitter,

and others. An increasing number of people share information about current events through social networks, but this also increases the risk of sharing misinformation and conspiracies (Mancosu and Vassalo, 2022). Conspiracy theories spread through social media can negatively influence the way individuals perceive and interpret reality (Mari et al., 2022). This was most recently demonstrated during the coronavirus pandemic when social media mostly helped to share useful information and instructions but also allowed the spread of many conspiracy theories that often led to chaos and panic (Miller et al., 2016). Some users of social media are more susceptible to certain misinformation and conspiracies than others. The reason may be a greater tendency towards conspiracy thinking, which is further intensified by the influence of social media (Douglas et al., 2019).

Sharing conspiracy theories within social media intensifies conspiracy thinking and transforms conspiracy beliefs into real beliefs. These are further shared within social media, creating a vicious circle (Min, 2021). Additionally, within some social media (such as Facebook), conspiracy theories seem to spread more than within other social media (such as Twitter). It depends on both providers and users of social media (Ren et al., 2022), while unregulated social media can be a risky source of conspiracy theories (Mari et al., 2022). The beliefs of social media users in conspiracy theories vary by social status, economic situation, and political orientation (Hagen et al., 2022). These tendencies are amplified in times of social uncertainty when people use social media to search for information, interact with the community, and express their attitudes and feelings, which helps them cope with social reality (Ren et al., 2022). In difficult times, social media users are also more likely to follow the beliefs of anyone who offers a promising solution, regardless of its validity and reliability (Rutjens and Veckalov, 2022). Furthermore, social media users who are influenced by various conspiracy theories on social media have a greater tendency to actively engage in public protests against the current situation (Sadiq, 2022).

A clear understanding of how conspiracy theories spread through social media and how they influence the perception and reasoning of individuals is essential for effective and efficient prevention of the origin and spread of conspiracy theories (Shields, 2022) in families, communities, schools, workplaces, and the society as a whole (Shoaibi, 2022).

2.3 The Prevention of Conspiracy Theories

The traditional fight against conspiracy theories is based on presenting facts provided by official institutions. However, such a fight appears to be both ineffective and inefficient. The question is, whether official institutions can know the real truth, whether they should interpret the truth, and whether others will be willing to accept their truth (Sobo, 2021). Distinguishing between truth and false in the fight against conspiracy theories requires a broader social discussion and perspectives of all stakeholders, including the scientific community. Scientists who directly see irrational thinking behind conspiracy theories are more active in the fight against conspiracy theories than scientists who deal with conspiracy theories as a cultural phenomenon (Allington, 2021). However, knowing the truth or false in the case of conspiracy theories is not easy for any scientist. Conspiracy theories certainly require attention because they represent a potential societal threat, but their investigation requires a holistic approach examining all parts and relationships of the whole system behind conspiracy theories (Stasielowicz, 2022). If conspiracy theories cannot be disproved with clear empirical evidence, they should be challenged very sensitively concerning the particular circumstances and possible legitimate public concerns arising from them (Stecula and Pickup, 2021). Within social media, the approach of individual providers is crucial, as they can ban certain content or users from social media (Theocharis, 2021).

2.4 The Spread of Conspiracy Theories through Social Media

Empirical evidence shows that beliefs in conspiracy theories are a significant social phenomenon conditioned by many objective and subjective factors (Trevisan et al., 2021). Objective factors include political, economic, social, technical, cultural, natural, and other conditions in which people grow up, live, and work. Subjective factors include the abilities and motives of individuals determined by their personal qualities and expectations.

One of the qualities that allow individuals to successfully deal with conspiracy theories is their level of education, where it is assumed that lower levels of education are associated with higher conspiracy beliefs (Uscinski and Enders, 2022). In other words, people with low levels of education tend to believe in conspiracy theories more than people with higher levels of education, who are not as easily influenced by conspiracy theories.

The levels of education also determine the levels of professional employment, where it is assumed that higher levels of education are associated with higher levels of professional employment (van Prooijen and de Vries, 2016). In other words, higher levels of education allow people to do work that is, on the one hand, more complex and responsible, but on the other hand, more interesting and challenging, in terms of overall earnings and career opportunities. People with higher levels of education usually work in high-profile professions, requiring higher levels of responsibility and performance (van Prooijen and Douglas, 2017). People working in high-profile professions deal with sensitive information, make critical decisions, and influence other people's opinions, behaviors, and actions, often as team leaders. Such people are expected to meet high standards of behavior and outcomes in the workplace. These people, mainly due to their high responsibility, should be highly immune to the influence of conspiracy theories and should be great at dealing with potential disinformation and conspiracy theories.

These ideas evoke the question of the association between beliefs in conspiracy theories and work performance, which is not addressed as often as other issues regarding conspiracy theories. A few studies in recent years show that beliefs in conspiracy theories have significant work performance consequences (Enders and Smallpage, 2019). The origin and spread of conspiracy theories in the workplace may be associated with individual tendencies to conspiracy thinking as well as unpleasant work experiences resulting from unsatisfactory working conditions, such as meaningless tasks and duties, unfair earnings, unfriendly working relationships, or insufficient career opportunities (van Prooijen and van Vugt, 2018). This corresponds to the general mechanism of the origin and spread of conspiracy theories in society, where people tend to believe in conspiracy theories when they experience uncertainty and anxiety due to the events around them (Krauk et al., 2021). One of the most common sources of people's dissatisfaction in the workplace is poor working relationships, both between team members and between team members and team leaders, which can also be the reason for people to leave the organization (van Prooijen, 2020). Individuals, often authoritative team leaders or ambitious team members, who try to advance personal interests at the expense of others may be easily producers and propagators of conspiracy theories in the workplace, who may also seduce others to conspiratorial thinking (van Prooijen, 2022). The origin and spread of conspiracy theories in the workplace due to individual tendencies to conspiracy thinking or general job dissatisfaction can lead to demotivation and disengagement, which can negatively affect the work performance of both individuals and teams (Enders et al., 2020). This is why the origin and spread of any conspiracy theories in the workplace require the serious attention of organization managers and team leaders, who must not allow themselves to be the source of conspiratorial thinking to advance their interests (Enders et al., 2023).

3 Data and Methods

The paper deals with the association between beliefs in popular conspiracy theories spread through social media and work performance using the results of an authors' test of conspiracy theories applied to a sample of 178 students of the Faculty of Military Leadership, University of Defence in Brno, Czech Republic representing members of high-profile professions.

The authors' test of conspiracy theories was applied in September 2022 and included ten yes/no/don't know statements about popular conspiracy theories spread through social media: 1) the existence of cures for cancer; 2) the non-existence of Covid-19 disease; 3) the origin of the warming of the planet; 4) the origin of HIV; 5) the moon landing; 6) the events of September 11, 2001; 7) the origin of the Covid virus; 8) the effect of the microwave oven; 9) the existence of aliens; 10) the negative effect of the sugar.

The students of the Faculty of Military Leadership, University of Defence in Brno, Czech Republic were selected as representatives of high-profile professions that should be trained to deal with potential disinformation and conspiracy theories. The assumption was that the students would be generally immune to the impact of conspiracy theories and that most of them would not be aligned with defined conspiracy theories.

The authors' test of conspiracy theories was distributed in paper form among students of the Leadership course within the four-year study program Management and Employment of the Armed Forces. The Leadership course is taught in the second year and is focused on the development of the personality of students, including their character and personality traits. Their quality is important for students' choice of further specialization and their future careers. The test was distributed to a total of 230 students and it was completed by 178 students.

All students confirmed that they regularly use social networks such as Facebook, Instagram, LinkedIn, YouTube, or Twitter. At the same time, all students confirmed that they know what conspiracy theories are and that they know some of them. The students' responses were analyzed concerning their work performance review provided by their superiors. The students' work performance was defined on a three-level rating scale – top (above level performance, exceeds expectations), solid (at level performance, meets expectations), and poor (below level performance, doesn't meet expectations). The sample of 178 students included 37% of top performers, 60% of solid performers, and 3% of poor performers. Within the analysis, hypothesis H was verified:

H: Individuals with top work performance are less prone to believe in conspiracy theories than individuals with solid/poor work performance.

The hypothesis was based on the assumption that top students achieving above-level performance and exceeding expectations would demonstrate a high level of professionalism based on rational reasoning, including working with available information and dealing with potential disinformation and conspiracy theories. To perform the analysis and verify the hypothesis, a Pearson's correlation analysis, an analysis of variance (ANOVA), and an independent t-test using Microsoft Excel were carried out. The significance level (α) was set at 0.05.

4 Results

Based on empirical findings about the phenomenon of conspiracy theories, an authors' test of conspiracy theories was compiled to analyze the association between beliefs in popular conspiracy theories spread through social media and work performance using a sample of 178 students of the Faculty of Military Leadership, University of Defence in Brno, Czech Republic. The students representing members of high-profile professions were asked to answer ten yes/no/don't know statements about commonly known conspiracy theories. Table 1 summarizes students' responses to each statement.

Students most often agreed with the non-existence of covid-19 disease (S2) and the existence of aliens (S9). On the other hand, the students expressed a relatively clear no in the case of the existence of cures for cancer (S1), the negative effect of sugar (S10), the origin of HIV (S4), and the origin of the warming of the planet (S3).

Table 1: The responses to conspiracy theory statements

Conspiracy Theory Statements (S)	Yes	No	Don't know
S1. There are cures for cancer, but they are hiding from us. Cancer is artificially induced to reduce the amount of humanity.	1%	92%	7%
S2. The Covid-19 disease does not exist. It is a government invention and an attempt to control people and the world.	16%	64%	20%
S3. Human activity does not play a role in the warming of the planet. It is just a group of scientists and businesspeople trying to use the topic for profitable business and manipulation of the public.	6%	86%	8%
S4. HIV was created by the CIA as a means of reducing the world's population.	2%	87%	11%
S5. The Americans did not land on the moon within the Apollo program. It was all an elaborate hoax.	4%	79%	17%
S6. The US government intentionally enabled the events of September 11, 2001, as a pretext for future warfare in the Middle East.	10%	61%	29%
S7. The Covid virus was created in Chinese laboratories to weaken the world economy.	8%	59%	33%
S8. Microwave oven is harmful to health by destroying nutrients in food.	9%	62%	29%
S9. Information about the existence of aliens is kept secret from the world public.	15%	42%	43%
S10. Sugar is a secret poison created by governments.	2%	88%	10%

Source: authors' data, 2023.

Table 2 summarizes students' responses to conspiracy theory statements (S) depending on the students' work performance comparing responses of students with top work performance and solid/poor work performance.

The analysis showed no or negligible association between the students' beliefs in conspiracy theories and work performance (WP). No significant differences in yes/no/don't know responses to conspiracy theory statements depending on work performance were found. Students, regardless of work performance, most often agreed with the existence of aliens (S9), the non-existence of covid-19 disease (S2), and the events of September 11, 2001 (S6). Students with top work performance agreed more than students with solid/poor work performance with the existence of cures for cancer (S1), and vice versa, students with solid/poor work performance agreed more than students with top work performance with the negative effect of the sugar (S10). The greatest harmony of the students' yes/no/don't know responses was in the origin of the Covid virus (S7) and the origin of the warming of the planet (S3). Following these findings, hypothesis

H that individuals with top work performance are less prone to believe in conspiracy theories than individuals with solid/poor work performance was not confirmed.

Table 2: The responses to conspiracy theory statements depend on the work performance

	WP	Yes	No	Don't know	r	p-val
S1	T	3%	91%	6%	0.09	0.26
	S/P	0%	92%	8%		
S2	T	12%	71%	17%	0.00	0.99
	S/P	18%	60%	22%		
S3	T	9%	85%	6%	0.10	0.20
	S/P	4%	87%	9%		
S4	T	3%	88%	9%	0.05	0.49
	S/P	2%	87%	12%		
S5	T	6%	74%	20%	-0.02	0.77
	S/P	4%	81%	15%		
S6	T	14%	56%	30%	0.03	0.68
	S/P	8%	63%	29%		
S7	T	9%	52%	39%	-0.08	0.29
	S/P	8%	63%	29%		
S8	T	12%	61%	27%	0.07	0.38
	S/P	7%	63%	30%		
S9	T	18%	39%	42%	0.04	0.64
	S/P	13%	44%	43%		
S10	T	0%	91%	9%	-0.03	0.71
	S/P	4%	86%	11%		

Source: authors' data, 2023.

(Notes: WP=Work Performance, T=Top, S/P=Solid/Poor, p-value=p-value)

Concerning the spread of conspiracy theories, Pearson's correlation analysis revealed some interesting associations between specific conspiracy beliefs (see Table 3 and Table 4). For example, the analysis revealed a strong positive association ($r > 0.4000$) between the moon landing (S5) and the origin of HIV (S4), or the origin of HIV (S4) and the existence of cures for cancer (S1), or the events of September 11, 2001 (S6) and the origin of the Covid virus (S7). These findings show that people tend to believe in similar conspiracy theories, mostly those that have been popular for a long time or are topical.

Table 3: The associations between specific conspiracy beliefs (part 1)

Pearson's correlation coefficients (r) – part 1					
	S1	S2	S3	S4	S5
S1	1				
S2	0.3149	1			
S3	0.3076	0.1723	1		
S4	0.4009	0.3045	0.2897	1	
S5	0.3399	0.2746	0.2909	0.4747	1
S6	0.1956	0.1490	0.1615	0.2728	0.2281
S7	0.2452	0.2545	0.2853	0.1728	0.2061
S8	0.1619	0.2153	0.2670	0.1642	0.1847
S9	0.2227	0.1033	0.1730	0.0878	0.1769
S10	0.3546	0.3666	0.2962	0.2731	0.3782

Source: authors' data, 2023.

Table 4: The associations between specific conspiracy beliefs (part 2)

Pearson's correlation coefficients (r) – part 2					
	S6	S7	S8	S9	S10
S6	1				
S7	0.4089	1			
S8	0.2435	0.2320	1		
S9	0.2870	0.2293	0.2861	1	
S10	0.1736	0.2382	0.3135	0.1652	1

Source: authors' data, 2023.

5 Discussion

The authors' test of conspiracy theories applied to a sample of students of the Faculty of Military Leadership, University of Defence in Brno, Czech Republic representing members of high-profile professions did not confirm a hypothesis that individuals with top work performance are less prone to beliefs in conspiracy theories than individuals with solid/poor work performance. The findings revealed that students most often agreed with the non-existence of covid-19 disease and the existence of aliens. The covid-19 disease is an extraordinary and hard-to-believe global issue that raises many questions. Maybe that is why there are so many conspiracy theories about the origin of the covid-19 disease that persist, although they are systematically disproved by the scientific community (Mourad et al., 2020). The covid-19 disease seems to be exactly the case where there are still more worrying questions than satisfactory answers, and thus many people still tend to accept other than scientifically proven viewpoints, even conspiratorial ones (van Prooijen et al., 2022). Conspiracy theories about the existence of aliens are not new, but they are still topical and perhaps also the vaguest ones, as evidenced by the largest share of "don't know" answers. This might be the case of conspiracy theories that still attract the attention of many different people who find in them both an explanation and excitement (Douglas and Leite, 2017). On the other hand, students most often disagreed in the case of the existence of cures for cancer, the negative effect of sugar, the origin of HIV, and the origin of the warming of the planet. These conspiracy theories have been discussed for a long time and disproved by fairly clear empirical evidence, so they don't generate as much attention and excitement. However, any conspiracy theories regarding human life and health should be discussed and disproved very sensitively concerning the particular circumstances and possible legitimate concerns of the public (Stecula and Pickup, 2021).

The analysis showed that the students tested were more or less equally prone to believe in some conspiracy theories, regardless of their work performance. This proves that influenced by social and other media, various conspiracy theories gain more or less popularity over time as public opinion changes (Yongkwang, 2022). However, in general, popular conspiracy theories tend to persist over time (Douglas and Leite, 2017). The students' conspiracy beliefs may be motivated by a general tendency toward conspiracy thinking (Imhoff and Lamberty, 2017) as well as a current feeling of missing something important (Jolley and Lantian, 2022). The students with solid/poor work performance may lack success due to subjective or objective limits to their work performance. On the other hand, the students with top work performance may lack more growth and development opportunities. Generally speaking, students desiring to achieve something more, maybe more motivated to engage in conspiracy beliefs (Lantian et al., 2018) and take some action to meet their needs and interests (Liekfett et al., 2022). The danger, however, lies in the fact that rooted conspiracy beliefs do not reduce feelings of missing something but instead may encourage further conspiracy beliefs (Kauk et al., 2021). In other words, sharing conspiracy theories may bring them some benefits in the short term, but in the long term, it will be viewed negatively by those around them and may bring them many problems, whether personal or professional (Hart and Graether, 2018).

All discussed findings demonstrate that realizing the motivation and consequences of conspiracy beliefs is necessary for effective and efficient dealing with the origin and spread of conspiracy theories in society to avoid their negative effects (Shoabi et al., 2022). In this context, the role of the scientific community, which can both suppress and support the origin and spread of conspiracy theories, is crucial (Zembylas, 2021). People generally tend to trust scientific authorities, but when they do not get satisfactory answers from them, they tend to accept other viewpoints, even conspiratorial ones (van Prooijen and Lighart, 2022).

In the context of the authors' analysis, special attention should be paid to the impact of conspiracy beliefs on people working in high-profile professions who deal with sensitive information, make critical decisions, and influence other people's opinions, behaviors, and actions. Such people should be systematically trained to work with available information and deal with potential disinformation and conspiracy theories. Such people should also have high moral credit to avoid spreading and using conspiracy theories to advance their interests or the interests of other stakeholders.

The authors' findings are useful in the HR management practice of organizations that care about the professional qualities of their people, including their abilities, motivation, results, behavior, and attitude towards work and other people. Such organizations are civil service institutions or institutions of the police and military forces. These institutions should pay increased attention to the professional qualities of their people during all HR management activities, from recruitment and selection to performance management and compensation to training and development.

From a workforce perspective, the gateway to the organization is represented by the process of recruitment and selection. At this stage, it is necessary to carefully examine all the professional qualities of the candidates and predict their future potential work performance. This makes the future management of work performance in the organization much easier. At this stage, the authors' test of conspiracy theories or another similar tool could be useful to reveal potential tendencies of candidates towards conspiracy thinking and beliefs that could negatively affect their future work performance in the organization. A similar test of conspiracy theories could be a part of regular performance reviews to prevent the undesirable spread of conspiracy thinking and beliefs across the organization with a negative impact on the work performance of both individuals and teams.

6 Conclusion

The authors analyzed the association between beliefs in popular conspiracy theories spread through social media and work performance using the empirical findings about the phenomenon of conspiracy theories and the authors' test of conspiracy theories applied to a sample of students of the Faculty of Military Leadership, University of Defence in Brno, Czech Republic representing people working in high-profile professions that should be highly immune to the influence of conspiracy theories. The analysis showed no or negligible association between the students' beliefs in conspiracy theories and work performance. On the other hand, the analysis showed that the students were more or less equally prone to believe in some conspiracy theories, regardless of their work performance. These findings prove that influenced by social and other media, various conspiracy theories gain more or less popularity over time and that popular conspiracy theories tend to persist over time. Individual beliefs in conspiracy theories may be motivated by a general tendency toward conspiracy thinking as well as a current feeling of uncertainty or dissatisfaction. The danger of conspiracy beliefs lies in the fact that rooted conspiracy beliefs may encourage further conspiracy beliefs with a negative impact on one's behavior and actions both in personal and professional life.

From a workforce and workplace perspective, any organization caring about the professional qualities of its people should pay increased attention to any conspiracy thinking and beliefs across the organization with a potentially negative impact on the work performance of both individuals and teams. Efforts to prevent negative conspiracy thinking and beliefs should be part of all HR management activities, from recruitment and selection to performance management and compensation to training and development. Similar tools such as the authors' test of conspiracy theories could help with this.

The generalization of the findings is limited by the focus of the analysis on the members of the military forces represented by students of the Faculty of Military Leadership, University of Defence in Brno, Czech Republic as well as by the limited number of respondents and conspiracy theories surveyed. However, the findings encourage further research on the origin, spread, and impact of conspiracy theories in the workplace, especially their impact on workforce qualities and individual, team, and organizational performance. Achieving better-quality findings would require a larger number of respondents and organizations.

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Primary Paper Section: A

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CANONICAL, INTERNATIONAL, EUROPEAN AND CONSTITUTIONAL LAW: RECALLING THEIR INTERACTIONS FOR INTERNATIONAL LEGISLATION

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Abstract: The autonomy and independence of civil law in relation to canon law, especially in those countries where these legal systems meet in the drafting and application of international agreements of the concordat type, are not entirely simple questions maintaining both - national and international dimensions. The first level question seems to be the reception of canon law by civil law in the view of the principle of independence and autonomy of state legal systems. The second level question is the validity and effectiveness of international bilateral human rights rules agreed with the Holy See. Many multilateral international treaties of universal and regional nature on human rights, especially in the areas of protection of freedom of religion and freedom of conscience, generally regulate the legal relations, but specific regulation of concordats is also appropriate, sometimes complementary, and sometimes primary.

Keywords: Autonomy of law. Canon Law. Constitutional Law. International Law. Concordat Law. Relationship of legal systems. Reception of law. protection of freedom of religion and conscience. Conscientious objections

1 Introduction

In recent years, the debate regarding the autonomy and independence of civil law, which has a national and international dimension, is closely related to the position of the Holy See in the international field and especially to the phenomenon of concordats. Two issues used to be discussed primarily.

The first is the question of the reception of canon law and norms from the teaching of the Catholic Church into civil law in view of the principle of independence and autonomy of state legal systems.

The second is the question of the validity and effectiveness of international bilateral human rights rules agreed with the Holy See in concordats, taking into consideration the existence of constitutional rules in this area, as well as multilateral international treaties on human rights, especially in the areas of protection of freedom of religion and freedom of conscience. In this context, I also want to touch on a specific application outcome of the theoretical conclusions of this lecture, namely the possible concept of protecting freedom of conscience in Slovakia through a bilateral agreement with the Holy See..

2 Canonical, international, european and constitutional law: recalling their interactions for international legislation

The 1983 Code of Canon Law in Canon 22, as well as the 1990 Code of Canons of the Eastern Churches in Canon 1504, established that the reception of civil law into the canon law order and the obligation to observe it, requires the conformity of civil law with Divine law. At the same time, the condition that canon law does not establish different rules must be met. Civil or state law is a subsidiary source of canon law in those cases in which canon law explicitly refers to civil law.

On the part of the state, similarly, the Constitution of the Slovak Republic establishes the exclusivity of its legal order on the territory of the Slovak Republic, including the most important issue, which is the binding of a judge only by civil law.

A certain agreement on respecting the norms of canon law based on the Basic Treaty between the Slovak Republic and the Holy See sparked a discussion about the permissibility of the intrusion of canon law into Slovak law. As can be seen, there is indeed a certain degree of unilateral penetration. In my opinion, however, it is always an expression of the constitutional principle of the autonomy of the Church in its own affairs, as shown by the direct references to respect for canon law by the Slovak Republic in the Basic Treaty.

From the point of view of the content of the norms of canon law, constitutional law, as well as concordat law, it can be concluded that the civil legal system, as well as the canonical system, are in principle highly autonomous and independent, which is confirmed by both the norms of canon law and civil law. From the point of view of civil law, this of course also applies to the position of the teaching of the Catholic Church in the field of civil legal regulation. These conclusions must be respected, for example, in the creation of concordats and in general with all legal norms regulating the status of churches or freedom of religion and freedom of conscience.

The principle of autonomy and independence of civil law also raises another question: the justification of human rights regulations in concordats as bilateral treaties between states and the Holy See. The existence of multilateral international treaties on human rights, especially in the areas of protection of freedom of religion and freedom of conscience, as well as constitutional or European legal protection of this type of fundamental rights in the constitutions of individual states, concerning all residents regardless of their religion and with regard to the growing attention dedicated to the principle of equality and non-discrimination, might reinforce the opinion that the regulation of human rights in bilateral treaties concluded between states and the Holy See is redundant and non-standard. I have the opposite opinion.

The principle of freedom in contractual relations must be considered - the parties can agree on anything that does not contradict basic legal norms or their obligations. Furthermore, individual concordat regulations can respond better to the conditions in each country and thus better specify the legal regulation. The bilateral contract with the church, which is part of the legal system of the state and does not contradict the mentioned norms, is a confirmation of the observance of human rights. Moreover, it turns out that the general trend of suppressing freedom of conscience and leaning towards a relativistic view of values in law requires such an adjustment, while this can stabilize and refine it, and specify its application in the conditions of a local church operating in a certain state.

Both conclusions, i.e., the requirement to be based on the long-accepted principle of autonomy and independence of legal systems of civil law and canon law, as well as the validity of bilateral treaties with the Holy See that regulate the field of human rights, are not theoretical considerations that should fill the free time of legal scientists. I will allow myself to demonstrate this on the last consideration during this lecture: on a possible concept of protecting freedom of conscience in Slovakia through a bilateral agreement with the Holy See.

The idea to regulate bilaterally, contractually, and specifically with the Holy See in Slovakia the possibility of applying conscientious objections is due to those arguments without a doubt correct and very necessary. In the first place, it could be seen a few serious examples and tendencies that shift and change the traditional Christian view of the world and moral principles in Europe. The essence of the matter is that Slovakia is a living part of this Europe and will not influence it other than by what we have in ourselves as people living here, and hand on heart - are we not far enough from understanding Christian reality today?

And in addition, the principle applies, certainly already in the decisions of the European courts, that if a certain opinion prevails in most of the states of the Union, even in the moral area, it will also be applied to a state that might not identify itself with it.

The only possible guarantee of sound law remains an international treaty as an external agent of Slovak law operating

and based on the well-known principle of *pacta sunt servanda*. I note in this context that even if everything important does not create a law in our lives, the law significantly shifts human evaluation and thus affects the conscience of a person, the first of his values.

I will return to the application of the conclusions to a specific Slovak example of conscientious objections. It mainly concerns the issue of a respecting the principle of independence and autonomy of civil law, which has been somewhat forgotten.

It is well remembered the discussion held in Slovakia and in the European Union about the draft agreement on conscientious objections a few years ago... It was perhaps a good attempt, but it concealed at least two fragile and unsustainable legal conceptual constructions related to the autonomy of legal systems.

First, the agreement had the ambition to be directly enforceable. This means that the civil state judge should have relied directly on it in his decision. Anyone who wanted to raise a conscientious objection could therefore (though of course not an obligation, but still, everyone's right) draw only from the spectrum of the Church's moral principles, regardless of their beliefs. This objection was heard many times in the form of whether an unbelieving person also has a conscience in a reality and, therefore, as a strong request to regulate these matters with a law valid for all.

Second, the agreement referred to the magisterium of the Catholic Church and its religious and moral principles. This would mean that the judge would have to proceed from these principles, knowing them, interpreting them and be bound by them, which is in direct contradiction to the constitutional law of the Slovak Republic and does not respect the autonomy of the civil system of law and the canonical system of law.

With a more precise construction, perhaps the first of these objections could be explained, but it would remain sensitive. However, the second of the mentioned objections is, in my opinion, correct, because the autonomy of the legal systems of civil law and canon law is neither possible nor appropriate to violate, or to break this principle legislatively; it is a double-edged sword.

However, even this matter has a solution. The future agreement on conscientious objections could respect the idea of the autonomy and independence of civil law and the norms of the Church, including canon law, which is too strongly rooted in consciousness. It would not have to refer to another normative system in this way but could contain the agreement of both parties on the inviolability of specific, mutually agreed principles, on defined elements of the Church's religious and moral principles. Examples of principles protected by treaties could be:

- a) the principle of inviolability of human life from conception to natural death. It would mainly concern employees in the healthcare sector, healthcare institutions and patients. It would be recommending, prescribing, distributing and administering pharmaceuticals, performing or cooperating in activities whose primary purpose is to cause artificial termination of pregnancy at any stage or unnatural death.
- b) the principle of respect for human life and for its transmission in its natural distinctiveness and uniqueness. It would mainly concern employees in the healthcare sector, scientific workers, institutions, but also the entire public. It would be participation in an artificial or so-called assisted fertilization, genetic manipulations, eugenics, embryonic human cloning, sterilization and all activities serving contraception.
- c) the principle of freedom in the educational and educational process, in counseling and educational activities. It would mainly concern teachers, parents, children, schools and the wider public. It would be teaching, recommending and preparing activities contrary to the moral principles of the Catholic Church in the area of sexual morality, as well as

the teachings of the Catholic Church in the theological area.

- d) the principle of protection of marriage as a union between a man and a woman, which aims to create a permanent living community, ensuring the proper upbringing of children. It would mainly concern lawyers, clergy, adoption and other institutions, but also the wider public. This would be the performance of advocacy, judicial, guardianship and tutoring activities.
- e) the principle of protection of the confessional secret and the entrusted secret, which was entrusted orally or in writing under the condition of confidentiality to the person entrusted with pastoral care. It would mainly concern clergy and persons performing similar activities. It would be an obligation to testify before criminal authorities or civil courts.
- f) the principle of respecting the freedom of religious acts and the use of religious symbols. It would mainly concern the public, shops, the military, schools, and other institutions. This would be the use of religious acts and symbols in public in a negative sense and as an exception to the prohibitions established by law.

The future agreement could stabilise that the Slovak side will respect these principles and guarantee them in its domestic legal order and laws. The State should therefore have the obligation arising from the international agreement legislatively, through national law, laws, to ensure now and in the future and regardless of changing political opinions, to legally enforce, or not sanction, the fulfilment of legal obligations by people who in their conscience have a reservation against the violation of such principles. A judge who will resolve such a dispute would once again calmly rely on the law of the state, by which he is constitutionally bound, on civil law and not on the teachings of the Church or canon law, which according to our constitution does not bind him in any way.

It should be noted that such legislation does not apply to the merits of the case, simply for example whether abortion is allowed or not, but will clearly address the possibility of refusing to participate in it

3 Conclusion

The requirement to be based on the long-accepted principle of autonomy and independence of legal systems of civil law and canon law, as well as the validity of bilateral treaties with the Holy See that regulate the field of human rights, are not theoretical considerations only but it is an increasingly important support and symbol of distinction in the Slovak, and not only Slovak, legal order.

The Basic Treaty with the Holy See, and in general also international, European, and national legal norms protecting freedom of conscience and freedom of religion, establish the obligation of the state to guarantee the possibility of the believer's behaviour in accordance with the moral and religious principles of the Church.

However, the principle of autonomy of the legal systems of civil law and canon law, generally accepted in the minds of experts and laymen, leads to the conclusion that such complex matters as rights related to conscience, for example in the areas of genetics, or any interference with the inviolability of life, must be regulated as clearly and at the level at which specific and clearly sanctionable legal obligations are regulated in the same area.

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THE EFFECT OF ALCOHOLISM ON THE DESTRUCTION OF RELATIONSHIP VALUES

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Abstract: The paper examines the impact of alcoholism on the values of family relationships and highlights the destructive consequences of alcohol abuse. The paper uses qualitative research methods and focuses on two distinct groups: middle-aged women from well-off families and children from children's homes who have experienced alcoholism from a family member. The paper reveals the pervasive consequences of parental alcohol abuse, such as low self-esteem, emotional instability and difficulties in establishing and maintaining healthy relationships. The findings highlight the urgent need for greater awareness and prevention efforts regarding the broader social and familial impacts of alcohol consumption. This research contributes to the understanding of relational dynamics in families affected by alcoholism.

Keywords: Alcoholism, Relationship values, Qualitative research, Parental alcohol abuse, Emotional stability, Social intervention, Children's home

1 Introduction

Alcohol, a widely available legal substance, can have a profound and lasting impact on human relationships and the quality of interpersonal relationships. The main aim of this article is to highlight how alcohol consumption by a family member impairs the ability to maintain healthy and functional relationships, not only for the individual affected by alcoholism but also for other members of the impaired family.

We worked with two groups of persons with experience of alcoholism among their immediate family members. In the first group, we analysed the experiences of adult well-off women with the alcoholism of a member of their families. The second group was made up of children living in a children's home whose parents have alcoholism. We introduce the paper by reviewing the current state of knowledge with emphasis on the severity of alcohol abuse in the Czech Republic. We will then introduce the two groups studied and, using a qualitative design, look for similarities in fates, behavioural patterns, and, above all, the relational patterns of these groups studied, linked by the hostile experience of a close alcoholic. Our results will show the severity of the impact of alcoholism on family members, and especially the disturbances in relational patterns that are evident in the individual long after the last contact with an alcoholic father, mother, husband, or other loved one. Based on our findings, it will be possible not only to modify social attitudes toward alcohol but, above all, to draw attention to the fact that alcohol not only destroys alcoholics themselves but demonstrably destroys their loved ones as well.

2 The Situation Related to Alcohol Use in the Czech Republic

As far as the Czech Republic is concerned, it has long been at the top of the alcoholic beverage consumption charts. Alcohol is the most widespread socially tolerated drug. In the Czech Republic, drinking alcohol is widespread and is one of the most common and common ways of spending leisure time and having fun. We can say that alcohol is an integral part of the fabric of Czech society. Alcohol consumption in the Czech Republic is a severe and society-wide problem. The Czech Republic is one of the countries with a high consumption rate, equivalent to 10 litres of pure ethanol per person per year, including children and the elderly. Between 6 and 10% of the adult population drinks alcohol daily, and this proportion has remained stable over the long term. Approximately 12% of the population admits to frequent heavy drinking, which is highest among young adults and decreases with age. In contrast, the proportion of daily drinkers increases with age. Among adolescents, there has been a significant decline in drinking since 2010, including regular consumption and risky forms of drinking, as confirmed by the 2022 studies. Nevertheless, the level of drinking among adolescents remains high in the European context. An estimated 1.3-1.7 million adults in the Czech Republic fall into the

category of hazardous drinking, of whom 720-900,000 show signs of harmful drinking. Annually, 6-7 thousand people die as a result of alcohol consumption, of which 2 thousand deaths are directly attributable to alcohol, and of these deaths, 500 are due to alcohol intoxication. Alcohol dependence has significant impacts on society and the health system, including injuries, traffic accidents and alcohol-related violence. People with alcohol dependence die on average 24 years earlier than the general population. Approximately 25-35,000 persons are in contact with services and treatment for alcohol dependence annually, with the most significant proportion in contact with mental health facilities, including outpatient and inpatient care (Chomynova et al. 2024).

3 The Current State of Knowledge

For a paper on the impact of alcohol on relational competence, a brief description of the relevant literature would be very extensive. We have therefore decided to describe in a manageable amount of detail all the available authors, focusing only on the most relevant ones for each area. Thus, we will begin with a brief insight into the relational domain, continue with the issue of the adverse effects of alcohol on health, and focus primarily on the impact of parental alcoholism on the healthy psychological and social development of the child. We will also take a brief look into the area of trauma.

Relational competence, i.e., creating and maintaining healthy and functional interpersonal relationships, is essential for an individual's psychological and social development. John Bowlby, the founder of relational attachment theory, emphasised that early relationships between children and their caregivers influence their emotional and social skills. Bowlby's theory states that children with a secure attachment to a caregiver can better regulate their emotions, have higher self-esteem, and have healthier relationships in adulthood. Conversely, children with an improperly formed attachment often suffer from anxiety, mistrust, and relationship problems (Bowlby 1999; Ainsworth 2015).

Zdeněk Matějček, a prominent Czech child psychologist, emphasised the importance of the family environment for the child's healthy development. According to Matějček, children must grow up in an environment where their emotional needs are met and feel safe and loved. Matějček emphasised the need for emotional security and support in early childhood, essential for developing trust and secure relational attachment. Negative influences, such as neglect or abuse, can lead to severe problems in relational competence, which manifests itself in adulthood in the inability to establish and maintain stable and healthy relationships (Matějček 2007). If Bowlby is seen as the father of research on relational issues, Matějček can be described as the Czech Bowlby.

The ideas resonating through the work of Bowlby and Matějček underscore how crucial early relationships are to an individual's life. Secure and stable early relationships are the foundation for healthy social functioning and psychological well-being (Iwaniec 2006). Conversely, the absence of these elements can lead to long-term problems that require therapeutic intervention and support. Understanding these dynamics is crucial for effective work with children and families in psychological and social practice. Early intervention and support can help prevent the negative consequences of maladaptive relational attachments and ensure that children grow into emotionally stable and socially competent individuals. Several authors have highlighted the negative impact of alcohol on child development. We have mentioned the Czech Republic's infamous top ranking in alcohol consumption. However, the Czech Republic is not only on the cutting edge of alcohol consumption but also on the cutting edge of alcoholism research with a long tradition of quality treatment (Miovsky et al. 2018).

One of the effects of a parent's alcoholism is damage to the child's physical health (Bjorkquist et al. 2010; Williams et al. 2015; Floyd et al. 2007). Alcohol has a devastating impact on the development of the child's organism (Pop-Jordanova and Demerdzieva, 2022). Alcohol is often the cause of family breakdown. Parental divorce is a severe trauma for a child (Çaksen 2021; Parker and Harford 1988). If the family does not break up, alcohol can disrupt the stable patterns of a family environment. Regular and excessive alcohol use can lead to the development of aggressive behaviour and decreased empathy and understanding, resulting in frequent conflict and an inability to solve problems constructively (Black et al. 1986; Blane 1988; Seilhamer et al. 1993; Şen-Aslan 2021).

Alcohol often acts as a catalyst in exacerbating existing relationship problems, resulting in loss of trust, increased alienation and isolation of partners or family members. Alcohol is present in violent behaviour patterns in families (Noh-Moo et al. 2023; Gallego et al. 2019; Velleman 2004). For a child, living in a family affected by a parent's alcoholism is a significant determinant of future educational and social difficulties (Brisby et al. 1997; Dore et al. 1995; Hodačová et al. 2017). In such families, a stable environment, so much for healthy child development, is absent (Iacopetti et al. 2021; Mayer and Black 1977; Murphy et al. 1991; Sovinova et al. 2001). There is no question that the experience of having a family member who has alcoholism is a highly traumatic affair. We sometimes forget that although alcoholism is a severe disease, the disease is downright toxic to family members of alcoholics. Trauma demonstrably impacts many areas of the affected individual's life (Anda et al. 2002; Maté 2012). To conclude this section, mention should be made of the groundbreaking work of Janet Geringer Woititz, whose work details the negative impact of a parent's alcoholism on a child's personal development, which is reflected in their behaviour throughout their life (Woititz 2020).

Children of alcoholics often suffer from a wide range of problems. Low self-esteem, anxiety and depression are common problems experienced by these children. Children of alcoholic parents have an increased risk of developing mental disorders, including post-traumatic stress disorder. Children growing up in an environment with alcoholic parents often face problems in social relationships. These children tend to isolate themselves from their peers and may have difficulty forming and maintaining friendships. The lack of stable and positive family relationships often leads to difficulties in interpersonal interactions and trust issues. Emotional instability is another common phenomenon in children of alcoholic parents (West and Prinz 1987). These children often experience feelings of shame and guilt for their parent's behaviour. This emotional burden can lead to long-term problems with emotional regulation and self-concept. Children of alcoholic parents often experience difficulties in academic settings. Research shows these children have a higher risk of school failure, lower academic performance, and more frequent need for special education. Cognitive deficits may include problems with memory, attention, and executive function. Children growing up in families with alcoholic parents face many challenges that affect their psychological, social, and emotional development (Schuckit and Sweeney 1987; Woititz 2020; Röhr 2011).

4 Methods

For this paper, we worked with a qualitative research design based on a thematic analysis of information gathered from two groups of respondents. All respondents were affected by a family member's experience of alcoholism. This global group was stratified into two subgroups. The first group was middle-aged women from well-off families, and the second group was children from the children's home. Within these groups, we worked primarily with interviews. Interviews are one of the most important research tools for qualitative research (Wilson et al. 2000; Dejonckheere and Vaughn 2019). Interviews were recorded, converted into written text, and analysed further. All research participants were informed about the possibility of refusing to participate. We are aware of the ethical level of the

research. Therefore, all data is anonymised and presented in a way that maintains privacy and avoids the possibility of identifying those involved. Although our focus group had fewer respondents, this smaller number allowed us to have more intensive contact with respondents (Krueger and Casey 2015).

We used thematic analysis as the primary research tool. Thematic analysis is a qualitative research method often used to identify, analyse, and interpret themes in research data. Thematic analysis is popular due to its flexibility and ability to handle large volumes of data, making it suitable for a wide range of research questions and datasets. The process of thematic analysis can be divided into several primary stages. The research begins with a detailed familiarisation with the data. The data are then systematically coded, which involves identifying aspects of interest in the data that are relevant to the research question. The codes are grouped into potential themes. The identified themes are revised and refined. Themes are defined and named. Each theme is described in detail, highlighting its importance and relevance to the research question. The thematic analysis process is concluded by producing a final report that includes a detailed analysis of each theme and its relevance to the research question. This stage involves interpreting and presenting the results in the broader research context (Braun and Clarke 2006).

The thematic analysis offers several advantages contributing to its growing popularity in qualitative research (Attride-Stirling 2001). Thematic analysis is a highly flexible method that can be applied to various research questions and data types. It can be applied to data from interviews, focus groups, documents and other qualitative sources. This method allows researchers to capture the complexity and richness of qualitative data. As a result, deep and nuanced meanings can be identified that might be overlooked by other methods. Thematic analysis effectively identifies and analyses patterns (themes) in data. It allows researchers better to understand structured and unstructured data and its meaning. The thematic analysis procedures are relatively easy to understand and apply, making them easy to use even for researchers who are not experts in qualitative methods. Thematic analysis can be used in various disciplines and fields, including psychology, sociology, education, health, and others. It is suitable for basic research as well as applied and evaluative studies. Thematic analysis can be used in both theoretical and empirical research. It allows researchers to explore data within existing theoretical frameworks or develop new theories based on data (Nowell et al. 2017; Guest et al. 2012).

Thus, we worked with two sets of information that we collected during our research activities. We filled these two baskets of information primarily with the help of interviews, which we supplemented by observing respondents' reactions during interviews and analysing available documents. We then processed the captured findings using the thematic analysis method. This allowed us to identify common themes that emerged when coding data from two very different research settings. Thematic analysis is a robust and versatile method that allows for deep and meaningful exploration of qualitative data. Its flexibility and ability to reveal hidden patterns in data make it an essential tool for researchers in many disciplines.

4.1 Study Group 1

The first group studied consisted entirely of middle-aged women who had undergone past alcohol treatment. We were familiar with the fact that the fathers of the respondents had severe alcohol problems. Respondents were from well-off backgrounds, financially secure, and well-educated.

Respondent 1, female, age 32

Conduct during the interview: she speaks readily, digresses, loses context, talks in great detail, and shows emotion. The father was an alcohol addict; he never paid attention to the family. His alcohol binges were full of aggression, arguments with his mother, crude insults, violence, and attempted rape of his daughters. The respondent married very soon, leaving with

her husband to another town. Her sister included her with reproaches for having abandoned her and stopped protecting her against her father's attacks. Her mother cried into the telephone and begged her to come home, saying that they could not manage without her. At that time, the respondent began to seek help in alcohol. She went into treatment, successfully abstaining. The reason she relapsed was the tragic death of her husband, who was a great support to her. She underwent further treatment and is now abstinent.

Respondent 2, female, age 33

Conduct during the interview: she speaks coolly, without emotion, even about the worst experiences; nothing is taboo. She answers briefly, rather tersely, without thinking. From early childhood, she experienced her father's alcohol intoxication. Rough to brutal behaviour was the order of the day, all before her eyes. Her father ruled with a heavy hand, her mother had no say, she would not leave her father. When she found out that her daughter was sleeping with a knife under her pillow to defend herself against possible sexual assaults by her father, she began to lock her in her room, not to protect her child, but out of fear that her daughter would hurt her husband. From the age of 16, after her brother left the family, the respondent began to consume alcohol to a greater extent in order to survive everything. She is currently undergoing treatment for alcohol dependence. She also has problems with anorexia nervosa.

Respondent 3, female, age 34

Conduct during the interview: she speaks very willingly, is calm, and composed. Father addicted to alcohol. Childhood initially happy, parents devoted themselves to her and her sister, father often played with the children. The situation changed when the father moved to another job. He frequented the pub and returned home drunk. He often talked about suicide. There were arguments, remorse and crying in the family. The mother tried to seek professional help, but the father refused. The family was desperate. The father committed suicide. The respondent had undergone treatment, was married and had two children.

The interviews were conducted in a safe environment, and the respondents consented to them. We asked the following six key questions, and for our paper, we offer an accurate record of the most significant responses from all three respondents. This is an exact recording of direct speech; we have not edited the grammar.

- Q1: Did your father ever receive treatment for alcoholism?
 Q2: Has he ever regretted what he did in an alcoholic haze?
 Q3: How did your childhood affect you from your point of view?
 Q4: How do you feel about your father today?
 Q5: What contact do you have with your family?
 Q6: What is your relationship with men?

Q1: Did your father ever receive alcoholism treatment for alcoholism?

- Respondent 1: He didn't get treatment. No way, because he claimed that he was not an alcoholic.
 Respondent 2: He did not. He never admitted he had a drinking problem
 Respondent 3: He did not. He never wanted to seek professional help, even though his mother begged him many times.

Q2: Has he ever regretted what he did in an alcoholic haze?

- Respondent 1: Never.
 Respondent 2: Never.
 Respondent 3: He was always feeling sorry for himself and talking about what a burden he was to us. He didn't want to live.

Q3: How did your childhood affect you from your point of view?

- Respondent 1: I'm a terrible emotional person; I cry all the time, I don't trust myself, and I underestimate myself.
 Respondent 2: I'm an addict; I always underestimate myself; I don't believe in myself.
 Respondent 3: I couldn't cope with the stressful situation. It wasn't until treatment that I found many issues and problems that I was holding in. Fortunately, the treatment helped me to deal with them.

Q4: How do you feel about your father today?

- Respondent 1: He's my father, but he hurt us a lot, and I'll never forgive him for that.
 Respondent 2: He's a stranger to me.
 Respondent 3: I still think about him. I know today that his death was not my fault, but sometimes I ask myself if it could have been prevented after all. I did, and, in fact, I still love him.

Q5: What contact do you have with your family?

- Respondent 1: I love my mother very much, she comes to see me often.
 Respondent 2: I only see my mother, I love her, but I have never forgiven her for not protecting me against my father.
 Respondent 3: No answer

Q6: What is your relationship with men?

- Respondent 1: (respondent is crying) I lost the man of my life. I don't know if anyone will be able to replace him. I want him back.
 Respondent 2: I don't like men, it took me a very long time before I could establish a relationship with a man. I feel that men are an inferior race, that you can't lean on them, rely on them. I'm an advocate of feminism.
 Respondent 3: I have a wonderful and tolerant husband. He had to go through a lot of hard times with me, and our marriage has endured. I am grateful for his help and support.

4.2 Study group 2

The second group studied consisted of children living in a children's home setting who had experienced parental alcoholism. We use the term child because this is an established convention for the children's home setting, but the study group was composed of minors and young adults, two girls and one boy. Children's homes are for children whose families cannot function (Daněk et al. 2023). All members of the study group came to the children's home from pathological family backgrounds. A pathological environment is the primary cause of a child's arrival in a children's home environment (Daněk 2022; Daněk 2023). It is important to emphasise that although we knew which respondents had alcoholic parents, we always waited for this information to be heard from the child. Only then did we initiate the interviews, of course, with maximum consideration for the vulnerability of the respondents. Compared to study group 1, the interviews took place over a more extended period, and we could also corroborate the respondents' statements with additional information obtained from the educational records. Because we had the opportunity to have long-term contact with the respondents, it was preferable to use unstructured interviews. We only framed the interviews thematically around the parents' alcoholism.

Respondent 1, female, age 21

From the documentation, we found that both parents had an alcohol problem in the original family. In early childhood, the father committed suicide. The college-educated mother gradually fell through the labour market into menial labour positions. Currently, the mother lives in a hostel, refuses treatment, and denies alcohol problems. The respondent speaks about her mother's difficulties with obvious shame, often using the

following codes: shame, shame. She condemns alcohol. In her own words, the respondent cannot establish any relationship because she feels inferior. Attempts at a relationship regularly end after a very short time. Although psychological intervention has been repeatedly recommended to her, the respondent refuses it. School performance is somewhat below average. She maintains contact with her mother, and they visit each other frequently. After each visit, the respondent's psychological state deteriorates sharply, and recently, we have noticed an increase in psychosomatic difficulties.

Respondent 2, male, age 18

The respondent came to the children's home from a background where his parents divorced because of his father's alcoholism, and his mother found a new boyfriend who also has significant problems with alcohol. The father had repeatedly undergone alcohol treatment but usually left before the end of treatment. The mother is unskilled and uneducated, and she and her current boyfriend do not have stable housing. They work as temporary workers. The respondent has constant conflicts with his father, citing him as the cause of the problems that brought the respondent to the children's home. Like respondent 4, she has difficulty establishing, especially maintaining, a partner relationship. Also included in the relational dimension is the respondent's unbalanced relationship with his siblings. They are significantly younger and not yet fully aware of the context of their father's alcoholism. They glorify the father and claim that the father does not drink, that this is a purposeful lie told by the mother's current boyfriend. This contradiction introduces serious conflict in sibling relationships, with siblings accusing each other of lying. During interviews, a code was often heard: fatigue, pressure. Alcohol is frowned upon. The respondent is currently undergoing evaluation for post-traumatic stress disorder.

Respondent 3, female, age 19

The respondent came to the children's home from a broken family environment, which included a substance-abusing mother and a father who had significant alcohol problems. The father is currently serving a prison sentence. During interviews, the respondent repeatedly stressed that she was disappointed with the entire male population, which her father represented. Her father was brought to prison for criminal activity linked to alcoholism. The father relativises his wrongdoing, and the respondent claims a future together awaits them after his release. The respondent has been under psychological pressure for a long time, and because of this information, it was necessary to seek psychological support. She cannot establish a solid relationship, feels inadequate and, in her words, lacks self-confidence. She condemns alcohol. She escapes into the virtual world and describes her future after leaving the children's home as uncertain and threatening.

We would see similar stories with the vast majority of children in children's homes. Surprisingly, there is no accurate count of the number of children who came to the children's home as a result of the alcoholism present in their original families. This can be explained by the fact that alcohol is comorbid in a range of pathological behaviour patterns. For example, a child placed in a children's home because of domestic violence will cite domestic violence as the primary reason, but this may be accelerated by alcohol. Alcoholism as the main reason for placement in a children's home thus remains somewhat hidden. This area will be the subject of our further research.

5 Results

The main aim of our paper was to investigate to what extent a parent's alcoholism impacts the relational competence of the alcoholic's family members. Although we conducted the research in different settings, the results are identical. All of our respondents had significant relationship difficulties due to the alcoholism of their relatives. When we compare the results for Research Group 1 and Research Group 2, we find that each of

the respondents was significantly affected by the parent's alcoholism. The most significant codes for all respondents are low self-esteem, distrust of others, disappointment, and failure.

All of the respondents in Research Group 1 had significant alcohol problems themselves at some stage in their lives. All of the respondents in Research Group 2 condemn alcohol. However, we have to ask why should a child from a children's home be more resistant to the risk of alcoholism than the respondents in Research Group 1, i.e. well-off middle-class individuals? In terms of relationships, respondents repeatedly identified difficulties in establishing and maintaining relationships. For Research Group 2, we noted compensation for the absence of relationships in the form of escape into virtual space. When we consider the impact of the institutional environment on the individual, compounded by the negative experience with an alcoholic parent, the issue of parental alcoholism on children in the children's home takes on a deeper dimension.

6 Conclusion

Our small research study highlighted a big problem. Our work focused on the impact of family member alcoholism on family members' relational competence. And we found that the impact is enormous. We sought to use a comparison of two small groups of individuals affected by a parent's alcoholism to highlight the devastating impact on a child's ability to establish a fulfilling relationship. We have tried to highlight that this issue is current in all strata of society. Among college students, the unemployed, the financially secure, the young, the old, men and women. Each of our respondents had demonstrably impaired relational competence, and the cause was the alcoholism of a family member. Although our study group was small and we could not make general conclusions, we stated a question supported by our research rather than a conclusion.

Can a stable and harmonious individual ever grow up in an environment where an alcoholic is present? At the beginning of the article, we mentioned 720-900 thousand people in the Czech Republic showing signs of harmful drinking. Therefore, we operate with 720-900 thousand fathers, mothers, and family members. Suppose their harmful drinking negatively affected a single member of their family. In that case, we are talking about 720-900 thousand individuals who will show similarly disturbed relational competence as we described in our paper. Unless society realises the gravity of the situation, we cannot expect spontaneous improvement. Prevention activities at the state level will need to be significantly strengthened. It will be necessary to appeal to the media so that the space devoted to presenting trendy alcoholic beverages is dedicated to promoting healthy lifestyles. It will be necessary to recognise that the culturally established welcoming attitude towards alcohol needs to be reconsidered. We hope that our small article will contribute to a much-needed change.

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Primary Paper Section: A**Secondary Paper Section: AM**

COST OPTIMIZATION OF HUMAN RESOURCE MANAGEMENT THROUGH THE IMPLEMENTATION OF STRATEGIES TO REDUCE EMPLOYEE TURNOVER

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The result was created in solving the VEGA (No. 1/0038/22) Application of competitive digital games for the team cohesion development and social adaptation of Generation Z and project (KEGA 012UCM-4/2022) Human Resources Management in a Digital World A Bilingual (Slovak -English) Course Book with E-learning Modules based on Multimedia Content.

Abstract: Employee turnover has long been a concern for businesses of all sizes and industries. To address this challenge, businesses increasingly turn to data-driven approaches to predict and prevent employee turnover. The article's authors focus on the effectiveness of processing large data through a predictive machine learning model in the context of employee turnover. The real dataset used for company research contained 14999 data points and 16 elements, while each row represented one employee. The Python programming language was used for the development of the prediction model. The study's results showed the relevance of HR analytics for companies, accurately predicting employee departures using a machine learning model and achieving significant cost savings by implementing the model.

Keywords: Big Data Approach Employee Turnover, Human Resource, Replacement Cost, Cost Analysis

1 Introduction

Human Resource (HR) analytics has become a key strategic tool for organizations, enabling them to gain valuable insights into their workforce and make data-driven decisions. One of the key areas where HR analytics can be applied is in the prediction of employee turnover. Employee turnover can have significant financial and organizational impacts, including the loss of valuable skills and knowledge, decreased productivity, and increased recruitment and training costs. Predictive analytics can help organizations to identify employees who are at risk of leaving and take proactive measures to retain them, ultimately reducing the overall cost of turnover.

The data approach in HR involves the use of data to make informed decisions about various HR functions, such as recruitment, training, performance management, compensation, and engagement (Cappelli, Meister 2018).

Big data refers to the vast and complex sets of data that are too large and dynamic to be processed using traditional data processing techniques (Maurya, Sandip 2019). With the advancements in technology, organizations can now collect and store massive amounts of data on various HR-related aspects (Boudreau Cascio 2017). By leveraging big data analytics techniques, HR professionals can identify patterns, correlations, and insights that were previously impossible to detect, thus enabling them to make more informed decisions. As such, the adoption of big data in HR has the potential to revolutionize HR practices and significantly enhance organizational performance. The analysis of big data requires specialized skills and technologies, including machine learning and data mining (Petry Jäger 2021).

1.1 Cost of employee turnover

The data approach is becoming increasingly important in employee turnover, and organizations that fail to embrace it risk falling behind their competitors (Tursunbayeva et al. 2018). By analyzing data on employee turnover, companies can detect factors that contribute to high turnover rates and develop strategies to address these issues (Boukottaya, Khemakhem 2019). Therefore, it can be concluded that there is a research opportunity to investigate the connection between HR data approaches and employee turnover.

Employee turnover is a major challenge for human resource managers and has a significant impact on organizational performance, productivity, and profitability (De Winne et al. 2019). Understanding the causes and factors contributing to employee turnover can help organizations develop effective strategies to mitigate the negative impact of employee turnover (Hom et al. 2019).

Employee turnover can be voluntary or involuntary. With this perspective authors looked at the opportunities and threat that are associated with the fact of losing the employee (Gupta, Bhatia 2021). The defined opportunities were – opportunity for fresh talent, cost savings and increased diversity.

When employees leave, the organization has the opportunity to bring in new talent with fresh ideas and perspectives. This can lead to innovation and creativity within the organization. New employees may also have specialized skills that the organization previously lacked, which can help the organization stay competitive in the marketplace. If employees who have been underperforming or are highly compensated leave, the organization may be able to save money on salaries and benefits. This can help the organization allocate its resources more efficiently. Additionally, if the organization has excess staff due to changes in the business or a slowdown in operations, turnover can help reduce the number of employees without the need for layoffs. New hires can bring a greater diversity of skills, experiences, and backgrounds to the organization. This can help the organization become more competitive in its industry and better serve its customers. A more diverse workforce can also help the organization better understand the needs of different market segments and adapt to changing customer demands (Kehoe, Wright 2013).

When employees leave, it can take time for the remaining employees to adjust to new roles or for new hires to get up to speed. This can lead to decreased productivity, which can have a negative impact on the organization's performance. When experienced employees leave, the organization may lose valuable knowledge and expertise that is difficult to replace. This can lead to decreased efficiency and productivity and can also lead to increased costs associated with training new employees. Frequent employee turnover can have a negative impact on employee morale and can lead to a perception that the organization does not value its employees. This can lead to decreased engagement and productivity, as well as increased turnover in the long term (Kehoe, Wright 2013).

Tracking the costs associated with employee turnover provides valuable data that companies can use to improve their bottom line, retain top talent, and gain a competitive advantage in their industry (Cascio 2018).

Employee turnover can be costly for companies due to the direct and indirect costs associated with it. By tracking these costs, companies can identify areas where they can reduce costs and improve their bottom line. Understanding the costs associated with employee turnover can help companies make strategic decisions related to recruitment, training, and compensation (Leigh, DePaul-Haddock 2017). By identifying which areas of the organization have the highest turnover rates and associated costs, companies can develop targeted strategies to address these issues and improve overall performance. Companies that effectively manage employee turnover can gain a competitive advantage over their peers. By retaining top talent and minimizing the associated costs, companies can improve their reputation, attract more qualified candidates, and improve their overall performance (Noe et al. 2017).

Employee turnover can be costly for organizations, both in terms of direct and indirect costs. Direct costs include expenses incurred due to the departure of an employee, such as separation pay, recruitment costs, and training expenses for new hires.

Indirect costs are more difficult to quantify and can include decreased productivity, decrease morale, and lose institutional knowledge (Leigh, DePaul-Haddock 2017).

Direct costs are easier to calculate as there are precise numbers. There are several methods that companies are using to enumerate the costs of turnover. To calculate the indirect costs of employee turnover, organizations can take several approaches, including analyzing the workloads of remaining employees before and after an employee's departure to estimate the additional work they have to do, calculating the time it takes for new employees to reach the same level of productivity as the departing employee based on historical data and industry benchmarks, and gathering feedback from employees to estimate the impact of decreased morale and job satisfaction (Aldaihani, Alduais 2021). Organizations can also estimate the cost of lost institutional knowledge and relationships by analyzing the value of those assets and the time it takes to rebuild them (Mondore, Douthitt 2021). Overall, calculating the indirect costs of employee turnover requires a combination of quantitative and qualitative data analysis, and it may require input from various stakeholders within the organization.

It is used to determine the total cost associated with hiring a new employee, including recruitment costs, advertising, interviewing, and other administrative costs. This method is helpful in analyzing the effectiveness of the company's recruitment process, evaluating recruitment strategies, and assessing the impact of recruitment costs on the company's bottom line (Phillips 2016). The formula for calculating the cost-per-hire is as follows:

$$\text{Cost-per-hire} = (\text{Internal costs} + \text{External costs}) / \text{Total number of hires}$$

However, there are some limitations to the cost-per-hire method. One major limitation is that it does not take into account the quality of the new hires or the long-term impact of the recruitment process on the company's bottom line. Also, the method can be time-consuming and resource-intensive to implement, especially for companies with a large number of hires (Cascio 2018).

The turnover rate method is a common way to calculate employee turnover, which measures the number of employees who leave an organization in a given time period, divided by the average number of employees in the same time period. It is a simple and straightforward formula that provides a quick way to assess employee turnover rates (Noe et al. 2017). The formula for calculating turnover rate is:

$$\text{Turnover rate} = (\text{Number of employees who left during the period} / \text{Average number of employees during the period}) \times 100$$

The replacement cost method is based on the premise that the cost of replacing an employee is equivalent to the sum of the costs associated with recruiting, selecting, and training a new employee to perform the same duties and responsibilities as the former employee. Replacement cost analysis considers the direct and indirect costs of employee turnover to the organization. The formula for calculating the replacement cost is as follows (De Cieri, Kramar 2015):

$$\text{Replacement Cost} = (\text{Cost of recruiting} + \text{Cost of selection} + \text{Cost of training}) \times \text{Number of employees lost}$$

As a benefit this method provides a comprehensive estimate of the cost associated with employee turnover, can inform retention strategies, and improve recruitment effort, and helps organizations to quantify the financial impact of employee turnover (Baker, Baker 2018). However, the method may not capture all of the indirect costs associated with employee turnover, such as lost productivity, decreased morale, and decreased customer satisfaction and may not consider the unique circumstances of each employee who has left the organization.

Cost analysis is a method used to calculate the direct and indirect costs associated with employee turnover. The theory behind this method is that companies need to account for all the costs related to losing an employee to make informed decisions about how to reduce turnover and its associated costs. The formula for cost analysis is (Vidal 2017):

$$\text{Total cost of turnover} = (\text{Cost of replacing an employee} + \text{Cost of lost productivity} + \text{Cost of lost knowledge and expertise}) / \text{Total number of employees}$$

One of the benefits of the cost analysis method is that the method provides a comprehensive picture of the costs associated with employee turnover, including both direct and indirect costs. It also enables companies to make informed decisions about retention strategies and investments in employee development and training. Another benefit is that the method helps to identify the root causes of turnover and develop targeted solutions to reduce it (Sturman, Clarke 2019).

The limitations of the cost analysis method include potential difficulties to accurately calculate some indirect costs. Also, the fact that it is a retrospective method that does not provide insight into the factors that contribute to turnover (Ramlall 2017).

The costs of employee turnover can be connected to big data in HR analytics by leveraging data to understand and mitigate the drivers of turnover. With the help of big data, organizations can track and analyse a variety of factors, such as employee engagement, satisfaction, and performance, that contribute to employee turnover. By collecting and analyzing this data, companies can identify patterns and trends to predict and prevent future turnover. This can lead to significant cost savings, as the costs of replacing employees can be substantial. In addition, big data can help companies optimize their recruitment and retention strategies, allowing them to attract and retain the best talent while minimizing costs associated with turnover (Marr 2019).

1.2 Big data approach to employee turnover

The big data approach to employee turnover involves the use of data analytics to identify and predict factors contributing to employee turnover (Lienert 2018). The following are the steps involved in the big data approach to employee turnover – data collection, data analysis, identification of factors, prioritization of factor, intervention development and intervention implementation.

The first step in the big data approach to employee turnover is data collection. Organizations collect data on employee demographics, job roles, performance, compensation, benefits, job satisfaction, turnover rates, and other relevant variables. The second step is data analysis, which involves the use of statistical techniques, machine learning, and predictive modelling to identify patterns, correlations, and trends in the data. The third step is the identification of factors that contribute to employee turnover. Based on the data analysis, HR professionals can identify the factors that are most strongly associated with employee turnover. Some common factors include low job satisfaction, inadequate compensation, lack of opportunities for growth and development, poor management, and work-life balance issues (Silva et al. 2019). Once the contributing factors have been identified, the next step is to prioritize them based on their importance and impact on employee turnover. This allows HR professionals to focus their efforts on the most critical factors and develop targeted interventions to address them. The fifth step is the development of interventions to address the factors contributing to employee turnover. These interventions may include changes to compensation and benefits packages, improvements in work-life balance policies, management training, and other initiatives aimed at improving employee satisfaction and reducing turnover rates (Kouloumpis et al. 2019). The sixth step is the implementation of the interventions developed in step five. This involves rolling out the changes to the organization and monitoring their effectiveness in reducing employee turnover rates. The final step is the evaluation of the effectiveness of the interventions. HR professionals can use data

analytics to track changes in employee turnover rates and identify whether the interventions were successful in reducing turnover rates.

Overall, the big data approach to employee turnover is an effective way for organizations to identify and address factors that contribute to employee turnover. By using data analytics to gain insights into employee behavior and preferences, HR professionals can develop targeted interventions that improve employee satisfaction and reduce turnover rates. This not only helps to retain valuable employees but also saves the organization money on recruitment and training costs (Lienert 2018).

The research published so far focuses primarily on exploring the possibilities of collecting and storing vast amounts of data on various aspects related to human resources (Boudreau, Cascio, 2017), prerequisites such as specialized skills and technologies, including machine learning and data mining at work from Big Data (Petry, Jäger 2021), or analysis employee turnover and its impact on organizational performance, productivity, and profitability (De Winne et al. 2019; Noah et al. 2017, De Cieri & Kramar 2015; Vidal, 2017). However, there is no study analyzing the actual accuracy of identifying the most common reasons for employee departures through a predictive machine learning model. There are also no studies analyzing the impact of deploying a predictive model in relation to reducing fluctuations in the company's turnover rate or the impact of implementing a predictive model on the costs associated with human resources management.

The research presented in this paper expands the knowledge base mainly by demonstrating answers to the authors' sanitized research questions:

- To what extent does the predictive model developed using machine learning techniques accurately identify the most common reasons for employee departures based on the input data provided?

The authors deduced that the predictive model using machine learning techniques can accurately find the most common reasons for employee departures. This question implies that such a model can provide valuable insights into why employees leave their jobs and help companies take appropriate action to retain their employees.

- Is compensation identified as the primary reason for employee departures, based on a higher frequency of this factor compared to other reasons in the data?

The authors presumed that compensation would be the primary reason for employee departures, as indicated by a higher frequency of this factor compared to other reasons in the data. This question implies that compensation is a significant factor in employee turnover and that addressing compensation-related issues can help reduce employee turnover.

- Does the deployment of the predictive model, within a 6-month result in a reduction of fluctuations in the company's turnover rate, thereby supporting the company in adjusting internal initiatives to lower turnover?

The aim of this question is to test whether implementing a predictive model will reduce fluctuations in the company's turnover rate. The authors assume that the initial results of the predictive analytics will help the company adjust internal initiatives to lower turnover. Based on an agreement with internal HR, the expected turnover will be 10% lower due to the usage of information from the predictive model.

- To what extent does the implementation of the predictive model result in savings from the planned HR budget, as indicated by a reduction of costs over a specified period?

The authors investigate whether implementing the predictive model will result in cost savings for the company. It implies that

implementation of the predictive model will result in savings by a reduction in recruitment costs over a specified period.

2 Methodology

The authors contacted an international company that agreed to cooperate on the model development and implementation. This company operates in multiple markets and employs more than a million employees across the globe. This company desired to stay anonymous due to the sensitivity of the shared data. After initial contact the authors agreed with HR representatives what type of data should be tracked and collected 12 months after this initial meeting. After this period the dataset has been firstly reviewed by the internal HR department and cleaned based on GDPR regulations. The cleaning meant substitution of an employee name by random employee number and deleting all sensitive information. The authors worked with data connected to the number besides employee name. The real company dataset contained 14999 data points (rows) and 16 elements (columns). Each row represented one employee. The turnover tracked in this dataset was 26%. The dataset tracked Age, Job level (seniority), Years at company, Total working years, Overtime, Promotion within the last three years and results from internal employee survey. This survey tracked job satisfaction, relationship satisfaction and work life balance on the scale from one to ten, one being the lowest and 10 being the highest value. The survey was conducted in May 2021 by internal tool. The data were tracked from three countries – Slovakia (14%), Czech Republic (28%) and Germany (58%).

Description of the selected software: Python is a high-level, interpreted programming language that was created in the late 1980s by Guido van Rossum. It is widely used for web development, data analysis, artificial intelligence, scientific computing, and more. Python is known for its clear syntax and readability, making it easy for developers to write and maintain code (Hakeem, Haris 2020). The authors decided to work with Python programming language, because of several reasons. Firstly, it is an open-source language, which means that anyone can use it, modify it, and distribute it without any restrictions. It is also a cross-platform language, which means that it can run on various operating systems such as Windows, Linux, and macOS. Secondly, the system has numerous libraries and frameworks that make it easy to work with data (Ramalho 2015). Some of the most popular libraries for data analysis and predictive analytics in Python include NumPy, Pandas, Matplotlib, and Scikit-learn. Thirdly, in predictive analytics, Python can be used for a range of tasks, including data pre-processing, feature engineering, model selection and training, and model evaluation. In conclusion, Python is a versatile programming language that has become an essential tool for predictive analytics. As the demand for data-driven insights continues to grow, Python is likely to remain a popular choice for predictive analytics for years to come (Ramalho 2018).

For the prediction model development Team Data Science Process (TDPS) framework was followed. It is generally used for data science projects that was developed by Microsoft (Taylor et al. 2019).

predictive model was built based on machine learning algorithms. The authors used four modelling techniques - logistic regression, decision tree classifier, k-nearest neighbours, and random forest:

- Logistic regression is a statistical model that uses a logistic function to model a binary dependent variable.
- K-nearest neighbours is a non-parametric method used for classification and regression.
- Decision tree classifier divides the data into smaller subsets based on the values of the input features, creating a tree-like structure.
- Random forest is an ensemble learning method that constructs a multitude of decision trees.

The data were processed using each of the four modelling techniques in the same manner. The dataset was split into testing

and training data, and the training set was used to fit the model by adjusting its parameters to minimize the error between predicted and actual data. The aim of fitting the training set to the model was to find the set of parameters that best capture the relationship between the input features and the output variable, enabling the model to make accurate predictions on new, unseen data. The result of each modelling technique was a confusion matrix, which is a table that compares the predicted values of the model with the actual values of the testing data. The confusion matrix provides information on the true positive, false positive, true negative, and false negative predictions made by the model, which is used to evaluate its performance (Zhang et al. 2021).

To compare the performance of these models, several metrics were used, including accuracy, precision, recall, the area under the curve (AUC) curve, and the F1 score. Accuracy measures the percentage of correctly classified instances, while precision measures the percentage of true positives among all predicted positives. Recall measures the percentage of true positives among all actual positives. The AUC (Area under the curve) is a metric that measures the overall performance of the model across all possible thresholds, and it represents the probability that the model will rank a randomly chosen positive instance higher than a randomly chosen negative instance. The F1 score is the harmonic mean of precision and recall. All these characteristics were displayed in a table for the comparison based on which one of the four models (logistic regression, decision tree classifier, k-nearest neighbours, and random forest) was selected for further analysis.

Both the qualitative and quantitative methods were used. Qualitative methods were used for gathering the employee attributes and demographics for predicting turnover as well as finding the retention factors for retaining a valuable employee, whereas the quantitative methods were used for weighting the factors influencing the turnover and analyzing the accuracy of the prediction model built for predicting turnover.

Exploratory data analysis was used to examine the dataset gathered from the real company. It involved analyzing the data to identify patterns, outliers, and other features that could be used to inform the development of the predictive model.

Factor analysis identified the fundamental factors that drive observed patterns in a dataset. By identifying these factors, it was possible to predict future outcomes based on the relationships between these

essential factors and the outcome variable.

Regression analysis predicted the value of a dependent variable based on one or more independent variables, such as linear regression, logistic regression, and multiple regression.

Correlation analysis: This method was used to identify relationships between the variables in the dataset. Correlation analysis measures the degree to which two variables are related, with values ranging from -1 to +1. A positive correlation indicates that the variables are positively related, while a negative correlation indicates that the variables are negatively related.

Machine learning algorithms: This method involves using algorithms to train a model to predict outcomes based on input data. Machine learning algorithms that were used are logistic regression, decision tree classifier, K-nearest neighbours, random forest.

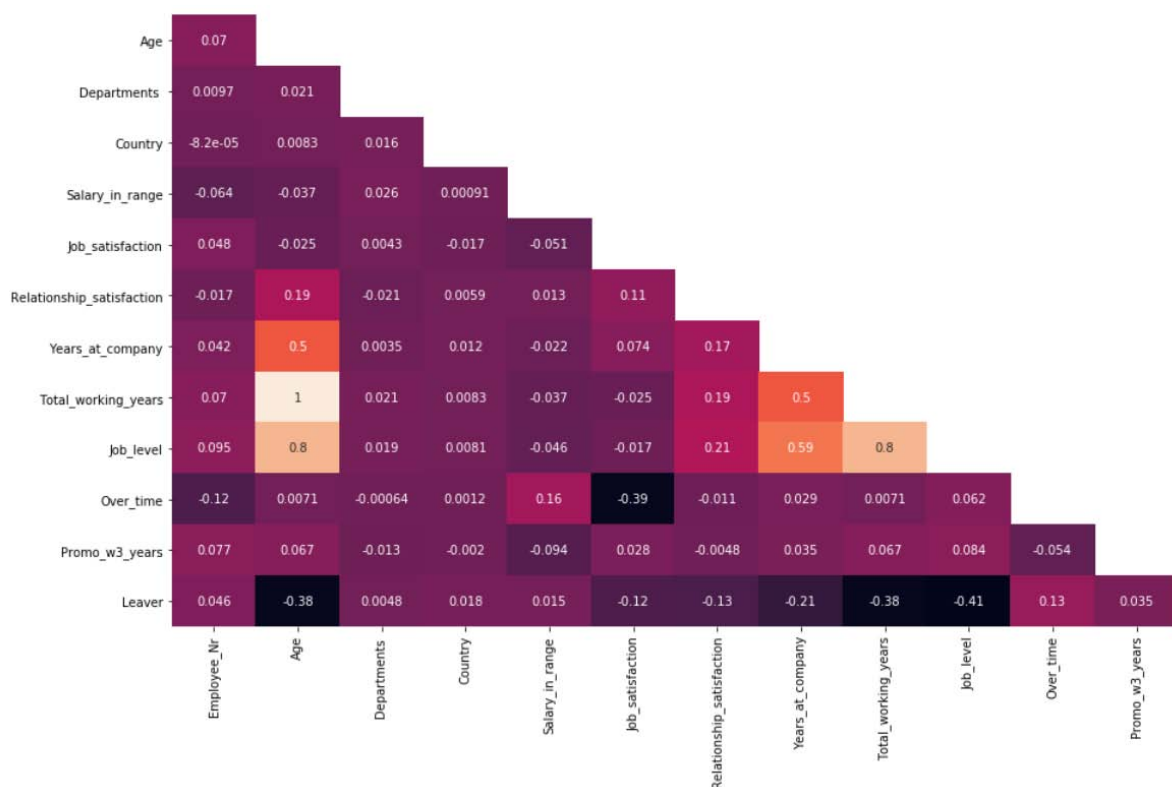
Modelling involved building and training a machine learning model using a dataset of employee data, and then using the trained model to predict which employees were likely to leave the company in the future.

3 Results

3.1 Correlation matrix

To gain a better understanding of the relationships between variables in the dataset, a correlation matrix was generated (Graph 1). On the Graph 1 two columns in correlation matrix were missing "Type of leaver" and "Reasons for leaver", both columns contained text and therefor were not part of this comparison, moreover the correlation with column leaver is obvious. The correlation matrix also was interpreted visually using colours, with brighter colours indicating stronger correlation, black color illustrated negative correlation. A positive correlation was indicated by a plus value, meaning that as one variable increases, so did the other, while a negative correlation was indicated by a minus value, meaning that as one variable increased, the other decreased.

Graph 1: The correlation matrix of the real company dataset.



The matrix shows that there was a positive correlation between age and total working years (1), as well as between job level and total working years (0.8). This indicated that as employees got older or progressed to higher job levels, they tended to accumulate more working experience. Another positive correlation was between over-time and leaver (0.13), which suggested that employees who work overtime were more likely to leave the company.

Furthermore, the matrix reveals a moderate negative correlation between age and leaver (-0.38), indicating that younger employees were more likely to leave the company compared to their older counterparts. This trend was also reflected in the correlation between total working years and leaver (-0.38), suggesting that employees who worked for shorter periods of time were more likely to leave the company compared to those who had been with the company for longer periods.

The matrix also reveals a positive correlation between promo_w3_years and job level (0.084), which suggests that employees who received promotions within three years tended to progress to higher job levels. This may indicate that the company had a strong internal promotion system in place, which could motivate employees to stay with the company for longer periods of time.

Overall, this correlation matrix provided valuable insights into the relationships between various employee-related variables. By understanding these relationships, organizations can make informed decisions to retain employees and improve job satisfaction, which can lead to a more productive and successful workforce. This correlation matrix shows the relationships between various employee-related variables. It was important to understand how these variables are related to one another in order to identify patterns and make informed decisions that can benefit both the employees and the organization. Having completed the exploratory data analysis (EDA), the authors started to develop machine learning models to predict employee turnover

3.2 Develop machine learning models to predict employee turnover

Four different algorithms were explored- logistic regression, decision tree, k-nearest neighbours (KNN), and random forest - to identify the best approach for predicting whether an employee is likely to leave the company or not. Each of these models has its strengths and weaknesses, and by comparing their performance, the best algorithm for the dataset was selected. The authors used programming language Python for this analysis. For the better transparency, the authors summarized the results of the models in one table (Table 1).

Table 1: Summary of the models' performance

	Accuracy (on test set)	Precision	Recall	F1 score	AUC curve
Logistic regression	0.99	0.97	1.0	0.99	0.99
Decision Tree Classifier	0.99	1.0	1.0	1.0	0.99
KNN	0.79	0.66	0.48	0.58	0.80
Random Forest	0.99	0.99	0.99	0.99	0.99

Logistic Regression and Decision Tree Classifier have excellent performance in all metrics, with an accuracy of 0.99, precision of 0.97-1.0, recall of 1.0, F1 score of 0.99-1.0, and AUC curve of 0.99. This suggests that these two models are very good at predicting employee turnover and can be relied upon for accurate predictions. KNN has the lowest accuracy and F1 score of 0.79 and 0.58 respectively, indicating that this model may not be the best choice for predicting employee turnover. However, it has a relatively high AUC curve of 0.80, suggesting that it is still somewhat effective in distinguishing between positive and negative cases. Random Forest has excellent performance in all metrics, similar to Logistic Regression and Decision Tree

Classifier. Its precision, recall, F1 score, and AUC curve are all 0.99, which suggests that it is also a good choice for predicting employee turnover. When everything is considered, choosing a single machine learning model for further analytics is a practical and effective approach that helped to streamline the efforts and made more confident decisions. By using logistic regression for further analytics, the authors was able to predict the probability of leaving, reasons for leaving, and associated costs with greater accuracy and confidence.

When building a predictive model for employee turnover, the machine learning algorithm looked for patterns in the data that could help predict whether an employee was likely to leave. The algorithm considered all 15 features (columns) that might impacted employee retention. To assign weights to each of these factors based on their importance, the algorithm used a technique called feature selection and method mutual information. This method measured the mutual dependence between each feature and the outcome variable, and assigned weights based on their level of correlation. The weights were assigned based on the correlation between each feature and the target variable (i.e., the variable "Leaver" we want to predict). Features that had a strong correlation with the target variable were assigned a higher weight, while features that had a weak correlation with the target variable were assigned a lower weight. Table X12 shows the list of features and assigned weights (Table 2).

Table 2: Assigned weights to the features of the training dataset.

Feature	Weight
Employee_Nr	0.00
Age	-0.07
Departments	-0.09
Country	0.02
Salary_in_range	0.00
Job_satisfaction	-0.00
Relationship_satisfaction	-0.01
Work_life_balance	-0.02
Years_at_company	0.07
Total_working_years	-0.26
Job_level	-0.33
Over_time	0.11
Promo_w3_years	0.04
Type_of_leaver	1.10
Reasons_for_leaving	2.89

As it is visible in Table 2, there are 2 strong correlations. Firstly, the "Job_level" feature has a weight of -0.33, indicating that employees with higher job levels are less likely to leave. Lastly, the "Total_working_years" feature has a weight of -0.26, indicating that employees with more total working years are less likely to leave. Once the model had assigned weights to each feature, it used these weights to calculate the final probability of an employee leaving. The values of predicted reasons for leaving are listed in Table 3. These reasons were assigned to the 11,153 employees who were still with the company at the time of evaluation.

Table 3: Counted values for predicted reasons of leaving.

Reason	Count
Overtime	5019
Compensation	3345
Internal transfer	1673
Work environment	558
Different department	446
Relocation	112
Career advancement	0
Personal reasons	0

Table 3 shows the counted values for predicted reasons of leaving. The majority of employees, 45%, were predicted to leave the company due to overtime, with a total of 5019 employees identified as potential leavers for this reason. Compensation was the second most common reason, with 30% of predicted leavers (3345 employees) citing this as their reason

for leaving. Work environment was the next most frequent reason, with 558 predicted leavers (5% of the total), followed by different department with 446 predicted leavers (4% of the total). The remaining predicted reasons, including career advancement and personal reasons, did not have any identified potential leavers. Relocation was the reason for leaving for 1% of predicted leavers (112 employees).

3.3 The costs calculation of the predicted turnover

As a last step of the predictive analytics, the authors prepared a calculation of how the costs of turnover could be determined. Calculating the cost of recruiting and onboarding new employees is an important factor to consider when evaluating the costs of employee turnover. To accurately calculate the cost of recruiting and onboarding new employees, companies should consider the following factors – job posting, recruiter fees, background checks and pre-employment testing, orientation, and training.

Total Job Postings Cost = Cost per Job Posting x Number of Job Postings

Recruiter Fees = First-year Salary x Recruiter Fee Percentage

Total Background Check and Pre-employment Testing Cost = Cost per Check/Test x Number of Checks/Tests

Total Orientation and Training Cost = Cost per Employee x Number of Employees

Total costs of onboarding = (yearly salary/12 months) x amount of training months

For example, if it takes an average of two months for a new employee to reach the same level of productivity as the employees who left for the entry level roles in Slovakia, and the average salary for that role is \$15,000 per year, then the estimated cost of lost productivity would be (15 000€ / 12 months) x 2 months = 2500€ This calculation assumes that the new employee will be paid the same salary as the employee who left and that the level of productivity of the new employee will be the same as the employee who left. However, if the new employee requires additional training or support, or if the job is particularly complex, the estimated cost of lost productivity could be higher.

To determine the salary ranges, the authors analyzed salary data from various web pages. For Slovakia the authors got information from two sources – platy.sk and Ministry of Labour, social affairs, and family of Slovak republic. For Germany and Czech Republic the authors used these web pages Payscale.com, Glassdoor.com and Salaryexpert.com. Then created salary ranges for each job level and country combination based on this analysis (Table 4).

Table 4: Salary ranges based on the country and level.

Level	Country	Salary range
3	Germany	€25,000 - €45,000
	Czech Republic	€10,500 - €21,000
	Slovakia	€10,000 - €20,000
4	Germany	€35,000 - €60,000
	Czech Republic	€16,500 - €29,000
	Slovakia	€20,000 - €30,000
5	Germany	€50,000 - €90,000
	Czech Republic	€25,000 - €50,000
	Slovakia	€30,000 - €50,000
6	Germany	€75,000 - €120,000
	Czech Republic	€41,500 - €75,000
	Slovakia	€50,000 - €80,000
7	Germany	€100,000 - €200,000+
	Czech Republic	€62,000 - €125,000+
	Slovakia	€80,000 - €150,000+

The authors assigned these salary ranges to each employee based on their job level and country (Table 4). Once the costs were

calculated for each employee, they were added to the database under a new column named Total cost. As a result of the authors' prediction analytics three new values were assigned to each employee (Table 5) - probability of leaving, reasons for leaving, and total costs of turnover.

Table 5: Final table of the predictive analytics.

Employee Nr	Probability_of leaving	Reasons_for leaving	Total costs
3500	9.27%	Compensation	10206
3501	0.00%	Internal transfer	15206
3052	6.04%	Compensation	3956
3053	15.30%	Overtime	16456
3054	64.20%	Overtime	11456
2830	51.30%	Internal transfer	17106
2696	24.20%	Compensation	8956
2562	72.80%	Overtime	3956

Only by preventing predicted turnover with the probability of leaving higher than 50% displayed in Table 5, company could have saved 32518 Euros.

3.4 Evaluation of research questions

Research question 3: To what extent does the predictive model developed using machine learning techniques accurately identify the most common reasons for employee departures based on the input data provided?

Based on the results of the calibration curve and Brier score, the accuracy of the predictive model developed using machine learning techniques was evaluated. The accuracy was found to be higher than 60%. However, the model was not entirely accurate, as indicated by the Brier score of 0.36. The Brier score indicated that there was still room for improvement in the predictive model's accuracy. A lower Brier score would indicate better accuracy, with a score of 0 indicating perfect accuracy. However, it's important to note that the level of accuracy required for the predictive model to be considered useful might vary depending on the specific use case and context. Additionally, while the model might not be perfectly accurate, it still provided valuable insights and information that informed decision-making and helped improve HR practices.

Research question 4: Is compensation identified as the primary reason for employee departures, based on a higher frequency of this factor compared to other reasons in the data?

Initially, the authors presumed that compensation would be identified as the primary reason for employee departures based on the frequency of this factor compared to other reasons in the data. This question implied that compensation was a significant factor in employee turnover and that addressing compensation-related issues helped reduce employee turnover. Based on the logistic regression prediction model, the authors initially identified overtime as the strongest reason for employee departures, followed by compensation as the third reason after internal transfer. However, after verifying the model with new data, it resulted in compensation being the strongest reason for employee departures. This was attributed to the company's implementation of three internal initiatives to reduce the number of overtimes.

Research question 5: Does the deployment of the predictive model, within a 6-month result in a significant reduction of fluctuations in the company's turnover rate, thereby supporting the company in adjusting internal initiatives to lower turnover?

The authors aimed to achieve a reduction in fluctuations in the turnover rate of the company after 6 months of deploying the predictive model. After the comparison of the turnover rate prior to model deployment and the rate after 6 months, it was found that there was a 4% reduction. The authors realized that the

reduction was not 10%, as initially planned, as it was overly ambitious, given the short timeframe of 6 months.

Research question 6: To what extent does the implementation of the predictive model result in savings from the planned HR budget, as indicated by a reduction of costs over a specified period?

After implementing the predictive model, the company calculated the costs of all turnover that probabilities were higher than 80% and compared them to the HR budget. The results showed that the savings achieved were 16%. Therefore, it could be concluded that the implementation of the predictive model did result in significant savings from the planned HR budget.

In conclusion, the research successfully tested the research questions and achieved the stated objectives

Authors was able to confirm the relevance of HR analytics for companies, identify the prevalence of manual data collection and analysis methods among HR representatives, accurately predicted employee departures using a machine learning model, and achieved significant cost savings through the implementation of the model. However, given the broad scope of the topic, there remains ample opportunity for further research and improvement in the field of HR analytics.

4 Discussion

Predictive analytics is a technique to identify the likelihood of future outcomes based on historical data (James et al. 2013). The goal of predictive analytics is to go beyond understanding what has happened in the past to provide a best assessment of what will happen in the future (Gandomi, Haider 2015). The outcome of predictive analytics is typically a predictive model or set of predictive models. These models are designed to make predictions or forecasts about future events or behaviours based on historical data (Kanchana, Chinnadurai 2020).

In the context of employee turnover, predictive analytics can be used to identify the factors that contribute to employee turnover and to predict the likelihood of an employee leaving the organization. This can be valuable information for HR managers who can take proactive measures to retain their valuable employees and reduce the negative impact of employee turnover. Predictive analytics can be used to identify employees who are at risk of leaving an organization. This can help companies take proactive measures to retain their best employees and reduce the costs associated with turnover (Fallucchi et al.2020). Predictive analytics can also help companies identify the factors that contribute to employee turnover and develop strategies to address them.

A study by Gupta and Sagar (2022) found that predictive analytics can accurately predict employee turnover with an accuracy of 82.2%, which can help organizations take proactive measures to retain employees. Another study by Braganza and Bharati (2021) found that predictive analytics can help identify the factors that contribute to employee turnover, such as job satisfaction, work-life balance, and career growth opportunities. In the context of employee turnover, the outcome of predictive analytics could be a model that identifies the factors that contribute to employee turnover and predicts the likelihood of an employee leaving the organization. This model can then be used by HR managers to take proactive measures to retain valuable employees and reduce the negative impact of turnover (Hogan et al. 2020).

Two relevant studies that have focused on similar topics are "Predicting employee turnover in the banking sector (Dávid et al. 2019): A comparative study of data mining techniques" and "Employee turnover prediction using machine learning: A case study on Indian IT sector" (Mohapatra et al. 2020). In the first study, the authors applied several data mining techniques, including decision trees, neural networks, and logistic regression, to predict employee turnover in the banking sector. They found that decision trees and neural networks were the

most effective techniques for predicting employee turnover. In the second study, the authors used machine learning techniques to predict employee turnover in the Indian IT sector. They collected data on several variables, including employee age, gender, job role, performance ratings, and length of service. The authors found that the machine learning models were able to accurately predict employee turnover and identified several key factors that contributed to employee turnover, including low job satisfaction and poor performance ratings. The conclusions of these studies are in line with the results of our research.

4.1 Implementing actions based on model outputs

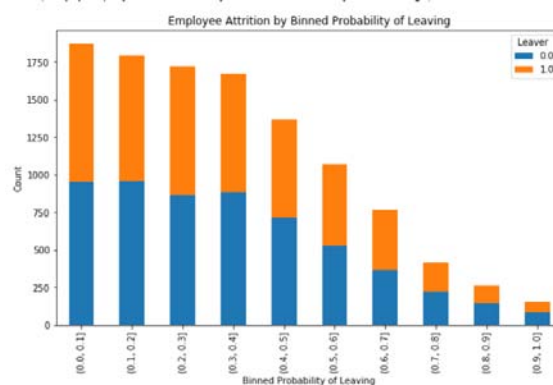
The results of the predictive analytics led to new information being assigned to each employee, including their probability of leaving, reasons for leaving, and turnover costs. HR representatives worked with these data and agreed with management to address the issue of overtime. Overtime was identified as a strong predictor of employee turnover, with 45% of all employees predicted to leave because of it. After presenting these results, the company took three initiatives to manage employee workload and reduce the likelihood of turnover due to overwork and burnout. First, the company became more transparent and proactive in managing workload, with the aim of retaining top talent, improving productivity, and maintaining a positive and engaged workforce. The predictive model highlighted the need for the company to be more transparent with employees about their expected workload and potential overtime. Secondly, the company worked on providing more detailed information about job requirements and workload during the recruitment process. This involved hiring additional staff to distribute the workload more evenly. Lastly, to manage overtime more effectively, the company monitored overtime hours and provided employees with more flexibility in managing their work schedules. This involved offering flexible working hours, allowing employees to work from home, or providing time off in lieu of overtime hours worked.

Six months later, the same employees were tracked to determine if they were still with the company or if they had left. If an employee had left, the authors verified the predicted probability of leaving against the actual outcome using the results obtained from the predictive model and the reason for leaving.

The new dataset contained 11,093 values, of which 3,349 employees left the company.

For a better interpretation of the predicted and true values of whether employees stayed or left the company, below is a graphical representation (Graph 2).

Graph 2: Ratio of predicted and true values.



The x-axis shows the ranges of predicted probabilities, which have been grouped in bins of size 0.1. For example, the first bin "0.0-0.1" represents employees whose predicted probability of leaving was between 0.0 and 0.1. The y-axis shows the proportion of employees who actually left or were predicted to leave within each bin.

In the histogram with grouped probabilities, the orange bars represent the actual distribution of the leavers, while the blue bars represent the predicted probability distribution of the leavers. From the graph, it is visible that the model tends to overestimate the probability of employees leaving, as the proportion of predicted leavers is generally higher than the proportion of actual leavers within each bin. Furthermore, the model is more accurate in predicting employees who are less likely to leave (i.e., lower predicted probabilities), as the proportions of predicted and actual leavers become more similar in the lower probability bins.

Overall, the graph helps to assess the model's performance in predicting employee turnover and could be used to identify areas for improvement in the model or in the data preprocessing. Table 6 below shows the updated list of reasons for leaving the company. The company followed the authors' advice by taking three initiatives to promote work-life balance and keep employees. As a result, overtime was no longer the main cause of employees leaving the company.

Table 6: Updated list of reasons of leaving.

Compensation	6896
Overtime	3510
Internal transfer	2140
Work environment	1274
Career advancement	210
Different department	24
Personal reasons	20
Relocation	19
Involuntary	7

Interestingly, the authors' predictions regarding compensation as the strongest justification for leaving were confirmed by the data. This suggests that offering competitive compensation packages and opportunities for growth and development can be effective in retaining employees. Additionally, the updated list of reasons for leaving can provide valuable insights for HR departments and management in identifying areas for improvement in the company. By addressing the root causes of turnover, companies can reduce the costs associated with employee turnover and increase employee satisfaction and retention. The model was verified using new data and by comparing the predicted and actual values. Overall, the results were valuable to the company that participated in this research. Additionally, a new list of reasons for leaving the company was generated based on data collected after six months. By comparing the situation before and after the model was applied, the authors found differences in the reasons for leaving the company. This indicated that the model had an impact on the company and helped to identify issues that needed to be addressed. Another positive outcome of the model implementation was a decrease in the turnover rate from 26% to 22%. This suggests that the model was successful in identifying factors contributing to employee turnover and in helping the company take appropriate measures to retain employees. The company used the predictive model to calculate the costs of turnover and compared them to the HR budget. The HR representative selected all employees with predicted turnover higher than 80% and added their assigned costs together. The final number was then compared to the yearly HR budget and the results showed savings of 16%.

Overall, the model verification process demonstrated the value of using predictive analytics in HR to address employee turnover. The results provided useful insights that could be used to make data-driven decisions and improve the company's HR practices.

4 Conclusion

High levels of employee turnover can have significant financial and operational implications, including increased costs associated with recruiting and training new employees, decreased productivity, and decreased employee morale. By

using data mining and predictive analytics techniques to identify the factors that contribute to employee turnover, businesses can proactively take steps to address these issues and retain their valuable employees.

Predictive analytics is a complex topic that has various possibilities. The authors worked on a list of potential research topics that could be elaborated further. Firstly, additional features could be explored. The current research used 16 features to predict employee turnover, but there may be other relevant factors that were not included in the analysis. By adding more features, the model may be able to make more accurate predictions and provide deeper insights into the reasons for turnover. For example, the culture and values of a company, employee engagement and managerial style could be an important factor in predicting turnover. These could be measured through surveys or by examining factors such as the level of collaboration and communication within the organization. Further research could delve into the data and conduct both qualitative and quantitative investigations specifically targeting the reasons behind employee departures. This comprehensive approach would provide deeper insights into the underlying factors contributing to turnover and facilitate the development of more targeted retention strategies. In addition, the model can be used to identify the most valuable employees to the organization based on their level of contribution and the costs associated with replacing. The model's performance could be evaluated across different subgroups. The current research does not explore how the model's performance varies across different subgroups of employees, such as those with different departments or levels of experience. By examining how the model performs for different subgroups, researchers can identify areas where the model may need to be refined or adjusted. Further research could investigate the impact of different algorithms. The present examination used four different machine learning algorithms to create a confusion matrix. It may be worth exploring other algorithms, such as support vector machines (SVM) or neural networks (NN), to compare their performance and determine which algorithm is most effective for this particular dataset. Assessment of the impact of external factors could be another valuable point of view. The authors did not explore how external factors, such as economic conditions or industry trends, affect employee turnover. Another perspective on predictive analytics could be a cost-benefit analysis. The authors calculated the costs of turnover for each employee, but they did not explore the potential cost savings associated with interventions to reduce turnover.

Overall, the predictive model provides the company with valuable insights into the factors that contribute to employee turnover, allowing them to take proactive steps to retain their top talent. By using data-driven approaches to HR, companies can improve their retention rates, reduce costs associated with turnover, and maintain a competitive edge in the marketplace.

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Primary Paper Section: A

Secondary Paper Section: AE, JC, JD

ENTREPRENEURSHIP IN FAMILY AND NON-FAMILY CONTEXTS: OVERVIEW AND PERSPECTIVES

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Abstract: The article examines key differences between family and non-family businesses, focusing on values, strategy, innovation, human capital, and work-life balance. Family businesses are characterized by long-term planning, deep-rooted values, and succession challenges. The family brings emotional aspects, while business requires rationality and results. Non-family businesses typically have formalized management, faster decision-making, and short-term performance goals, influencing flexibility and innovation. Questionnaires show family businesses prioritize stability and values, whereas non-family businesses emphasize innovation and competitiveness. The results suggest areas for future research and practical implications.

Keywords: family business, non-family business, differences, innovations, values, human resources.

1 Introduction

In the current era, where the economies of the world are becoming increasingly globalized and competition is intensifying, business is becoming the focus of attention both in academic circles and in practice. A specific and significant segment of business is family businesses, which differ from non-family businesses in several characteristics. This article focuses on comparing these two types of businesses to identify key differences and similarities that affect their functioning.

Family businesses, often considered the backbone of national economies, are characterized by the involvement of one or more families in the management and administration of the company. This unique structure brings specific challenges and opportunities, including strong personal ties, long-term focus, and often deep roots in social and community values. On the other hand, non-family businesses are typically managed on a merit-based system, and their strategic decisions are more influenced by market conditions and shareholder needs.

The aim of this article is to conduct a systematic review of the literature focusing on these two categories of businesses and provide a comparative analysis that could serve as a basis for future research directions. Through this introduction and subsequent detailed analysis, the article seeks to contribute to a deeper understanding of the functioning of family and non-family businesses, which should help academics, entrepreneurs, and policymakers better understand and support the diversity of business models in the modern economy.

Currently, the business environment is constantly evolving, leading to intense discussions about the specific challenges and opportunities facing family and non-family businesses. These discussions often highlight the different approaches to management, innovation, sustainability, and work-life balance that these two types of businesses apply. Family businesses, characterized by the involvement of multiple generations and strong ties to family values, exhibit a specific business culture that can be a source of significant competitive advantages as well as specific challenges. On the other hand, non-family businesses may have greater flexibility in decision-making processes and be more open to risky innovations and changes, but they may face challenges in building equally strong relationships and loyalty among employees. Although there are numerous studies examining these differences from various perspectives, many questions remain about how these differences affect not only the internal dynamics of companies but also their relationships with the external environment, innovation capabilities, and overall sustainability. The following

chapters are dedicated to a comprehensive analysis that combines theoretical foundations and empirical evidence to provide a deeper understanding of the specifics of family and non-family businesses. The main differences that distinguish these two segments and are discussed in the literature are examined.

2 Business versus Family Business

At first thought about a business, it is clear that research in this area has countless possibilities. Family businesses are among the longest-running businesses in the world. However, their definitions have not been unified even after such a long time. In the conditions of the Czech Republic, a business is any entity engaged in economic activity regardless of its legal form. These entities include primarily self-employed persons and also family businesses performing crafts or other activities. At the same time, it also includes commercial companies or associations that regularly engage in economic activities [1]. Despite unclear definitions, the literature converges on some characteristic features of family businesses, and the definition of family entrepreneurship has also been included in non-legislative regulation for several years, specifically in government resolution no. 899 dated October 18, 2021. This definition was proposed by the Ministry of Industry and Trade to the Government of the Czech Republic [2]. A classic feature of a family business is that it is based on the personality of the founder, the intensity of family involvement in the business, and the commitment of family members. They tend to deliver quality performances with the aim of representing the family business name and preserving the tradition [3]. Other characteristic features include if the owner considers it a family business, intends to pass it on to a close relative, and besides the owner, other family members are also involved in the business. This is also confirmed by Machek [4].

These features were crucial for determining the sample from which two companies were selected for the case study. A very important aspect distinguishing family businesses from non-family businesses is the element of family or family culture (social) interconnectedness between the family and the business in economic, managerial, and sociological frameworks. The driving force is to build a family tradition in a given area of business and maintain a good name for decades [3]. A characteristic feature that distinguishes family businesses from non-family businesses is the active involvement of family members in the daily activities of the business. Employing family members is included in approximately one-third of the analysed European definitions of a family business. Family members often voluntarily work more and are willing to invest their own assets in the business to ensure its operation [5]. Families are a special type of group that connects kinship ties, norms, and altruism. These ties do not have a financial, transactional, or market character. They are relational and systemic. One relationship, whether positive or negative, can positively or negatively influence the entire structure of the business [6].

3 Areas of Differences

The differences between family and non-family businesses can manifest in many aspects, from management and ownership structure to corporate culture and strategy. Here are the main areas where these two types of businesses typically differ:

1. Ownership and Management

- Family Businesses: Ownership and often management of the business are in the hands of one or more families. Family members hold key positions in the business.
- Non-Family Businesses: Ownership is dispersed among a broad group of shareholders, and the management of the

business is entrusted to managers who are not members of the owning family.

2. Approach to Financing

- Family Businesses: They may be more reliant on internal financing or bank loans, as they may be more cautious about issuing shares.
- Non-Family Businesses: They often have easier access to capital markets and can use a more diverse range of financial instruments.

3. Corporate Culture and Values

- Family Businesses: Strongly influenced by family values, which can foster greater loyalty and commitment among employees. However, nepotism can also occur.
- Non-Family Businesses: The culture is shaped more by professional managers and may be more performance oriented.

4. Strategic Planning and Long-Term Vision

- Family Businesses: Often focus on long-term sustainability and passing the business on to the next generation, which can lead to a more cautious approach to risk.
- Non-Family Businesses: May be more oriented towards short-term goals and performance to meet shareholder demands.

5. Flexibility and Innovation

- Family Businesses: Can be more flexible in decision-making but may sometimes be less willing to adopt innovations due to a desire to preserve traditional ways.
- Non-Family Businesses: Usually have greater resources for investment in innovation and development, but decision-making processes can be more complicated due to a larger organizational structure.

Research has shown that these five areas are the most critical in which family and non-family businesses differ [7] [8] [9]. The author further delves into these selected areas:

3.1 Innovation

In today's dynamic business environment, innovation plays a crucial role in maintaining competitiveness and long-term sustainability of enterprises. This subchapter focuses on examining the differences in approaches to innovation between family and non-family businesses. Utilizing relevant literature and empirical data, it seeks to identify specific factors that distinguish these two types of businesses in the context of innovation behavior and collaboration.

Family and non-family businesses represent two distinct business models that differ not only in their structure and ownership but also in their strategies and approaches to innovation. While family businesses may be perceived as more cautious and tradition-oriented, non-family businesses are often viewed as more agile and open to riskier innovative projects.

For family businesses, it is essential that their innovation strategy is linked to their tradition. The literature highlights that the impact of product and process innovation in a family business is crucial to consumer perception. Studies show that consumers appreciate local products if they embody tradition, culture, or reflect the identity of a specific place [10]. Innovations, especially in family-owned wineries, are perceived as enhancements. They represent a comprehensive process from idea through development to implementation. Implementation is a critical factor in innovation; without it, it remains just an idea. Innovations lead to improvements in processes, products, or services provided [11].

Studies point to several key differences in innovation behavior between family and non-family businesses. One major finding is that family businesses tend to collaborate with a smaller number of carefully selected external partners, particularly suppliers and customers, reflecting their effort to build long-term relationships and trust. In contrast, non-family businesses are generally more open to broader collaboration and actively seek new opportunities for innovation through technological alliances.

Additionally, the studies suggest that family businesses may be less inclined to adopt radical innovations due to a stronger focus on preserving family legacy and values. This can lead to a preference for incremental innovations that pose less threat to the existing business model and culture. The prioritization of internal harmony and socio-emotional wealth in family businesses sometimes results in a cautious approach to external collaboration, potentially limiting their exposure to new knowledge and innovation opportunities [12] [13]. Conversely, non-family businesses often exhibit a higher degree of openness to experimentation and risky innovative projects, which can facilitate quicker adoption of new technologies and practices [9].

Understanding the differences in innovation behavior between family and non-family businesses is crucial for developing effective management strategies and supporting innovation. For family businesses, it is important to find a balance between preserving family values and leveraging innovation opportunities, while non-family businesses may have greater freedom in experimenting and forming risky technological alliances. Future research should further explore how these differences impact the long-term performance and competitiveness of both types of businesses [14].

In conclusion, while family businesses benefit from their unique family and social capital in fostering innovation, their conservative approach and focus on socio-emotional wealth can sometimes hinder their willingness to engage in high-risk innovative projects. On the other hand, non-family businesses may be more inclined towards radical innovations due to their less restrictive management structures and greater openness to taking risks. Further research is recommended to investigate the heterogeneity within family firms to better understand the conditions under which they can enhance their innovation capabilities [15].

3.2 Human Resources

People are a crucial aspect in businesses, serving as the driving force behind both family and non-family firms. However, even in this area, and perhaps especially in this area, several differences can be observed.

Compared to non-family businesses, family businesses may differ in several key aspects of Human Resources (HR) management that affect their approach to recruitment, training, evaluation, and overall employee management [21].

Roles and Responsibilities of HR: In family businesses, the role of HR may be more intertwined with family values and culture, influencing their approaches to recruitment, compensation, performance evaluation, and employee relations. Conversely, in non-family businesses, the HR role is often more standardized and focused on generally accepted human resource management practices.

Strategic Approach: Family businesses may place particular emphasis on creating and maintaining a strong corporate culture that reflects family values and traditions [18]. This can include strategies to increase employee engagement closely linked to the family's business goals. In non-family businesses, HR strategic planning may be more focused on achieving business objectives and efficiency.

Innovation and Change: Family businesses may face challenges in adapting to changes and innovations due to strong traditions and resistance to change that may be ingrained in the family culture. HR in family businesses plays a key role in supporting

adaptability and acceptance of change, while in non-family businesses, the change management process may be more agile and less influenced by family dynamics [19] [20] [3].

It is important to realize that specifics may vary depending on the particular business and its culture. Understanding and knowledge of the specifics of family businesses, strategic management approaches including human resource management, optimally defined organizational structure, and the ability to manage conflicts can impact their competitiveness and success in a globalized economy [23].

The task of human resources management is mainly to create conditions for increasing the intellectual capital of the business. A positive workplace climate reflects in the economic performance of the business. Many studies also examine the connection between socio-emotional wealth (SEW) and human resource management [3].

In family businesses, family, ownership, and management are inseparably linked. However, several studies show that introducing non-family members into the business management can have a positive impact on the entrepreneurial process. Having an external board can positively influence family dynamics.

External leaders are capable of offering impartial judgments on matters affecting current operations or the future direction of the business. They are not afraid to challenge the current ways of doing things, as they are not bound by family ties. They provide a cold and objective assessment of the business's current and future performance. They can offer alternatives that might not occur to the family or that the family might be afraid to suggest for fear of family conflicts. Although an alternative might be very beneficial for the business, it could be rejected for emotional reasons—an external leader should prevent this. Their opinions are accepted with fewer emotions. However, they should also act in a way that maintains the family's cohesion and compatibility. The proposal must be politically appropriate to preserve the function of both the family and the business. After all, family members as owners have the final say [17].

It is also advisable for family members to compete for job positions in the business under the same conditions as other (external) candidates. It is often customary for family members to be hired based on blood ties rather than managerial or other skills—so-called nepotism [5]. In connection with nepotism, another examined concept and area is talent management, as it seeks to combat nepotism. The specific approach to talent management in a family business is defined by family values and emotional ties and is often embedded in the family business culture [3].

Although the involvement of only family members is understandable in certain respects, "external" employees can bring a new, unbiased perspective to the business and can help in areas where the family's abilities no longer suffice [10]. Whether in terms of knowledge or capacity, they can contribute to expansion [17].

Regarding compensation, research has found that CEOs of family businesses earn less than CEOs of non-family businesses. Generally, family businesses pay less at all levels. Employees of family businesses tend to be more loyal, and there is low employee turnover [5].

Many non-family businesses also strive to maintain a "family atmosphere" within their company, but the crucial factor of intertwining family and business is excluded.

3.3 Business values

The philosophy of each family business is unique and stems from the family itself, from values, traditions, and beliefs that permeate the entire business and ultimately form the company's strategy [25]. The key to successful involvement of family

members in the family business lies in familiarizing each member with the family values that guide the business [16]. Effective family involvement is the foundation of quality management control over the processes of the family business and, ultimately, the long-term performance of the company [18].

Of course, the value of a business can be approached from an economic perspective using traditional valuation methods. However, in a family business, besides this quantifiable value, emphasis is placed on so-called "soft values." These are intangible values that cannot be quantified but often hold much greater importance for the family. In addition to financial goals such as wealth maximization, socio-emotional goals, namely the preservation of socio-emotional wealth (SEW), are essential for the family. Family values and emotional attachment to family assets can interfere with the business process if measures to separate the family from the business by establishing appropriate organizational structures are not implemented. However, the involvement of the family in business is what makes the family business different and at the same time exceptional [17].

The foundation of a functioning business is a functioning family and its cohesion. Therefore, the family's focus is on controlling business activities to ensure that trading does not endanger family traditions, culture, values, and assets [17]. A focus on perceiving a high level of trust (and deepening it) and effectively communicating the values of the family business has a positive impact on business continuity [31].

Another factor that differentiates family businesses from non-family businesses and sets a slightly different direction is the fact that family businesses feel associated with values such as honesty, trust, reliability, ethics, innovation, integrity, continuity, stability, etc. These values are additional components of the aforementioned socio-emotional wealth. The results of qualitative content analysis [31] show that Czech family business owners, regardless of the size of the business, prioritize social and affective factors over purely financial ones. This is also confirmed by Machek [4] and others. Family businesses are value-oriented and pursue different financial goals. They can rely on networks based on long-term relationships and trust. They achieve market success by identifying the family with the brand identity. These characteristics shape the strategy of the family business and differentiate it from non-family businesses [4].

Provided that family members are aligned in values and interests, have a high degree of cohesion, and have no disparate (external) owners, they can determine the rate of return on equity. At the same time, they can determine the cost of equity and, given prevailing costs and the level of indebtedness, the cost of capital for the business. Decision-making about financing and investing in the family business, and thus the cost of equity, is linked to family culture, family cohesion, and, last but not least, the size of the family and the business [5].

Non-family businesses are more focused on short-term financial goals, growth, and profit maximization for shareholders. This focus can lead to faster decision-making processes and greater flexibility in responding to market changes, which can support innovation and expansion [32]. In non-family businesses, professional management and governance structures with an emphasis on performance and competitiveness in global markets may also be more developed [33].

When looking at values from the perspective of capital structure and business performance, it has been found that family firms in the Czech Republic are less indebted than non-family businesses and have shown to be more profitable in terms of return on equity (ROE) and return on assets (ROA). Research has also identified significant differences in financial characteristics not only between different business sectors but also between the sample of family firms and all/non-family firms in a single business sector [34].

These findings suggest that while family businesses may be more focused on long-term sustainability and have a specific approach to management and governance, non-family businesses may be more focused on short-term performance and flexibility in financing and governance. These differences may be influenced by the structural factors of family businesses and various management and decision-making approaches.

3.4 Work-life balance

The first step towards a balanced relationship between work and personal life is mental health, both at the individual level and at the level of the family and family business. Founders of family businesses face a crucial dilemma regarding time: what comes first, family or business? [30] [24]. Mental health is characterized by the World Health Organization (WHO) as a state of well-being in which an individual realizes their own abilities, can cope with the normal stresses of life, can work productively, and contributes to their community. It is not merely the absence of mental disorders. Additionally, it is necessary to distinguish between the family as a group and the business (composed of family and non-family employees) as a group in approaching this issue at the group level. For example, the recently introduced concept of "family resilience" (i.e., the family's belief in their ability to find solutions to problems) differs from business resilience. Family and business resilience can have meaningful interactions, but it is important to assess each separately to find the interaction that can be supported through various means. Individual mental imbalance can affect family relationships, and the resulting imbalance within the family can cause problems in the family business. At the same time, psychological capital is trainable [26].

Exploring the balance between work and personal life in family and non-family businesses reveals differences that affect organizational performance and personal well-being. Research suggests that achieving a harmonious Work-Life Balance (WLB) can be crucial for a company's innovation, influencing leaders and employees differently depending on the gender dynamics within the organization. A study by Shouman et al. [27] examines how male and female leaders apply WLB strategies to align work and non-work activities and suggests that while employee satisfaction with WLB does not directly correlate with increased organizational performance, supervisor support plays a crucial role in enhancing employee WLB. Additionally, positive individual attitudes and coping strategies significantly contribute to overall well-being [27].

Attention has also been drawn to mental health issues in family businesses and their impact on entrepreneurial families, highlighting the unique challenges and pressures these entities face. Arijs and Michiels [26] provide a comprehensive overview of mental health in this context, emphasizing the interconnectedness of family and business systems, which can both support and challenge the mental and emotional well-being of the individuals involved. The review highlights the need for a deeper understanding of mental health issues in family businesses to create supportive frameworks for effectively addressing these challenges [26].

Entrepreneurship in transitional economies, such as those in Central and Eastern Europe and specifically in Russia, presents additional layers of complexity where the influence of the family can significantly shape entrepreneurial orientation, risk-taking, and innovation strategies. This dynamic can have profound implications for business sustainability, especially in transitional economies where business support systems and financing options are evolving. Female entrepreneurs in these contexts face unique challenges as they lack specific programs or initiatives to support their businesses, although financial resources are available without gender discrimination [28].

Financial interdependence within startups, especially family businesses, is associated with entrepreneurial stress, impacting the balance between work and family. Research by Choi and Kessler [29] in South Korea indicates that the intertwining of

family and business finances can increase stress levels, affecting the quality of life for business-owning families. This stress, exacerbated by the need to use family resources to finance the business, underscores the delicate balance necessary for sustainable management of entrepreneurial ambitions and family well-being [29].

These studies collectively shed light on the complex balance between work and life in both family and non-family businesses, highlighting the importance of supportive policies and strategies to promote a healthy integration of work and personal life, which can lead to innovative and sustainable business practices.

3.5 Business strategy

In recent decades, research has highlighted that strategies characterizing successful family businesses often differ from those of non-family businesses. Family businesses intertwine various goals that need to be aligned, including corporate, family, and personal goals. Aligning these goals can be significantly more complex than in other types of businesses. The formulation and implementation of strategy are greatly influenced by family dynamics. Family dynamics refer to factors such as family cohesion and unity, which impact the structures, processes, and operational activities of family foundations. They also influence goal setting. Family businesses are value-oriented, pursuing different financial objectives. They can rely on networks based on long-term relationships and trust. They achieve market success by identifying the family with the brand identity. These characteristics shape the strategy of the family business and differentiate it from non-family businesses.

Another factor that distinguishes family businesses from non-family businesses and sets a slightly different direction is the fact that family businesses feel associated with values such as honesty, trust, reliability, ethics, innovation, integrity, continuity, stability, etc. These values can be described by the term Socio-Emotional Wealth (SEW). The results of qualitative content analysis [31] show that Czech family business owners, regardless of the size of the business, prioritize social and affective factors over purely financial ones.

In the view of the family, controlling business activities ensures that trading does not endanger family traditions, culture, values, and assets. Family dynamics cannot be ignored in the business process. What threatens a family business can also elevate it the most. From a strategic management perspective, families are both a resource and a constraint [17].

All the aforementioned areas (innovation, HR, corporate value) and not just these influence the strategy of the business. However, this is such an extensive topic that this article only addresses the strategy briefly, and the differences in strategy between family and non-family businesses will be the subject of separate research.

4 Ranking

For a comprehensive overview and as a point of interest, the author presents a ranking of the largest family and non-family businesses in this chapter. According to Forbes magazine's 2023 [36] ranking, the largest family businesses in the Czech Republic, regardless of industry, are:

- Czechoslovak Group (CSG): A holding company with activities in the automotive, defense, aerospace, and watchmaking industries.
- Stavebniny DEK: A network of building material stores.
- Mattoni 1873: A manufacturer of mineral waters and non-alcoholic beverages.
- HP Tronic: A distributor of electronics.
- Synot Holding: An operator of lotteries and casinos.
- Juta: A manufacturer of textile products.
- Promet Group: A development and investment company.
- Kofola: A producer of non-alcoholic beverages.
- Agrostroj: A manufacturer of agricultural machinery.

- Brano Group: A manufacturer of building materials.

Other significant family businesses:

- Petrof: A manufacturer of pianos.
- TON: A producer of bentwood furniture.
- Linet Group: A manufacturer of hospital beds.
- KARA: An agricultural company.
- Jablotron Group: A manufacturer of security systems.
- Wikov Industry: An engineering company.
- PREFA: A producer of concrete prefabricates.
- AVE CZ: A company engaged in waste management.
- MOTOR JIKOV GROUP: An engineering company.
- Robert Bosch: A manufacturer of automotive components.

According to Forbes and the Czech TOP 100 ranking [38], the largest companies in the Czech Republic in 2023 are:

1. ČEZ a.s.: An energy company, the largest in the Czech Republic and in Central and Eastern Europe. It focuses on the production, distribution, and sale of electricity and heat.
2. Agrofert a.s.: An agrochemical and food holding, one of the largest in Europe. It focuses on the production and sale of fertilizers, pesticides, seeds, and food.
3. Škoda Auto a.s.: An automobile manufacturer, the largest in the Czech Republic and among the largest in Europe. It manufactures and sells Škoda brand passenger cars.
4. PPF Group N.V.: An investment group active in finance, telecommunications, real estate, and other sectors. It is one of the largest investment groups in the Czech Republic and Central and Eastern Europe.
5. Unipetrol a.s.: A petrochemical and refining company, the largest in the Czech Republic. It focuses on the production and sale of fuels, petrochemical products, and asphalts.
6. ČSOB a.s.: A bank, the second-largest in the Czech Republic. It offers a wide range of banking products and services for retail and corporate clients.
7. Komerční banka a.s.: A bank, the third-largest in the Czech Republic. It provides a wide range of banking products and services for retail and corporate clients.
8. Moneta Money Bank a.s.: A bank, the fourth-largest in the Czech Republic. It offers a wide range of banking products and services for retail and corporate clients.
9. Generali Česká pojišťovna a.s.: An insurance company, the largest in the Czech Republic. It offers a wide range of insurance products and services.
10. Kooperativa pojišťovna a.s.: An insurance company, the second-largest in the Czech Republic. It offers a wide range of insurance products and services.

When comparing companies, several criteria can be used—revenues, number of employees, company value/brand value, and EBITDA. For comparable comparison purposes, revenues were used as the key factor.

These data illustrate the diversity and scope of the Czech business environment, where large corporations coexist with significant family businesses that play a key role in the country's economy. When comparing the largest Czech companies and family businesses in 2023 in terms of turnover:

The Largest Czech Companies:

- Turnover: The top 100 companies in the Czech Republic by turnover in 2023 were dominated by energy and industrial giants like ČEZ a.s., Energetický a průmyslový holding a.s. (EPH), Unipetrol a.s., Agrofert a.s., and Škoda Auto a.s. Their turnovers range in the hundreds of billions of CZK (see Tab. 1).
- Size: These companies employ thousands to tens of thousands of people and have extensive assets. They are key players in the Czech economy and their activities impact the lives of millions of people.

Tab. 1: The Most Significant Companies in the Czech Republic in 2023

Rank	Name	Revenues in 2022 (in billion CZK)
1	Energetický a průmyslový holding a.s.	911.9
2	Škoda Auto a.s.	444.2
3	ČEZ a.s.	288.5
4	Agrofert a.s.	245.1
5	ORLEN Unipetrol a.s.	209.5

Source: [39].

The Largest Czech Family Businesses:

- Turnover: Compared to the largest companies in the Czech Republic, the turnover of family businesses is usually lower. In 2023, the most significant family businesses included Petrof a.s. (piano manufacturing), TON a.s. (bentwood furniture manufacturing), Linet Group s.r.o. (hospital beds), KARA a.s. (agriculture), and Jablotron Group a.s. (security systems). Their turnovers range in the billions of CZK (see Tab. 2).
- Size: Family businesses typically employ hundreds to thousands of people. Compared to the largest companies in the Czech Republic, they are generally smaller and locally anchored. They often focus on specific market segments and excel in tradition and craftsmanship.

Tab. 2: The Largest Family Businesses in 2023

Rank	Name	Revenues in 2022 (in billion CZK)
1	Czechoslovak Group	28.1
2	DEK	29.8
3	Mattoni 1873	16.5
4	Promet	15.6
5	HP Tronic	23.4

Source: [37].

Main Differences:

- Turnover: The largest companies in the Czech Republic achieve turnovers in the hundreds of billions of CZK, while the turnover of family businesses is usually in the billions of CZK.
- Size: The largest companies in the Czech Republic employ thousands to tens of thousands of people, while family businesses typically employ hundreds to thousands of people.
- Ownership: The largest companies in the Czech Republic are usually joint-stock companies with a broad ownership structure. Family businesses are owned and managed by a single family with the intention of passing the business on to the next generation.
- Focus: The largest companies in the Czech Republic focus on a wide range of sectors, while family businesses usually focus on specific market segments.
- Tradition: Family businesses often pride themselves on a long tradition and craftsmanship.

From this survey, it is evident that the largest companies and family businesses in the Czech Republic play a crucial role in the country's economy. The largest companies generate a significant portion of GDP and employ hundreds of thousands of people. Family businesses contribute to the diversity of the economy and maintain traditions and craftsmanship.

5 Research

The main goal of this article is to highlight the differences between family and non-family businesses that arise from a literature review that preceded the research itself. The output of the literature review is empirically verified on one case study – one family and one non-family business. The goal is also to set themes for future research. Research should always begin with at

least one research question, which is preceded by a knowledge of the literature [19]. Based on the literature review, the following research questions were established:

- What are the main differences between family and non-family businesses?
- Do the strategies (vision, mission) of family and non-family businesses differ?
- What future do family and non-family businesses have from the perspective of the owner?

5.1 Research Methods Used

For the purposes of this article, a qualitative research method in the form of a case study of one family and one non-family business was used. After conducting a literature review and establishing research questions, a questionnaire was prepared, which was then evaluated, and conclusions were drawn.

- **Selection Criteria for the Research Sample:** The business must meet the criteria of a small business, i.e., a business that has up to 50 employees and whose annual turnover or annual balance sheet total does not exceed 10 million EUR (European Commission. Directorate General for Internal Market, Industry, Entrepreneurship and SMEs, 2015). The subject of business is in the field of construction, specifically building construction. The headquarters/operation is in the Hradec Králové region.
- **Family Business:** One family business was selected, with parents as directors and three employees. The headquarters and operation are both in the Hradec Králové region.
- **Non-Family Business:** The second company is a non-family business with two directors, 15 full-time employees, and 20 part-time employees. The headquarters is in the South Moravian region, but the operation is in the Hradec Králové region.

Questionnaire Questions for Both Businesses:

- What motivated you to start the business?
- What values do you emphasize in the business?
- What is the mission and vision of your business?
- Do you have a defined strategy in the business, and if so, what is it?
- How do you see the future of your company? (e.g., sale, transfer to the next generation)
- How do you deal with work-life balance?
- How do you view innovation in your business?
- What requirements do you have for employees, and what do you emphasize when selecting them?

6 Discussions

Family businesses are characterized by the involvement of one or more families in the management and administration of the company. These businesses often have strong personal ties, a long-term focus, and deep roots in social and community values. The key areas where family and non-family businesses differ include ownership and leadership, approach to financing, corporate culture and values, strategic planning, flexibility and innovation, human resources, and work-life balance. Non-family businesses are usually managed on a merit-based system, and their strategic decisions are more influenced by market conditions and shareholder needs. These companies often have greater flexibility in decision-making processes and are more open to risky innovations and changes, but they may face challenges in building strong relationships and loyalty among employees.

6.1 Analysis of the Questionnaires

The responses in the questionnaires were analysed with the following conclusions:

6.1.1 Questionnaire – Non-Family Business

- **Starting the Business:** The business was motivated by professional experience and market opportunities. It was founded with a partner to utilize accumulated experience and fulfil personal dreams.
- **Values:** Emphasis is placed on quality over quantity, innovation, and following new trends and technologies. The goal is to always be a step ahead of the competition.
- **Mission and Vision:** Providing quality, timeless services with the goal of becoming a market leader in ventilated facades.
- **Strategy:** Monitoring technologies, competition, and market analysis. The goal is financial stability and attractiveness for potential acquisition.
- **Future of the Company:** The plan is to successfully sell the company to a prosperous foreign company.
- **Work-Life Balance:** Achieving balance between work and personal life is challenging. The necessity of occasional disconnection from technology is emphasized.
- **Innovation:** Innovation is welcomed as a path to success and fulfilling the strategy.
- **Employee Requirements:** Emphasis on the desire to learn, develop, be independent, and responsible. New employees are hired based on their willingness to learn and their construction education.

6.1.2 Questionnaire – Family Business

- **Starting the Business:** The impulse to start the business was motivated by 15 years of experience in construction, belief in one's abilities, and ego. After involving the children, the business became a family business with the goal of passing on a stable business to the next generation.
- **Values:** Seriousness, good business relationships, honesty, and team unity. New contracts are consulted with the family, emphasizing quality and the good name of the business.
- **Mission and Vision:** Providing quality services in the construction field with the goal of expanding specialization in ventilated facades and offering comprehensive solutions.
- **Strategy:** Keeping the business on the market for the next generation, ensuring the long-term financial stability of the family, and seeking mutually beneficial technologies.
- **Future of the Company:** Passing on a successful and well-established company to the next generations.
- **Work-Life Balance:** Emphasis on personal and family life after realizing that constant work can lead to health problems.
- **Innovation:** Emphasis on tool optimization and expanding the portfolio in related technologies to offer more comprehensive solutions to customers.
- **Employee Requirements:** Politeness, loyalty, friendliness, and emphasis on long-term positive relationships. New employees are hired based on recommendations.

6.1.3 Comparison

- **Motivation for Starting the Business:** Both family and non-family businesses were motivated by prior experience and the desire to achieve something. Over time, the family business owner realized a more noble reason for starting/running the business after involving other family members.
- **Values:** The family business emphasizes relationships and cohesion, while the non-family business focuses more on outputs.
- **Mission and Vision:** Both businesses emphasize providing quality services to customers. In the long term, their visions diverge.
- **Strategy:** The family business cares about the financial stability of the family, while the non-family business cares about the financial stability of the company. Both businesses aim for a prosperous company, but the non-family business plans to sell it, while the family business plans to pass it on.
- **Work-Life Balance:** In the family business, there is a dilemma of "if I take a break from work, the business won't

run, I'll endanger its success, I have to support the family." On the other hand, "if I don't take a break, neither I nor the business will be here, and I won't be here for the family." In the non-family business, there is also a dilemma but in the form of responsibility to the people dependent on the owner.

- Innovation: Both businesses view innovation positively. The family business expands the range of products/services similar to existing ones, while the non-family business is not afraid to expand and take risks.
- Employee Requirements: The family business emphasizes family-like atmosphere and long-term relationships, while the non-family business emphasizes performance.

Family and non-family businesses significantly differ in their values, strategies, and approaches to innovation and employees. Family businesses place greater emphasis on long-term stability, family values, and relationships, while non-family businesses focus on innovation, competitiveness, and short-term goals. These differences are reflected in their management, corporate culture, and strategic decisions, significantly impacting their functioning and future success.

7 Conclusion

The research for the purposes of this article highlighted the characteristic features of family businesses and the areas in which they differ from non-family businesses. Some areas were discussed in more detail, but each of these areas is so extensive that it deserves separate research. Based on the surveys for this article, several questions have emerged as a prompt for further research.

The article focused on comparing family and non-family businesses with the aim of identifying key differences and similarities that affect their functioning. Family businesses, often considered the backbone of national economies, are characterized by the involvement of one or more families in the management and ownership of the company. These businesses bring specific challenges and opportunities, including strong personal ties, a long-term focus, and deep roots in social and community values. In contrast, non-family businesses are typically managed on a merit-based system, with their strategic decisions more influenced by market conditions and shareholder needs.

The aim of the study was to provide a systematic review of the literature and a comparative analysis that would contribute to a better understanding of the functioning of family and non-family businesses. The research included an analysis of responses from questionnaires completed by a family and a non-family business, focusing on various aspects such as corporate values, mission and vision, strategy, future outlook, work-life balance, innovation, and employee requirements.

The goal of the research was to answer the following research questions:

- What are the main differences between family and non-family businesses?
- Do the strategies (mission and vision) of family and non-family businesses differ?
- What future do family and non-family businesses have from the owner's perspective?

Main identified differences are:

- Ownership and Leadership:
Family businesses: Owned and managed by family members, with an emphasis on continuity and legacy.
Non-family businesses: Owned by a broader group of shareholders and managed by professional managers, with an emphasis on performance and profitability.
- Values:
Family businesses: Emphasize honesty, unity, and reputation, often consulting decisions with the family.

Non-family businesses: Emphasize quality, innovation, and striving to stay ahead of the competition.

- Mission and Vision:
Family businesses: Aim to provide quality services, maintain market leadership, and ensure long-term sustainability for future generations.
Non-family businesses: Aim to provide quality services and achieve market leadership, with a long-term goal of selling the company.
- Strategy:
Family businesses: Focus on financial stability for the family and long-term sustainability, with a cautious approach to innovation.
Non-family businesses: Focus on market analysis, financial stability, and aggressive innovation to achieve short-term goals.
- Work-Life Balance:
Family business owners: Emphasize balancing work and personal life, considering health and family time.
Non-family business owners: Find work-life balance challenging due to constant work demands.
- Innovation:
Family businesses: Prefer incremental innovations related to existing products and services.
Non-family businesses: Are more open to radical innovations and risks.
- Employee Requirements:
Family businesses: Emphasize loyalty, long-term positive relationships, and personal connections.
Non-family businesses: Prioritize willingness to learn, responsibility, and performance.

The research successfully answered the posed questions by identifying significant differences in the values, strategies, and future outlooks of family and non-family businesses. The study highlighted the unique strengths and challenges faced by both types of businesses, providing valuable insights for further research and practical applications for entrepreneurs and policymakers.

Based on the extensive findings within the research for the article, the author suggests several areas for further research:

- In-depth exploration of specific differences: Each identified difference (e.g., approaches to innovation, employee management) deserves a separate, detailed study.
- Long-term research: Conduct longitudinal studies to observe how family and non-family businesses evolve over time, especially during generational transitions in family businesses.
- Comparative studies across industries: Investigate whether and how the identified differences manifest in various industries and sectors.

In conclusion, the study underscores the importance of recognizing the characteristic features and strategic approaches of family and non-family businesses, contributing to a deeper understanding of their roles in modern economies.

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LEADERSHIP IN THE DIGITAL AGE: NAVIGATING COMPLEXITY THROUGH CRITICAL THINKING, CREATIVITY, AND UNCONVENTIONAL APPROACHES

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Abstract: This paper explores various dimensions of leadership in contexts of a new age, emphasising critical thinking, mental flexibility, and innovative development methods. It addresses challenges posed by technological advancements and leaders' need to cultivate adaptability, creativity, and foresight. Using unconventional approaches, such as the sweat lodge method and exploration of altered states of consciousness, provides intriguing avenues for enhancing leadership qualities. Additionally, the role of substances like psilocybin in fostering creativity and well-being is examined. Ultimately, this paper underscores the irreplaceable role of human cognition and leadership amidst technological progress, advocating for continual development in leadership practices to navigate modern complexities.

Keywords: leadership, digital age, critical thinking, mental flexibility, creativity, unconventional approaches, sweat lodge method, altered states of consciousness.

1 Introduction

In today's multifaceted world, leadership stands amidst the complexities of human interaction and organisational dynamics. As society, technology, and culture evolve, so too must our understanding and practice of leadership. Effective leadership now requires a fusion of qualities and competencies that can navigate the ever-changing landscape of the digital age (1). Leaders must be able to improvise amidst uncertainty, cultivate professional intuition, foster creativity, and embrace change with resilience and adaptability. These attributes are the hallmarks of exemplary leadership.

Achieving these qualities, however, is not a passive process; it demands purposeful and methodical development of mental abilities and behavioural tendencies(2,3). Central to this endeavour is the cultivation of both analytical and intuitive thinking, which complement each other in a harmonious dance of cognitive processes. Analytical thinking provides the framework for logical reasoning and systematic problem-solving, while intuitive thinking draws on tacit knowledge and gut instincts to guide decision-making in complex and uncertain situations(4).

This paper embarks on an exploration of the impact of digitalisation on leadership and cognition, highlighting the necessity for leaders to develop mental flexibility and critical thought. It also introduces unconventional methodologies for enhancing leadership qualities, such as the sweat lodge method and the exploration of altered states of consciousness. Furthermore, the potential role of substances like psilocybin in fostering creativity and well-being is examined and supported by contemporary neuroscientific research.

The aim is twofold: to unravel the intricacies of thinking patterns that underpin effective leadership and to advocate for continual development and exploration in leadership practices. By integrating insights from neuroscience, psychology, ancient wisdom traditions, and cutting-edge research, this paper underscores the irreplaceable role of human cognition and leadership amidst technological progress. In doing so, it seeks to prepare leaders for the complexities of the modern era and ensure their ability to lead with innovation, resilience, and foresight.

2 The Impact of Digitalisation on Leadership and Cognition

The environment we create and the lifestyles we cultivate in various societies are evolving more dynamically than our natural surroundings. As these changes and transformations occur, the demands on professionals and leaders for quality, potential, and abilities also shift. Leaders play pivotal roles in organising and governing human systems within these rapidly changing

environments. With advancements in information technology, globalisation, and other transformative forces, our environment is becoming increasingly unstable and complex.

In the context of Industry 4.0(5,6), the natural potential of human resources is scrutinised against the backdrop of information digitalisation, artificial intelligence, virtual reality, and vicarious communication. While these technological advancements offer undeniable advantages and positive effects, they also present secondary, asymmetrical, and complex impacts on the psyche, mind, and cognition of individuals and societies.

There are two primary modalities of digitalisation and vicarious communication's shadowy effects. Firstly, their overuse alters the quality of consciousness and self-awareness, fundamentally changing how individuals perceive themselves and their environments. Secondly, the rise of digitalisation, algorithmisation, and artificial intelligence diminishes the role of intuition and analogy in cognitive processes. This reduction impacts decision-making and behaviour in specific situations, compromising the ability to adapt spontaneously to changing conditions and circumstances. (7)

2.1 Challenges to Fostering Divergent Thinking in Leaders

The mental mobility skill, openness towards changes, and selected subtle skills directly influence the flexibility of the paradigm. Mental mobility allows leaders to shift perspectives and adapt swiftly to respond to unexpected challenges and opportunities, ensuring informed decision-making. Openness towards changes involves embracing novel ideas and methodologies, essential for maintaining relevance in a constantly shifting landscape. Combined with subtle skills such as emotional intelligence and cultural awareness, these qualities are indispensable for modern leaders, enabling them to connect with diverse teams and drive innovation.

Clairvoyance represents the foresight or intuitive ability to anticipate future trends and challenges. This foresight is necessary for a leader's thinking, allowing them to navigate uncertainties with strategic insight. Many programs focusing on NGL—next-generation leadership—are emerging to address this need, aiming to equip leaders with the skills required for future challenges. These programs focus on preparing leaders for an increasingly complex and dynamic world.

The question arises: how do we measure and develop the ability to "foresee"? Developing foresight involves understanding trends, recognising emerging patterns, and envisioning potential outcomes. This predictive ability is linked to an individual's functional creativity level, essential for practical and innovative problem-solving.

However, various threats exist to creative, divergent thinking. The paradigm effect, where existing beliefs limit new possibilities, can block "clairvoyance." Rigid adherence to paradigms, or paradigm paralysis, occurs when individuals or organisations resist change, leading to the blindness of success. Significant investments in the old paradigm can hinder innovation, creating a reluctance to abandon outdated practices.

Personality traits, fear of failure, and impatience are additional barriers. Fear can stifle innovation, while impatience can lead to premature conclusions. Dependency on existing systems and over-reliance on technology can erode intuitive and creative capabilities. To counter these threats, leaders must challenge assumptions, embrace uncertainty, and foster a culture of continuous learning and adaptation, ensuring preparedness for future challenges.

2.2 Leadership Through Mental Agility and Critical Thought

In the dynamic landscape of contemporary leadership, the essence of effective stewardship extends far beyond traditional paradigms. Modern organisational dynamics demand leaders to navigate complexities with mental agility and critical thought. According to Northouse (8), effective leadership integrates various styles and adapts to the context, ensuring responsiveness to changing environments. Additionally, Goleman, Boyatzis, and McKee (9) emphasise the role of emotional intelligence in fostering strong leadership, highlighting the importance of self-awareness and empathy.

This chapter embarks on an exploration of leadership through the lens of mental agility and critical thought, delving into the nuanced interplay between cognitive flexibility, strategic acumen, and visionary foresight. From the intricate dance of systemic adaptability to the art of proactive situational responsiveness, we delve into the foundational elements that underpin leadership excellence in today's multifaceted world. Join us as we uncover the transformative power of mental agility and critical thought in shaping visionary leadership for the challenges of tomorrow.

2.2.1 Systemic (Ecological) and Situational Mobility

Systemic (ecological) mobility encompasses the adaptive prowess required to navigate seamlessly through a kaleidoscope of environments, ranging from the intricately structured urban jungles to the pristine expanses of natural landscapes. Beyond merely traversing physical terrain, it entails a deep understanding of the complex interplay between human-made systems and natural ecosystems, as well as the ability to orchestrate harmonious collaboration within professional circles, cooperative ventures, and collaborative initiatives (4). This holistic adaptability demands not only a keen awareness of the unique challenges posed by each environment but also the strategic acumen to leverage its inherent opportunities for growth and innovation.

Situational mobility epitomises the proactive mindset essential for thriving in an environment characterised by perpetual change and uncertainty. It entails a dynamic responsiveness to evolving circumstances and a keen ability to anticipate and navigate potential challenges with agility and finesse. By fostering a culture of adaptability and resilience, leaders can empower their teams to embrace change as an opportunity for growth rather than a hindrance, enabling them to stay ahead of the curve in an ever-shifting landscape. This nimble approach to leadership not only enhances organisational effectiveness but also cultivates a culture of innovation and continuous improvement, ensuring sustained success in the face of adversity.

2.2.2 Relationship Mobility

This includes social and organisational mobility, which manifests in the social continuum (self vs team member), organisational continuum (hierarchical vs organisation network structures), as well as in the managerial continuum (control/management/leadership). Flexibility in these realms allows for effective adaptation. (4)

Expanding on this concept, social and organisational mobility encapsulates the adaptability required across various spectra within the organisational landscape. At the social level, individuals must navigate between their individual identities and their roles within team dynamics. Similarly, within the organisational context, adaptability extends to manoeuvring between traditional hierarchical structures and more fluid, network-based organisational frameworks. Moreover, within the managerial realm, effective leadership necessitates the ability to transition seamlessly between roles of control, management, and leadership based on the demands of the situation and the needs of the team.

2.2.3 Mental mobility

Navigating the cognitive, ecological, situational, social, and organisational continuum necessitates a profound shift in individuals' inner attitudes toward self-development and self-actualisation. This transformation is essential for unlocking one's natural potential within professional roles and fostering personal growth (4,10). This shift applies equally to professional moral and value orientations, underscoring the evolving demands within contemporary human systems.

As the landscape of leadership and organisational dynamics evolves, innovative approaches to control, management, and leadership are paramount. These trends necessitate fresh perspectives on identifying and cultivating the resources, potentials, and qualities of leaders operating in today's environments.

The following is one possible way of operationalisation of critical thinking as a quality or ability, which should be found in every individual who takes for himself the right to lead other people and other human systems: *“Critical thinking is an individual ability to create optimal conditions for correct discernment in a situation or a role. This ability is shown in mental mobility. Mental mobility satisfies the following measurable parameters (4):*

- a) *Cognitive variability and mobility between analysis and intuition.*
- b) *Sceptical curiosity and courage, openness, and spontaneity of learning*
- c) *Psychophysical condition, stability of quality and quantity of output of psychological functions in time (attention and memory).(4) “*

In situational and systemic leadership, critical thinking plays a dominant role, manifesting as cognitive mobility across continua. The cognitive continuum is characterised by quasi-rationality, bridging intuition and analysis to facilitate learning and decision-making in diverse contexts (11,12). Thus, embracing critical thinking is vital for leaders to navigate the complexities of modern leadership, ensuring they are well-equipped to lead in dynamic environments.

Moreover, understanding the interplay between digitalisation and cognitive processes is crucial. The overreliance on digital tools can diminish intuitive capabilities, highlighting the need for leaders to balance technological advancements with human cognitive strengths. The cultivation of mental agility and critical thought thus becomes indispensable in preparing leaders for future challenges, fostering environments that promote creativity, foresight, and holistic decision-making.

2.3 Sweat lodge method and its use

The sweat lodge, also known as the 'purification lodge,' emphasises the principles of physical and mental cleansing, with effects lasting for several hours after the ritual (13,14). Participants endure challenging conditions, including alternating physical stress, darkness, humidity, mental discomfort, fatigue, and dehydration. These conditions necessitate focused attention and emotional resilience. The sweat lodge experience provides an effective, complex, and changing load at physical, mental, and emotional levels, combined with significant therapeutic benefits (15–17).

To consider the sweat lodge as a method affecting multiple levels—physical, mental, and spiritual—it is essential to include elements that induce an altered state of consciousness and psychophysical preparation. Only then can the ritual effectively purify and harmonise the body, mind, and soul, making it a multi-dimensional method. Aaland (17) noted that this ritual was extensively used by Native Americans and later by colonists for healing and harmonising the body, mind, emotions, and spirit.

Smith (18) highlights the use of sweat lodges as a form of psychotherapy, comparing the ceremonies to group therapies. These rituals are described as holistic experiences that improve the quality of emotional, physical, cognitive, and spiritual life (15). Colmant & Merta (19) also found that many Native Americans emphasised the importance of strengthening socialisation and friendship through the ceremony's healing nature, which fosters group laughter and a positive mood.

The physiological effects of the sweat lodge are comparable to those observed in studies on Finnish saunas. Research by Prystupa, Wołyńska, and Ślężyński (20) demonstrated significant changes in hemodynamics of the circulatory system in men and women using Finnish saunas, indicating improved cardiovascular function and resilience (20). This supports the potential of sweat lodge ceremonies to enhance physical health and endurance, further reinforcing their value in leadership development programs.

The healing properties of the sweat lodge are also supported by research on its role in addressing intergenerational trauma and substance use. Marsh et al. (21) identified the sweat lodge ceremony as a healing intervention for these issues, highlighting its potential for addressing deep-rooted psychological challenges. This is particularly relevant for leadership development, as leaders who understand and can address trauma are better equipped to support their teams effectively (21).

In addition to these traditional uses, modern applications of the sweat lodge method have shown potential in leadership training and development. The intense physical and mental challenges mirror the high-pressure situations leaders often face, making the sweat lodge an effective tool for enhancing resilience, focus, and emotional regulation. By simulating crisis environments, the sweat lodge helps leaders develop the skills necessary to maintain composure and make clear decisions under stress (22,23), thus improving their overall leadership capabilities.

These practices align with the broader trend of integrating traditional healing practices into modern therapeutic frameworks, as discussed by Moodley and West (24). Their work emphasises the importance of a holistic approach that incorporates spiritual, cultural, and emotional healing methods into counselling and psychotherapy. This integration enhances the overall effectiveness of leadership development programs by addressing the full spectrum of human experience (24,25).

<i>Method</i>	<i>Sweat lodge</i>
<i>Classification</i>	<i>Complex, activation-transformation method</i>
<i>Purpose & Effect</i>	<i>Examination of mental and psychophysical resilience, ability to cooperate and communicate, creation of values, teambuilding, cultivation of psychophysical flexibility and adaptability to challenging situations</i>
<i>Advantages</i>	<i>high complexity, efficiency and utility</i>
<i>Restrictive conditions</i>	<i>The difficulty of preparation, the necessity of implementation in field conditions, the necessity of the presence of an experienced facilitator</i>

Table 1: Method of the Sweat Lodge (26)

The sweat lodge technique is a valuable tool for identifying favourable traits essential for effective managerial and leadership roles (4,27,28). Research indicates that approximately 20% of individuals exhibit these traits, demonstrating the ability to adapt to dynamically changing environments, withstand fatigue and exhaustion, and regenerate quickly (7,29). These individuals exemplify leadership by setting a strong example, naturally respecting others, and effectively communicating while leading teams.

By employing the sweat lodge method, it is possible to simulate heightened psychophysical stress rapidly and efficiently, creating an environment that mirrors crisis conditions. This simulation is

invaluable for preparing and developing the psychophysical resilience of managers and leaders. Studies have shown that physical stress increased by 21% and mental stress by 20% during these sessions. Despite these stressors, 15 participants maintained or improved their cognitive performance in subsequent tests. Cluster analysis further allowed researchers to classify participants into performance-based groups, revealing more intricate relationships between their responses to stress (30).

In summary, the sweat lodge method not only serves traditional healing and spiritual purposes but also offers a robust framework for modern leadership development. It enhances the resilience, adaptability, and cognitive performance of individuals in high-stress environments, equipping future leaders with the skills necessary to thrive under pressure. (20,21,24)

2.4 Psychological Perspectives on Altered States of Consciousness.

Altered states of consciousness have long fascinated psychologists, offering insights into the depths of human experience and potential. Maslow (31) referred to these mystical experiences as a form of rebirth, or "little death," drawing from various sources to outline their characteristics. He meticulously analysed these experiences, identifying several key features.

In exploring therapeutic methods that can induce altered states of consciousness, it is essential to consider recent research on neuropeptides like galanin. Ullrich and Mac Gillavry (32) suggest that galanin may play a significant role in the neuroendocrine stress response, influencing behavioural patterns through its interactions with dopamine and norepinephrine systems. This research indicates potential new avenues for PTSD treatment and prevention, particularly relevant for high-stress professions such as the military, first responders, and police. Understanding these interactions could enhance the effectiveness of leadership training programs that aim to build resilience and adaptive capacity in leaders (32).

At the peak of these experiences, individuals often perceive the universe as an integrated and united whole, leading to a profound change in cognition that is non-judgmental, non-comparative, and non-evaluating. This state allows for an objective view of the world, including outside objects and other people, separate from personal interests. Individuals may reach a state of ego-transcendence, characterised by a lack of needs or requirements, and the ability to forgive oneself and be selfless. Mystical states assert their own truth and inner value, often becoming desired ends rather than means to other goals. Commonly, there is a disorientation or non-perception of time and space, and the world is perceived as beautiful, valuable, and attractive, with negative aspects viewed more holistically. This positive perception is closely linked to an all-encompassing understanding and inner values of existence, infinite truths, and the highest spiritual and religious values.

During these experiences, individuals become more ready and capable of deeper listening, and emotions such as wonder, awe, respect, humility, surrender, and reconciliation dominate. Dichotomies of life, polarities, and conflicts dissolve, and fear, anxiety, reservations, awkwardness, and defence mechanisms temporarily disappear. These experiences often have a profound and transformative effect on individuals, either immediately or gradually, akin to a visit to a personally defined heaven. People feel a greater sense of responsibility to themselves, and experience increased "free will." Liberation from self and ego transcendence are directly related to one's strength and purity of identity, fostering spontaneity, honesty, and freedom through an increased ability to love and accept. Governed more by psychological laws, particularly those of a "higher life," individuals find that selflessness and decreased motivation lead to a lack of wants, needs, or wishes. Feelings of gratitude and all-encompassing love become prevalent, and the polarity between humility and pride disappears, often resulting in a sacred sense of unified consciousness.

These characteristics underscore the transformative power of altered states of consciousness, which offer profound insights into human potential and well-being. By exploring these experiences, psychologists like Maslow have highlighted the importance of transcending ordinary perceptions and embracing the deeper, more unified aspects of existence. Such altered states can foster personal growth, enhance self-awareness, and contribute to a more holistic understanding of life and one's place within it.

Below, we present some of the principles and techniques that can be used to reach altered states of consciousness, modified based on Grof (33). These techniques include working with mind and attention through meditation, prayer, contemplation, self-hypnosis, and visualization, which help focus the mind and enhance self-awareness. Direct and indirect work with breath, such as pranayama, throat singing, nada yoga, and holotropic (34,35) breathwork, use breath control to alter consciousness and promote deep relaxation. Sound techniques, including drumming, rattling, recitation, and rhythmic sounds, can induce trance states and facilitate spiritual experiences. Dancing, specifically whirling dance or trance dance, allows the body to move rhythmically, aiding in entering altered states of consciousness.

Social isolation and sensory deprivation, such as isolated stays in remote places, deprivation of one or more senses, and sudden changes in the environment, can lead to profound inner experiences. Sensory overload, combining acoustic, visual, and other sensory inputs or even experiencing pain, can overwhelm the senses and shift consciousness. Physiological means like fasting, sleep deprivation, and dehydration alter the body's physiological state, impacting consciousness. Specific bodywork and stretching, including practices like yoga and qigong, combine physical movement with mindfulness to alter states of consciousness. Zero gravity simulation, such as floating in a sensory deprivation tank, can create a feeling of weightlessness, promoting deep relaxation and altered states. Additionally, the consumption of certain plants or animal secretions has been traditionally used to induce altered states of consciousness.

Using these techniques, practitioners can enter states of trance, facilitating profound personal transformation. These altered states offer the possibility for significant enhancements in personality, quality of life, creativity, and inspiration. Additionally, they can strengthen specific ways of thinking and reasoning, providing new perspectives and insights.

Moreover, the application of these techniques extends beyond personal development. In the context of leadership and professional growth, these methods can help individuals develop greater resilience, creativity, and emotional intelligence. By exploring altered states of consciousness, leaders can gain deeper self-awareness and empathy, enhance their decision-making capabilities, and foster a more holistic approach to problem-solving. This holistic development is crucial for navigating the complexities of modern organisational environments and driving innovation and success in various professional fields.

In conclusion, the exploration of altered states of consciousness through these diverse techniques provides valuable opportunities for personal and professional growth. By integrating these practices into daily life, individuals can unlock new levels of potential, creativity, and well-being, ultimately leading to a more fulfilling and impactful existence.

3 Psilocybin and its effect on the creativity of thinking and well-being.

"Contemporary neurological studies prove effective methods for increasing the neuroplasticity of the brain and the growth of new neurons. "Psilocybin is a certain biological key, which we use to open and enable a psychological material, such as suppressed emotions, for psychotherapy." (36) Carhart-Harris and Goodwin (37) provide a comprehensive review of the therapeutic potential of psychedelic drugs, suggesting that these substances can

facilitate profound psychological transformations. Pollan (38) also explores the renewed interest in psychedelics for mental health, pointing to their potential in addressing issues like depression and anxiety.

The newest study proved a very intense neuroplasticity effect of members of the leading chemical groups of serotonergic psychedelics in vitro and in vivo. (39,40) LSD, DMT, and DOI increased the complexity of the dendritic tree (neuritogenesis), stimulated the growth of dendritic spines (spinogenesis) and stimulated the formation of synapses (synaptogenesis). (36,40)

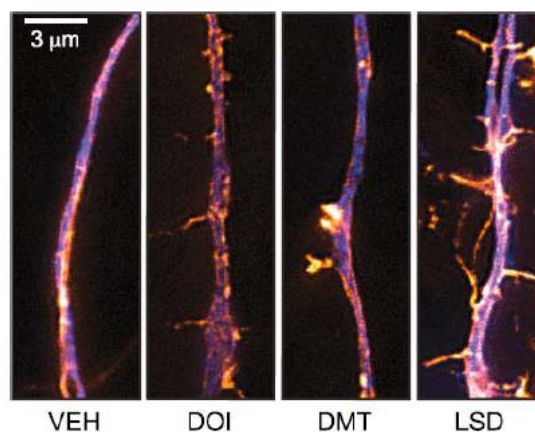


Figure 1: Neuron growth after administration of various psychedelic substances (39)

The potential applications of psilocybin extend to various areas including personal and personality development, stress reduction, enhancement of the creative process, mental activities, prevention of psychological dysfunctions, and resolution of complex dilemmas. Individuals considering psilocybin for these purposes should thoroughly understand the potential risks and consequences. Proper setting and integration of the experiences that psilocybin brings are crucial for maximising its benefits while minimising risks. (41)

Future research on psilocybin should build on well-designed studies, such as the approach taken by Daws, Timmermann, Giribaldi et al. (42). Their research design includes comprehensive exclusion criteria to ensure participant safety, such as a personal or immediate family history of psychosis, serious suicide attempts, and physical health conditions.

3.1 Functional connectivity

In their study, functional connectivity (FC) was analysed by using a functional atlas to divide the cerebral cortex into 100 regions of interest (ROIs). The FC between each pair of ROIs was calculated using Pearson correlation coefficients between their mean signal time courses, representing fluctuations in neural activity. This produced an FC matrix, where each element indicated the connectivity strength between pairs of ROIs. Positive values were Fisher-transformed to z-scores, and this procedure was independently repeated for each patient and scan, both at baseline and post-treatment.

3.2 Brain Network Modularity

The study measured brain network modularity, which involves the segregation of the brain's functional networks. Each FC matrix was summarised using a Louvain-like community detection algorithm to maximise the separation of brain areas into non-overlapping communities or modules. High modularity scores indicate strong segregation within brain networks, with weak connections to other parts of the brain.

3.3 Functional Cartography

The community detection procedure assigned each ROI to a community. These community labels were used to assess the extent to which ROIs were recruited into their typical functional networks, as defined by healthy adults. An allegiance matrix was created to represent the probability that two regions were assigned to the same community across multiple iterations of the modularity algorithm. This matrix helped summarise how often ROIs formed communities with others from the same functional network or different networks.

3.4. Dynamic flexibility

The short TR used in the fMRI protocol generated approximately twice the number of time points, allowing for additional analysis of dynamic flexibility. Multilayer modularity estimation was conducted using a matrix of volume-sliding windows with overlap. For each patient and scan, multilayer modularity was estimated multiple times, and the flexibility metric was calculated as the number of times an ROI changed its community allegiance over time. Flexibility scores close to 0 indicated rigid ROIs with stable community allegiance, while scores close to 1 represented highly flexible ROIs with frequently changing community allegiances.

Daws, Timmermann, Giribaldi et al. (42) concluded that psilocybin therapy's antidepressant efficacy is correlated with decreased brain modularity, suggesting underlying brain mechanisms. This antidepressant action appears specific to psilocybin therapy, as no changes in modularity were observed with the conventional SSRI antidepressant, escitalopram.

For exploring the effects of psilocybin on leadership, integrating the Leadership Judgment Indicator (LJI) with these imaging methods could provide valuable insights. The LJI assesses four main leadership styles—directive, consultative, consensual, and delegate—each divided into two substyles. This comprehensive assessment could help determine how psilocybin influences leadership abilities and decision-making processes.

4 Conclusion

This paper has delved into various dimensions of contemporary leadership, exploring the impact of digitalisation, the importance of critical thinking and mental flexibility, and innovative methods for leadership development. It has addressed the challenges posed by technological advancements and emphasised the necessity for leaders to cultivate adaptability, creativity, and foresight.

The discussion on mental agility and critical thinking underscores the need for leaders to develop both analytical and intuitive thinking. Analytical thinking provides a framework for logical reasoning and systematic problem-solving, while intuitive thinking taps into tacit knowledge and gut instincts, guiding decision-making in uncertain and complex situations. By cultivating these cognitive faculties, leaders can better navigate the complexities of modern environments, making informed decisions that balance logic and intuition.

The examination of the sweat lodge method highlights its potential for holistic impact on physical, mental, and emotional resilience. This traditional practice, by simulating crisis conditions and enhancing psychophysical endurance, demonstrates its relevance in preparing leaders for high-pressure situations. As noted, the sweat lodge method "creates an environment with the attributes of a crisis environment, which is usable in the preparation and development of the psychophysical condition of managers and leaders" (4).

Psilocybin's role in enhancing creativity and well-being has been explored through its profound effects on brain neuroplasticity and connectivity. Studies have shown that psilocybin significantly impacts brain function, with potential applications in personal and personality development, stress reduction, and

creative problem-solving. "Psilocybin is a certain biological key, which we use to open and enable psychological material, such as suppressed emotions, for psychotherapy" (36). The application of psilocybin in leadership contexts, combined with tools like the Leadership Judgment Indicator (LJI), presents a promising avenue for future research.

A leader must have good mental flexibility, critical thinking, and continuous reflection. Fulfilment of these attributes leads to the leader's ability to adapt to the environment and to act quickly, creatively, and effectively (43); the military environment has used the term "mindset" for it (44). This highlights the crucial role of mindset in leadership, emphasising the importance of adaptability and continuous improvement.

In conclusion, this paper underscores the irreplaceable role of human cognition and leadership amidst technological progress. It advocates for the continual development and exploration of unconventional methodologies to prepare leaders for future challenges. By integrating insights from neuroscience, psychology, and traditional practices, leaders can foster environments that promote innovation, resilience, and holistic well-being. As technological advancements continue to reshape our world, the development and cultivation of adaptable, creative, and foresighted leaders remain crucial for achieving organisational success and navigating the complexities of the modern era.

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NEW MEDIA AS A MEANS OF SPREADING ETHNOCENTRISM IN THE CENTRAL EUROPEAN CONTEXT

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Abstract: The paper deals with the presentation of the media system as not only a platform enabling mass social interaction but also spreading hate-speech regarding promoting the superiority of one's group (such as ethnicity, nationality, values or other). The article focuses on the topic of spreading ethnic stereotypes (e.g. those related to Jewish ethnicity). Attention is also focused on the issue of the credibility of such media content and its creators. The authors use a theoretical base to clarify several innovative possibilities brought not only technologically, but also culturally reformed "new digital age", the so-called Web 2.0, or Web 3.0. in Central European context.

Keywords: new media, ethnocentrism, stereotypes and prejudices, heteroimage, imagology

1 Introduction

In culturally and linguistically globalised Central Europe, its multiethnic basis, as well as the currently constantly ongoing mixing of cultures, are the starting points for accompanying negative phenomena, such as the polarisation of society and the associated undesirable extreme forms of ethno-significant elements in the means of expression. One of the most sensitive topics raised in the region is antisemitism and anti-Zionism as part of the global problem of xenophobia, racism and other forms of intolerance (especially towards ethnic and religious minorities). Central Europe was home to many Jews living on the Old Continent for a substantial period of modern history. Therefore, there is an assumption that the Central European cultural environment will be characterised by a low tolerance for manifestations of ethnocentrism, especially in connection with phenomena aimed at antisemitism. Nevertheless, in the countries of Central Europe, a negative attitude towards other ethnic, racial, and subcultural groups also exists due to strong nationalistic tendencies and the unclear line between harmless humour and slander, which fluctuates as a result of various well-known examples in the media.

One of the scares of today's society has gradually become an internet platform offering so-called microblogging – the creation of short messages and posts intended for publication and distribution online. Social platforms such as Facebook, Instagram, X (formerly known as Twitter), etc., have become the most popular forms of this new type of social interaction online. Websites and apps predominantly utilize them for portable gadgets, facilitating convenient and, most importantly, temporally and spatially adaptable interaction in contrast to eras when hot media were linked with financially and technically much more demanding apparatus such as television or computers intended for use in a single fixed location. However, the availability of these online platforms for sharing information and the possibility of unreservedly creating and disseminating contributions to them has also brought various risks, even threats. The list includes internet fraud, cyberbullying, as well as manipulative strategies.

Naturally, the average Internet user focuses more on the benefits and possibilities of the Internet. Several useful tools, such as the already mentioned blogging, instant messaging (programs offering not only text messages but also voice messages in the form of links or video calls, including the transfer of other types of files), interest groups or live chat are among the most used

forms in everyday life. The intensity of online interaction has taken on such a dimension that there is perhaps no topic in the virtual environment that is not discussed by users. Among them, some topics polarise society and bring hateful elements to the virtual and real world.

At the level of social communication taking place through hot media, it is also interesting to observe how users present their opinions and distinctive, often cultural or otherwise conditioned specifics. Users of social networks and other media platforms often uncritically present their own cultural patterns and their elements, and peculiarities of functioning, which they consider superior or universally valid. Manifestations of nationalism, chauvinism and ethnocentrism appear in a milder, but also radical form. Their dissemination is made possible by the nature of Internet communication and the multiple features it possesses, such as varying degrees of anonymity of communicants, indirect nature, generally limited control of hate speech, etc. The anonymity of participants in communication mediated by the Internet and the resulting appearance of absolute freedom of expression and its moral imperative has become a socially frequently discussed topic. Serious negative phenomena therefore include the radicalisation of opinions and the creation of communities whose creative content of various formats (text posts, images in the form of so-called memes, etc.) incites a hateful environment in the online space. It is indisputable that "extremism, of course, keeps up with the times and uses the Internet mainly to spread ideology, gain new sympathisers, but also serve as a tool for organising activities in real life" (Smieško 2017, p. 14).

The topic of morally questionable, hateful, and extremist content is currently receiving considerable attention from experts and the public alike. Media coverage is widespread, with certain channels promoting such content while others seek to highlight it as an issue. Extensive domestic and foreign literature and various research initiatives provide alarming statistics and information on specific aspects of this issue. This study delves into the characteristics of disputed media content in light of contemporary realities, drawing from historical experiences that have significantly influenced the prevailing sentiment in Central European society. It also explores the information behaviour of Internet users and other factors stemming from the technical aspects of modern media.

2 New Media as Constructs of Social Reality

The media are included in the group of institutions, but at the same time, they are also understood as abstract systems and socializing factors. Traditional media (e.g. newspapers) present on the Internet acquire the characteristics of multimedia and interactivity, as well as the possibility of customisation of distribution, addressed to precisely defined groups, and become sources of information about events in the world, thus fulfilling not only their basic informational but also socialising function. It represents the transfer of value systems across users, while its thematic or other emphasis focuses on a specific target group of its audience.

Social media is understood as a dynamic type of mass communication, characterised by the fact that thanks to the possibilities they offer, communication between the author and the audience becomes symmetrical – while in the past mass communication was predominantly one-way, or typically indirect and delayed feedback, the communication feedback that social media offers today is essentially immediate and anonymous to varying degrees. Social media platforms are distinct from other types of media because they are primarily used for sharing content. Even though they have numerous benefits, the unregulated nature of this content has led to increased unease and distrust towards the media.

According to Anna Remišová (2010, p. 20), the term media system designates the essence of the social system: the media-social system has a great influence on the thinking and behaviour of wide segments of the population and the quality of the entire social system. The mass media is not simply viewed by the public as an object or institution but is also seen as a contributing influence in shaping public opinion. The importance of the media is fundamental for today's information society, which confirms the validity of the constant need to update media research of an interdisciplinary nature.

The media create a certain media image of society and have a very important role in shaping the image of us, how we perceive ourselves and our relationships in society. According to Giles, "We may never know the true extent of this impact: we may never be able to confirm it, let alone measure it" (Giles 2012, p.18). According to McQuail (2003, p. 266), the media are a cultural indicator, as the media image is to some extent also a reflection of social and cultural values. However, these are specific to each culture. Therefore, we quite often encounter situations in which it is possible to detect or at least acquire a strong suspicion that the behaviour of individuals or groups, realised not only on the Internet media, is strongly influenced by ethnocentric and xenophobic views.

Nowadays, the issue of morally questionable, hateful or extremist content is given quite a lot of professional and lay attention. Domestic and foreign literature or other research initiatives on partial problems associated with this issue are full of alarming statistics and information. These were the impetus for the creation of this study, which contributes to the discussion of the topic with its comprehensive view of the specifics of the disputed media content concerning historical experience and current social development affecting the general mood in society and also the specific information behaviour of users coming from Central European countries. For the study, we territorially identify it with the V4 countries.

Central Europe lies at the crossroads of the West and the East, both physically and mentally. It has often been characterised by the changing position of unstable centres and peripheries, which resulted in its specific character based on principles of mutual connections with both East and Western cultures, but moreover, political aspects, are often understood as opposite. Its experience with three totalitarian regimes is important to note as it is yet still an actively present phenomenon thanks to those who, e.g. survived the holocaust during WW II, but also via their second or third generations, then also a post-war Soviet postcolonial context and other aspects all attributes unique characteristics to the region. Besides others, they include experience with the utopian cult of personality of Joseph Stalin and the media as a tool of propaganda as well as restrictive methods of self-presentation during communism. The media in the past contributed to the promotion of power and they drew a solid line between governors and governed.

From the specifics of this cultural and geopolitical area, we also put in the foreground its heterogeneous character, which is characterised by the mixing of not only Slavic and non-Slavic but also various religious and cultural patterns. Central Europe can be described as "an extremely complex conglomerate of historical deposits, rational and irrational complexes and prejudices, various burdensome historical experiences, but also completely legitimate and significantly different interests of individuals and entire nations that live in Europe and the states that make up Europe" (Klaus 2010, 45). It is prejudices that arise based on established sets of signs that deform the ability of society (or its parts) to reflect on what is happening around it. Thanks to technical progress, these ideas and opinions can be materialised and disseminated through the online space, which brings with it the aforementioned risks.

Today, when even these longitudes are dominated by the "third generation" information society (the so-called Web 3.0) and a well-built Internet infrastructure, the Internet user also becomes an active participant and creator of media content. This is done

through various web blogs, commentaries, discussion platforms and community groups designed to share opinions and ideas. Such a user is not bound by journalistic ethics, which allows him to "test" (or even abuse) his "right to freedom of opinion and expression: this right does not allow anyone to suffer harm because of his beliefs and includes the right to seek, receive and impart information and ideas by any means and regardless of frontiers" granted to him by Art. 19 of the Universal Declaration of Human Rights¹ and to which the user invokes in many disputed cases.

The behaviour of creators and disseminators of media content that may appear to be "questionable" becomes problematic – these are mainly posts on the verge of political, ethical or moral correctness, or tabloids, aimed at a person or group, which can be defined based on protected characteristics listed in the definition of hate speech. Thanks to the anonymity, ingenuity and creativity of contributors, the control or tracing of controversial Internet behaviour is often limited: in the contexts of various topics, specific linguistic situations arise using globalisms, neologisms, occasionalisms or linguistic twists that are very difficult to detect or unambiguously interpret, and thus sanction – e.g. the use of composite or contaminated expressions and puns, e.g. „iSSraHell“ (Israel, by doubling „s“ it is strikingly reminiscent of the abbreviation SS – Schutzstaffel – a major „protection squadron“ under Adolf Hitler and the Nazi Party), „Jewstice“ (justice) or the use of placeholders „xid/Xid“ for Czech words „žid/Žid“ (a Jew) (Mikulášek 2021, p. 3). The existence of fake accounts is also problematic, which causes obstacles in trying to sanction the author of an offensive or otherwise inappropriate post.

Even the topic of various forms of cyberbullying, from hidden (indirect) forms of discrimination to explicit manifestations of xenophobia,² has become a practically constant subject of discussion at various levels in recent years – political, social, cultural or media. The need to increase the level of media literacy and general education in this area is reinforced by the constantly increasing worldwide manifestations of racially or ethnically based hate speech. Not only is their number increasing, but the nature of the means of disseminating stereotypical images is also changing, e.g. podcasts, blogs, comments and other hybrid Internet "products" offering interaction between the author of the content and the user or between users.

2.1 Antisemitism and the Digital Age

The presented study contributes to this extensive society-wide discussion in a way that is based on an interdisciplinary approach to the problem of spreading manifestations of ethnocentrism in new media. As it is a dynamic system with significant interdisciplinary overlap, the aim is to provide a comprehensive view of the state of Central European society in terms of constructing, spreading and tolerating hate speech in the Internet space.

The authors are also interested in the manifestations of antisemitism and anti-Zionism and their unique position in the Central European cultural environment, which the authors follow from the point of view of ethnocultural specifics tied to this region, its inhabitants and their history. The diachronic and transmedia approach to this topic is the starting point for the correct interpretation or disclosure of suspicious Internet behaviour with elements of racism or xenophobia, which lies at the centre of our attention. Through specific expressive representations extracted from media content, we draw attention

¹ The Universal Declaration of Human Rights. See: https://www.ohchr.org/sites/default/files/UDHR/Documents/UDHR_Translations/slo.pdf

² In the context of ethnically or religiously based forms of discrimination, it is mainly the so-called flamingo, i.e. hostile and offensive behaviour towards an individual or a group of Internet users, which stimulates further discussion by verbal provocation, often of a rude or even vulgar nature. The attacker intends to worsen the social relationships of the participants in the discussion, create a hostile environment towards the opponent or radicalize the group in which the discussion takes place.

not only to the manifestations of prejudice and negative mental images of ethnic significance spread by the Internet but also to the reactions they provoke. By conducting this research probe, the study offers an overview of such manifestations of media content that in various forms verbally or otherwise negatively comments, insults, or defames the Jewish religious and ethnic minority.

Capturing the demonisation of Jews as “creators of evil” and their subsequent defamation cannot be “measured” by conventional methods. We agree with the statement that “antisemitism is an attitude, and like all attitudes, it exists in society at different levels of intensity, and with different shades to it. The elastic view explicitly takes this into account: some people may be strongly antisemitic, others less so; and while still others may not fit into either of these categories, they may still hold certain attitudes – even if these are small in number and weak in intensity – that have the potential to make Jews feel offended or uncomfortable. Thus, no single figure can capture the level of antisemitism in a given society” (Staatsky 2017, p. 3). The statistics that attempt to do so are rather an effort to capture the experience and perception of antisemitism. We do not deny that their results are our cognitive support, which points to the extent of the occurrence of this large-scale society-wide problem. However, while respecting their validity, we focus on different dimensions of the issue – since antisemitism is essentially a way of seeing the world that uses hateful rhetoric against the Jewish community, often based on prejudice, there is no rational core. The stigmatisation of the Jewish community, regardless of whether or not they have a demonstrable connection with the phenomena with which the authors of such content associate them, is a problem that has persisted for centuries. However, the power of modern technology is to spread such manifestations more efficiently and effectively. Anti-Israel campaigns, Holocaust denial, and bullying ethnocentric comments directed at this minority leave irreversible consequences on their reputation. It is therefore important to consider the thematic structure of these media contents in connection with the means of expression used by communicators, the context of the creation of media content, as well as its possible semiotic overlap with cultural and other realities, not only today but also past. Thanks to the current dynamics of information dissemination, it is also not necessary to limit ourselves to regional realities but to take into account the possible global nature of influences as well as the dissemination and impact that were or are the impetus for the creation of this extracted media content.

It is the regional specifics related to the occurrence of the stereotype of the Jew in Central Europe that bind many persistent stereotypical ideas to the Jewish community. As far as the Visegrad Four countries are concerned, there is a lack of a regionally specific understanding of modern antisemitism. Although the main discussions, themes, and actors that dominate modern antisemitic discourse in the region have been explored (Barna - Felix 2017; Barna et al. 2018), it is still not properly understood how modern antisemitism is rooted in the cultural and political heritage of the region, or how much it differs from Western European patterns. No detailed research has yet been conducted on the regional specifics of the interconnectedness of the different subtypes of modern antisemitism (Barna et al. 2018). In addition, there have been few efforts to collect specific empirical data from all the Visegrad Four countries using the same methodology, which prevents systematic comparisons between the four countries. In 2010, a book entitled *Modern Antisemitism in the Visegrad Countries – Countering Distortion* was published, which also brought the results of a survey from the V4 countries on attitudes towards antisemitism. Following a description of the primary findings of the online focus group research, the most important research conclusions were summarised, which served as the foundation for policy debates.

Harsh Holocaust denial and rejection of the historical truth about the Holocaust did not occur during group discussions in all V4 countries, and participants considered opinions about harsh Holocaust denial to be absurd and unacceptable. They also

unanimously condemned the Holocaust, considered it a tragic historical event, if not the most tragic event of the twentieth century, and saw it as part of their history. Participants considered educational programs about the Holocaust to be important, and especially the Czech participants of the focus group were indeed overwhelmingly in favour of a more comprehensive school curriculum that would include teaching about the Holocaust. In addition, when discussing the Holocaust as a historical event – although it was less observable in the case of the Czech and Slovak focus groups – participants overwhelmingly avoided words such as Jews, terms describing the political ideology of the perpetrators or national collaborators, and even the word antisemitism. Instead, they usually used common narratives in which the Holocaust appeared as a symbol of universal suffering and as a historical event from the distant past, with the only contemporary consequence being a vague moral lesson. Another important finding was that the level of sensitivity to antisemitic content was high in all four Visegrad countries. Participants were particularly sensitive to antisemitic narratives, but there was often a lack of willingness to openly disagree with anti-Jewish comments. Antisemitic statements were often met with indifference and silence. Even seemingly non-antisemitic participants were unable to present counterarguments to antisemitic content. Second, although less observable in the Slovak focus groups, participants generally had insufficient knowledge of issues related to Jews, Jewish culture and history, Zionism, the history of Israel (including the history of the Israeli-Palestinian conflict), the Shoah, and the various forms and motivations of antisemitism and Holocaust denial and distortion (Barna et al. 2021, p. 18-24).

2.2 The Language of New Media as a Means of Spreading Ethnocentrism (With an Emphasis on Antisemitism and Anti-Zionism)

Various forms of hate speech can be encountered in the online realm. It can be comments, jokes, blogs, and Facebook posts in the form of hoaxes, but also disinformation that is published on portals that imitate news websites and give the impression that it is the work of a journalist. The risks associated with the spread of harmful content and the low journalistic and ethical standards of disinformation media are particularly problematic. A self-proclaimed expert who passively, uncritically adopts other unverified ideas puts himself in the role of an alternative source of information to which an ordinary user does not have access to.

The World Jewish Congress monitored the most popular Internet social platforms such as X/Twitter, Facebook, Instagram, YouTube and others. It states that of the approximately 382,000 antisemitic posts identified in 2016, most of them appeared on the original Twitter platform (63%), followed by Facebook (10%) and Instagram (6%). In 2018, the same institution reported that the total number of antisemitic posts on the Internet increased by one third compared to the same period in 2016 (Kršková 2018). From the countries that were monitored in the research, we can mention e.g. Poland, which has also seen a significant increase in the number of antisemitic “tweets” (The Rise of Antisemitism on Social Media - Summary of World Jewish Congress 2016).

The aforementioned Twitter (now X) is often referred to as a “toxic environment”, as evidenced, for example, by the alarming 17,000 uses of the so-called hashtag #HitlerWasRight in one week (Antisemitism on Twitter: Reactions to Middle East Conflict 2021). Through this hashtag, the topic of the extent to which Adolf Hitler’s actions concerning the Jewish minority were legitimate was heated was discussed. Numerous consensual opinions of the debaters have spread through this hashtag (or its alternative versions) in response to the open fighting between Israel and Hamas in the Gaza Strip, among them such extreme forms: “I think #Hitler was right when it comes to #Holocaust. Some people just don’t deserve to live and Israeli are at the top of this list. British just collected the scum of the whole world and dumped it at the holiest of places. #PalestineUnderAttack #GazaUnderAttack #IsraelTerrorist”, „not all Jews are Zionists.

But all zionists are terrorists“, „Adolf Hitler was right, Jews are animals, not humans and now the whole world is watching the proof #GazzaUnderAttack #PalestineUnderAttack“, „zionists deserve nothing but miserable deaths just like every other white supremacist“ (Ibid.). Such generalisations are not only negative media portrayals of Jewish cultural heritage but are downright dehumanising. To demonstrate, we present other examples of the occurrence of such posts that contain antisemitic sentiments and which, especially on online portals, confirm the spread of the antisemitic context, often with manipulative expressive rhetoric or graphics evoking a negative attitude towards Jews.

However, modern times have brought many innovative means for society and its associated interest groups or individuals to create a space for themselves to present their attitudes and ideas. This space is provided by the means of mass communication, which, due to its many advantages, is described in the first part of this study. It is important to note that these are not only explicitly verbalised antisemitic attacks or comments with a hateful or discriminatory background. One popular way to spread antisemitic propaganda is through images (World Jewish Congress 2016, 169). Currently, these are mainly cartoons and collages, often with combined (visual and verbal) content (memes). These popular forms of media content can be considered as a kind of modern successors to traditional caricatures. These were (especially in the past) a means of deliberate distortion of persons and phenomena, not only because of their expressive visuality. It aims to exaggerate the characteristics of phenomena occurring in society or to ridicule them.

However, this is not a new concept of harbouring prejudices in Central European realities. The society of Central Europe has been “cultivating” a negative attitude towards the Jewish minority for a very long time. With the gradual increase in the representation of the Jewish population, especially in large settlements, the general awareness of their activation in terms of the cultural, social and political life of the city was also strengthened in the past. In doing so, they stood in a kind of special position; their appearance and culture were often put in opposition to the domestic Hungarian convention. The relationship with this minority deteriorated after the adoption of the Patent of Toleration. It is not surprising that artistic stylization evolves with the times. However, its content images about Jews often remain unchanged, or only modified, as can be seen in some of the following examples.



Figure 1: Cartoon *Juda-pesti bulváron* (On the Judapest Boulevard) published in newspaper *Herkó Páter* on 29 July 1894 (Vörös 2003)

For a mutual confrontation of the historical and contemporary treatment of the topic, we bring you an older topos “Juda-pesti”,

the author of which is allegedly the Austrian lawyer Karl Lueger. He appeared in the Hungarian satirical periodical *Herkó Páter* in the mid-90s of the 19th century. It depicts a group of people in front of a café with a pair of men in the foreground. In addition to the general socio-cultural context of the drawing presenting the Jew as a wealthy cosmopolitan, a naturalised citizen of a big city, who leads a community life, his stereotypical depiction is also typical – his physical features – a distinctive nose, large protruding ears and dark hairiness, etc. The visual presentation of the typology of the character of the dominant characters (greed, sly, cunning, etc.), through captured gestures and facial features – an overexposed indication of an incoming handshake as a symbol of an agreement, a closed business or friendship, which such a heteroimage is supposed to all connect with Judaism, are also represented in this 130-year-old caricature. Although this drawing was probably a reflection of the unwanted assimilation of the middle class of the Jewish population in Budapest at the time of its creation, it is currently analogous to the caricatured depiction of Jewish cultural elements. Only the form and, naturally, the context have been updated. The most common depictions are defamatory or ridiculous depictions that are now predominantly found in electronic media, as a reaction to some stimulus – this is usually a specific impulse from political or social events, as is the case in the following examples.

KARIKATÚRA Eurofondy vs. pokuty za kvóty



BRATISLAVA - Brusel rozhodol.

Figure 2: You stay here for now, Ali Hasan.

The cartoon from 2016 with the descriptions “Bratislava – Brussels has decided” and “EU funds vs. quota³ fines” depicts a European official to whom the hunched representatives of Slovakia, Hungary and Poland bring money. The cartoon responds to the European Commission’s proposal that states that refuse to accept refugees based on allocated quotas will be able to “redeem” themselves by paying fines. The “Brussels decision” in the cartoon is embodied by the President of the European Parliament, Martin Schulz, known for his critical attitude towards the refugee crisis. The picture, however, has distinctive features strikingly reminiscent of the already mentioned Jewish heterostereotypes. Although the caricature was supposed to be an ironic commentary on the quotas proposed by Brussels, it incorporates the visual of the usual heteroimage. The “Jew” in the cartoon was also recognized by most of the readers who reacted to the picture – some indignantly, others with enthusiasm, and there were also antisemitic comments. However, the cartoon was withdrawn after numerous critical reactions and the editors apologized for its publication: “The cartoon was in no way intended to spread antisemitism or create a connection with the World War II cartoon that some critics were looking for on the Internet. The cartoon, which had evoked unwanted associations among many critics on the Internet, was immediately withdrawn” (ibid.). The editors also promised to

³ Šéfredaktor sa ospravedlnil za kontroverznú karikatúru so Židom. Topky.sk/Omediach.sk. [online], 2016. Available at: <https://www.omeiach.com/i nternet/9040-sefredaktor-sa-ospravedlnil-za-kontroverznu-karikaturu-so-zidom>.

pay increased attention to the treatment of controversial topics in the future.

In December 2023, a political cartoon published in the Canadian newspaper Toronto Sun attracted attention, its editors apologized on the magazine's website for publishing a cartoon of Zelensky, which again used established stereotypes.⁴



Figure 3: Political cartoon of Zelensky stealing from Biden⁵

This now unavailable cartoon depicted the Ukrainian president, who is of Jewish origin, reaching into the pocket of US President Joe Biden. In its statement, the editors note that the cartoon incorrectly implied US aid to Ukraine, which it portrayed either as theft, while others interpreted the cartoon as a bribe from an ally. In both cases, however, it was considered offensive not only to Canadians of Jewish descent and the Jewish people in general but also to Ukrainians who are currently facing Russian aggression.⁶

As we have already mentioned, not only is the number increasing, but also the form of means of spreading (not only antisemitic stereotypical images in contemporary society. While in the past it was first oral literature, later the already mentioned social or political-satirical drawings, graphics, and later caricatures disseminated by the press, nowadays various other modern forms spread through various media channels are widespread, thanks to which stereotypes are spread, they are typical of the masses: podcasts, blogs, comments and another internet "products" offering interaction between the author of the content and the user or between users. At the end of 2022, the Media Services Council initiated administrative proceedings against Hlavné správy for Boris Mesár's blog, which was published on their website hlavnespravy.sk under the title A Jewess from Tel Aviv exposes the falsification of the Holocaust story. In it, the author refers to the Holocaust as "fraud and manipulation" (Struhárik 2022). Even though the text was published in the form of a blog, which is defined in terms of genre as a post with the subjective attitude of the author and allows authors (registered users) to share their opinions, they should meet a certain ethical and moral standard. However, the content is based on a rather speculative and provocative basis: claims appeared in the blog that "during World War II, the number of Jews in the world did not decrease, but increased by 2 million" or "the Holocaust took place decades before World War II." He adds that "against the background of the genocide of the Russian population of Donbas, organised by the Zionists led by the president of the European Jewish Union, Ihor Kolomoyskyi, this report looks, to put it mildly, strange" (Kernová 2023, online). This text was published for several months and was among the most read on the site. Council for Media Services labeled the blog as illegal content, had the text withdrawn and fined the site. The case was also subjected to a police investigation with the suspicion that by publishing and disseminating the text, the crime of disseminating extremist

materials or defamation of the nation, race and belief was committed (Ibid.).

It must be said that although in the above case, it was a blog message strikingly reminiscent of the ideas spread by Russian propaganda, in an older blog by the same author entitled The Jewish Question: A Historical View, there were numerous other defamatory claims directed at the Jews: "every country that emancipated its Jews was soon taken over by the Jews", "a huge number [of Jews] continue to live in foreign countries, where, by their dominant presence, overrepresentation in key professions, a tendency to network and their constant involvement in fraud and financial machinations continue to fuel antisemitism" (Struhárik 2022). The texts were published on the website of Hlavné správy until the author's blogging activity was stopped. In a statement, the editors of Hlavné správy objected to his controversial texts with the following words: "Everyone can blog on Hlavné správy, but only under their name, with their photo and at their own risk. [...] The editors of Hlavné správy do not edit or check the blogs." The blogger bears full responsibility for the content of his blog, but at the same time by registering he agrees, among other things, to point 7. The Hlavné správy Blogger's Code⁷ states: "In particular, a blogger is prohibited from: promoting violence and inciting hatred, openly or covertly, on the grounds of sex, race, colour, language, faith and religion, political or other opinion, national or social origin, membership of a nationality or ethnic group; [...]" (Ibid.).

The self-regulatory mechanism in the editorial offices of online media or hosting platforms, and thus the control of compliance with their codes of ethics, generally does not work effectively. Self-censorship by Internet content creators does not work either. However, the impact of such unregulated internet content also has consequences that can be life-threatening for both the individual and the community. One example is the tragic shooting on Zámocká Street in Bratislava on October 12, 2022, which claimed two victims and one injured person. Since this is a case that has not yet been clarified, it can be stated that the crime was probably committed as a result of radicalisation on the Internet by a nineteen-year-old student who presented several posts sympathetic to right-wing extremism on the social network X. Numerous homophobic, especially antisemitic, but also other extremist and neo-Nazi views are repeated not only in the document that the young man left behind but also in his other Internet posts.⁸ The report, prepared by the Media Services Council, states that "digital platforms played a significant role both before and after the attack. The offender's digital footprint clearly shows he had been radicalised via Internet" (Terrorist attack on Zámocká Street in Bratislava: Immediate and preventive activities aimed at illegal and harmful content. Council for media services 2022, p. 4). The shooter was involved in anonymous discussion forums in the form of the so-called imageboard 4chan and its sister site 8chan (now 8kuna). Both are extremely popular among young users inclined to Internet subcultures, also because there is no content regulation in the discussion sections (Ibid.). Extremist or other ideas can be freely disseminated, shared, and commented on and thus their "enthusiasts" can be freely disseminated, who mediate materials with each other in text or image form. "A study by the RAND Corporation confirms that the Internet facilitates and offers more opportunities to become radicalised, as it allows you to connect with like-minded people and access extremist ideas from all over the world. At the same time, the Internet acts as an 'echo chamber'. This means that users regularly communicate their thoughts with people who have the same opinions, which confirms them in the long term that they are correct" (Behr et al. 2013).

The attacker, who also published a comprehensive manifesto on his profile, publicly called for violence against Jews or members

⁴ Elnézetést kért a kanadai újság, amiért antiszemita karikatúrát közölt Zelenszkijről. [online]. 2023. Available at: <https://mandiner.hu/kulfold/2023/12/elnezest-kert-a-kanadai-uj-sag-amiert-antiszemita-stilus-ur-karikaturat-kozolt-zelenszkijrol>.

⁵ Toronto newspaper cartoon depicts Zelensky stealing from Biden. [online]. [10.05.2023]. Available at: <https://disinfowatch.org/disinfo/toronto-newspaper-cartoon-depicts-zelensky-stealing-from-biden/>.

⁶ Sun apologizes for cartoon. [online]. 2023. Available at: <https://torontosun.com/opinion/sun-apologizes-for-cartoon>.

⁷ Kódex blogera Hlavných správ. [online]. [23.05.2024]. Available at: <https://blog.hlavnespravy.sk/kodex-blogera>

⁸ Polícia Slovenskej republiky: Mimoriadne: polícia vypátrala strelca zo Zámockej ulice. [status update], 2022. Facebook. Available at: <https://www.facebook.com/policiaslovakia/posts/pfbid02Gvqb82qJGHN1Wq7y9vzHPgstfFMmwRHigWmB5rSxeYaw1uhU71fnX9yi8L3mYicl>

of the LGBTI+ community, from which the victims of the aforementioned crime also came. Among other things, he also referred to conspiracy theories that speak of the efforts of Jews to dominate the world, destroy it and subjugate the white race (Terrorist attack on Zámocká Street in Bratislava: Immediate and preventive activities aimed at illegal and harmful content. Council for media services 2022, p. 11). The extent of the consequences of such radicalization of a young grammar school student has become an alarming case not only for Slovaks. The solidarity that this tragic incident evoked on the part of a significant part of the public was unprecedented by Slovak standards – it brought many silent protests and commemorative marches for all victims of terrorism and homophobia.

However, similar incidents have also deepened the polarisation of society. While on the one hand, there are initiatives against racism and homophobia, e.g. Black Lives Matter⁹, RainbowLaces¹⁰, You Can Play¹¹, Me Too¹², on the other hand, a part of the public is also mobilized, which considers them an undesirable opportunity to point out marginalized groups and draw attention to “their problems”, at the expense of finding solutions to the problems of the majority part of society, which, according to them, remain neglected. In addition to posts and comments that downplayed the seriousness of the terrorist act from Bratislava's Zámocká Street, there was criticism of the media, public political, cultural, sports, and other representatives, who also began to engage in the issue of respecting basic human rights in connection with ethnic, sexual and other minorities. In predominantly conservative societies, such as the V4 countries, besides the nationalistic principle, the heteronormative principle is also still strongly rooted. It makes topics such as gender or sexual identity “undesirable” impulses for cultural and social dialogue, often associated with liberalism and progression.

The immediate reaction of the media themselves to the tragic act of the shooter from Zámocká Street, which was classified as a terrorist attack, was also controversial – it turned out that some journalists do not have the necessary experience or knowledge of how to communicate with the public about this type of news and its background. Several media succumbed to pressure and, to lead the way in information and to create a sensation, reported on the event in an unprofessional way, e.g. by spreading instructions on how to find the murderer's discussion on the 4chan platform, etc. In this way, they provided the public with information that potentially enabled the acquisition of illegal Internet content. The dissemination of extremist material as a result of such an act is particularly dangerous; The media used it to help the perpetrator fulfil his intention to shock the public and potentially inspire other individuals to carry out similar extremist acts (Terrorist attack on Zámocká Street in Bratislava: Immediate and preventive activities aimed at illegal and harmful content. Council for media services 2022, p. 51).

Based on experience from abroad, it is possible to observe a diverse way of processing the facts: for example, while the attack by an ultra-right radical on the Norwegian island of Utøya in 2011 with 69 victims was covered by the media almost immediately, including the revelation of the identity of the attacker and other details, the public could learn about the shooting at a mosque in the city of Christchurch (New Zealand) in March 2019, in which 51 people died, although the public could learn directly from a live broadcast, which the shooter himself mediated via the Facebook platform, but his identity or details regarding the name or photo of the attacker remained non-public for some time. This was done not only in the interest of protecting the mental health of the survivors of the victims but

especially in the sense of the slogan “No name - No photo - No notoriety”¹³ or following the example of the “Don't name them” campaign from 2014, which the American FBI came up with¹⁴. Both were created in the interest of public safety to responsibly inform about persons who commit or attempt violent crimes. Currently, specific crisis mechanisms are in use, specially prepared in connection with terrorist attacks with an online element. „In spite of the fact that Slovakia is one of the signatories of Christchurch Call¹⁵, interviews with representatives of this initiative showed that the Christchurch Call Crisis Response Protocol was not initiated after the attack on Zámocká Street“ (Terrorist attack on Zámocká Street in Bratislava: Immediate and preventive activities aimed at illegal and harmful content. Council for media services 2022, p. 64).

3 Conclusion

The modern digital media system is a platform that, in addition to the possibilities for searching and sharing information, mainly mediates mass social interaction. It allows individuals to actively participate in the creation of media content by adding their posts and comments. The volume of content generated in this way also brings with it an uncertain amount of unverified information in the form of opinions or subjective views on various subjects of social discourse, often presented as “facts”. Their enormous reach is enormous due to the interconnectedness of the hypertext media network, which brings with it many risks that have already been discussed. The presented study contributes to the topic of controversial media content through a transdisciplinary view of individual elements entering the system of interactive communication as a modern social phenomenon. Through selected examples, it demonstrates the risks of spreading those media products that are ethnocentric, hateful or directly extremist content that originated or has connotations with the Central European region.

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¹³ See: No Notoriety. <https://nonotriety.com/>

¹⁴ See: FBI to media: Don't name mass shooters. Available at: <https://www.ksat.com/news/2014/07/28/fbi-to-media-dont-name-mass-shooters-2/>

¹⁵ The campaign is based on motivating media and its representatives to rethink the way they report on tragic crimes in particular – the way should be to draw attention to the victims and not to the attacker. This will not fulfil their motivation to gain attention, fame or arouse public interest in their person and actions, which often have tragic consequences. See: <https://www.christchurchcall.com/assets/Documents/Christchurch-Call-Crisis-Response-Workplan.pdf>

⁹ The movement speaks out against police brutality and racial inequality directed against African Americans and Latinos. It was created in response to repeated cases of open discrimination.

¹⁰ A key objective of the campaign is to promote LGBT+ acceptance among children and young people involved in community and educational initiatives, such as England's Premier League Primary Stars and Premier League Kicks, and within football academies.

¹¹ A campaign of social activism that aims to eliminate homophobia in sport.

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THE CONCEPT OF COMPETITION IN EDUCATIONAL EVALUATION

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Abstract: The aim of the following study is to introduce the methods and the ways of pedagogical evaluation in harmony with the individual stages of the process of evaluation. We have divided the process of pedagogical evaluation in the following way: setting the goals, planning and organizing the pedagogical evaluation, collecting information, choosing the method, means and tools of evaluating the examined phenomenon of the pedagogical reality, evaluating and interpreting the results, deciding about the prognosis suggestion. The function of feedback in evaluation lies in the teacher's providing feedback to students on their performance, learning activities and the efforts made to perform the task. However, evaluation also fulfils an informative function, particularly in terms of providing study results to students and their parents. Evaluation in education sometimes functions to regulate student learning activities. If teachers formulate views on students, direct activities and draw attention to errors or incorrect procedures, they use the potential of the regulatory function of evaluation. In this paper, I introduce what is actually evaluated in education in terms of student performance or if their learning activities depend not only on the teacher's personal conception of the teaching itself, but also on some general concepts of education. The concept of evaluation gives a comprehensive view on the issue from the aspects of defining the process and applying the methods, means and results of evaluation.

Keywords: methods of pedagogical evaluation, ways of pedagogical evaluation, Educational Evaluation

1 Introduction

Educational objectives in most cases are general and vague, i.e. we cannot determine unequivocally the "ideal state" to be achieved. We do not know clearly what is to be regarded as the result of the education process: knowledge (i.e. memorizing and understanding information), skills (specific and non-specific transfer – the application of knowledge) or abilities as well, for example the ability to learn, or also the attitude, the student's effort, perseverance, etc.? If yes, then what should be the ratio of these elements represented in evaluation? We do not exactly know the answer to the question what to measure, therefore its validity (weight) is difficult to assess. Although marks are there at our disposition to evaluate students' performance, it is not clearly defined what two or three, etc. really are. In addition, student performance is not constant, but on the contrary, it is time-variable. We do not know how often to classify and evaluate the student for his or her assessment to be reliable (accurate). Thus, we do not know the correct answer to the question "How to measure it?" either. The consequence of these factors is the subjective evaluation of students.

If evaluation is subjective, it tends to be unfair resulting in the fact that the student does not agree with his or her assessment. In this case, the teacher's control and evaluation do not fulfil their functions, including that of educational, motivational and prognostic. It often happens that students who did very well at school do not succeed in life as much as their classmates with generally weaker results. One reason for this contradiction is the difference in evaluation criteria in school and practice.

The teacher's duty is to develop such skills of students which enable them to perform well in life, i.e. the ability to think for oneself, make decisions, take action and learn. Therefore, the teacher should not only examine the outcome of the learning process but also the learning process itself. After all, the development of learning skills should be one of the main aims of the school (Porubčanová, 2017).

It is known that many students prepare for the lessons (they learn) the way their teacher is going to test them. Many teachers, however, direct testing to a lower level, mainly to remembering

information (facts, formulas, definitions, theories, etc.). The result is that students prefer memory learning.

The assortment of the functions of evaluation is far from being unified and complete. Therefore the classification of Smoleňáková-Bendíková (2017) was particularly inspirational for us, mentioning five evaluation functions according to the purpose they fulfil in the education process: the development-formative function, the function of feedback, the informative function, the function of greater efficiency and the differentiating function.

2 Pedagogical Evaluation

The evaluation is in the focus of attention of those who are involved because this is the area of the teacher's activities which concerns the students, their parents as well as the teachers themselves a lot. Furthermore, pedagogical evaluation as such influences the relationship the student is going to build to the subject, teacher and the school, how fair the students will consider the evaluation of the teacher.

For evaluating purposes in the school there are different ways from which the teacher can choose (he can vary and combine them too) after taking into consideration the aim of the lesson, the aim of the evaluation, situational factors, the student himself who is the focus of the evaluation. Last but not least the teacher has to consider the concrete stage of the teaching or evaluating process.

When evaluating students, the teacher is offered to use a number of ways from which he can choose the one that suits the aim of the evaluation, the individual personality of the student, the situation the best. By the different ways of the evaluation the teacher provides the results of the evaluation of the students' work.

The non-verbal ways of evaluation (smile, nod, mimics, gesture, tactile contact) exist on their own or they can also be the accompanying feature of the other ways of either positive or negative evaluation. The paralinguistic aspects of speech make the oral expressions audible. It is the volume of the speech, the speed, pauses, verbal emphasis, the colour of the voice, intonation, rhythm, acoustic filling of pauses. (Oberuč-Zapletal, 2017b). The simple verbal evaluation is about the teacher orally expressing the satisfaction (yes, good, nice, I agree) or dissatisfaction (careful, mistake, fault, no, I disagree) with the performance of the student. A typical example of the quantitative evaluation is giving grades according to the grading scale. The teacher can also evaluate the performance in points, percentage on the basis of the correct and incorrect results. Other, rather unusual ways of evaluation are various symbols, stamps, cards, which the teacher uses to express the level of the students' performances. The public evaluation of the students' performances are used mainly when the student has achieved some extraordinary success. Thus the student (his name and photo) can appear on the noticeboard of the classroom, on the board of honour of the school, web page or school magazine.

The basic rule of evaluation, regardless of the chosen method and way is to apply an individual approach, avoid the regular formulation, the standard phrases and classifying the students according to their results without considering them in their complexity. This kind of evaluation does not show the child's true self – loses its credibility and in fact is not really truthful. The evaluation should concretely contain what the student knows what he doesn't know, what his abilities are and how he uses them. For these criteria the verbal evaluation is the most suitable. One of its advantages is indisputably the fact that it is focusing on the positive support of the student's improvement instead of the pressure on the performance, emphasizing the importance of cooperation instead of competition, it provides the students with equal possibilities rather than eliminating them and

it also provides individual support instead of the same frontal approach. Essentially the verbal evaluation should contain information about the student's personal improvement, for example the difference between his work at the beginning and end of the evaluated period of time. As for verbal evaluation it is not suitable to use the words from the area of grading – excellent, very good, good, acceptable, not acceptable in order to avoid the confusion with grading. The spirit of the evaluation, however, should be stimulating. To start with, there should be some positive information, what the student is the best at, because a positive evaluation has a more motivating effect than a negative one. It is very important that the teacher should never compare the students with each other (Hrmo et al, 2016).

Every single evaluation is the expression of a certain quality, value. However, the degree to which we consider it important, responsible or fair depends to whom and what these expressions of the quality mean. The cybernetic view of evaluation is always about a certain goal, and the process within which it is about to take place.

The pedagogical evaluation, regardless of the type that we use should according to Marks-Lajčin (2017) consist of the following stages:

- setting the goals, planning and organizing the pedagogical evaluation
- collecting information, choosing the method, means and tools of evaluating the examined phenomenon of the pedagogical reality
- evaluating and interpreting the results deciding about the prognosis suggestion

3 The stage of setting goals, planning and organizing the pedagogical evaluation

The goals that were achieved we usually compare with the goals which had been set. Therefore it is essential to set goals which are possible to measure and evaluate. It is necessary to set the goals of the given subject (in general they are stated in the state education program), then come the goals for the individual cognitive (effective and psychomotoric) areas of performance and they are mainly expressed in an operationalized form. Operationalization means expressing a goal in a concrete form of the student's performance, what he should know and on what level. This enables the evaluation of his performance. Planning and organizing the evaluation is inevitably a part of this stage. (Oberuč-Zapletal, 2017a). Planning is about deciding who is going to prepare and put it in practice how it should go and what organizational conditions it should meet. The interesting thing about this phase of the evaluation process is that it depends only on the teacher, he takes part in it, creates it, the student is not a part of it. It is therefore expressed by the activities of the teacher.

4 The stage of collecting information, choosing the method, means and tools of evaluating the examined phenomenon of the pedagogical reality

This stage of the evaluating process is characterized by the interactive relationship between the teacher and the student. Both the teacher and the student play an active role in it, the work of the teacher influences the work of the student and vice versa.

The stage of collecting information can be further divided into some other phases which are defined by Hrmo-Turek (2003). The first part of the stage of collecting information is specifying the tasks. Some features of the evaluation can already be seen in this stage by how the teacher specifies the task, what kind of task it is, how demanding the given task is. From specifying the task it is possible to see the evaluating competence of the teacher as well as his relationship towards the student, his expectations from the students and last but not least the connection to the previous stage – setting the goals of evaluation. In the following microphase of the stage of collecting information, called the exposure of performance the students shows the knowledge that

is required, puts the concrete operation in practice, solves the task while the teacher is following and checking carefully whether the student is right. At this point if it is necessary there can be some correction. The teacher often uses one of the ways of evaluation. By the means of non-verbal communication (a stroke, mimics, an agreeing or disagreeing gesture, a smile) paralinguistic aspects of speech (the tone of voice, melody of speech, the colour, etc.) or by a simple verbal evaluation (yes, mistake) he shows that he agrees or disagrees with the student's performance.

5 The concept of competition in educational evaluation

This view comprises the semantic essence of competitiveness and rivalry as an important and natural element of human life. In society, the individual strives for better job opportunities, career or salary advancement. The school as an educational institution prepares the individual for such society. The role of schools is to provide quality education. Education is viewed as an investment in the future and it is believed that caring for study results is entirely the student's business. Students are therefore considered to be solely responsible for their academic performance. The constant rivalry at schools is a preparation for what the student can expect to happen in life. This concept is based on the assumption that students can and mainly that they want to learn. Each student is considered to be intrinsically motivated, so motivation specifically is not attended to. It is assumed that to achieve good evaluation is the primary goal of each student and the sole fact that they are evaluated is motivating enough and it is not necessary to apply other instruments of motivation. The concept takes it for granted that individuals at schools make all the effort to achieve good scores, just like contestants do in competitions. Differences in performance are therefore considered to exist due to differences in students' abilities (Bendíková, 2017).

The concept of competition in terms of educational evaluation emphasizes results and the ranking of students based on their performance. The school must prepare students for the competition by creating optimal conditions and a fair environment. This can only be achieved if the teacher treats all students equally and adjusts the instruments of teaching accordingly. Therefore, the most effective teaching methods appear to be those where the teacher is dominant as the sole bearer of knowledge, transmitting information in a finished form to the students who are acquiring it. It can then be assumed that applying the concept of competition in educational evaluation is allowed primarily by the concept of the traditional type of educational process, based on the behavioural theories of learning (Hašková, 2020).

What is the point of competition in school conditions? It is particularly monitoring the process from a lower to a higher level of education. Competition therefore means preparing students to progress to the next stage of school and ultimately enrolling them for further studies.

How does the concept of competition appear in the techniques and methods of evaluation? The emphasis is on ensuring accuracy and objectivity. This is achieved firstly by establishing equal and strictly monitored conditions for all, secondly by the existence of such rules and evaluation criteria which ensure objectivity. This objectivity can be assured by objective evaluation tools, mainly by didactic tests. Their emphasis can easily be moved towards measurable performance, which in practice is often the case. Its consequence is that those areas of performance and skills that are difficult to measure are initially underestimated in evaluations, and later in the classroom as well. The concept of competition in educational evaluation is present whenever we want to create some sort of achievement rank of individuals. It may be believed that the preparation of students for higher-level schools follows an objective, external evaluation criteria expressed in the expectations and claims of the school related to the applicant. In reality, however, these expectations are relative and conditional upon the performance of the students

studying at the given school, so they are not the school's real expectations (Szököl, 2016).

What are the problem areas of applying the concept of competition in educational evaluation?

1. It is not possible to consider the argument about students wanting and being able to learn as generally applicable. The expansion of education, the increase in the length of compulsory education and various demographic factors significantly reduce children's intrinsic motivation to achieve good academic results. Schools applying the concept of competition in educational evaluation are not able to support and positively affect such students.
2. Based on the above, it can be concluded that schools are attended by heterogeneous student, either in terms of skills, social composition or background. Whereas differences in the ability of students assume and cause differences in their performance as well, competition loses its meaning. And this is because the achievement rank of students gets created very fast and remains unchangeable.
3. Overexposing the nature of rivalry and the comparison of students to each other can easily lead to labelling and pigeonholing, which does not affect positively the psyche of the student.
4. Rivalry alone cannot be regarded as a generally motivating factor for each student. It is not correct to assume that each student likes competing and winning. The atmosphere of competition can have an utterly negative effect on students who are of introvert, timid and shy nature. The atmosphere of competition for them is the source of constant stress and affects their performance negatively.
5. The concept of competition in educational evaluation does not allow applying the holistic view (as a whole) of individual performances.
6. It is a mistake to believe that solely the students are responsible for their study results. This view distracts attention from the formative influence of the teacher's personality on student development. Teachers are thus placed into the arbitrator's position while the essence of their educational activity escapes them (Hašková, 2017).

This concept of evaluation is historically the oldest and widely used even today in our schools. During their undergraduate training and also in subsequent teaching activities, many teachers have encountered and applied solely or mainly items of the concept of competition in educational evaluation. Only recent research findings have prompted educators to rethink the concept of competition and enrich it with new elements.

5.1 The stage of evaluating and interpreting the results

In this stage too we can identify two sequences – partial phases of this stage. In one of them, in the final analysis of the performance, the teacher has to carry out a very demanding analysis of the student's performance in a relatively short time. In this stage the overall performance of the student is evaluated. The teacher should approach it with responsibility and realize that the evaluation for the student is formative (it means that the teacher's attitude to the evaluated student is going to influence his attitude to further studies and himself too) and for the teacher opinion forming (it means that on the basis of the attitude the teacher has towards the evaluation and the particular student will the rest of the class view him). Therefore it goes without saying that the teacher involves the other students in the evaluation (so the teacher uses the method of peer evaluation). It is not because of avoiding responsibility but because he wants confirmation about his concepts or on the contrary, the students' opinions in the class will force him to change his mind. At this point the teacher can give space to the student to speak up, by which he applies the method of autonome evaluation.

The second microphase of this stage is about expressing the evaluation. To get the evaluation it is important to compare the current situation of the evaluated student with the past situation as well as with the required criteria (Turek, 2008/). For the

teacher the main criterion is the norm given by the education program. The judgement can be communicated to the students by almost all ways of the evaluation. Most frequently it is by the way of quantitative evaluation, so by classification grades, simply by grades. This can be accompanied by comments, the explanations of the teacher. In addition there are the non-verbal expressions of the teacher which the student is very sensitive to and it multiplies the result (effect) of the evaluation.

5.2 The stage of deciding about the prognosis suggestion

This stage can be divided into three microphases. The first is expressing a certain recommendation, how to react to the result of the evaluation, how to improve and how to exploit the potentials of the evaluated student. The teacher can suggest certain pedagogical measures which not only him but the evaluated student or the whole class can take part in. A typical feature of a good evaluation is that it contains the assumptions for the student's further development and this actually gets us to the second microphase of the final stage of evaluation. By expressing the prognosis the possibilities and ways of the student's further improvement are revealed (Turek, 2008, p. 79). This stage according to Hrmó-Turek (2003, p.187) is completed by the microphase of realizing the possible consequences of the student's evaluation. It is performed only by the teacher and it takes place by means of intracommunication (asking questions, answering them, looking for connections, stating reasons, arguments etc.). In order to see what the evaluation has caused where it got the student, the teacher needs to know him profoundly.

6 The function of building a positive self - image

Self-image tells what the student thinks about himself or herself. It can have positive as well as negative content. It is exactly the teacher's evaluation that matters greatly in moving the students' image of themselves in the correct direction. Students differ in perceiving themselves, and it appears mainly in their preference of different opinions, attitudes and values. According to research results (Lajčín-Porubčanová, 2021), students with positive self-image do not attach importance to those school situations which are less significant from the aspect of their preferences. Conversely, students with negative self-image overestimate failure at school, which only reinforces their negative perception of themselves. Students with a positive self-image and realistic self-evaluation demonstrate a higher degree of motivation; they overcome minor obstacles at school more easily, achieve better performance in cognitive areas and is cooperating. Negative self-image and negative self-evaluation makes it hard for the student to adapt to school and later to society, and are obstacles to the positive development of his personality. The primary school level here has an irreplaceable place, because at a later stage, when the student already has a clearer vision and value preferences, building or renewing a self-image is hard to start with and correcting a negative self-image is very difficult.

If the performance of the student meets the expectation of the teacher, the student achieves success, while if the performance is below average, he or she feels and experiences failure. The chain of these sequences will affect the creation of the student's motivational aspirations and self-esteem. Likewise, evaluation is also influenced by the level of the student's self-evaluation. Self-evaluation is thus at the same time the cause and consequence of success or failure, it predetermines what attitude the student takes (a favourable or unfavourable one) towards fulfilling the tasks and obligations of school.

6.1 The function of positive social reinforcement

Reinforcement means that positive assessment assumes the repetition of a student's good performance. Reinforcement can be internal or external. Inner reinforcement is characterised by the external factors not being in operation. Activities and their good outcome already carry an affirmative effect in themselves for the individual. External reinforcement (rewards, punishments) occurs when internal reinforcement does not work

or if there is a contradiction between the teacher's expectations and the values or performance of the student. Positive reinforcement (praise, recognition) in evaluation, when the teacher expresses satisfaction with student performance, is much more motivating than negative reinforcement. This may even have an impact on the social status of an individual in the group.

6.2 The function of motivation

Evaluation affects the motivation of students, their attitude to school, study obligations, the given subject or the teacher, and therefore it is one of the major motivating factors. It affects also the creation of students' learning styles. Barnová et al. (2019) argues that the experience of success, expressed by the teacher's evaluation motivates students for further work and study. On the other hand, the student's failure expressed by the teacher's evaluation motivates him or her less towards further work, and he or she may even completely lose interest in studying.

The teacher must handle evaluation with caution. Unrealistic and undeserved over-evaluation, the use of positive evaluation including reinforcement can lead to false illusions of success in students, which is not justified and has no real basis. On the other hand, exaggerated negative evaluation destabilizes the position of the student as an active learner and prevents him from the feeling of success, which then discourages him. The teacher faces a difficult task: evaluate realistically, the real performances of students with the need to highlight positive aspects, point out weaknesses in the student's performance and suggest courses of action for improvement. By evaluation, teachers should primarily follow the development of each student's personality and abilities. Therefore, they should use evaluation as a means of increasing students' motivation to learn. This can help to achieve the student's increasing interest in learning, which is essential especially for the aims of self-development, permanent learning and self-improvement. The research results of Perry (according to Hrmo et al., 2016) show that in those classes where students' self-regulation and self-development is taken into account, and the teacher uses interactive assessment throughout the whole teaching process, the students' errors are interpreted as a tool to improve performance. On the contrary, the students of the class where stress is laid on the quantitative parameters of achievement levels or the mystification of correct and incorrect answers, where convergent tasks prevail and the performances are constantly compared not only to standards but also to other students, are not lead to self-improvement and evaluation cannot fulfil its developmental role.

The motivation of students is one of the determinants affecting the education process along with other factors that are likely to influence it, including for example the family background, the society and environment where students spend their free time, certain health conditions, etc. As it can be seen, there is indeed enough of these determinants, while each of them is capable of – either alone or in combination with other factors – affecting the intellectual and education process and hence the students' evaluation and marks.

The evaluation of learning results, classroom work, practical skills and habits acquired during practical instruction can be expressed not only by the teacher's giving a mark, but also by words, movements, gestures, facial expressions indicating acceptance, approval, satisfaction, praise, possibly disapproval, etc. The evaluation of practical performance, if it is a positive one, can enhance the student's confidence, but in case of negative results it can also help learners to correct their errors or deficiencies. The relationship between teachers and students within the evaluation process has a great influence on forming the students' self-esteem, self-confidence and not the least their character.

Evaluation of the results of the teaching process for individual students can be expressed also in the form of a mark reflecting the level of the students' knowledge, their habits and skills. In practice, the most attention is often drawn to the mark itself as it

can determine the position of the student in the class, the relation of parents not only to the achievements of the student, but in some cases also to the student himself or herself. For many, the mark is the main motivation for learning, its sole purpose.

It must be noted that an experienced teacher should arouse the students' interest in learning, in acquiring new knowledge and practical skills so that students would have pleasure and interest in learning while overcoming difficulties step by step and inventing new methods for learning. Such intense intellectual activity, and not only during the lesson, but also when doing homework, would bring them joy, satisfaction and encouragement to gain further knowledge and solutions for their problems. It can be stated that students' aroused interest in learning or the learning material is the best motivation for them to learn; when the role and importance of marks is moved into the background and the sense of learning is found in completing tasks and acquiring new knowledge, which in turn can lead to solving complex tasks that previously were considered unsolvable.

6.3 The model-serving function of evaluation

By his professional approach to evaluation the teacher should achieve that evaluation could serve as a model for students' self-evaluation (autonomous evaluation) and peer evaluation, that is the one from classmates. For this, clear criteria, rules, forms and methods of evaluation should be specified. Marking the student's performance has little and very relative information value. Although the student's performance is associated with certain classification, this is not indicative of his or her qualities concerning personality, motivation and attitude. This negative phenomenon can be opposed by verbal evaluation which gives teachers the opportunity to express (verbally or orally) the strengths and weaknesses of student performance. The teacher can point out the student's diligence, the progress in cognitive areas, changes in personality traits, and the expectations of the teacher can also be outlined. For students, however, this system of criteria must be clearly legible, by which the teacher as well as students guide themselves and which they follow when being evaluated (Lajčín-Porubčanová, 2021). The teacher's evaluation affects the overall perception of the classroom atmosphere. If students perceive that the teacher's evaluation is not objective and it arouses negative emotions in them, this is reflected also in the overall social atmosphere of the class, in the nature of human relationships. And this is because the teacher is focused on negative assessment, on pointing out the mistakes in student performance. Students tend to imitate the behaviour of their teachers, they are often overly critical and unfair to each other, even negatively tuned, which does not favour positive classroom atmosphere in any way.

6.4 The function of greater efficiency in educational evaluation

Evaluation results tell us whether the teaching, the school or the school system is successful and efficient. There are various parameters, criteria that tell us about the effectiveness and successfulness of teaching. Indicators of success may be the results of students in school-leaving examinations, the results of monitoring the knowledge and skills of students finishing the 4th and 9th grade of primary schools, the results of international measurements, etc. The wide application of achievement tests enables the comparison of schools with each other, based on the results of student performance, and if countries enter international measurements, the effectiveness and successfulness of the whole school system can be measured (Kissné Zsámboki, 2021).

As a rule, the effectiveness of a school is assessed according to the number of students accepted for further study, the students' prominent positions in various competitions and their results in national measurements. These are manifesting indicators which, however, may not be representative of the actual quality of the educational work. After all, schools with good image, schools

for which there is demand, schools with attractive study offers have no shortage of students. These students generally achieve not only excellent academic results, but are also engaged in various competitions more often and with good results. Latent, but no less important indicators of a school's successfulness are the added value of educational work expressed in the individual development of each student, the application of a uniform philosophy of education at the school, the cooperation of teachers in approaching students and following their development, the application of alternative and activating teaching methods to develop students' motivation and self-knowledge, and other factors.

To sum it up, it can be stated that the absence of clearly defined indicators measuring the quality of education both externally and internally also implies the inability to objectively evaluate schools which due to their specific conditions achieve outstanding results. A serious problem is also manifested in the lack of clearly defined rules of such educational measurements which would reflect not only the immediate and the current level of the learner's knowledge, but it could track the student's progress throughout the learning process. The question therefore arises whether external measurements (Monitor) assessing a state of knowledge in two years of primary school (4th and 9th grade) in two subjects (Mathematics, Slovak, possibly the language of instruction) are truly objective?

7 Conclusion

If evaluation is subjective, it tends to be unfair resulting in the fact that the student does not agree with his or her assessment. In this case, the teacher's control and evaluation do not fulfil their functions, including that of educational, motivational and prognostic. It often happens that students who did very well at school do not succeed in life as much as their classmates with generally weaker results. One reason for this contradiction is the difference in evaluation criteria in school and practice.

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MOTIVATION OF TEACHERS AND STUDENTS AS PART OF FORMATIVE EDUCATION

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Scientific study created by DTI University, Dubnica nad Váhom (SK) as a part of the IGA project 004-DTI-2022 - Teachers' professional identity in pedagogical reality.

Abstract: The authors of the study are based on the idea that the basic precondition for the success of the teacher's pedagogical-didactic work is his/her motivation as well as the ability to encourage students' intrinsic motivation and keep the students continuously interested throughout the educational process. For this reason, it is important that the teacher pays due attention to motivation and constantly improves his/her knowledge in this field. Motivation is a set of motives that evoke the activity of an organism and determine its focus. It is an internal driving force behind meeting unsatisfied needs. It is said that good motivation is a guarantee of success and in relation to education that "good motivation is half the success of a teacher's work and student's learning."

Keywords: factory and sources of motivation, formative education, learning, assessment, teachers, students

1 Motivation of students

The issue concerning motivation is very complex, as it is the key to understanding the human psyche and understanding the human. Motivation can be included among the components of human mental regulation, which ensures the functioning of learning, activates cognitive processes and motoric systems to achieve the desired and set goals, the authors, Hanuliaková and Porubčanová, state (2024). The phenomenon of motivation has always been understood and at the same time explained differently, as evidenced by a number of theories about motivation.

Motivation is an internal state of the organism that activates it to respond in a certain way to certain stimuli. This means that a person behaves in a certain way, chooses goals and the means to achieve them (Matúšová, 2019). On the other hand, it is a system of states and processes of self-management that activate a person and guide him/her through the creation of intentions and set goals.

Experts distinguish between the concept of motivation and the concept of motivating. Motivation is a condition whose causes, manifestations and results in a person are studied by general psychology. Motivating is a process demonstrating the use of the laws of motivation in stimulating or inhibiting personality motives to achieve a certain behaviour in learning (learning activities) and education. Motivating is an activity to promote other person's motivation (e.g., encouraging an appetite for learning). Self-motivation refers to the process of motivating oneself. Demotivation represents activities aimed at weakening someone's motivation (Machalová, 2015).

Motivation is an important part of work in those professions where the core of the work is contact, cooperation and influencing people (e.g., teachers and lecturers, psychologists, career counsellors, social workers, businesspeople, managers, coaches, priests). Demotivational influences and elements manifested in the behaviour of persons can be characterised as unintentionally applied or, conversely, as involuntary, unintentionally existing; undesirable manifestations that negatively affect the motivation of persons. They can grow into barriers to learning and education.

In this study we will deal with these phenomena, their theoretical basis and the possibilities of their application in the process of classical and formative education. It should be emphasised that motivation cannot be narrowed down merely to the types of motivation that are linked to external stimuli (e.g. teacher's influence on students, lecturer's on participants in education, teaching methods and organisational forms of education relevant

to the specificities of the target group, age specifics of participants in education, their expectations, life goals and attitudes), but also to the internal states and processes activating and energising the individual in the process of learning and education.

1.1 Motivation in education

Knowledge of motivation allows us to better understand the causes of human behaviour, understand the diversity of motives and apply knowledge of motivation theories and other principles in motivating people (students) towards desired behaviour, work and learning performance, or use them to design forms and methods applied in implementing educational programmes for adults, for instance.

Penetration and application of psychological knowledge into education is becoming an integral part of educational theory and practice. Education supports the development of education and upbringing of citizens, the creation of competencies for work and life in a society based on knowledge and information. Priority has also been given to the comprehension of psychological knowledge regarding personality and its development, support of acquisition and development of professional, social and psychological competencies. At the intersection of psychology and pedagogy, there is the development of the individual potential of the learner (Đurič, et al., 1999). The psychological approach emphasises the differences in the processes of cognition and application of knowledge. Pedagogy focuses more strongly on external manifestations of a person (externalities), psychology focuses on internal processes and states of a person (internality). Knowledge of psychological determinants, aspects and conditions of students' learning and their education is the epicentre of the scientific interest of educational psychology.

In a psychological approach, changes in the psychological level of individuals are assessed, and changes in the psyche (experience, behaviour, actions) and causal connections in the personality are taken into account. The psychological development of the personality of the participants in the education is evaluated (Machalová, 2015). Learning and education takes into account several aspects that are related to:

- psychology of personality in a broader sense (student and teacher);
- psychology of personality in the narrow sense (with the personality and specific characteristics of the pupil – student) – particularly with the abilities and motivation to study and its age peculiarities;
- ontogenetic psychology, specifying the characteristics of developmental periods;
- educational psychology, especially the issues of teaching (types and styles of teaching), learning (learning conditions) and education, as a process of mutual interaction between pupil – student and teacher (Krystoň & Kariková, 2015, p. 100).

Motivation of behaviour, in this case teaching/learning, is based mainly on intrinsic motives and needs (*intrinsic motivation*) or from external incentives (*extrinsic motivation*), as writes Matúšová (2019). In case of intrinsic motivation, the motivational state results from the personality, whereas in case of extrinsic motivation, the motivational state is controlled from the outside, by other people.

Both intrinsic and extrinsic motivational factors are manifested in human behaviour. Both types of motivational factors positively or negatively affect a person's effort to act as well as to learn. *Intrinsic motivation* is understood as the current state that forces an individual to do something for their own satisfaction. It represents a subjective aspect of motivation, the goal of which is the activity itself. A student who acts under the

influence of intrinsic motivation acts spontaneously, out of interest, with pleasure, but also on the basis of his/her life plan. *Extrinsic motivation* represents a state where a person acts under the influence of external stimuli, incentives. Incentives are stimuli that externally stimulate the personality to action. These can be external phenomena and events (e.g., proving to a parent or teacher that a student is able to overcome an obstacle, learn the curriculum; in the case of an adult, it may concern a difficulty in finding a job, job loss, outdated knowledge that cannot be used at work) affecting a person from the outside as motivating factors. Extrinsic motivation is caused by an exogenous stimulus.

Both types of motivation, which complement each other, need to be promoted and developed in education. Extrinsic motivation should not be exclusively prioritised over the intrinsic motivation, as extrinsic, forced motivation in the long run forms a person's dependence on external control, such as the lecturer's control tools (e.g., learning only to pass the exam is not the same as when a person learns to apply knowledge and skills in the workplace and in work performance).

Psychology has cultivated a certain concept of motivation, delimiting three dimensions – *arousal, direction and persistence of behaviour*. 1. *Arousal* of behaviour (activity) is caused by needs, especially their deficiency, which leads to an effort to eliminate the feeling of deficiency (deficit). 2. *Direction* expresses the focus of the activity depending on the values, interests, attitudes, life orientation, beliefs, in accordance with the aspirations and ideals of a person. 3. *Persistence of behaviour* pursues a certain goal to be achieved, which also depends on the level of aspiration.

The *arousal of activity* means activation of oneself (learning subject), states S. Matúšová (2019), and in terms of learning or education it primarily concerns clarification of educational *needs* of a personality that are related to the needs to ensure the existence and development of the personality (in terms of employment, occupational and personal interests and job prospects), knowledge of the most important *motives*, which are related to participation in education and the use of education results in personal, social and professional life. The basic needs of a person in society include the need to work, the need of self-actualisation, the need of social contact, security and safety, the need for recognition.

Szabó & Kolibová (2014) point out that if the level of arousal is low, the organism does not respond. Arousal can be affected by an intense stimulus, unexpected situation or stimulants (caffeine, drug). People feel comfortable as long as their level of arousal is moderate. Optimal performance is also provided at a medium level of arousal. At its higher level, disorganised behaviour may occur and at an extremely high level, an individual's activity can be blocked. Students and adults in education, when in a state of exam fever (high level of arousal), are unable to give adequate performance. However, individuals differ significantly in what level of arousal they experience as optimal. At very low levels, they are usually placed in an environment that is poor in stimuli, they are bored. This condition is called *sensory deprivation*. In this situation, the individual engages in an activity that increases the arousal level in order to get rid of sensory deprivation. On the other hand, account must be taken of the fact that the arousal and motivation features of the personality include instincts and impulses. These are innate and ensure the viability of the organism.

Direction means directing the outlaid energy in the appropriate direction, e.g., to pick a specific education programme, or type of education depending on values, interests, attitudes, life orientation and beliefs of a person. These are the motives giving purpose and direction to behaviour and action.

Persistence means targeting activities of the personality at a certain goal and its achievement (e.g. to achieve success or avoid failure).

Motivation therefore means arousing, sustaining and directing human energy and activity. It can be considered as a driving force of a mental nature that sets into motion human behaviour and activity. Motivation is manifested outwardly as a set of processes involved in the intensity, direction and manner of action, but in essence it means an internal force that energises the organism.

A typical sign of motivation is that it is always a present feature. Whatever the driving force is, it always motivates now, in the present. Even though the experience from the past can be manifested in the present behaviour and activities, the motivating force is contained in the present, current needs. However, motivation cannot be understood as an exclusive means or a tool to justify behaviour (Szabó & Kolibová, 2014). Direction towards the goal depends not only on the motivation, but also on the human competencies. Even very strong motives are not enough for a person to achieve a goal if such person lacks the necessary abilities and skills. Even the best competencies are not enough for a person to start and persevere in an activity, if that person's motivation is zero. Performance always depends on a person's intellectual preconditions and the level of motivation targeted at the goal.

2 Factors and sources of motivation

Stimuli and motives act on a person at the same time, and this effect and its result are called the process of action motivation. In practice, however, both notions are often used as synonyms or equivalents. This means that stimulation is understood as such an external action on the human psyche, the result of which there arise certain changes in person's activity through a change in mental processes, through a change in his/her motivation.

Motive is considered to be the key intrinsic source of motivation. Extrinsic sources of motivation are also stimuli from the external environment – incentives. Intrinsic motivation, which is manifested in interest, desire, longing and activity, is central to achieving goals and learning results. According to Ríčan (2009), the strength of the motive at a given moment is mainly influenced by the following factors:

- *internal state of the subject* – e.g., the time that has elapsed since the person last consumed something, or when the person was at a favourite cultural or sporting event;
- *presence and nature of the motive* (incentive) – e.g., the proximity of the object of desire, where the obstacle on the way to the goal further increases the strength of the motive, unless it is insurmountable at first sight; the motive can also be negative (e.g., visible danger reinforces the current motive to escape);
- *individual dispositions* – e.g., tendency to spend a lot of time with friends, peers or in shopping centres, gaming rooms, with computer in the virtual world.

A special motive is *exploratory motive* evoking exploratory behaviour that extends to everything and is referred to as curiosity. *Secondary motives* are psychological (although they may be derived from biological motives). An example of a secondary motive is the need for money, for which you can buy food, prestige, pleasant company, health, educational course.

Intrinsic sources of motivation include *needs*. Need is a specific state of the organism that can energise behaviour leading to satisfying such need. Needs are linked to deprivation – a deficiency or excess of important substances in the organism. They are manifested by a feeling of internal deficiency or excess, which disrupts the homeostasis of the organism.

The *biological needs*, which include 12 to 15 needs – hunger, thirst, sexual motive, care for offspring, ensuring appropriate body temperature, avoidance of pain, excretion, need for oxygen, need for sleep and rest, need for activity (related to the level of activation), need for safety, aggressive motives (Szabó & Kolibová, 2014), serve for the organism's survival.

The needs the satisfaction of which ensures the survival of the organism are called the *primary needs*. They are innate and necessary to sustain life (e.g., needs for food, water, air, heat, sleep, activity, pain avoidance). Their satisfaction and motivational strength is similar in all living things. *Negative needs* require for their satisfaction the escape from an unwanted object or condition (e.g., the need for safety, the need for peace, the need to get rid of pain or discomfort).

Primary psychological needs may have a biological basis in human instinctual equipment, but they are strongly shaped by learning. They include the need for knowledge, games and entertainment, however the social needs related to other people predominate:

- the need for social contact (to be with other people, not alone);
- the need for autonomy (to do what I see fit, including the ability to be alone);
- the need to take care of others;
- the need to control someone;
- the need to excel, surrender or be in opposition;
- the need to imitate;
- the need for tenderness.

Satisfaction of primary psychological needs can be characterised, according to Řičan (2009, p. 180), as follows:

- i) their satisfaction is normally less urgent than is the case of the primary biological needs and can be also postponed;
- ii) it can take a variety of forms;
- iii) it is largely interchangeable in the sense that meeting one need replaces the satisfaction of another needs.

Range of secondary (psychological or social) needs is significantly richer. They are created during the individual's ontogeny and arise in the interaction of primary needs with the environment (e.g., the need for safety, care, affection, aesthetic and sensory needs, the need for self-actualisation, self-creation). The most important secondary needs include:

- social needs (e.g., the need for prestige, the need for a positive relationship);
- cognitive needs (e.g., the need to acquire new knowledge, the need to seek and solve problems);
- performance needs (need for successful performance and avoidance of failure).

For *social needs*, it is characteristic that they behave in contrast to the biological needs. If a person succeeds in satisfying their social need, then such need grows in intensity. For example, a person's success in social life motivates him/her to gain further success, though failure discourages him/her from such activity. Social needs are variable on the case-by-case basis, depending on each person's experience and life situations.

Interests represent a special category of motives that is of practical importance, especially in terms of education. It characterises a permanent relationship to certain objects and phenomena. They contain *cognitive* and *emotional aspect*. Interests indicate the focus and motivation of the personality and are a specific prerequisite for a strong positive motivation for activity and learning. They are carried out over the course of a certain activity, not in its result, e.g., interest means playing volleyball (but not winning; that's another motive), collecting coins, studying languages, caring for children, constructing aircraft models, etc. Interest is what a person enjoys doing.

Interests are very plastic and can be shaped by upbringing. They can change in different age periods and be completely different. Initially, they have a dynamic (and diverse) structure, later they become more permanent in nature. Knowledge of students' interests is of great importance in the educational process.

Attitudes are opinions on objects, phenomena, persons, situations that are formed during life under the influence of upbringing in

the family and school, under the influence of the environment, life experience, public opinion and the mass media. They express an evaluative relationship to social objects in the environment in terms of preferences and liking (what a person prefers or likes). An attitude comprises a cognitive component, emotional and cognitive component – the tendency and readiness to act in the direction of the attitude. Attitudes are shaped by person's experience, so they are highly emotional, individualised and variable.

Attitudes are formed on the basis of spontaneous learning in the family and other social environments. They are related to value systems, and are equally dependent on cultural, ethnic and educational factors (Průcha, Walterová, & Mareš, 2013).

Value is defined as a specific property of all social and natural phenomena manifesting their positive or negative significance for humans (Boroš, 2001, Jablonský & Matúšová, 2013). The values are not fixed. They are formed during life under the influence of the environment, upbringing and own activity (self-education) of individuals. Values are adopted in the process of interiorisation and, through a certain amount and arrangement of interiorised values, they create a person's value orientation. An important value of an adult is health, happiness, satisfaction, peace, good relationships.

The value of educational attainment has been gaining in importance and been clearly growing. Investment in education is considered to be the most promising and effective. Education is the "instrumental value" enabling the acquisition of competence and qualifications (retraining), application on the labour market, reduction of unemployment and getting a job, development of the ability to navigate today's world and its processes, formation of one's own opinion and attitudes, making a choice from offered alternatives in life and in the workplace, and the strengthening of the stratification of one own's place in society (Veteška & Kursch, 2021). Education promotes personal autonomy, independence and increases one's own defences against manipulation. The level of education achieved affects the way of integration into social, labour and family life. For many people, education as such stands for a meaning and value.

People acquire values through socialisation and enculturation. Each cultural community has specific values that govern attitudes, norms of behaviour, motivation, morality. A special role is played by the values relating to education, family upbringing, work and co-determining how individuals are integrated into school and further education, how they cope with the requirements of the labour market, etc. The values given by society are hierarchically arranged as value orientations/value systems and prioritisation of values changes due to the effect of the civilisation changes in youth and adults (Průcha & Veteška, 2012, p. 119).

Current values can also include moral level and the good (as opposed to the bad), justice, authenticity, truth, freedom, transcendence (transcendence of oneself).

Aspirations are strong arousal-motivational factors, characterised by the efforts to achieve close and distant goals on the basis of self-assessment and past experience. Aspiration is goal-oriented action, efforts, desire for something. It is the level of self-performance that an individual expects based on previous performance in a given situation. Aspiration depends on personality dispositions, value orientation and the current situation, which influences the strategy of one's activity. Real aspirations are linked to the desire to succeed and to try to avoid failure. If the aspiration and the achieved performance are in concord, the motivation is strengthened, if they are in discord, the motivation is weakened. Success increases the aspiration level, and, *vice versa*, failure decreases it (Průcha & Veteška, 2012, Matúšová, 2019). In adult education, we may encounter several aspiration levels for the same participant, depending on the type of activity, subject or content of education.

Habit is an individual motivational tendency to repeatedly follow a certain scenario in a certain situation. Certain situational

signals trigger the urge to act in the usual way. Habit is actually a learned need, but more specific and individualised. People differ greatly and are unique in their habits. In a certain situation or based on a certain stimulus, it is our tendency to perform a series of activities in a settled form, in an unchanged order (Průcha, Walterová, & Mareš, 2013, p. 170). One of the characteristics of habits is the automation of proceedings, routine actions without thinking, i.e., without conscious control. Useful habits save time and energy, bad habits create unnecessary worries and harm. Habit can have a great motivating power and inertia. In older learners, we may encounter in education reduced adaptability resulting from overly strong habits. Leading students to the right habits (repeating, revision, answering control questions, and solving practice problems) can give them significant benefits – added value to learning results.

3 Use of motivation theories in education

Motivation theories examine the motivating process by others, as well as the process of forming the intrinsic motivation of individuals. They explain why people behave in a certain way and why they make efforts in a specific direction (e.g. in learning and education, interpersonal interaction, communication in the family and in the workplace).

The needs of learning, education and personal development are based on individual learners' motives, which include the motives of improving and developing one's own performance by acquiring, expanding and deepening knowledge in a certain area, improving skills and forming habits.

Need theory may be named as one of the best-known motivational theories. The need theories examine the essence of motivation and ways of influencing it through the basic forms of human motives – needs. Needs are a signal of shortcomings or surpluses and are a direct initiator of individuals' behaviour. Need theories provide a number of ideas that can be used in the application of motivational approaches to learning and education, in designing a suitable range of motivational tools, and in creating educational methods and forms.

A. H. Maslow made a significant contribution to the need theory (cited according to Říčan, 2009). His theory of needs is probably the best-known theoretical conception of motivation in human behaviour. He believed that in order to understand motivation in a specific area, one must understand human motivation in general. He assumed that motivation arises on the basis of needs, i.e., everyone is motivated by satisfying unmet needs. He proposed a model of motivation theory that to some extent strikes a balance between biological and social needs. He assumed that the individual needs competed with each other for their own satisfaction. According to Maslow, the *motives are arranged hierarchically according to their urgency*. This means that basic needs must be met first, and only then follow the hierarchically higher needs.

The Maslow hierarchy of needs model distinguishes seven levels of needs:

1. *existential needs* belong to the basic needs of preserving human life, they must be satisfied so that the individual does not feel intolerable suffering (hunger, thirst, sleep, clothing, housing); Maslow placed them at the base of the pyramid and called them physiological;
2. *need for safety* is placed on the first level; it is important for a person to achieve a sense of safety for their standard of living, which may, nevertheless, be devastated by the loss of a job or the loss of a home;
3. *need for belonging and association* represents the need to belong somewhere and be beloved;
4. *need for respect and self-esteem* represents the need and desire for constant, firmly established, generally high self-assessment, self-esteem, self-confidence and respect shown by others, a desire for the feeling of self-assurance, self-worth and success;
5. *need for knowledge, beauty and harmony; and*

6. *need for self-actualisation* that focuses on satisfying the potentials available to an individual, namely the realisation of intentions that lead to the well-being of others, enthusiasm for creative work or the struggle for the superpersonal goal in which one can self-actualise;
7. *need for transcendence* means the transcendence of oneself, the deep feeling and experiencing that the individual is part of a larger whole – humanity, nature, the Earth and finally the whole universe.

The process from lower to higher levels is not automatic (Říčan, 2009, p. 190).

3.1 Other important areas of motivation

In terms of education, it is necessary to also mention other important areas of motivation. These are the areas of *performance motivation, cognitive dissonance, self-determination and self-assessment*.

Performance motivation

It is characterised as an individual's effort to overcome obstacles, to succeed in performance situations (both in one's own eyes and in the eyes of other people), to persevere in demanding activities, to achieve a goal, to be successful. It is connected with performance needs, such as the need for independence, the need for competence, the need for successful performance, the need to avoid failure and sometimes (paradoxically) the need to avoid success, i.e., not to draw attention to oneself (Průcha, Walterová, & Mareš, 2013, p. 159).

Performance motivation (or motivation to succeed) is based on the need to set challenging goals and make efforts to achieve them. People differ in the level of performance motivation and its specific focus. These differences among people correlate with their commitment and success rate in the given field. It has been shown that companies with a high share of performance-motivated people are more dynamic, more productive and show a higher level of overall prosperity (Matúšová, 2019). Research on performance motivation yielded the following findings:

- i. In solving tasks, people with strong performance motivation are more persistent and more future-oriented (planning activities, strengthening prospects for success).
- ii. In solving challenging tasks, these people are predominantly interested in success (or expecting it) over the fear of failure. This finding has led to a distinction between two types of people – those oriented at performance (success) and those oriented at the avoidance of failure.
- iii. Where there is the option to decide the task difficulty, the performance-oriented people will usually choose a task of medium difficulty, i.e., a task requiring greater efforts to make a positive result realistic. People who tend to avoid failure usually choose tasks that are either extremely easy, with no difficulty to succeed, or extremely difficult tasks in the case of which everyone will fail, though there is also a chance of accidental success.
- iv. People with strong performance motivation attribute their success to their efforts rather than talent or external factors (Helus, 2011, p. 134).

Cognitive dissonance

It is defined as the contradiction experienced by a person when his/her internal attitudes or opinions are inconsistent with his/her external behaviour. As a rule, such dissonance is unpleasant, and people try to establish harmony. Dissonance is felt particularly badly when a person is forced (e.g., by circumstances at school, at work or by a situation in society) to suppress his/her attitudes and adapt his/her behaviour to such circumstances (Průcha & Veteška, 2012).

Self-determination

In education, the topic of self-regulation, human self-management falls under the issue of motivation. Here arises the eternal dilemma of whether the motivation for better and more responsible performance is associated more with intrinsic motivation (with the support of intrinsic resources) or with stimuli from the environment. The question is clear: Is the learning performance linked to independent, autonomous human decision-making or is it stimulated through external pressure coming from the person's control and from a sophisticated system of rewards and punishments? (Kuruc, 2017, p. 30).

The theory of self-determination by E. L. Deci and R. M. Ryan represents a mechanical model of human motivation and self-regulation. The authors perceive people as beings who have a natural tendency to be internally integrated, as beings with a natural tendency to the inner mental growth, endowed with a natural effort to develop their own interests. Everyone naturally seeks optimal challenges, new perspectives, tries to internalise and transform the cultural customs of their environment. It is a natural need to develop one's own capacity and show one's own talent. These natural features are characteristic of people of any age and form the essence of human motivation for life (Kuruc, 2017, p. 31). In their essence, people are oriented towards satisfying their own needs. The needs are more effectively met in a company of other people and in cooperation. Here we can see the first link between intrinsic and extrinsic motivation.

Self-assessment

This ego-related approach leads to a distinction between two kinds of motivation – to defend and evaluate the ego and to avoid ego devaluation. *Defence against ego devaluation* is manifested in the strategy of compensation and elimination of negative self-assessment. Boosting the opinion of oneself is manifested in the preference of *the autovalorisation motive* comprising a set of mental processes by which an individual maintains or strengthens an opinion about themselves (also in the sense of the saying “am I worse than the others?”).

For this reason, when monitoring the learning and educational motives of children, young people or adults, it is necessary to point out the links between the motive to learn, get educated and strategies to improve self-assessment and improve assessment by personally important people (parents, teachers, trainers, coaches, mentors, partners, superiors, peer community, etc.). In the decision-making stage, *cognitive component of motivation* (a person puts forward factual arguments) is applied, whereas *emotional component of motivation* is applied mainly at the beginning and at the end of the motivational process (at the beginning as an emotional impulse – enthusiasm for new, unknown areas, subjects, topics or educational challenges, at the end as satisfaction from the achieved result and improvement of self-assessment).

4 A new phenomenon in knowledge-oriented personality - personality success

The issues of motivation and motivating students for education need to be addressed when seeking for an answer to the question why students with the same (measurable) abilities achieve different levels of performance. This phenomenon is ascribed to the fact that the students are differently motivated. This requires that during the education process effective ways be sought and found of bringing students to the “optimal level of motivation”. It is recommended that when teaching students, as well as adults, the activities focus on problem solving, problem solving, personal experience and the need to achieve success. These are also the things forming the cornerstones of formative education.

Learning motivation, for instance, in adults, which is different from a certain aspect than in pupils or students, is characterised by Bontonová (2015, p. 97) as “a dynamic, individually unique characteristic of the participants in education, which forms part

of the complex *attitude-motivation-value component*, as well as part of the unique whole of the adult's personality.”

A new phenomenon and notion have emerged in the knowledge-oriented personality – *personality success*. Psychological approaches to the success of personality in education take into account the personality determinants of success in conjunction with environmental influences. Personality determinants are components and relationships of the personality system (personality potential). The social determinants are school education policy, visions, strategies and practical measures in programmes and in the content of education.

A personality (elementary school pupil, secondary school student, but also an adult) can have in relation to learning *positive motivation to learning* or *negative motivation to learning*. A positive motivation is considered to be a state of motivation that evokes an awareness of the positive consequences of learning. Positive motivation is based on the desire to know and curiosity, desire for knowledge, excellence in the classroom, group, love for the subject, etc. In case of negative motivation, learners are aware of the unpleasant consequences that may ensue if they do not learn, or if they do not direct their study efforts where the teacher (lecturer) or the parent want them to be.

The motive for learning is also related to the success motive and the failure avoidance motive. They are linked to the theory of performance motivation. *Performance motivation* is a set of internal dimensions that encourage individuals to the performance-oriented behaviour, i.e. to achieve good performance in various types of activities. Good performance is both a motive and a goal of behaviour. Performance motivation refers to a wide range of activities, good performance in education, later in employment, interpersonal relationships, family and the wider social environment in which the individual has to demonstrate their abilities.

In terms of effective motivation, it is essential for teachers, managers and lecturers in education to get acquainted with and to know the main motivating factors that affect their students, but also adult learners, and to be able to use them to the benefit of education. Sources of individual learning motivation can be divided into several types, as writes Matúšová (2019), such as:

1. extrinsic motivation (requirements placed by a teacher, school, parent, employer);
2. intrinsic motivation (interest, desire, wanting by a student, learner);
3. reputation-based motivation (excellent reputation of the school, organisation, team of teachers, lecturer);
4. performance-based motivation (own achievements, school success, education and demands associated with learning or studies).

4.1 Success and failure as a psychological phenomenon

Success and failure is a psychological phenomenon that is associated with the level of motivation and aspiration (expectations of success or failure). They can be evaluated objectively, but greater value is placed on their subjective evaluation. It is necessary to compare the difference between the actual performance and the original level of aspiration. Success and failure participants in education mainly means an experiential state with an (immediate) dynamic motivating and emotional influence on human behaviour. The concept of one's own success is formed in the previous and current process of mental experience of success and failure, their assessment in the context of the difficulty of solving the required tasks, evaluation of success ranking in groups, in class, and in increasing one's own aspirations.

A comparison of personality factors and the influences of the situation revealed that “the more successful or unsuccessful the subject is, the more the success and failure depends on the personality and less on the situation. For subjects with a medium

level of success, success and failure will depend more on the situation than on the personality," states Machalová (2010, p. 148).

Success is conditioned by the influences of the social environment (such as standards, behavioural models and performance standards). Pupils with relatively the same level of talent and abilities can achieve significantly different performances also because the motive for attaining successful performance has been developed in them in different cultural and family environments. Low levels are seen in those who, as children, were more dependent on their parents and behaved in a more subordinate way towards them.

Therefore, the success of a personality is both a psychological as well as social phenomenon. Self-assessment will be affected by an external evaluation of the student's or learner's performance, which has an impact on how the personality will behave in further performance situations and what aspirations will guide his/her performance. From the social point of view, it is important how the activity and performance of the personality is assessed and evaluated by others, according to the criteria applied in the school or other social environment.

The criteria for evaluating the learning results of pupils or adults in education are related to the control of educational activities, the performance of teachers, lecturers and educators, the performance of students or other participants in education, as well as the effectiveness of teaching and education. The starting point for determining the success criteria is the determination of the goal of education, educational activity or programme (Matúšová, 2019). When determining the education goal, it is necessary to determine what is to be achieved through education (acquisition of knowledge, formation of skills and attitudes, practical skills, etc.).

Forecasting success in education is oriented on the detection of intelligence, intellectual abilities, cognitive style of personality, personality motivation (interests, attitudes and value orientation) and knowledge of personality traits. A no less important source is also knowledge, analysis, comparison and evaluation of performance over the course of learning and education of the subject and the statement of whether the subject has always been successful, whether their performance has progressed, stagnated or declined, in which situations and under what conditions.

For instance, research in young people has confirmed certain characteristics of successful learners. They have developed and strengthened:

- effective learning habits;
- positive attitude towards study;
- defined interests with preference for intellectual interests;
- control of impulsivity in behaviour;
- a positive image of oneself;
- increased introversion (closure), or self-orientation;
- lower activity in establishing relationships;
- independent thinking;
- criticality in thinking;
- ability to develop and solve problems;
- logic and accuracy of answers (Machalová, 2010, p. 149).

Success in education is associated with psychological determinants and applies equally to students and young adults:

1. *Motives for learning and education:* In education, successful pupils/students are more guided by motives of personality development and personal (prestigious) goals.
2. *Success is linked to interest preferences:* The interest orientation of successful students is more oriented towards more distant life goals; among unsuccessful students it has several features of existential orientation.
3. *The course and results of education are greatly affected by the ability to learn (habits and attitudes to learning and education).* In the unsuccessful, attitudes to the study are significantly more negative in the cognitive, emotional and activity components. Learning lacks favourable circumstances such as lack of perseverance, deficiencies in

scrupulous work on assignments and writing of papers, inconsistent and unplanned learning, mental lability and nervousness, learning under the influence of moods and current mental states, time constraints, difficulties in understanding more demanding texts, difficulties in written expression, insufficient concentration, lack of concentration, will, desire to learn.

4. Learning performance is significantly affected by adaptation. Successful students are not under the influence of personal (health, emotional) and social adaptation during education. Failing learners are affected in the education by the family, health and emotional adaptation, etc. (Machalová, cited according to Matúšová, 2019).

It transpires from the Maslow's hierarchy of needs how important the needs for acceptance, recognition, performance, competence or self-actualisation are important for an individual. All these needs are a motivation source for students, also during their education. If teachers want teaching to be effective, they should work from these needs, states e.g. Furlong and his colleagues (2014, 2016, 2018). In educational practice this means creating an opportunity so that students experience success, recognition as often as possible, and are praised, awarded and encouraged a lot in the learning process.

5 Formative education and assessment as a current method in the teacher's work

The current method in the work of a teacher – manager, is *formative education and assessment*, as a process that is gradually being implemented in several areas, whether it is the assessment of those in education or assessment of learners in the process of their self-assessment, or evaluation of projects, teamwork and individual work. The main goal of formative assessment, as presented by Laufková, V. (2017), Starý, K., & Laufková, V. et al. (2016), is to improve, develop and acquire new occupational competencies needed to manage and evaluate the teaching process through innovative forms and methods. In European countries, considerable attention is paid to formative assessment (Bell-Cowie, 2001, Frey, N. & Fisher, D., 2011, William, D., 2015), whereas in Slovakia there is a lack of information. In practice, assessment is most often used when students are placed in classification levels (Szarka, 2017, Szarka et al. 2019). However, formative assessment is focused on the continuous identification of areas that primarily require some improvement and subsequent decision on the further course of teaching (Tóthová, Kostrub, & Ferková, 2017).

The function of motivating students to learn is fulfilled by various, and that is not only positive, motivational factors. These factors affect differently the students and their overall success in the learning process. Often times, students' learning is guided by fear either of a bad mark, punishment by a parent, fear of teacher, or duty, or the need to achieve success, prestige, and reward. In the case of intrinsic motivation, the student is motivated by the activity itself, i.e., he/she is interested in the curriculum, motivated by a desire to know, etc. In extrinsic motivation students care for praise by a parent or improvement in marks. Since the basis of students' active and creative activity in lessons, as well as their success, is what motivation they use to do these activities, the primary role of the teacher is to arouse and maintain students' genuine interest in cognitive reality and to develop in them a desire for continuous learning. Inducing and maintaining intrinsic motivation is not an easy task. Modern didactics offers teachers the options of inducing and sustaining intrinsic motivation of students by using initial and continuous motivational methods, activating methods, methods of differentiated teaching, which allow to transform educational content according to age and individual peculiarities of students and motivate all students not by fear of failure but by desire to succeed (Petty, 2002), and here lies a built-in requirement of formative education, or formative approach.

The aim of the school's current educational activity must be to develop the student's personality so that, in addition to the acquired knowledge and skills, the student also learns such

qualities as activity, independence, creativity, responsible approach to learning and then later to work. The path of further improvement of the educational activities for students is in the whole complex of motivational factors that activate the internal resources of students and based on that they lead them to conscious regulation of activities. The issue of the relationship between the educational process and the learning motivation of students must be viewed from two aspects, as write Petlák et al. (2006, 2019), which overlap:

- The problem of using motivational factors to facilitate learning, to gain knowledge. The authors included here the use of motivational factors by a teacher in teaching, the organisation of learning activities, the use of content, methods and forms during lesson, and the impact on the social climate in the classroom. An important fact is that teachers are able to use motivational factors in the greatest possible unity with the needs and interests of students.
- The problem of influencing the motivational sphere of students, the development of the level of motivation of students, the formation of new motives.

In terms of strategies for forming a positive relationship to learning activities, important are positive motivation, student's positive attitude to the course of learning activities, interest in content, understanding of context, ability to apply knowledge in other learning situations, need to know, find out the result, solve a problem independently and seek problem solving options. In order to ensure positive motivation, it is necessary to strip the lessons of stereotype, boredom and avoid uninteresting activities (Petlák et al., 2006, 2011).

Motivation to learn is also influenced by the way students interact. Such interaction can take three forms: cooperation, competition or individualism. Vendel (2018) states that cooperation between students arises in the events of complex learning. This form though can sometimes slip into a situation where the two or three most skilful students do the work of the whole group. Then it turns into a situation when these students are gaining, while the other students in the group "just enjoy the ride" without the desired effect. It is frequently beneficial to have equal representation of both genders when forming a group that is to work together. Imbalance has often proved to be disadvantageous. In general, it may, therefore, be said that for very timid and introverted students, individual learning is more beneficial precisely because they are unable to express themselves enough within a group.

Individual learning is learning when students learn independently and are evaluated for their own performance only. With the right approach and the necessary time and adequate explanation provided, most students can meet the goals.

5.1 How to increase motivation to learn? Procedures for increasing motivation to learn

According to Petty (2002) and Szarka, et. al. (2019), the main prerequisite for optimal motivation is properly prepared and organised *classroom climate and rules*. The teacher should be patient, helping, should form the right relationship with the students, also individually with each student, should not criticise them and should especially not shame them in front of the classroom. It is important for the teacher to be able to assign tasks that are not too easy or too difficult, as in both cases there may be a loss of motivation. It is essential for students to be reminded of the meaning of what the teacher is presenting to them. When evaluating students' performance, it is appropriate to emphasise the comparison of the student with himself/herself, not with others, and point out the improvement. It is necessary to provide feedback and tell students what they are doing right and what wrong. Vendel (2018) brings up again the fact that when a teacher makes a student feel that he or she believes the student or that he/she can get better, it becomes a certain obligation for the student. Regarding motivation, Petlák (2006) talks about the magic circle, where success feeds success and failure leads to failure.

5.1.1 Assessment

Assessment measures the depth and breadth of knowledge and skills. It is sometimes criticised for being inaccurate and unreliable, and distorting both teaching and the curriculum. It should also be borne in mind that assessment results are not always a good or appropriate prediction of future performance. Nevertheless, both teachers and society need them. Properly implemented assessment inspires, motivates and gives feedback, which is important for, for instance, directing a quick correction or assistance if needed. However, according to Petty (2002), it can also result into an oversight of that what cannot be easily assessed.

Assessment can serve for various purposes. It can classify student performance, assist in job interview processes, assess the effectiveness of courses, teachers, lecturers, coaches, and can provide learners with a goal. This mainly concerns the assessment of the teaching or course, which should contain what the student/adult learner has achieved.

Teachers most frequently use *continuous – formative* assessment, which takes place during the lessons/course, and which assesses whether and how much the student has learned. With precision it also determines the student's learning problems, which the teacher can use to provide help. Since summative and formative assessment have very different goals, they are implemented by different methods.

5.1.2 Self-assessment

Assessment of students has been becoming more and more humanistic (Szarka, K. 2017, Szarka, Brestentenská, & Ganajová, 2019), it is focused on the development of self-assessment skills. The student compares the development of his/her skills with himself/herself in a given time. In assessment, it is appropriate to focus on the cognitive, affective and psychomotoric side of the personality, which makes the evaluation of the student comprehensive. In assessing, the teacher prioritises the positive aspects of the student and constantly encourages him/her to improve. The meaning of self-assessment lies in the fact that students be able to assess their learning performance and at the same time be able to realistically assess their own strengths and abilities. Self-assessment can be implicit when the student assesses own results for himself/herself, re-evaluates what he/she has or has not managed to do, and explicit when self-assessment can take place outside the classroom between the teacher and the student, or possibly in front of the classroom, where each student assesses himself/herself publicly.

In self-assessment, the teacher's important role is to create climate and space for students in the classroom by, for example, providing students during lessons with procedures for solving individual tasks, in conclusion by providing information on the correctness of tasks, using tests that are not marked and thus verify only students' knowledge, by giving the assessment criteria in advance and informing the students of the given assessment criteria, in case of incorrect problem solving by not giving bad assessment immediately, but by giving students room for correction, and thus actually supporting the student's awareness of what is correct, and last but not least, by requiring from students to assess their own performances (Chmelíková, 2003, Tomášková, 2015).

There can be more ideas and suggestions and it is up to the teacher which procedures he/she chooses to succeed among the students and thus induce the right climate in the classroom, natural motivation, and to make students feel confident, comfortable and have the desired impact on them.

6 Conclusion

Formative assessment is a long-term, responsible and demanding activity, which – provided it becomes a school philosophy – makes sense and continuously brings demonstrable results. The

goals of self-assessment, but also the methods and forms, are determined by the school itself. This allows its self-regulation and management from within (Turek, I., & Albert, S., 2006). The use of self-assessment though also increases the quality of education provided, report Spilková, V., 2012, Braunová, 2013, Straková, J., & Slavík, J. 2013, and Marks, I. 2022.

Systematic assessment and self-assessment of work is thus one of the main tools of school autonomy, it is a starting point for compiling annual reports, school educational programme, updating the goals of further development, etc.; it should definitely not become a formal issue. On the contrary, thanks to team cooperation in its implementation, it should be an important tool, without which quality management in school is difficult to imagine. By knowing your strengths and weaknesses, it is possible to advance.

Therefore, it will be interesting as well topical to: – examine some issues of formative assessment and motivation of students; – assess the pedagogical training of future teachers; – what innovations have been put into practice, whether teachers of vocational subjects use assessment methods promoting students' learning process and metacognitive development, for the purpose of purposeful and targeted planning of personal progress; – it will be necessary to expand knowledge about formative assessment at the secondary school level as one of the current trends in secondary school assessment; – explaining emphasise its benefits in respect of students, teachers, vocational lecturers, instructors, and for the school as such as well as practical training centres; – and to analyse whether teachers use appropriate teaching strategies and whether, in the generation of the new millennium, within the upbringing and educational process, they really assess what will be needed in the future regarding the requirements of the labour market in Slovakia and abroad.

The teacher has a strong formative influence on the students. A teacher's communication, attitudes, expectations, aspirations, goals and relationships with the students themselves, can greatly influence their attitudes and the learning outcomes as such. In addition to the pedagogical-didactic, methodological readiness of teachers for their profession, the ever-growing emphasis is placed on their personal and psychosocial qualifications. It is also underlined that the basic precondition for the success of the teacher's pedagogical-didactic work is his/her motivation as well as the ability to encourage students' intrinsic motivation and keep the students continuously interested throughout the educational process. For this reason, it is important that the teacher pays due attention to motivation and constantly improves his/her knowledge in this field (Petlák et al., 2006, 2011, Matúšová, 2019). Motivation is a set of motives that evoke the activity of an organism and determine its focus. It is an internal driving force behind meeting unsatisfied needs. It is said that good motivation is a guarantee of success and in relation to education that "good motivation is half the success of a teacher's work and student's learning", writes E. Petlák in his monograph on motivation (2019).

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IDENTIFICATION OF PERSUASION PRINCIPLES IN BUSINESS BEHAVIOR – METHODOLOGY PRS40

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Abstract: The aim was to enrich the understanding of persuasion issues with a specific focus on identifying persuasion principles in business behavior. Data from respondents were obtained through the PRS40 questionnaire (Principle of Persuasion). The goal was achieved through the development and validation of the original PRS40 methodology, which was created to identify persuasion principles in business behavior by specifying its factor structure and basic psychometric parameters.

Keywords: Persuasion, Principles of Persuasion, PRS40 Methodology, Business Behavior

1 Introduction

Persuasion, influence, and manipulation are concepts we encounter daily. However, we often do not know the differences between them. Most of us even use these techniques in various ways without realizing it. In the world of business and entrepreneurship, these techniques are indispensable. Companies now even provide various courses for their employees. In these courses, people learn not only how to use these techniques but also how to defend against them. Zelina (1990) believes that the persuasion process is closely related to other aspects of conducting a good conversation, such as proper preparation, understanding people, and building rapport during the conversation. The art of persuasion can be learned through practice and attentiveness to feedback.

The word "persuasion" comes from the Latin word "persuasio," which can be translated as "convincing" (Korolko, 1998). Manipulation differs from persuasion in that the manipulator's goals are not known to us. Prokúpek (2017) attempts to explain the differences between persuasion, manipulation, and influence. He defines persuasion as a conscious effort to change the attitudes, opinions, or behavior of another person or group while maintaining free will. It must not involve pressure, bans, or commands, and the recipient has the right to refuse. Prokúpek (2017) describes manipulation as persuasion using dishonest techniques. The boundary between manipulation and persuasion may not be the same for everyone, so it cannot be precisely defined. What one considers honorable, another may regard as dishonorable behavior. Subsequently, the author describes influence. He believes that influence is a conscious or unconscious act on others that can lead to a change in their attitudes, opinions, and behavior (Prokúpek, 2017). Influence is therefore the broadest of these three concepts.

Within his definitions of persuasion, Gálik (2012) states that it is an intentional attempt to influence, it is a form of communication involving the transmission of a message, it involves changing the mental state of the recipient (changing thoughts, beliefs, attitudes, opinions, or behavior), and it respects the recipient's free will, distinguishing it from manipulation.

Various methods are used in persuasion to truly convince people. Rational and emotional arguments are used, where it is important to pay attention to the content of the information. Expert opinions are often used for persuasion, or popular celebrities are utilized as well (Karlíček, Král, 2011).

Perloff (2008) defines persuasion as a symbolic process in which the communicator seeks to convince the recipient to change their attitude or behavior by sending a message in an atmosphere of free choice.

According to Šerkovin (1977), persuasion can be considered as a flow of information that reduces the level of psychological resistance of the recipients subjected to communication influence.

2 Research

The aim of the research was to enhance the understanding of persuasion issues with a specific focus on identifying persuasion principles in business behavior. This objective was achieved by proposing and validating the original methodology PRS40 for the purpose of identifying persuasive principles concerning the specification of its factor structure and basic psychometric parameters. The results were processed using the statistical program IBM SPSS Statistics 26 through statistical methods: Pearson's correlation coefficient; factor analysis (Principal Component Analysis with Varimax rotation), Cronbach's alpha, Friedman test.

Based on the defined research aim, a research problem and research hypothesis were formulated and addressed within the research project: Problem: Is there a structure of persuasive principles in business behavior, and is it possible to delineate the taxonomy of this structure? Hypothesis: We assume that there is a structure of persuasive principles that can be taxonomically specified in business behavior. The data were obtained through a research project on a sample of 338 respondents operating in the business environment, including 153 (45.3%) men and 185 (54.7%) women aged 18 to 67 years (average age 38.39 years, standard deviation 12.937).

Taxonomic specification of the factor structure of the existence of persuasive principles in business behavior: By factor analysis using the Principal Component method with Varimax rotation, five factors were extracted, confirming the existence of the presumed factor structure of persuasive principles in business behavior (Table 1, Table 2, and Graph 1). These factors were characterized as follows:

Attractiveness - Respondents who score higher in this factor tend to believe more that if they feel physically more attractive, they communicate better. These respondents adhere to the belief that physically attractive people are better communicators. They tend to ignore or reject information that conflicts with their opinions and beliefs. Self-deception is used to maintain their thoughts and feelings in line with what someone else has done or is planning to do. Cronbach's alpha: 0.860.

Reciprocity - Respondents who score higher in this factor perceive people around them as bigger, wiser, and more experienced than themselves. They adhere to the tendency that kindness is repaid with kindness and help with help. This factor also holds the belief that kindness, gifts, and invitations must be reciprocated. If they see people in certain situations, they tend to adopt their behavior. Cronbach's alpha: 0.840.

Popularity - Respondents who score higher in this factor are characterized by seeking answers or direction to follow. They do not ask what others can do for them but what they can do for others. Respondents feel the need to orient themselves in the world and have the need for correct information. Cronbach's alpha: 0.830.

Free Choice - Respondents who score higher in this factor tend to believe more that their decisions are right and good. They need constant explanations for trust in a person to develop. If they feel their free choice is somehow narrowing, they want to act immediately. They then react with direct resistance and try to regain their freedom. They feel better if they see that more people before them were satisfied with the same decision before buying. Cronbach's alpha: 0.799.

Adaptability - Respondents who score higher in this factor are adaptable when they are unsure how to perceive or interpret a situation. A discounted price of a product makes them feel the product is scarce. This factor also involves carefully observing the surroundings and then adapting to them. They are more manipulated by peer pressure than the truth of the situation. Cronbach's alpha: 0.850.

Tab 1: Saturation of extracted factors by individual items

	Factors				
	Popularity	Adaptability	Attractiveness	Reciprocity	Free Choice
PRS1 - When I see someone with an expensive car or watch, it evokes respect for that person in me.			,554		
PRS2 - If I feel physically more attractive, I communicate better.			,576		
PRS3 - I tend to listen to those who are similar to me (not physically).			,560		
PRS4 - Physically attractive people are better communicators from a communication standpoint.			,721		
PRS5 - Once I make a decision, I feel internal pressures to behave in line with that decision.			,604		
PRS6 - Sometimes I deceive myself to keep my thoughts and feelings in line with what someone else has done or is planning to do.			,668		
PRS7 - I tend to ignore/reject information that conflicts with my opinions and beliefs.			,597		
PRS8 - I believe that physical attractiveness influences popularity.			,641		
PRS9 - Compliments towards me increase the popularity of the communicator in me.			,598		
PRS10 - I perceive people around me as bigger, wiser, and more experienced than myself.				,436	
PRS11 - I adhere to the tendency that kindness is repaid with kindness and help with help.				,601	
PRS12 - I am accustomed to reciprocating all kindness, gifts, and invitations in the future.				,769	
PRS13 - My own thinking compels me to reciprocate kindness, gift, or help with the same kindness, gift, or help.				,639	
PRS14 - If someone does something for me, I feel that I owe them in some way, and vice versa.				,478	
PRS15 - If I give a gift to an acquaintance, it is very likely that I will also receive a gift on another occasion.				,577	
PRS16 - If I hear laughter in the background, I start laughing too.				,641	
PRS17 - If I see people in certain situations, I tend to adopt their behavior.				,598	
PRS18 - I seek answers and direction to follow.	,569				

PRS19 - I choose the service/product that I consider most trustworthy.	,563				
PRS20 - I mostly encounter people who are kind, smiling, respond to every email or call in personal contact.	,448				
PRS21 - The more I am in contact with people and see them, the sooner I establish friendship with them.	,657				
PRS22 - Face-to-face communication is more effective than mediated communication.	,726				
PRS23 - I do not ask what others can do for me, but what I can do for others.	,624				
PRS24 - I believe that people are interdependent.	,695				
PRS25 - I have the need to orient myself in the world and have correct information.	,527				
PRS26 - I need explanations for trust in a person to develop.					,445
PRS27 - I believe that my decisions are right and good.					,558
PRS28 - If my free choice is limited, I feel an increased need to behave to maintain my freedom.					,631
PRS29 - When purchasing a product at a discounted price, I feel joy and satisfaction.					,553
PRS30 - If I feel my free choice is somehow narrowing, I want to act immediately.					,733
PRS31 - If someone or something restricts my free choice, I react with direct resistance and try to regain it.					,712
PRS32 - I feel better if I see that more people before me were satisfied with the same decision before buying.					,460
PRS33 - The "discounted price" of a product I am interested in makes me feel its scarcity.	,492				
PRS34 - I tend to behave as those around me behave.	,635				
PRS35 - I tend to buy things that have been on the market the longest.	,540				
PRS36 - I adapt because I am unsure how to perceive or interpret a situation.	,560				
PRS37 - The need for acceptance by others forces me to agree with them.	,800				
PRS38 - I behave in a certain way because that is what others want.	,817				
PRS39 - I am more manipulated by peer pressure than by the truth of the situation.	,790				
PRS40 - I carefully observe my surroundings and try to adapt my behavior to them.	,603				

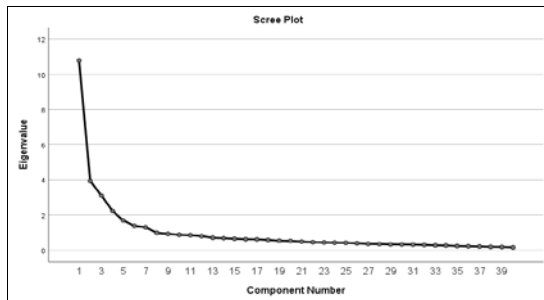
Tab 2: Results of factor analysis

Factor	Eigenvalues	% of Variance	Cumulative %
Popularity	10,786	26,965	26,965
Adaptability	3,933	9,832	36,797
Attractiveness	3,100	7,749	44,546
Reciprocity	2,224	5,561	50,107
Free Choice	1,691	4,229	54,336

Source: Own processing

During the evaluation of the analyses, we proceeded based on the criterion of Kaiser normalization, where we established a fixed number of factors (5 factors), as the research sample on which the factor analysis was conducted consists of 338 respondents operating in a business environment.

The extracted factors explained together 54.336% of the variance. This variance was sufficiently high, and the proposed factor structure could be accepted. It was supported by the reliability values obtained using Cronbach's alpha (Tables 3-7). The identification of additional factors that would increase the mentioned percentage was not appropriate. Further factors could not be meaningfully specified in content. The extracted factors could be quite clearly specified in content. The indicated factor structure is also confirmed by the result of the used Scree plot method (Graph 1).



Graph 1 Displaying identified factors based on the Scree Plot method

Tab 3: The values of Cronbach's alpha for the factor Attractiveness

Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
PRS1	27,24	36,813	,520	,852
PRS2	25,82	37,088	,594	,845
PRS3	25,93	36,554	,608	,844
PRS4	26,55	34,925	,654	,839
PRS5	26,08	37,685	,562	,848
PRS6	26,60	35,920	,596	,845
PRS7	26,54	35,946	,533	,852
PRS8	26,07	35,734	,608	,844
PRS9	26,21	35,898	,624	,842

Cronbach's alpha for the factor Attractiveness = 0,860

Tab 4: The values of Cronbach's alpha for the factor Reciprocity

Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
PRS10	23,30	26,664	,457	,840
PRS11	22,04	26,206	,616	,817
PRS12	22,24	24,356	,736	,800
PRS13	22,16	25,318	,686	,807
PRS14	22,27	25,871	,588	,819
PRS15	22,80	25,718	,576	,820
PRS16	23,11	25,409	,508	,831
PRS17	23,15	25,723	,553	,823

Cronbach's alpha for the factor Reciprocity = 0,840

Tab 5: The values of Cronbach's alpha for the factor Popularity

Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
PRS18	26,30	21,453	,473	,822
PRS19	26,04	21,619	,557	,810
PRS20	26,69	21,615	,494	,818
PRS21	26,17	20,386	,706	,791
PRS22	26,14	20,506	,648	,798
PRS23	26,47	20,725	,610	,803
PRS24	26,42	20,357	,559	,810
PRS25	26,16	22,265	,420	,828

Cronbach's alpha for the factor Popularity = 0,830

Tab 6: The values of Cronbach's alpha for the factor Free Choice

Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
PRS26	22,20	15,778	,478	,782
PRS27	22,01	16,617	,485	,781
PRS28	22,25	15,353	,569	,765
PRS29	22,13	15,479	,546	,770
PRS30	22,36	14,473	,631	,752
PRS31	22,29	14,699	,584	,762
PRS32	22,16	15,939	,423	,793

Cronbach's alpha for the factor Free Choice = 0,799

Tab 7: The values of Cronbach's alpha for the factor Adaptability

Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
PRS33	18,80	30,642	,470	,847
PRS34	19,20	29,329	,577	,834
PRS35	19,03	31,183	,449	,848
PRS36	18,64	31,340	,516	,840
PRS37	19,24	27,971	,740	,813
PRS38	19,42	27,917	,769	,810
PRS39	19,47	28,600	,723	,816
PRS40	18,81	29,934	,496	,844

Cronbach's alpha for the factor Adaptability = 0,850

The results of Cronbach's alpha reliability analysis confirm the adequacy of the analysis results with satisfactory values within each factor. The obtained values of the Cronbach's alpha coefficient indicate that the internal consistency of the items comprising the specified factors falls within an acceptable range. Cronbach's alpha is an indicator of consistency, reliability, of the mentioned factors. A value of 0.8 for this indicator represents a high level of consistency, reliability.

The correctness of the stated factor structure of the PRS40 methodology is further supported by the values of the computed intercorrelation coefficients between the individual extracted factors (Table 8).

Tab 8: Inter-correlations of defined factors in the PRS40 methodology

Factors	Attractiveness	Reciprocity	Popularity	Free Choice	Adaptability
Attractiveness	1	,472**	,462**	,584**	,463**
Reciprocity	,472**	1	,560**	,414**	,440**
Popularity	,462**	,560**	1	,464**	,279**
Free Choice	,584**	,414**	,464**	1	,280**
Adaptability	,463**	,440**	,279**	,280**	1

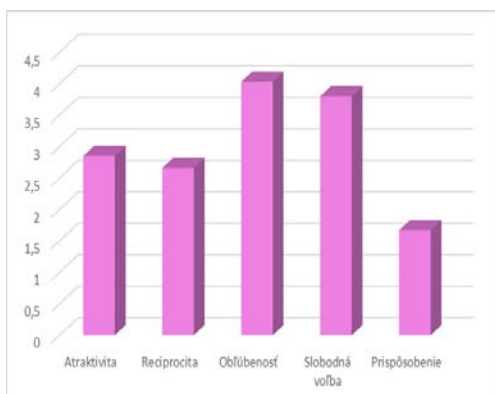
Adaptability	,463**	,440**	,279**	,280**	1
	0,000	0,000	0,000	0,000	

Legend: **Statistical significance at the 0.01 level of significance

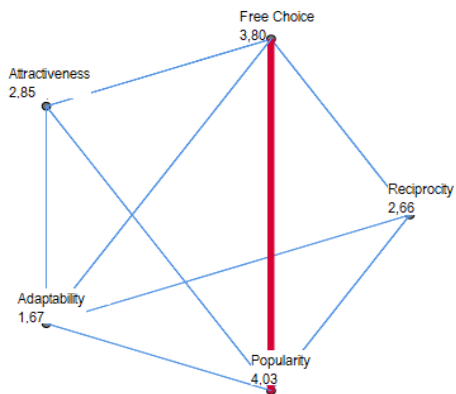
The results of correlation analyses indicate that individual principles of persuasive behavior identified by the PRS40 methodology are statistically significantly related. Correlations at the significance level of 0.000 represent the extent to which individual factors are related to each other.

The factors extracted by the PRS40 methodology were not assessed equally. The Friedman test confirmed statistically significant differences in the evaluation of individual tested factors at the significance level of 0.001 (Chi-Square 510.042; df 4; Asymp. Sig. 0.000). Five newly emerged factors (Attractiveness - 2.85; Reciprocity - 2.66; Popularity - 4.03; Free choice - 3.80; Adaptation - 1.67) of persuasive principles in business behavior were analyzed.

Respondents achieved the highest scores in the Popularity factor. Respondents prefer to seek answers or direction to follow. These respondents utilize popularity as a component of the need to orient themselves in the world and the need to always have the right information. These respondents do not ask what others can do for them, but what they can do for others. The lowest score was specified in the Adaptation/adaptability factor. Respondents are adaptable if they are not sure how to perceive or interpret a situation. They carefully observe their surroundings and then adapt to the situations. Respondents achieved average scores in the Attractiveness factor. In this case, respondents believe that if they feel physically more attractive, their communication is better and more confident. They hold the opinion that physically attractive people are better communicators. They tend to ignore information that conflicts with their opinions and beliefs (graph 2).



Graf 2 Assessment of the average values of each extracted factor in the PRS40 methodology



Graph 3 Pairwise ComparisonSource: Own processing

Through the method of pairwise comparison, or pairwise rating, we display the ranking or selection from a group of alternatives

by comparing them pairwise, where each node represents a sample count of successes. Pairwise comparison is used for decision-making or studying people's preferences. This rating simplifies and improves the accuracy of respondents' decision-making.

The presented research results and their interpretation are considered important for verifying the hypothesis: We assume that there is a structure of persuasive principles that can be taxonomically specified in business behavior. The proposed 5-factor structure of analysis of persuasive principles in business behavior and its basic validation parameters confirm the meaningfulness of the proposed specification for creating a methodology to identify principles of persuasion in business behavior.

3 Discussion and conclusion

Part of a salesperson's professional competence is the ability to persuade recipients about the credibility, correctness of their words, and ultimately to withstand the criterion that offers time, truthfulness, and activeness of words. In persuasive methods, the word primarily occupies a central position as the basic means of persuasion. The possibility of using persuasion in practice by salespeople is certainly inspiring.

The development and subsequent validation and verification of the PRS40 methodology are considered meaningful activities. It should be noted that the original PRS40 methodology can be applied in the context of various processes related to persuasion and people management in both business and managerial contexts. Specifically in the field of business, the use of this methodology can be specified in terms of personnel selection for business positions, their further education and training, and the preparation of operational and strategic materials in the area of persuading recipients.

In evaluating the analyses, we proceeded based on the criterion of Kaiser normalization, where we established a fixed number of factors. The proposed five-factor structure of analysis of persuasion in business behavior and its basic validation parameters confirm the meaningfulness of the proposed specification for creating a methodology to identify these methods in business behavior.

Basic principles such as attractiveness, reciprocity, popularity, freedom of choice, and adaptability are increasingly integrated into our lives, thereby integrating us into society. By using proper persuasion, a professional, or salesperson, can achieve tremendous power and incorporate it into fulfilling their requirements for selling goods, services, gaining and providing gifts, obtaining consent from the other party, and more. It is up to us how we view the salesperson who persuades us. It is up to us what or who we succumb to and start believing.

Cialdini (2009) refers to his principles as "weapons of influence." We fully agree with this designation and extend its application to all persuasive tools and strategies that exist. Each of these tools can indeed be imagined as a weapon. All weapons are capable of contributing to achieving a good goal in certain situations, but in the wrong hands and used incorrectly, they can cause great harm. These are tools that do not belong in everyone's hands, and their use needs to be regulated.

The presented findings and insights indicate the possibility of creating such a methodology, although further analyses are needed, and especially their implementation on larger, more heterogeneous samples, possibly including additional business situations.

At the same time, the findings highlight the necessity of constantly considering the degree of generality of accepted conclusions within the principles of persuasion, or the situational and contextual conditionality of these principles.

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Primary Paper Section: A**Secondary Paper Section: AE, AM, AN**

E-LEARNING IN THE CZECH REPUBLIC DURING THE SECOND YEAR OF PANDEMIC COVID-19

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Abstract: The aim of this research is to map the situation of online education in the Czech Republic and compare it with the European one. The research was conducted based on data provided by the Czech Statistical Office and Eurostat. The evaluated data were subsequently compared with findings from the literature search. The findings show that the usage of online courses is 20,8% more than the average in the EU27. And the use of online education materials in the Czech Republic, like the EU27. Online learning is still evolving, it has issues due to the lack of experience, but the potential is growing over time.

Keywords: E-learning, covid-19, online learning, students, online materials

1 Introduction

The Internet has become one of the most significant parts of our daily lives. Internet usage accounts for an average of 40% of the daily time, which is nearly 7 hours (Kemp, 2020). This means that the average person who sleeps 8 hours daily spends 43,8 % of their day on the Internet.

The pandemic of Covid-19 came with a lot of changes. Almost every country in the world was impacted by this, and it affected every section of our daily lives—health care, economy, travelling etc. One of the most impacted segments was education. The COVID-19 pandemic has led to a significant change in training behaviour in ophthalmology towards e-learning and online courses, which has not been accompanied by a general decline in a training activity (Kamouna et al., 2022). The Czech Republic during 2020 and 2021 mostly switched to online courses, starting from grammar school to university. Due to the devastating Covid-19 outbreak and the implementation of national lockdown in many countries, teaching and learning across the world's universities has consequently shifted from the usual traditional class-based to online. While the conventional approach has been preferred by most academics and students, adjusting to online learning posed a new challenge to academic students (Mseleku, 2020). This backs up the statement from Jafar (2022) in his paper, he said that the outbreak of the COVID-19 pandemic had transformed the education system in most countries worldwide (Jafar et al., 2022). During the COVID-19 pandemic, some instructors transitioned their courses into a fully online environment by adopting flipped learning (Lo & Hiew, 2022). For many students, it was beneficial; it cut their transportation costs, and for some, it was better so they could study in their homes in a more peaceful environment. Among the major advantages of e-learning is not only improving students' learning experience and widening their educational prospects but also an opportunity to gain insights into students' learning processes with learning analytics (Deeva et al., 2022). The student could spend more time focusing on learning. And some research even shows that only listening technique is better for studying. The results suggested that studying by oneself rather than simply listening to lectures enhanced the effects of the discussions and led to higher learning outcomes. In addition, the effect of the instructor's intervention in the middle of the discussion varied depending on the pre-learning activities of the discussion (Lim et al., 2022).

2 Literature Research

The education segment was forced to start from nothing in 2020 and 2021, and the return to digital education was better for students and teachers since they had some experience from the year before. Digital learning (DL) is well-placed to cater to these needs, as it provides teaching options that can be delivered flexibly and on demand from anywhere in the world (Kok et al.,

2022). The usage of e-learning cannot be pushed into all the study fields. For example, it is very unsuitable for medical studies. As Delungahawatta et al. (2022), said in their research, that, e-learning is recognised as a useful educational tool and is becoming more common in undergraduate medical education. E-learning is compatible with flipped learning; however, it is considered to be unsuitable for providing training on surgical techniques (Okada et al., 2022). Many educational institutions have been forced to close due to the sudden COVID-19 outbreak, and many students have been forced to stay at home and take online courses (Amaechi et al., 2022).

E-learning is achieved by the deep integration of modern education and information technology and plays an important role in promoting educational equity (Qiu et al., 2022). E-learning, online learning, and distance learning are all of those mentioned here before, but the start of the pandemic of covid-19 gave them a much more needed push to becoming a noticeably big segment in today's education. Students will check online content before performing procedures for the first time (74.8%), to understand what was explained in class (65.9%) or read in books (59.5%), to relearn clinical techniques (64.7%) and to visualise rare procedures (49.8%). (Dias et al., 2022) Most of the students are happy that most of the theoretical lectures become online. Students were highly accepting of lectures and seminars conducted in the form of e-learning, but not a laboratory and clinical classes (Dyrek et al., 2022).

The emergence of the Covid-19 pandemic undoubtedly resulted in devastating socio-economic challenges across the world (Mseleku, 2020). For this reason, traditional education and training have shifted to an online learning format (Al Shamari & Farooqui, 2022). In many forms, we can see online learning formats in online classrooms, sharing learning materials online, video courses and many more. The adoption of e-learning in response to COVID-19 is to ensure the continuous development of human capital through alternative means. Nevertheless, the success of e-learning systems depends much on the attitude of the users (Osei et al., 2022).

The positive that comes from switching to online education is the range. You can study from everywhere, and thanks to some online courses you can study anytime you want. The features accessibility, flexibility, intractability, and visualization with the characteristics of remote accessibility and flexibility, repetition and retrospect, feedback requests, and visualised analytical reports were considered to enhance learning outcomes (Liao et al., 2022). Not only the visualization but students had to think more since "they were on their own". The learning practices were positively associated with the thinking processes and the thinking processes were positively associated with students' basic science-related clinical ability (Liang et al., 2022).

There are many positives coming from e-learning but there are some negatives too. According to Dyrek et al., (2022) the main problems in e-learning are the quality of the classes conducted and the Internet connection. The students expect e-learning classes to be conducted in real-time, with direct, face-to-face contact with the lecturer (Dyrek et al., 2022). The technical issues with the personal or psychical problems of students can add up to more problems. In addition to technological issues, the majority of students cited psychological and social factors as reasons for their negative attitudes toward e-learning, such as a lack of readiness and ability to adapt to a new style of education, the ineffectiveness of the means and methods used, and poor communication with teachers and other classmate learners (Rabayah & Amira, 2022). And the study from Azmi et al. (2022) shows that, about half of the students were associated with increased depression. The outcome also indicated that female students experienced extreme depression, stress, and fear of examinations more than males (Azmi et al., 2022). This is proven also by research done by Zhou et al. (2022). We found that online courses with inappropriate characteristics were

associated with children's mental health. The findings called for efforts to optimise online courses and improve children's mental health (Zhou et al., 2022). Factors affecting the results of e-learning can be everywhere. The results show that a combination of organizational, technological, environmental and behavioural factors affects the efficacy of e-learning (Manjeese, 2022).

One of the worst problems was the adaptation to this new system of education, the university students for example had to switch to remote lectures instead of practical training in the laboratory. In Science this pandemic there have been tectonic shifts in the education sector. Effective implementation of e-learning in higher education depends on students' adoption of this technology (Chahal & Rani, 2022). Thanks to all of these experiences we can be more prepared for the future problems that could bring online education back, according to Subashini et al. (2022), adopting E-learning into the higher education sector could be recognized as a viable solution to facilitate the higher education during a crisis like COVID (Subashini et al., 2022). The students had to become more independent. In times of heavy restrictions, most of the libraries were closed. Students had to for their thesis find all the resources online. But there are more problems with that. Thanks to a lack of information on how to cite or use electronic resources some students could even end up doing electronic crimes. This was the focus of Ayyoub et al. (2022) research done at the University of Jordan. This indicates students' lack of awareness of the effectiveness of procedures and penalties for electronic crimes that can be applied in e-learning due to the rapid transition in the learning process (Ayyoub et al., 2022). However, the actual use by teachers appears to be primarily dependent on personal and technological factors. Similarly, 91% of the variability of the use of e-learning tools by librarians can be explained by organizational, personal and technological factors, with the personal factors having a negative impact on the actual use (Lopes et al., 2022). But it does not mean online learning is the only bad. Therefore, higher education institutions that aspire to benefit the most from the e-learning system should pay close attention to the aspirations of their students and enhance their enjoyment, and then redefine the "e" in e-learning as enjoy rather than simply electronic (Bessadok, 2022). The results from Li et al. (2022) indicate that online learning mode is more likely to reduce the academic performance of lower-grade students (e.g., freshmen and sophomores). The learning environment could be one of the essential factors affecting academic performance during online education. Studying at home or dormitory is more evidently correlated with academic performance decline (Li, et al., 2022). One study showed that a growth mindset can influence positively neonatal resuscitation performance after an e-learning simulation (Spénard et al., 2022).

But the problem is not only with the students. The teaching techniques needed to change the approach to e-learning. According to Matviichuk et al. (2022) the an urgent need for training experience, organization and implementation during wartime because of the fact that both the educational process and the opportunity to obtain an education should not be halted (Matviichuk et al., 2022). It can be challenging for teachers to engage students online; to know whether students are engaged or not. Online engagement can be perceived differently than in-class engagement (Bergdahl, 2022). The other study shows that students may have trouble focusing due to a lack of teacher-student interaction yet online learning has some advantages that are unavailable in traditional classrooms (Dong et al., 2022). In a study done by Hensen et al. (2022) a sense of community is linked to and facilitated by the online learning environment and the educators' and students' roles throughout the course. This study found that interaction and inclusion can be augmented by a hybrid educational design and supported by the mutual efforts of educators and students (Hensen et al., 2022).

3 Methodology and Data

The data used for this paper are from the Czech statistical office. Specifically, the data set called Use of ICT in Households and by Individuals - 2021 (Czech only). The data were conducted in the form of a personal interview using a personal computer on a selected sample of about ten thousand. Persons aged sixteen and more who live in private households in the Czech Republic.

The reference period for questions about the use of the Internet on selected devices, internet activities and educational activities on the Internet is the last 3 months before the investigation.

Data for international comparison comes from the Eurostat database for the digital economy and the company, the last update in January 2020. Tables and graphs with international comparisons for EU countries are presented as a percentage of the total number of students in the country.

The chosen categories for this research are:

- Students older than 16 years in EU countries using the Internet (in the last 3 months),
- Using inter participating in online course,
- Using online teaching material.

Participation in the online course - a teaching course that takes place over the Internet. Communication with teachers takes place via the Internet, also the teaching materials are sent online. Online courses include language courses, personal development courses, computer courses and more. This also includes courses made through applications such as Duolingo.

Using online teaching material - includes education on websites or in applications using audio, video or text materials or online teaching software. There are no teaching materials that are downloaded from the Internet and used offline (without an Internet connection).

The research was done by comparing the data from the Czech statistical office with finding from literature research. Based on the keywords associated with this research. Such as e-learning, online learning, online course and more.

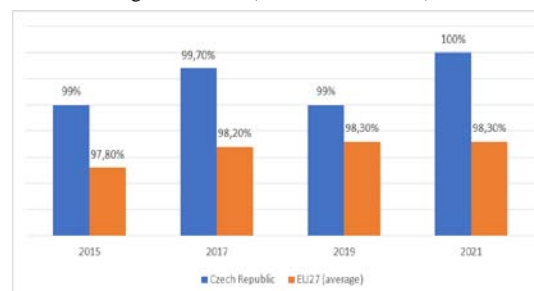
4 Results

Based on data from the Czech Statistical Office, specifically the use of information technology students (2021), several conclusions show.

Based on the data, it is possible to determine the use of IT students, which indicates a sample of approximately 10,000 students, for more than 16 years. We can learn the following.

First, we can see from the data that Students older than 16 years in EU countries using the Internet (in the last 3 months) compare the data from the Czech Republic to the average usage in the EU.

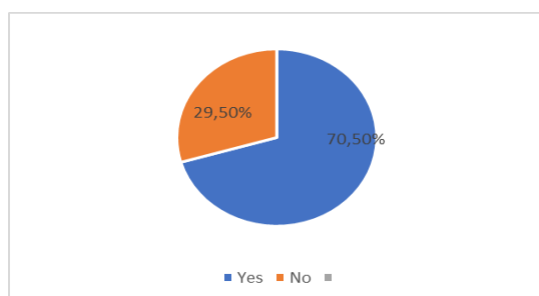
Figure 1: Number of students older than 16 years in EU countries using the Internet (in the last 3 months)



Based on the data showed in Chart 1, we can see that the Czech Republic is above average usage of internet compared to the usage of internet in EU. The data from Czech Republic shows, that the trend is going to be 100 or almost 100% usage in the next years, thanks to the internet still evolving and becoming one of the most important things in today's teenagers live.

This corresponds with the statement from Kemp (2020), in his research he confirmed that nearly 7 hours we spend on average on the internet. This trend is confirmed that 100% of students use the internet.

Figure 2: Participation in an online course



Based on the data shown in Chart 2 that from the data 70,5% of students over 16 participated in the online course. This shows that even younger students show interest in online courses, this can be heavily based on the required usage of online courses due to schools switching to online courses due to the pandemic of Covid 19.

If we go even deeper into the data, 71.8% of men over 16 and 69.1% of women over the year sixteen participated in online courses. The expansion of online courses is imminent. This data show not only the usage of internet courses provided by the school but also shows the use of online courses outside the school like Duolingo etc.

Figure 3: Using online teaching materials

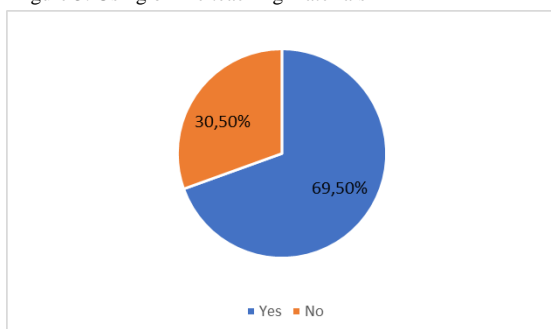
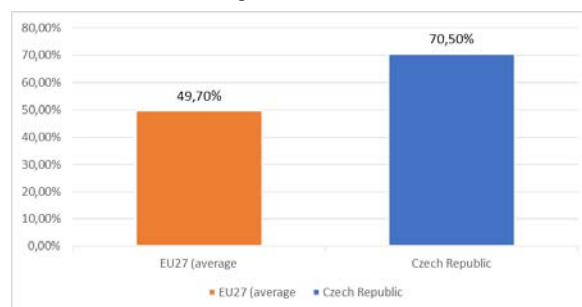


Chart 3 shows a similar trend in using online teaching materials. 69,5% of participants used some in the 3 months prior to the study some online materials. Based on gender we can see that 71,8% of men and 67,8 of women over the age of sixteen used online materials. The usage of online materials corresponds with a statement from Liao et al. (2022) that flexibility, accessibility, visualisation etc. were proven to enhance learning.

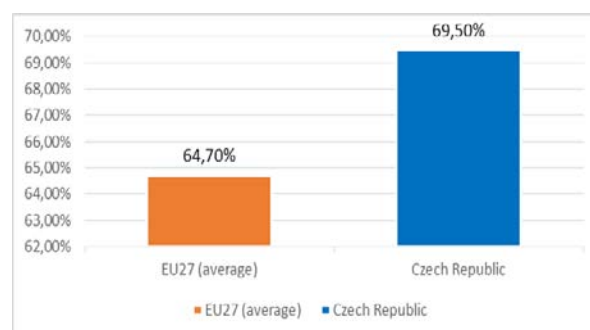
For a comparison of e-learning in the Czech Republic and EU27, I used the data provided by Eurostat to show very different results.

Figure 4: Participation in educational activities on the internet with students 16+ (EU compared to CZ)



Based on the data shown in chart 4 we can see that only 49,7% on average in the EU27 interacted in educational activities but only in the Czech Republic, 70,5% used participated in said activities. This shows the importance of education in the Czech Republic. And the will to the continued effort to educate students even during the pandemic.

Figure 5: Using online teaching materials (EU compared to CZ)



In chart 5 we can see the comparison of using online forms of teaching materials. There we can see there is not much of a difference between the Czech Republic and the EU27. It shows that most of the countries in the EU provided their students with online learning materials. But in comparison to online courses, it shows that the usage of just online materials is more common

5 Discussion

The application process of learning has undergone major changes over the past two years, one of which was the adaptation to online learning. The results vary based on geographical territory. If we focus only on the Czech Republic, it shows that the effort to educate students is strong. Almost 71% of students over the age of sixteen participated in educational activities. Meaning webinars, online classrooms, educational courses etc. The usage of online education activities coming not only from schools but also from the student's free time corresponds with the results from Sivaramalingam et al. (2022). Our results showed that the students were satisfied with the webinar teaching and acknowledged it to be an effective tool in the teaching-learning process to gain new knowledge and wish to attend webinars in future as a part of their curriculum. Thus, webinars have a constructive effect on the teaching and learning process in professional courses during the pandemic lockdown (Sivaramalingam et al., 2022). This also can be found in the study by Mohamed et al. (2022). This study finds that improving and enhancing student factors and system quality is critical for students' satisfaction with e-learning. Furthermore, e-learning platforms should contain new advances in computer-mediated technologies that enable collaboration, which is a critical factor in the success of e-learning systems (Mohamed et al., 2022)

The usage of online materials is becoming more and more imminent in our future. Since it has more benefits than negatives. One of those can be the saving of paper for printing the materials. Objectives Increased exposure to digital devices as part of online classes increases susceptibility to visual

impairments, particularly among school students taught using e-learning strategies (Cortés-Albornoz et al., 2022).

The online learning format however still has many problems. The technical issues, but we have to keep in mind that the students tend to be more struggling with mental issues thanks to the lack of social contact and world events. The coping strategies used by students ranged from support from family and counsellors, help-seeking, frequent communication, time management, and learning flexibility to control the learning environment (Okyerere et al., 2022). One of the problems that can be found in the teachers, is that most don't have that much experience with online learning. The relationship between the instructor role (instructor support, instructor-student interaction and instructor innovation) and students' approaches to using online learning technologies highlight the importance of instructor support and innovation in facilitating students' adoption of desirable approaches to learning from the application of technologies (Wang et al., 2022).

6 Conclusion

The usage of the online learning era was pushed even further thanks to the pandemic of Covid-19. During the pandemic, online learning interaction became more frequent among course network members whose interaction scale increased. After the pandemic, although the scale of interaction declined, online learning interaction became more effective (Zhang et al., 2022). Online education had become one of the only forms how to educate students during the lockdown in the Czech Republic. Online mode of education has been identified as the subtle solution to continue learning during the pandemic (Shafana et al., 2022).

From the data provided by the Czech Statistical Office and the Eurostat, we can see that in the year 2021 that 70,5% of students over the year sixteen participated in some online courses, which is 20,8% more than the average in the EU27. This shows that the Czech Republic has priority to still educate their students even during the lockdown. The data also shows that the students used not only online courses provided by the school but also educated themselves in their free time.

The usage of online materials is almost the same in the Czech Republic (69,5%), and the EU27 (64,7) making the difference just 4,8%. Online materials are more common now than ever since all the students and teachers were forced to work together online, based on the data and literature research the usage of online materials will become more important in the future. Even with the technologies latest trends, students nowadays use more technologies than traditional books and papers. Expectations regarding technology-mediated learning post-COVID-19 are mixed, hampering planning for the future. Hesitancy about teaching or taking courses with some or full online components persists (Guppy et al., 2022).

Because of the pandemic, schools needed to change their old learning activities and become more online, than ever before. The students proved that online learning is beneficial for them and the teachers. But it still has many issues which must be resolved for the future of online education. Overall, the perceived effectiveness of e-learning among students and teachers has not changed significantly over time. Nor have students' preferences shifted significantly for various learning modes after in-person learning resumed. However, informative directional trends have emerged (Li et al., 2022).

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Primary Paper Section: A

Secondary Paper Section: AM

BLANK DRAFTS TO SECURE OBLIGATIONS WITHOUT FINANCIAL RISK

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Abstract: Blank drafts have become an increasingly popular payment instrument used by banks and creditors to reduce financial risk. Bank drafts have a specific legal status, containing inconsistencies between a partial filling-in and their transformation into securities. The study aims to analyze blank drafts as an instrument in modern business transactions, their strengths and weaknesses, legal aspects, and related risks. Blank drafts are a flexible instrument used in multiple business transactions. Issuing an incomplete security paper allows the parties to agree on the terms and conditions of the transaction and then complete the necessary information, dramatically speeding up the processes. On the other hand, blank drafts impose a risk and may lead to harmful consequences.

Keywords: blank drafts, drafts, security, risk

1 Introduction

Financial instruments enjoy enormous interest, attracting financial historians, political economists, and antiquarians (Barnes & Newton, 2022).

A draft is a written document binding one party to pay a fixed sum of money to another party within a predetermined period or at sight and is not valid until signed by the drawee (Alharthi, 2022). A draft may be issued via an attorney, but the drawee assumes full-scale liability for its performance. Companies issue drafts via authorized bodies. Although signed by the attorney, the company is fully liable to perform obligations arising from the document (Şafak & Şengül, 2020).

Lyonnet et al., (2022) explored the relationship between the currencies used by exporters and financial security papers, revealing that large companies frequently use security papers when valuing a foreign currency. The authors also argue that by using these instruments, firms will tend to set prices in a foreign currency. The extended model of the drafting currency suggests that the general availability of security papers will make large corporations used to trading in the domestic currency prioritize invoicing in foreign money.

Chi et al., (2023) analyzed the optimal strategy for the risk management of insurers. They used the expected value theory to calculate the insurance premium and examine the effect of security papers, revealing that although stop-loss insurance is always viable, the full-scale risk transfer is optimal only upon meeting reasonable requirements.

Having financial security papers available helps companies decide on currency and risk management, requiring meticulous financial planning and risk analyses in the business environment.

Bolton & Guidi-Bruscoli, (2021) conducted a historical analysis, revealing that in the Middle Ages, drafts were used to transfer capital between regions and effectively run the business. Studying the drafts of Filippo Borromei & Partners disclosed their variable maturity, allowing enterprises to change deadlines and pay in installments. They also served as security against contracts and guaranteed business transactions. Their value and rates changed dynamically, allowing smooth capital transfers. In the late Middle Ages, drafts helped enterprises manage financial transactions and develop business relationships.

Although the previous historical study proved that drafts played an essential role in this security and financing, Hungary is still reluctant to trust this security paper. Szalay et al., (2020) argue that although Act CLXXXV came into force in 2017, Hungary is still cautious about issuing and using drafts and promissory notes. The authors further suggest that drafts could ensure the cash flow of small and medium-sized enterprises when other short-term securities are not available.

Traditional or modern drafts have great global potential Zhongmin, (2023) argues that drafts are essential in letters of credit (LC). However, disputes over various explanations of the drafting order within multiple legal areas arose. The author claims that drafts are imperative in the LC management's payment verification, maturity date, and receiver. The article aims to assess the utility of blank drafts in modern banking transactions, analyze their strengths and weaknesses, and explore legal aspects and related risks.

2 Methods

The article reflects the *de lege ferenda* theory, including four parts. The first phase defines and explores the relationship between blank and regular drafts, analyzing laws and by-laws under the Draft of Exchange and Cheque Act and articles indexed in the Web of Science.

The second phase deals with the use of blank drafts within economic relationships as the security against risks using the content analysis of the Czech law judicature.

The third phase involves expert's opinions on blank drafts and the fourth part explores situations where the law is not obeyed, including content analysis and Czech law judicature.

The data processing contains the instruments of formal logic, including analysis, synthesis, generalization, deduction, abduction, induction, comparison, observation, etc.

3 Results

3.1 Defining Blank Drafts

Blank drafts involve partially filled-out issued securities. Even if completed after the new Draft of Exchange and Cheque Act has come into effect, the issued blank draft is subject to Act No. 191/1950 Sb., as amended and governed by Judicature No. Rv I 1377/29.

The difference between the terms 'blank draft' and 'draft' involves many factors on top of a different name in the text. Judicature No. 29 Cdo 4535/2014 governs that a change in the terminology does not deny the validity of the draft. The court rules that unless the subject matter of the draft is changed, no terminological modifications revoke the effect of the document.

Under § 1 Act No. 191/1950 Sb., a draft of exchange involves a designation in the language of the document, an irrevocable order to a payment, the name of the paying party (payor), maturity date, place of the payment, the name of the beneficiary (payee), date and place of issuing and the drawee's signature. Under the § 2 Act No. 191/1950 Sb., unless the draft of the exchange meets all requirements set out in the previous text, the document is not legally effective, subject to the cases in the following text. Second, a draft missing a maturity date is presumed payable at sight. Third, if not stated otherwise, the place mentioned next to the payor's name is deemed the place of the payment and the permanent address of the payor. Last, unless the draft contains the place of issuing, it is presumed that the place next to the drawee's name is the place of issuing.

Although Clause I. § 10 of the Draft of Exchange and Cheque Act of Judicature No. 29 Odo 1261/2004 does not specify the term 'blank draft', the act permits issuing a partially filled-out draft, subsequently completed under the agreed terms and conditions. Under Clause § 10 Act No. 191/1950 Sb., unless the partially filled-out draft complies with the agreed terms and conditions, the draft owner is not entitled to any objections against violating the agreement, subject to the situations when the owner acts in bad faith or is accused of gross negligence upon issuing the draft. Under the listed conditions, the owner of the partially filled-out draft is protected by the law.

Judicature No. 29 Odo 721/2006, §10 Act No. 191/1950 Sb., neither prescribes any formal requirements for completing a blank draft nor specifies or denies requirements for further completion. Second, the effect of converting a blank draft into a fully completed *ex tunc* draft, obligating the guarantor (avalist) to sign it. Last, if the issuer signed the blank draft after the maturity date, the draft would not become legally effective until signed. Although converting the blank draft into the fully completed draft of exchange is operative *ex tunc*, the debtor may not perform his obligations 'to the draft of exchange' until provided by the drafted sum of money and other related requirements. Under Judicature No. 29 Cdo 538/2007, if the debtor receives the blank draft before the date of its completion, he may not perform his obligations.

Under Judicature No. 29 Cdo 1047/2007, a missing signature of the issuer on the draft of exchange when the guarantor agreed to secure the document does not relieve the guarantor of the obligations arising from the document. The Draft of Exchange and Cheque Act or any other legislation does not regulate the order of the data or signatures on the draft. Last, the fully completed draft of the exchange is deemed issued when the first owner receives the document.

3.2 Using Blank Drafts

Blank drafts are open documents with no sum of money written in them and, therefore, pose a risk. However, the owner of a blank draft may exercise the right to complete the document to minimize the risk.

The right to complete the blank draft (empowering the owner to fill out the missing requirements to convert it into a draft of exchange) is agreed (subject to an agreement) between the party signed on the blank draft and the receiving party (the owner). This provision regulated the right to complete the blank draft (when and how the bearer may fill out the missing data). Under Judicature No. 29 Cdo 2861/2014, the agreement does not have to be in writing (verbal or implied-in-fact agreement is sufficient) and involves only a unilateral statement creating the right to complete the blank draft.

Blank drafts are like empty sheets of paper. Although the right to complete the blank draft allows its owner to write what he wants, he may get into trouble. The following text explains what can happen when the guarantor denies the payee the right to complete the draft. Under Judicature No. 29 Cdo 1591/2014, unless the guarantor grants the right to complete the blank draft to the payee, the blank draft will be null and void (issued incomplete), relieving the guarantor of all obligations arising from the document (without the prior agreement he cannot have been) later completed with the full text.

Under Judicature No. 9 Cmo 274/2004, the right to complete the blank draft is not time-barred, i.e. the owner is entitled to complete the blank draft anytime, irrespective of the lapse of time. If the agreement binds the owner to write in a maturity date, he is entitled to fill in any date he wants. In the event of security drafts, the maturity date must not expire before the secured debt is payable. Under Judicature No. 29 Cdo 860/2012, the agreement on the right of the owner to fill out the missing data (regarding its definiteness) is ineffective not only because it does not specify the way of completing the blank draft. Unless agreed otherwise, if the issued blank draft secures another (causal) debt, the causal relationship between these facts is decisive for granting the right to complete the document (when and how the bearer can complete the missing information).

Both previous judicatures entitle the owner of the blank draft to complete the document and observe the terms and conditions arising from the contract. In the event of security drafts, the maturity date and the deadline before the security debt is payable must not be exchanged.

Once filled out, blank drafts become legally binding documents, giving the right to complete the draft the utmost imperativeness

to avoid misunderstanding. Under Judicature No. 20 Cdo 2031/2009, incomplete blank drafts do not create a claim. Blank drafts are not securities, but liability-free instruments not obligating any party involved in the document. Under Judicature No. 29 Cdo 731/2015, a blank draft becomes a draft of exchange upon its completion. Unless the owner exercises the right to fill out the instrument only partially, he is entitled to compensation under the effective legislation, as it is presumed that the owner deems the blank draft 'complete'. Although the final instrument is inconsistent with the agreement on the right to complete the document, the debtor may raise objections under the Draft of Exchange and Cheque Act. The consequences of violating the right to complete the blank draft are punishable according to whether the drawee (debtor) incurred a loss arising from an incorrect completion of the blank draft.

The previous text implies that an incomplete blank draft does not create a claim and must be completed to become legally binding. The following text explains how to use the right to complete the blank draft to fill out data not previously agreed on. However convenient the situation seems for the owner of the blank draft, the drawee may get into trouble. Under Judicature No. 29 Cdo 1245/2014, if the issuer and the guarantor signed the blank draft missing the information on the money exchanged, maturity date, and the date of issue, whereas the terms and conditions of the right to complete the document were not specified, and the transferee is aware of this circumstance, the right to complete the blank draft is deemed implied in the agreement.

In this case, the judicature refers to an implied agreement and recommends filling the missing information in the blank draft upon a mutual agreement of the parties without explicitly stating some aspects of the contract.

However, the statute regulates the agreement on filling out the missing data in the blank draft. If the drawee completes the document, albeit unauthorized by the debtor, the drawee is not entitled to the payment against the obligated parties who had signed the instrument before the drawee filled out the document. Under Judicature No. 12 Cmo 391/2006, the parties had signed the instrument before it became legally operative.

By filling out missing data, we can change the content of the blank draft upon a mutual agreement. If the parties agree on the right to complete the document that the blank draft should contain only specific data, we may not fill in any other information.

We must especially observe the agreed terms and conditions of the right to complete the document when filling in the maturity date so that the draft remains valid. Under Judicature No. 29 Cdo 3507/2015, an incorrect completion of the maturity date in the blank draft does not revoke the effect of the instrument. However, the drawee may object against the owner of the blank draft on the grounds of the erroneous maturity date, which may affect the obligation to pay the agreed sum.

Under § 33 Act No. 191/1950 Sb., a draft of exchange is issued either at sight, a specific time after sight, a defined time after issuing, or a specified date. Drafts containing a maturity date other than mentioned above or are payable in installments are null and void.

In a situation when the statute does not explicitly regulate the exact wording of the clause that complies with Clause I § 34 p. 1 the Draft of Exchange and Cheque Act allowing other than a statutory time-limit for submitting a draft of exchange payable at sight, we may infer the change in the deadline from the issuer's statement to pay the draft "at sight – but no later than ...". Judicature No. 29 Cdo 894/2013 governs to provide a specific date when the period expires.

Under Judicature No. 29 Cdo 3317/2007, an issued incomplete draft intentionally missing the sum and payable at sight is discharged by frustration if the agreement on the right to complete the draft sets, apart from terms and conditions of the

payable sum, the maturity date to 'five days after sight'.

Both previous judicatures govern that changing the deadline for submitting the bill payable at sight is invalid unless performed according to the law. If it is not the case, the change is voidable.

The period for submitting a bill payable at sight is calculated from its submission at the place of payment. In such a case, a promissory note must contain a place of payment. Its issuer agrees to pay the draft at the place of payment, while the creditor's entitlement to the claim is limited to the place of payment. The draft is submitted for payment at the place of payment when it falls due, with ensuing consequences upon failure to pay the agreed sum. The information on the place of payment must be clear, without an alternative way of informing of the place of payment. In such a case, it is impossible to unequivocally decide where (at which place) the issuer is liable to perform, and the owner is entitled to the performance of the draft. The draft must contain at least a municipality or city to meet the requirements for the place of payment. The place of the draft payment usually refers to where the draft is payable and to whom to submit the payment. If the draft contains the place of payment and domicile, this information must be consistent, as governed by Judicature No. 29 Cdo 2352/2008.

The place of payment is shown on the blank draft and remains valid even after transferring or assigning the draft to another person. By transferring or passing the blank draft to another person, the right to complete the draft devolves upon the assignee of the instrument without a need to enter into a contract on a claim assignment or a related agreement. The content of the right to complete the draft cannot change even in the event of transferring or assigning the draft to another person. Under Judicature No. 29 Cdo 336/2010, even upon transferring or assigning the blank draft to another person, only the agreement on the completion is decisive. Judicature No. 29 Cdo 4610/2014 supplements the general rule for transferring or assigning blank drafts to another person in a situation when the debtor of the causal claim changes. Under the judicature, the draft is securing to the causal relationship prejudiced by the change in the debtor (§ 531 sec 1 the Civil Code) only if the drawee (the debtor) agrees to the change in the obligated subjects (involving a possible change in agreed terms and conditions when the creditor may exercise the draft against the debtor or complete the missing data).

Although agreements denying the draft transfer exist, they do not invalidate the transfer of a draft to order or the name if made under the law of negotiable instruments, as governed by Judicature No. 5 Cmo 242/2004.

Under Judicature No. 20 Cdo 2977/2018, upon signing the blank draft, the guarantor agrees to secure the draft under the warranty that the instrument will be completed and converted into an ultimate draft. By completing the instrument, the draft containing guarantors' signatures becomes retroactive (*ex tunc*) and considered effective from the beginning, i.e. from the date of issuing, including signatures of all debtors and the avalist.

The circumstance under which the blank draft was completed does not affect the retroactivity of the draft completion and its conversion into an ultimate draft.

The previous text dealt with general principles of the right to complete a draft, giving examples of its exercise. The following paragraphs will focus on specific cases when completing a draft may get the drawee into trouble. Under Judicature No. 9 Cmo 536/2003-53, if a blank draft was completed for no other reason than an adjudication of bankruptcy to the bankrupt's estate whose causal obligation had been secured without agreeing on terms and conditions of the right to complete the draft, the draft was not completed according to the agreement.

We must consider many factors before using blank drafts and carefully assess the situation from a legal viewpoint, e.g. settling a marital obligation.

Under Judicature No. 31 Cdo 4087/2013, the community property may affect the validity of the blank draft, including the law of negotiable instruments. The creditor knows the contractual terms and conditions, and the husband knows his wife's future *ex tunc* obligation. Using a blank draft related to the community property, both spouses must know about this legal alteration. Under Judicature No. 20 Cdo 5588/2016, an agreement to reduce and settle the community property of spouses during the marriage when one of the spouses became the exclusive owner of the thing that had been in the community property until then is insufficient to deny the creditor the right to seize the property when seeking the performance of the obligation assumed by one of the spouses during marriage.

Blank drafts are risky when related to the community property or involving several drawees.

Mere signatures of several people on the blank draft do not automatically create a joint debt or joint-guarantee obligation. An obligation arises when the signature attests to the prior agreement under Judicature No. Rv II 885/36, governing that countersignatures on a blank draft require an additional agreement.

Blank draft inheritance involves another specific case to consider using the draft. Under Judicature No. 29 Cdo 1844/2015, if the parties to probate proceedings acquire property by inheritance, they also acquire the rights and duties of the deceased guarantor, including rights and obligations arising from the agreement on the right to complete the draft of the deceased guarantor had entered into with the owner of the blank draft. Blank draft inheritance may also pose a risk to the heirs, who become the guarantors and may be liable to pay, although they had been unaware of this fact before. The heirs must be informed of all the drafts payable by the deceased to avoid this situation.

Blank draft inheritance poses a risk to the heir, who becomes the guarantor and may be liable to pay the agreed sum even though the blank draft was lost and destroyed.

Losing or destroying a blank draft may get the owner into serious trouble. Under Judicature No. 24 Co 210/2003 § 185i of the Civil Procedure Code, a lost or destroyed blank draft may be redeemed. When redeeming a blank draft, the court observes the general rules for redeeming instruments (§ 185m Clause 2 of the Civil Procedure Code) and not regulations applicable to redeeming drafts and cheques (§ 185m Clause 3 and 4 of the Civil Procedure Code).

3.3 Expert's opinion on blank drafts

Blank drafts are a specific category that does not contain a sum of the bill payable. Although involving the debtor's signature, blank drafts do not provide further information, like the payable amount. The lack of essential data makes blank drafts objectionable and subject to abuse.

Any legal dispute arising from this incompleteness requires an expert's opinion to authenticate the drawee's signature. Missing factual information about the bill payable may prompt the court to focus on the signatures when deciding upon the authentication of the instrument.

An expert opinion is required when disputing the bill payable where the plaintiff shoulders the burden of proof. In the dispute over the bill payable, the burden, including the authenticity of the draft and signatures, is on the plaintiff, i.e. the party who submitted the instrument as proof to assert his claim before the court. The authenticity of the disputed instrument (or signature) may be proved either by an expert's opinion or other (relevant) means of evidence. Under Judicature No. 29 Cdo 4049/2017, the situation when the conclusion of the expert's opinion on the authenticity of the plaintiff's signature is not resolute does not mean that the plaintiff failed to bear the burden of proof relating to the authenticity of the submitted draft.

Under Judicature No. 29 Cdo 6038/2016, an expert's opinion involves a means of evidence to authenticate a disputed instrument, whereas the court is obliged to consider other (produced by the parties) evidence which may shed light on the case according to the principle of the discretionary weighing of evidence.

Under Judicature No. 29 Cdo 1164/2010, the situation when the conclusion of the expert's opinion on the authenticity of the plaintiff's signature is not resolute (i.e. the expert's opinion did not confirm the authenticity of the plaintiff's signature) does not admit the conclusion that the plaintiff as the petitioner of the disputable instrument failed to bear the burden of proof relating to the authenticity of the submitted document without further proceedings.

An expert's opinion dealing with the unauthenticity of the defendant's signature does not establish circumstances that would disqualify the defendant from claiming his signature unauthentic as soon as objecting against the compulsory payment order in the form of a draft. Under judicial decision No. 29 Cdo 359/2020, the expert's opinion exists without prejudice to the defendant's right to challenge the authenticity of his signature when objecting against the compulsory payment order in the form of a draft.

In the event of civil proceedings, the dispute over a bill payable and punishable unless performed, the testimony of the party that should approve (or disprove) the payment is essential for deciding upon paying or not paying the designated sum. In this case, the determination of the civil court upon this testimony is not conclusive. Under the effective legislation, § 346 Clause 2 Pa. a) the Criminal Code (Act No. 40/2009 Sb., as amended) and Judicature No. 6 Tdo 528/2017, and giving false testimony on the matter creates criminal liability for perjury and false expert's opinion.

Although expert's opinions are imperative for authenticating blank drafts, they might not always be conclusive. An ambiguous conclusion of the expert's opinion requires further evidence, which should shed light on the authenticity of the blank draft. The court must consider multiple factors and other relevant proofs to resolve upon authenticating the draft. The conclusiveness of expert's opinions depends on their concordance with other evidence.

3.4 Non-observance of legislation

The failure to comply with legislation on blank drafts bears various legal consequences. Incorrect or missing information on the blank draft may cast doubts on its authenticity, giving rise to legal insecurity and potential disputes between the parties involved. Such violation may also compromise its enforcement and, in the event of ill faith, it may create criminal liability.

The law of negotiable instruments not only protects drawees but also gives security to creditors. Any failure to comply with legislation or incorrect completion of the blank draft may lead to serious legal consequences. The law of negotiable instruments seeks conformity between the interests of drawees and creditors, protecting both transacting parties. The primary goal is to establish a legal framework to optimize and regulate the relationships between transacting parties by minimizing legal uncertainty and encouraging effectiveness and trust.

The drawee should, therefore, be cautious when issuing a blank draft. He must consider its content and who the receiving party is. Violating the law might lead to severe consequences, and the drawee might become liable for a sum he has not available. When issuing a blank draft, the drawee must be vigilant and precise to avoid the risk of potential legal complications and financial losses.

The creditor must be cautious when receiving the blank draft and make sure that the blank draft was issued by an authorized person and filled out as agreed with the drawee. In the event of

violating the law of negotiable instruments, the creditor may have problems enforcing the bill payable. Therefore, the creditor must be vigilant and authenticate the blank draft to avoid the risk of complications when enforcing the obligation.

Under Judicature No. 6 Tdo 1576/2010, completing the blank draft by the authorized person, albeit excessively, is not considered a forgery or fraudulent alteration. However, if an unauthorized person intentionally filled out the missing information, which had been issued as a security instrument, and sold it with the intent to benefit from the sale, this conduct may be considered a deception offense under the Criminal Code.

Under Judicature No. 5To 17/2013, the total amount cited in the draft must be considered when inspecting the possible forgery, governing that assessing the gravity of the crime under the Criminal Code involves several factors. Aside from the total of forged or altered instruments and the nature of the crime, the total amount cited in the instrument is decisive. If the sum markedly exceeds the limit of extensive damage stipulated in the Criminal Code, even a smaller number of forged instruments is deemed extensively criminal under applicable sections of the Criminal Code.

Along with forgery, alienating the guarantor's property may create criminal liability. By signing an incomplete draft, the guarantor agrees to pay the debt to the creditor. Aside from his guarantor's duties, he becomes an immediate debtor and thereby may not dispose of his property, which would otherwise constitute a crime of an injury to the creditor, as governed by § 222 Clause 1 Par a) the Criminal Code, under Judicature No. 5 Tdo 889/2013.

Under Judicature No. 4 Cmo 23/2016, a failure to pay the draft may constitute criminal liability. What will happen when the draft is not paid before it falls due? In this case, the owner has a direct claim against immediate drawees to all that is enforceable under § 48 and 49 Act No. 191/1950 Sb. To assert and maintain the direct claim against the drawee of the draft of exchange or payee of the promissory note requires neither a presentment to pay the draft nor a protest against the failure to pay.

If the draft is not paid, the creditor is entitled to indemnity from the drawee. By intentionally forging the signature, the drawee may become criminally liable for forgery and fraudulent money alteration.

Under Judicature No. 3 Tdo 1220/2009, the crime of forgery and fraudulent money alteration governed by § 140 clause 2 of the Criminal Code and § 143 of the Criminal Code or an attempted crime thereof under § 8 clause 1 of the Criminal Code may also be committed by procuring a forged signature of the issuer. The case is applicable even if the blank draft does not contain the date of issue and the right to complete the draft does not explicitly apply to providing this information.

Under Judicature No. 8 Tdo 361/2014, a crime of deception is committed if the offender, contrary to reality, feigns that the aval designated in the draft is a debtor.

On the other hand, under Judicature No. 29 Cdo 2971/2007, the law is not violated when the creditor has multiple security of the payment of debt, and this impediment is not involved in the agreement on the right to complete the draft.

Objections in the proceedings are an effective weapon for challenging the compulsory payment order.

Under Judicature No. 29 Cdo 4392/2018, the proceedings accept only timely and justified objections, including claims defining the extent of the disagreement with the compulsory payment order and facts substantiating the defendant's defense against the compulsory payment order.

The defendant may object that he had already discharged the bill payable or was invalid. Under Judicature No. 29 Odo 483/2002, the issuer's missing signature on the date the draft falls due does

not invalidate the draft if completed later. Second, even if the draft was not submitted for payment to the immediate debtor, the creditor may file his claims with the court, while the service of the lawsuit to the defendant bears the effects of the draft's presentment. Third, guarantors may object against the issuer of the draft of exchange to own the order that the obligation had already been discharged.

The defendant may also object that the draft is invalid, or the bill payable was already discharged.

The defendant is not entitled to a new defense after the deadline for lodging objections against the compulsory payment order has expired unless included in the previous objections. However, the defendant is entitled to provide new facts to complement the previously raised defense and justify the cause of this defense. These facts will not be considered new objections if lodged only to complement prior challenges under Judicature No. 29 Cdo 838/2011.

Objections may also be raised against incorrect blank draft completion. Under Judicature No. 29 Cdo 5333/2016, if a new owner backed the (blank) draft, the drawee is entitled to raise objections against incorrect blank draft completion (i.e. completing a blank draft contrary to the agreement on the right to complete the draft made between the debtor and drawee) only upon proving that the owner had acquired the draft in ill faith or committed the act with gross negligence.

Under Judicature No. 29 Cdo 5999/2017, if the defendant defends against the compulsory payment order based on the objections against the incorrect designation of the sum, he must include in timely and substantiated objections the correct sum. The mere statement that the sum payable is false is not enough, as it does not specify the extent the compulsory payment order is challenged and whether the total money or another sum is questioned. Under Judicature No. 9 Cmo 7/2003, the defendant also acts contrary to the law when claiming to be able to authenticate the completed sum by himself.

On the grounds of considering the objections against the compulsory payment order, the court may decide to extend the deadline for performance or pay the debt in installments, according to § 160 clauses 1, behind the semi-colon, the Civil Procedure Code. In such a case, the compulsory payment order is effective under the modified terms and conditions of performing the obligation arising from the order. The new (extended) deadline or payment in installments is subject to the court's decision, which may also regulate the amount and deadlines of the installments. This method will allow the court to ensure that the defendant adequately performs his obligations according to the law under Judicature No. 29 Cdo 3150/2019.

4 Discussion

Blank drafts are incomplete securities. Even if a blank draft is completed after the new law of negotiable instruments has become inoperative, the legislation thereof still applies to the draft.

Act No. 191/1950 Sb. governs the requirements for a valid blank draft, including a maturity date, place of the payment, drawee's name, etc. The court's decision regulates that a missing signature of the drawee on the draft of the exchange does not bear on the existence of the bill payable by the debtor, ignoring the chronology of writing the data on the instrument.

Using blank drafts to settle marital obligations or inheritance requires utmost caution when entering into agreements and dealing with other legal aspects. The succession of blank drafts may bring the successors both the benefit or risk by assuming the decedent's drafts are payable.

Legal disputes over the authenticity of a blank draft rely heavily on an expert's opinion, predominantly focusing on authenticating the drawee's signature. Although expert opinions

are an essential means of proof, the court must also consider other substantiated evidence and information produced by the disputing parties when authenticating the instrument.

The court must carefully examine the evidence produced, try the case without prejudice, and make a fair decision upon the validity and authenticity of the document.

5 Conclusion

Despite their utility in financial transactions, blank drafts involve substantial risk, including abuse or inconsistencies in agreements and the rights to complete the instrument. The effective use of blank drafts requires utmost caution and concordance between the issuing and receiving parties to avoid legal and financial complications.

When using blank drafts, the contracting parties must adhere to the agreement on the rights to complete the draft to comply with the agreed terms and conditions. The judicature governs that the right to complete a blank draft is limited, and any changes must abide by the law and contractual terms and conditions.

Blank drafts are a specific instrument having both strengths and weaknesses, finding their use in some modern business transactions.

The strengths involve flexibility, which allows the parties to agree on details later, and straightforwardness, which appeals even to people without extensive legal knowledge. Blank drafts serve as prompt security for a debt and allow the creditor to file the claim with a court.

On the other hand, an incomplete blank draft is subject to abuse by a dishonest holder. A failure to meet formal requirements and incorrect completion of the blank draft may nullify its effect and deny the creditor its enforcement. The debtor is less protected compared to classical contractual obligations.

Breaching the legislation governing blank drafts may lead to severe legal consequences, including relative validity, legal insecurity, and disputes. Drawees should be cautious when issuing blank drafts and carefully choose a receiver.

A failure to pay the draft and its incorrect completion may create criminal liability, including fraud. The defendant may object to the compulsory payment order and produce substantiated facts challenging the validity of the document. The court may decide to extend the deadline for the performance or pay the debt in installments according to the law. A close adherence to the legislation and careful use of blank drafts help avoid potential legal complications and disputes.

Our research yielded an ambiguous answer to using blank drafts as an instrument.

On the one hand, they are a remarkably flexible paper usable in various business situations. The advantage of issuing an incomplete negotiable instrument is that the parties may agree on the terms and conditions of the transaction and complete the missing information later, markedly speeding up the process.

On the other hand, blank drafts may be risky, leading to severe and unexpected consequences. As incorrect completion or incompleteness of the draft may give rise to legal disputes and complications, the parties must meet all legal requirements and study the legislation governing blank drafts.

Blank drafts are risky, requiring utmost caution when used. The parties must satisfy all formal requirements and consider all risks and legal aspects arising from these negotiable instruments.

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UNIVERSITY STUDENTS' VIEWS AND UNDERSTANDING TOWARDS AGEING AND OLDER ADULTS

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This research originated as a partial outcome of a research project BIN SGS02_2021_002: University Enhancing the Smart Active Ageing (UESAA), supported by Norway through the Norway Grants. Information about the project is available at: <https://ff.ucm.sk/sk/eea-grants/> and within the project KEGA 004UCM-4/2022 Podpora zdravia a pohody študentov prostredníctvom inkluzívnej edukácie na terciárnom stupni ("Promoting the health and well-being of students through inclusive education at the tertiary level").

Abstract: Ageing could be perceived as a dimension encompassing potentially novel roles with favourable and unfavourable connotations. This study explores the views and knowledge of the ageing process and the older generation from university students' perspectives. 60 students enrolled in universities in Slovakia participated in asynchronous email interviews. The data analysis employed a thematic content analysis to interpret the study's outcomes. The results suggest that the viewpoints of university students play a pivotal role in shaping their strategies towards embracing healthy and active ageing in the light of the moral development theory. Higher education institutions should prioritise the positive development of students' attitudes to ageing and the ageing population by fostering the holistic development of their personality.

Keywords: ageing, older adults, university students, view, thematic-content analysis

1 Introduction

Increasing life expectancy has raised concerns about how societies can accommodate ageing populations while promoting healthy and active lifestyles. In recent years, the concept of smart, active ageing has gained interest as a potential solution (Menezes & Rocha, 2021). Active and healthy ageing and living in smart environments refers to creating the environments and opportunities that enable people to feel valued in their existence and actions throughout their lives. Also using technology and innovation to help older adults live independently while promoting physical and mental well-being (WHO, 2020). The ageing index has been significantly increasing in Slovakia in the last decade. The turning point was in 2018 when the number and proportion of older adults exceeded the number and proportion of children for the first time in history. Then, there were 102 people aged 65 and over for every 100 children. The latest national population forecast points to a continuing increase in the ageing index and by 2060 there will be up to 220 people aged 65 and over per 100 children under the age of 15. Current research indicates that the most significant demographic trend will be fully reflected at regional level (Bleha et al. 2018); (Repková, 2020).

Research findings indicate that students generally hold favourable attitudes towards the elderly, albeit with a limited degree of positivity (Sanvicen-Torné et al., 2022). Furthermore, the implementation of a simulated older adults' programme has proven beneficial in enabling nursing students to enhance their comprehension of the physical vulnerabilities and living conditions of the elderly, thereby expanding their perspectives on elderly care (Kocak et al., 2021). In addition, comparisons have been made regarding the negative stereotypes associated with older individuals among young and older adult university students, revealing the prevalence of such stereotypes within both demographics (Hyunjung et al., 2020). Additionally, an examination focusing on the descriptions provided by students of older adults and grandparents demonstrated that descriptors for grandparents tended to be more positive, emphasising

personality traits. This underscores the diversity in perceptions of older individuals and highlights the significance of research in the field of gerontology (Fernandez et al. 2018). Also, Guest et al. (2019) delineated the pervasiveness of gerontophobia and ageism within culture and consciousness, demonstrating their intimate connection with the fear of one's future and discrimination against older adults. How young people perceive the ageing process will inevitably shape their treatment of older adults. This perspective underscores the significance of engaging with young people to facilitate discourse on their perceptions of ageing and the ageing process, as well as their attitudes towards older adults.

Universities should guide their students to develop positive views and understanding towards ageing as well as to promote the holistic development of their personalities. Related to this is the concept of active ageing. Active ageing and the link between self-activation and social support are suitable tools for eliminating social loneliness (Balogová et al. 2018). Before the actual education of older adults, emphasis should also be placed on the aforementioned development of a positive approach to active ageing, as university students are also older adults of the future. The all-round development of one's personality in the future intelligentsia creates the prerequisites for involvement in different areas of life. As long as an individual's creative participation in social events lasts well into adulthood, it may be consistent with social usefulness as well as with the eventual possibility of participating in creative work activities. A positive start to this development can already take place during university studies. There are insufficient studies on how university students in Slovakia perceive general understanding towards the older population and whether there is an association with their own ageing process. This study aims to explore the views and knowledge of the ageing process and the older generation from the university students' perspectives.

The main research question was: *How do Slovak university students view and understand the ageing process and older adults?* In addition, three research sub-questions were employed: "What is the view of Slovak students about ageing?"; "What are Slovak university students doing to implement their active ageing and to attain old age?" and "What are the students' views and ideas on desirable types of active ageing support tools?"

2 The theoretical framework

The field of age differentiation and human ageing has been reflected by several relevant theories. One particularly interesting and frequently used theory is Kohlberg's theory of moral development, which postulates that moral development occurs in parallel with cognitive development. As Babinčák (2012, p. 6) notes, Kohlberg's articulation of stages of moral development describes how the way we think about moral issues changes as a function of the development of cognitive structures. Remisova (1996, p. 43) asserts that Kohlberg's theory of moral development can be understood as a progression from an egocentric to a social norms-accepting and adopting level, and finally to a level of critical reassessment and evaluation of social norms based on general moral principles (Gursky 2021). Kohlberg distinguishes between three levels of moral reasoning: pre-conventional, conventional, and post-conventional. Furthermore, these stages are subdivided into two sub-stages.

The present study focuses on the post-conventional levels of adulthood. Kohlberg confirms that less than 15% of individuals attain this third level, which consists of the fifth and sixth stages. The fifth stage is oriented towards the social contract. At this stage, individuals begin to reflect on existing legal norms. This implies that they can conceptualise natural law. Kohlberg (1981) is aware that legal acts of positive law may not always follow natural law, that is to say, they may not be correct. The second sub-stage of the third stage represents the pinnacle of this

process and this is the acquisition of a belief in universal ethics. A minimal number of individuals reach this stage, which signifies the actual acquisition of one's views regarding universal ethical rules. This is the stage at which individuals develop their own ethical beliefs.

The younger generation, as university students, will have to master the ethical rules as the basis of their opinions and attitudes towards other people. These opinions should be led by the universal ethical principles regarding the above-mentioned demographic challenges. There are different models of identity crisis, as well as reflections on different stages of human life, including later stages. In this sense, we can point out that the views and understanding of university students as forming intelligence can also prejudice their future strategies in terms of active and positive ageing.

3 Methods and Materials

The study conducted an exploratory qualitative design to capture the view of ageing and older adults from university students ($n = 60$) from five study programmes and two public universities who had participated in this study. The online interview is described by O'Connor & Magde (2017), as an online research method conducted via computer-mediated communication (CMC), which may encompass various forms of digital communication, including instant messaging, email, or video.

The asynchronous email interviews (known as online survey interviews, qualitative surveys, or internet-based interviewing) allow the interviewee to reflect before answering, which may be advantageous in interviews where sensitive topics are addressed (Braun et al. 2021); (Dahlin, 2021); (Oates et al., 2022). Furthermore, the text is already transcribed, which requires the interviewer to invest time and effort into the answers and follow-up questions. This ensures that the participant feels valued (Saarijärvi & Bratt, 2021). The topic of ageing may not be considered a sensitive one, but given that the researchers were interested in university students' views on general views on ageing as well as their perceptions of ageing, they chose this method of data collection with the assumption that it would ensure free expression of views and sharing of ideas.

3.1 Setting and Sample

This study was conducted at two public universities in Slovakia, one in western and the other in central Slovakia. Both universities collaborated on the project 'University Enhancing Smart Active Ageing' funded by EEA and Norway Grants BIG SGS02_2021_002: in the period from 2022 to 2024. The present study will utilise the qualitative data collected through the main project and aims to explore the views of university students towards ageing and older adults.

The main study consisted of 136 university students recruited from two Slovak public universities between November 2023 and December 2023. University students interested in participating ($n = 60$) received written information about the study. Participants had to meet the following main criteria: (1) undergraduate and graduate students; (2) age range: 18-35; (4) fluency in Slovak language; (5) voluntary participation.

All participants were recruited from different geographical areas. The mean age of the participants was 30. The sample consisted of university students from four study programmes (Psychology, Education, Social Work, Foreign language studies) and Humanities (not further specified) - (see Table 4).

3.2 Data Collection

Data were collected during the period January 2024 to April 2024. The lead author (TSZ) commissioned a third author (MT) to create a secure digital space to ensure data collection into the Nettskjema system. Nettskjema is a secure digital tool and space developed and operated by the University Information

Center, Norway. This ensured the anonymity and confidentiality of the participants. The interview document had a study code and was kept in a separate location from the participant identification information. Only one of the researchers (MT) had access to both these documents. This researcher assigned security codes to computer records and then encrypted identifiable data. Following the receipt of the email, the data were encrypted, anonymised, and shared in a secure virtual space with other researchers to enable evaluation. An asynchronous email interview was guided by questions such as: How old would you like to live? Who do you think is an old man and woman? Please, describe old age...: What are you doing to maximise your life expectancy?

3.3 Ethical considerations

The study received ethical approval and a research permit from the promoter of the project, Ss. Cyril and Methodius University in Trnava, Slovakia, with reference number FF-EK-2-2023. The ethical principles were respected in the conducted research. These principles included voluntary participation of all research subjects, informed consent obtained from all participants, anonymity of the responses was secured, confidentiality was safeguarded by removing all identifying information of participants from the study, potential for harm was considered in the study and it was eliminated by the informed consent of the participants.

3.4 Data Analysis

A thematic content analysis (TCA), described by Braun & Clarke (2013), is a suitable form of methodology because it entails the recognition of patterns or themes in textual information and showcases results through the classification of data into themes according to shared characteristics, followed by the measurement of the frequency of each theme to unveil their prevalence and importance.

The initial step of the TCA involved the manual coding and analysis of the data. This approach was selected due to the flexibility, deep engagement, and reduced interpretive bias afforded by manual coding methods conducted by all researchers. Inductive coding was employed to identify all relevant descriptions across all participants, ensuring a comprehensive understanding of participant views on ageing and older adults. Open coding was then used to identify meaning units associated with concepts relevant to our research questions. Subsequently, the researchers TSZ & JS developed sub-themes and themes based on the clustered meaning units. Both researchers engaged with this independently to enhance the dependability and confirmability of the study's findings. In the event of discrepancies, the researchers TSZ & JS consulted with the next researchers MT & MA. The coding scheme was applied systematically to the entire dataset, coding responses across different themes and subthemes. The frequencies of themes and subthemes were tabulated based on the number of times participants used repeated terms that could be clustered under specific themes and subthemes in response to interview questions. The data were then interpreted based on the predominant aspect of each theme and subtheme in the participants' responses, ensuring alignment with the research objectives. The themes were then reviewed against the data, with the analytic process repeated from the beginning without reference to the initial units of meaning, categories, sub-themes, and themes. As the analysis progressed, the researchers refined the meaning units and categories as necessary. Finally, after the process, the researchers separated or consolidated the units, categories, sub-themes, and themes, retaining the participants' words to reflect a realistic ontology. The findings were presented in the tables of frequencies (Tables 1, 2, 3).

Table 1: Thematic frequency -The notion of older age

The notion of older age (60)	Positive or neutral connotations (32)	Age (16)	Over 50 (2); Over 60 (4); Over 65 (2); Over 70 (3); Over 75 (2); Over 80 (2)
		Experienced person (3)	Experiences/knowledge (3)
		A person who thinks of him/herself as old (5)	Who feels him/herself to be old (3); Who thinks he/she is old (2)
		Do not know (4)	Do not know (2); It is relative (2)
		Pension and grandchildren (4)	Retirement (3); Grandchildren (2)
	Negative connotations (28)	Loss of purpose in life (4)	Someone who has lost the sense/purpose of life (4)
		Loss of physical and mental health (15)	A person who has a lot of wrinkles (3)
			Someone who has many diseases (5)
			Someone who can't take care of him/herself/needs help (4)
			Loss of strength (3)
		A person who waits for death (5)	The final stage of life (2); Do not want to live/resigned to live (3)
		Someone who does not create new experiences but lives in the past (4)	Someone who does not want to learn (2); Lives in the past (2)

Table 1 illustrates that the positive or neutral connotations of older age are slightly prevailing over the negative connotations. The majority of university students perceive older age in connection with a certain age or as a loss of physical and mental health.

Table 2: Thematic frequency - Support of one's ageing

Support of one's ageing (60)	Healthy lifestyle (41)	Lifestyle (9); Good sleep (3); Workout (6); Movement (3); Healthy diet (8); Not smoking (3); No alcohol (2); No stress (3); Meditations (2); Healthy relationships (2)
	Just living (8)	Active life (6); Education (2)
	Nothing (11)	Nothing (11)

The frequency of themes (Table 2) connected with the procedures of the students aimed at supporting their own ageing consisted of three categories, namely healthy lifestyle, normal living and no implemented procedures and activities.

Table 3: Thematic frequency - Desired support

Desired support in old age (60)	Family and social environment (11)	Family (6); Not to be alone (2); Pet (3)
	Internet, online communication, online shopping (7)	Online shopping (2); Home delivery (2); Communication (3)
	Good quality care services (8)	Good quality of medical care (3); Doctor (2); Other people's help (3)
	Financial security and assurance (10)	Higher pension (5); Financial help (5)
	Technology and compensatory aids (14)	AI/Smart assistant (4); Household robots (3); Assistive technologies (7)
	Education of elderly (3)	Possibility of education/memory development (3)
	Not to be old (7)	Sanity/ preserved mental abilities (3)
	Don't know (4)	

Table 3 summarises the frequency of identified categories under the theme of desired support in older age. The most frequent

were technology and compensatory aids and the second most frequent was family and social environment.

4 Results

Table 4: Participants' characteristics

Age	N / %
18-20	16 (26.66)
21-23	17 (28.33)
24-26	4 (6.66)
27-30	4 (6.66)
>31	19 (31.66)
Study level	
Undergraduate (Bc.)	50 (83.33)
Graduate (MA.)	10 (16.66)
Study field	
Psychology	22 (36.66)
Education	8 (13.33)
Social work	12 (20.00)
Languages	8 (13.33)
Humanities (not further specified)	10 (16.66)

4.1 University students' view on the ageing process

In terms of outcomes related to ageing, university students view older people as a group of people of a certain age with various health and mental health problems. Few of them see older people more positively as experienced and wise individuals. Concerning the different views on old age and ageing, students also express different expectations about their life expectancy.

Table 5 View of the university students on desired age of life

Desirable age	N	%
60 and less	4	06.67
61-75	8	13.33
76-90	24	40.00
More than 90	8	13.33
Other	16	26.67
Total	60	100

Answers in the category "Other" show the participants' different views on ageing. Some of them have positive attitudes toward ageing, which can be seen in their desire to live as long as possible:

P1: "As long as possible." P5: "If my health would hold out, of course, as high as possible." P18: "As long as I will be allowed." P27: "Forever." P28: "As God gives." P38: "80 would be nice, but at least in retirement if I died I wouldn't complain."

P12: "Tough question, mainly to keep me independent, so probably max 89." P16: "To such an extent that I am not intellectually, mentally and physically dependent on others." P17: "I want to live as long as my brain will serve me." P20: "Until a dignified age." P22: "100 (but only with mental well-being)." P25: "An age at which I would be physically and mentally independent." P30: "Mainly to be independent, not reliant on others."

The extremely negative views on older age were also present among university students as follows:

P34: "Depends on where the world is going. If it goes on at this rate and direction, I won't want to live." P42: "Not so much." P48: "I wish I hadn't been born in the first place, but since I'm here I would be happy with 30."

The notion of older age by the respondents

Older age is seen in various connotations by the students.

4.1.1 Negative connotations of ageing comprised of the following answers:

A person who waits for death; Loss of purpose in life; Aspect of age; A person who does not create new experiences but lives in the past; Someone who complains about everything; Loss of physical and mental health.

4.1.2 Positive or neutral connotations of ageing were:

Person with experience; Who has grandchildren; Pension; A person who thinks of himself as old; Does not know.

Negative, positive and neutral connotations were categorised according to the participants' answers to the question: Who do you think is an old person? Try to define old age.

Answers describing old age by university students were heterogeneous. As mentioned, the answers varied from negative to positive connotations. The variety of views on old age with some of the participants' citations are as follows:

1. A person who waits for death (e.g. P2: "Old age is the end of a person's life stage." P8: "Someone who is waiting to die because most of those he loved are already dead.")
2. Loss of purpose in life (e.g. P10: "a person who has no desire to live!" P32: "an old person who has resigned him/herself to life")
3. Specific age as the criterion of old age (e.g. P13: "An old person, in my opinion, is a person of retirement age, roughly over 65." P21: "My idea of an old person is someone who is over 55. Old age for me is related to age and not to feelings. That's normal because there's nothing wrong with it. It is perfectly natural. In old age, the body and mind are naturally weaker and don't offer the same possibilities as they did during adolescence and youth. On the other hand, with old age should come greater peace and life satisfaction. I think of old age as the final part of life, when everyone should be able to come to terms with how they have lived." P42: "It is one that has reached a high age. Old age- the final stage of development where a person is at the end of his life, it is the culmination of a person's life stage")
4. One who does not create new experiences but lives in the past (e.g. P25: "A person who has reached a certain age and no longer creates new experiences but would rather live in the past and remember what life was like." P29: "In my opinion, an old person is no longer willing to learn and adapt to new things." P18: "A person who does not work on him/herself, does not develop, is indifferent to him/herself, is not young in spirit.", P3: "An old person is a person who no longer understands "new things", does not know and does not want to change his/her mind about things, and takes what s/he knows as the gospel truth. Old age is that period of life that does not welcome the passing of time.
5. Loss of physical and mental health (e.g. P35: "Someone who can't walk, a person who has a lot of wrinkles, and is hard of hearing." P45: "A person who, by virtue of his or her biological age, has various forms of limitations and difficulties.")
6. A person who thinks of him/herself as old (e.g. P26: "Old age is subjective. I think that an old person is one who says or feels that s/he is old." P34: "Someone who feels old." P50: "It depends on who is feeling how sometimes even an older person can feel young and not realise they are already old.")
7. People who have grandchildren (e.g. P8: "A person who has grandchildren, or is of an age where they may already have grandchildren.")
8. Pension (e.g. P47: "Old age begins with retirement." P49: "For me, a person of retirement age." P60: "I define old

age partly by appearance, but mainly by a person who is already retired and not working.")

9. Person with experience (e.g. P37: "A person with a certain amount of practice, experience and accomplishments in life." P56: "A person who remembers a lot, and is entitled to rest, the elderly are supposedly protected persons, they deserve respect")
10. Do not know (e.g. P9: "I can't define it exactly." P59: "I don't know, it is relative")

4.2 Support of one's ageing

Table 6 Participants' activities to support their own ageing

Category	N / %	Examples of chosen answers
Healthy lifestyle	41 / 68.33	P3: I exercise, eat healthily, try to think positively P12: I try to eat a balanced diet, get enough good quality sleep, exercise, educate myself, and do leisure activities to relieve stress (psychohygiene). Healthy diet, exercise, psychohygiene, faith in God
Just living	8 / 13.33	I try to live an active life I'm living I try to live so that I and my surroundings are satisfied
Nothing	11 / 18.33	I don't want to live to an advanced age not much of anything, I'm glad I'm living the current age nothing
Total	60 / 100	

In connection to surveying the desirable help and support in participants' older age, students would prefer various areas:

4.2.1 Family and social environment (e.g. P2: "I wouldn't want to be alone in the first place. I would like to be surrounded by friends and, most importantly, to have functioning medical and nursing care in Slovakia." P18: "Minimum technology. I would rather have a helper animal like a dog." P19: "Family help.");

4.2.2 Good quality care services (e.g. P10: "Pretty young nanny." P21: "Someone to take care of me at home." P30: "Doctor visiting me at home.");

4.2.3 Technology and compensatory aids (e.g. P33: "Technology to help me overcome health problems." P34: "A robot that will do things for me or with me that I won't be able to do on my own.");

4.2.4 Internet, online communication, online shopping (e.g. P1: "Online shopping; making doctor's appointments, dealing with paperwork for the authorities, it would be nice to have more things electronically to avoid endless waiting in queues." P42: "Technologies that would allow me to communicate with my loved ones if I no longer have the strength to visit them or someone to talk to so I don't feel alone (but we already have such apps.");

4.2.5 Education of elderly (e.g. P15: "So that the elderly are taught the necessary things and not that some procedure is implemented e.g. in the health service to facilitate (online appointment booking), while some people don't even have the internet"; P55: "To make them more aware of internet safety and scammers". P60: "I would still welcome opportunities to develop and train my brain.");

4.2.6 Financial security and assurance (e.g. P17: "To have a good pension". P35: "It would be quite sufficient for me if the state guaranteed me the provision of a quality social service of my choice. And that the provision of this quality social service should be financially affordable for me, i.e. that my family should not have to contribute financially").

There was also a group of respondents who shared a negative opinion of older age in the form of statements such as P8: "Don't get old!". The other student wrote P9: "Euthanasia!". P57: "I can't imagine living with limited health." Ten students could not state any own proposals about older age and they pointed out; P20: "I never thought about it". P6: "Nothing". or P39: "I can't comment on that".

5 Discussion

Several recommendations and challenges focused on public policies aiming at the target group of older people have been formed by international institutions recently. All are based on principles of respect for human dignity, the development of prosperity and civil liberties (Chancellery of the National Council of the Slovak Republic, Department: Parliamentary Institute, 2020). The issue is covered in particular by the following documents: UN Principles for Older Adults (addressing the principles of independence, participation in society, care, self-realisation and dignity); Recommendations on Ageing and Disability in the 21st Century by the Council of European Committee: Sustainable Frameworks for Higher Quality life in an inclusive society; the European Social Charter (describes measures to promote full citizenship and an active social position, the promotion of independent living in a preferred environment); European Charter of the Rights and Responsibilities of Older People Dependent on Long-Term Care and Assistance (describes measures to ensure the right to dignity, well-being, freedom and security, the right to self-determination, care, information and counselling, communication and social participation) and others. These documents adopted on an international level are focused on the well-being of the elderly as part of the national documents about the elderly, long-term institutional care for the elderly and lifelong learning for the elderly. The reasons for the interest of this study in issues of active ageing are specifically connected to the Slovak context, for example, the ageing of Slovak populations brings changes in the age structure of people and a growing population in the group above 65 years of age. In the last century, demographic changes have been recorded at the level of population ageing resulting from the decline in mortality and fertility rates, and the increase in average life expectancy. Another important demographic feature is the growth of the group of "very old people" (aged 80+) and a decrease in the number of young people, thus the so-called double ageing (Pereira et al., 2023). Double ageing will have immense economic, social and medical importance.

The same situation is also in Slovakia, the changes in the demographic structure by economic age groups point to an ageing population. This trend has continued since 2011 when the working-age population has tended to decline and the share of the population of post-working age has increased (The Statistical Yearbook of the Slovak Republic 2023). Due to the aforementioned situation, it is important to prepare the younger generation for their own ageing and also to develop their understanding of some aspects connected with advancing age. Positive or neutral perceptions of old age only slightly prevail among the students. As proved by the investigation, not all the students positively perceive older age, their views on the elderly population differ and also their opinions on the most useful tools and types of support for the elderly and active ageing are varied. Even some of the students (lower numbers) do not implement any activities to support their own healthy ageing and do not think about their future, or they do not want to live to an advanced age. On the other hand, it is proved by literature (Edström, 2018); (Chang et al., 2020); (Marques et al., 2020); (Bratt et al., 2023); (Hyun Jung, 2020); (Guest, 2021) that as people age, older adults are confronted with a multitude of challenges, including stigmatisation and negative attitudes that are prevalent in society.

The stigmatisation of older adults can manifest itself at both a structural (i.e., institutions; healthcare) and individual level, becoming a public health issue with deleterious effects on the health and well-being of older adults. Ageism, or negative

attitudes towards older adults, including those held by younger generations and also by older adults themselves, is shaped by prejudice, stereotypes, and discrimination. Attitudes and understanding towards the older generation are shaped by the unique process of the moral development of each individual. Attitudes can be defined as thoughts or beliefs with an evaluative component (Bohner, 2011). How one perceives older adults can differ by age, personal experience and education. Attitudes towards one's personal support of ageing have been associated with one's lifestyle, health and well-being, and self-compassion and compassion to others. Research reveals that individuals who have a positive view of ageing, both on their own and in general, perceive less discriminatory behaviours in others (Voss et al, 2016); (Giasson et al., 2017). This is following the Kohlberg's theory of moral development (Kohlberg, 1981). The presumption is, that when students attain the stage of ethics of self-chosen, universal ethical principles, less prejudice, negative attitudes and stereotypes occur in their views and opinions towards the elderly. At this final stage, the morally good action is based on personally held principles that apply both to the person's immediate life as well as to the larger community and society. The universal principles may include a belief in democratic due process (Stage 5), but also other principles, such as a belief in the dignity of all human life or the sanctity of the natural environment. At Stage 6, the individual's beliefs are guided by universal principles, which may occasionally lead to disagreement with customary practices (Stage 4) or even with legal norms (Stage 5).

The dissemination of universal principles at university level should facilitate the development of more positive attitudes towards ageing and the older generation, thereby reducing the prevalence of ageist views. It is the responsibility of universities to educate young people about the importance of fostering a society that is more welcoming of older generations.

6 Conclusions and Recommendations for Future Research

The results suggest that the viewpoints of university students play a pivotal role in shaping their strategies towards embracing healthy and active ageing in the light of the moral development theory. Higher education institutions should prioritise the positive development of students' attitudes related to ageing and the ageing population by fostering the holistic development of their personality.

It is essential to provide university students with adequate education and training in the field of active ageing and provide them with sufficient information about the elderly population. Due to the above, it is essential to facilitate communication between the two groups through the development of the understanding of the ageing specifics. Furthermore, the younger generation's knowledge of the various aspects of ageing and older age can provide the basis for their own healthy active ageing processes.

Our findings indicate that university students require a deeper understanding of physical weakness, the potential for successful ageing, and the knowledge required for elderly people to age in peace. This can be achieved by integrating active-based learning with the use of simulation, such as the GERT age simulation suit (Moll, 2019). It can be argued that academic training may positively influence the image of older persons constructively and beneficially. Furthermore, the incorporation of gerontological content into the social sciences curriculum could facilitate the resolution of existing barriers. To mitigate the negative perceptions of ageing and older adults, university education should emphasise the importance of healthy habits and a positive perception of ageing. Furthermore, lifelong learning initiatives at universities can benefit older individuals. The incorporation of themes related to the elderly in universities can facilitate intergenerational learning.

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V. SOROKIN'S NOVEL "MARINA'S THIRTIETH LOVE" IN THE COORDINATES OF SOC-ART AND SOCIAL REALISM

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Abstract: The purpose of the study is to analyze V. Sorokin's conceptualist novel "Marina's Thirtieth Love" (1984), to identify the features of its genre-structural constructions, to trace the connection of genre features of the "Soviet novel" with the tradition of Socialist realism literature and its deconstructions in the practice of conceptual art of the 1970s–80s. The paper identifies the target settings of the conceptual novelist Sorokin to overcome the principles and techniques of Soviet socialist realist art and to establish discrediting perspectives of perception of social and ideologically stable "concepts" that developed in the post-October period. It is established that the imitation base in Sorokin's "Marina's Thirtieth Love" was the so-called "production novel", a thematic subspecies of prose of socialist realism.

Keywords: Vladimir Sorokin; novel "Marina's Thirtieth Love"; conceptualist strategies; production novel; apologetics and debunking; text and pretext.

1 Introduction

Vladimir Sorokin is one of the most prominent figures in Russian literature at the turn of the XX and XXI centuries, winner of many Russian and international prizes. The prose writer's name consistently occupies the top positions in the international ranking of writers, his books represent Russian literature at the most prestigious international book fairs and salons. Sorokin's novels are popular among readers, however, it can be assumed that Sorokin's text is not always understandable, does not immediately reveal the mechanism of plot construction and the embodiment of compositional form, therefore it becomes necessary to trace the origins and strategies of complex narrative moves of the writer's prose. The novel "Marina's Thirtieth Love" can be chosen as an "exemplary" Sorokin text, directly related to overcoming tradition and forming a new poetics.

2 Literature Review

Sorokin's novel "Marina's Thirtieth Love", created in 1982–1984 and first published in Russian in 1995 (it was published in French in Paris in 1987), has already been subjected to critical reflection and certain aspects of its analysis have been proposed by researchers. Mentioned in general reviews by M. Lipovetsky (Lipovetsky 1997), N. Leiderman (Leiderman 2003), M. Epstein (Epstein 2000), V. Kuritsyn (Kuritsyn 2001), I. Skoropanova (Skoropanova 2002), G. Nefagina (Nefagina 2005), M. Abasheva (Abasheva 2012) et al., the novel "Marina's Thirtieth Love" attracted the special attention of some domestic and foreign researchers (see: Dobrenko 1998, 2004; Kostyrko 1992; Hansen-Leve 1997; Sosland 2009; Fomenko 2010; Engstrom 2010; Novokhatsky 2010; Smirnova 2012; Genis 2018; Leitner 2018; Uffel'mann 2022), each of whom chose a specific angle of analysis (obscene vocabulary, the image of a beautiful lady, intertextual layers, discursive practices, Heidegger's philosophy, Lacan's psychoanalysis, pornographic motives, connection with the techniques of social art, etc.). Meanwhile, the general structure of the novel and its genre nature were ignored by critics. That is why the task of our research is to discover the origins of the genre-compositional form of Sorokin's novel, and not so much verbal as visual pretexts that mediated the structural strategies of a single novel whole, and analyze their modification within the framework of conceptual poetics.

Connoisseurs of the biography of Vladimir Sorokin are well aware that the early period of the future prose writer's work was associated not with literature, but with painting. In the mid-1970s, Sorokin worked as a book graphic artist, designed and illustrated books and magazines, participated in painting exhibitions, joined the avant-garde artists, the group of Moscow pictorial conceptualism led by I. Kabakov and V. Pivovarov with the participation of E. Bulatov, D. Prigov and others, was close to the artists of social art V. Komar and A. Melamid. It was the conceptual artists that Sorokin had in mind when he admitted in an interview that he was more influenced by "fine art than literature" (Sorokin 1998), and that "from the very beginning <he> considered himself an artist" (Sorokin 1992, 119), and not a writer.

During the heyday of conceptualism and social art, it was the pictorial practices of artists that revealed to Sorokin that "the Soviet world has its own unique aesthetics, which is very interesting to develop, which lives according to its own laws and is absolutely equal in the chain of the cultural process" (Sorokin 1992, 119). The aesthetics of socialist realism becomes the "foundation stone" of conceptualism and social art painting and, as a result, the (pseudo-)cult aesthetics of Sorokin the writer – it undergoes deconstruction and reinterpretation when, within the framework of Sorokin's literary project, "typical socialist realist consciousness is transferred to new planes" (Novokhatsky 2010). In this regard, the novel "Marina's Thirtieth Love" undoubtedly correlates more than other Sorokin texts with the aesthetics of socialist realism and the practice of Soviet prose (Kazarina 2018, 132–138).

As for the formal features of the novel "Marina's Thirtieth Love", the competent and respected critic A. Genis considered the novels love (female) and production to be the genre forerunner of the Sorokin text under consideration (Genis 2018). According to the critic's observations, if the first part of "Marina's Thirtieth Love" embodies the sum of the love motives of the so-called female novel (29 lesbian hobbies of the main character), then the second part is strictly focused on the labor, factory theme: "a love affair becomes a production one" (Genis 2018).

The critic's position seems quite convincing, it seems that this is how the novel narrative is built and it is these themes that replace one another: love and production. However, if we look at the genre form from a different angle, it turns out that such a representation can be refined. If we are talking about the typology of Sorokin's novel, then the literary model of "Marina's Thirtieth Love" should be recognized not as a love (female) novel, not an education novel (as suggested by A. Leitner (Leitner 2018)), not a "dissident" novel (according to M. Smirnova (Smirnova 2012, 227–228)), but the novel is a production novel, exclusively a production novel. Let's try to justify this judgment by recalling that Sorokin's literary game is completely conceptual — it is the conceptology of "Marina's Thirtieth Love" that we have to reveal.

3 The conceptual image of a heroine

Sorokin's novel tells about the life of a young heroine named Marina (Alekseeva), who in the first part of the two-part narrative works as a music teacher at the House of Culture, teaches children of proletarians to play the piano, and raises "the general musical level of the workers of the famous factory" (Sorokin 2002, 10). However, this part of the heroine's life, "a thirty-year-old woman with large, slightly slanted brown eyes", is only a superficial, external, socially mimic layer. Her real life, non-public and private, but real and essential, is the profession of a prostitute, a modern Venus (Sorokin 2002, 12, 53, 101), which ensures its existence by entering into sexual relations with various men (creative aristocrats, "aging noble offspring", musicians and pianists, dissidents and/or Soviet party

functionaries, etc.). A. Genis is right – indeed, the entire conditional first part of the novel is “female”, “love” and is connected with Marina’s sexual partnership. But this is exactly Sorokin’s conceptual move: from our point of view, the writer brings to the fore not the actual love theme, but the production activity of the heroine, professional prostitution. Sorokin describes in detail and consciously the work of the heroine Marina – where and how she works, getting in touch with men who provide her with money, things, entertainment or products. Communication with various partners, according to Sorokin, is a special kind of production activity of the thirty-year-old heroine. If as a music teacher she is (by her own admission) “professionally unsuitable” (Sorokin 2002, 22), then as a paid “lover on call” she is a professional (according to the hero Valentine, she has a “profession” (Sorokin 2002, 10)).

The episode that opens the narrative in “Marina’s Thirtieth Love” seems excessively detailed and long in the general plot of the novel, it emphatically reproduces the scene of Marina’s intercourse and Valentin who invited her “to work”. One might think that Sorokin describes exclusively the love joys of the characters (which is partly true). However, it is even more important for a conceptual novelist to present Marina’s production area in detail, to focus on her professional experience and skills. Within the framework of the general architectonics of the novel, in relation to the second conditional part of the narrative, where the heroine will be decisively and radically transformed and where the author will give a detailed description of her enthusiastic participation in the factory life of the Small-sized Compressor Plant, Sorokin establishes compositional balance, structural proportionality. With an excessively long and detailed description of the sexual intercourse of Marina and Valentin in the first part, the author equalizes the importance of various types of “production” activities of the central heroine of the novel.

Sorokin travests the genre features of the Soviet production novel, overturns its problematic-thematic angles, translates the principles and techniques of socialist realist narrative into unexpected and absurd spheres. By equalizing the two fields of professional activity of the title character, Sorokin not declaratively, not journalistically, but figuratively and artistically explicates the one-sided nature of traditional socialist realist genre education, demonstrates the thematic emasculation of the Soviet type of novel, fundamentally and programmatically devoid of erotic and naturalistic components.

Sex and eroticism, even “vague erotic overtones” (Sorokin 2002, 12) were not and could not become the subject of a Soviet production novel due to the taboo nature of the topic in the Soviet state (especially considering that the time of Sorokin’s narrative is the early 1980s, the period of the reign of the politically literate and morally stable Secretary General Yu. Andropov leading his family tree from the depths of the State Security Committee). But Sorokin makes professional sex the object of a new “produced” text, writing out in detail the scene of Marina’s sexual intercourse or discussing the penis size of one of the characters on the pages of the novel (Sorokin 2002, 15). By addressing such realities, the conceptual writer transforms and ironically “edits” the genre features and specific features of the socialist realist production novel, depriving the factory theme of the right of exclusivity and dominance. Paid professional love is recognized by Sorokin, the author, as a worthy topic of the latest production novel.

4 The soc-art origins of Sorokin’s genre form

The conceptual and conceptualist “shifter” comes into force within the framework of the narrative system of Sorokin’s novel, forcing one to think about the roots and recall the soc-artistic paintings-posters by V. Komar and A. Melamid, when the heroes of labor who deserve a mosaic profile or recreation on the relief of the award mark turn out to be not only ordinary, but not heroic people, but also cartoon characters (see: Rubinstein 1991; Pozdnyakov 2003; Bogdanova 2005). Sorokin expropriates the pictorial strategy of soc-artists and masterfully and wittily

transfers their moves to the field of literary text, transforming the visual into the verbal. Within the framework of a literary text, the writer demonstrates the techniques and principles of pictorial soc-art, when the external apologetization of Sovietism and socialist realism turns into their simultaneous debunking and annihilation. Sorokin adopts the artistic experience of Komar and Melamid, therefore M. Lipovetsky is right when he believes that “the only soc-art prose writer in the full sense is Vladimir Sorokin” (Lipovetsky 1997, 252).

In “Marina’s Thirtieth Love”, Sorokin, on the external level, consistently builds a novel in the tradition of the usual socialist realist narrative, but brings to the text details, signs and qualities that the Soviet novel was deprived of. So, if in Soviet prose the hero traditionally became a Soviet man, completely immersed in the traditionally Soviet atmosphere (according to the well-known formula: a traditional hero in traditional circumstances, with clarification: a Soviet hero in Soviet circumstances), whose environment was obviously Soviet, then Sorokin intentionally every object and thing (for example, in the apartment of the hero Valentin) accompanies by the epithet of exclusivity, foreignness, non-Sovietism: a Persian carpet, an Arab sheet, an Indian bedside table, a Viennese chair, a Cuban sugar, a Japanese tape recorder, an Estonian trinket, a Magyar bottle (Sorokin 2002, 11, 12, 15, 17, 61, 86, 100, 113) and others. Outwardly, Sorokin paints familiar Soviet life with signs-epithets of the non-Soviet world, features of deliberately emphasized foreignness, explicating, on the one hand, signs of a financially secure way of life and mentality of the Soviet establishment, overstocked at special bases (or in stores like the famous Eliseevsky or currency “Birch”). On the other hand, it actualizes the features of the communal life of representatives of dissidence, which are directly and firmly connected with the mechanisms of farce and speculation in foreign goods. Even a spacious knitted sweater with a wide neck (Sorokin 2002, 10, 11, 16, 92, 112, 125) in imitation of the photographic E. Hemingway, the idol of the intellectual youth of the 1970s, it becomes an atypical feature of the characterization of the novel heroine and the quasi-Soviet novel itself.

In Sorokin’s text, the external outline of the socialist realist novel narrative is apparently preserved and carefully imitated, but its semantic content is radically and conceptually changed, intentionally and fundamentally deformed.

5 Tsvetaeva’s precedent name and its function in the novel

The conditional first part of the novel “Marina’s Thirtieth Love” is the most interesting in terms of imagery, content and associative motivation. In it, especially in connection with the accentuation of the theme of lesbian love, the image of the heroine, or rather her name, Marina Ivanovna, attracts special attention. In the mind of an informed recipient, in connection with such a “non-random” choice of a patronymic name, the silhouette of Marina Ivanovna Tsvetaeva is undoubtedly contoured in the space of the novel. Critics drew attention to this, and some of them even seriously immersed themselves in the textual identification of the intertextual connections between Sorokin’s novel and Tsvetaeva’s poetry (and epistolary), establishing visible intersections in the course of comparisons.

So, M. Smirnova finds that Sorokin’s novel contains numerous references not only to creativity, but also to Tsvetaeva’s biography. According to the critic, “the names of the heroes serve as a signal <...> the full name of the heroine of V. Sorokin is Marina Ivanovna (compare: Marina Ivanovna Tsvetaeva), and the name of the first real man in Marina’s life is Sergey (like Sergey Efron)” (Smirnova 2012, 228). Specialist M. Smirnova cites other judgments and facts – introduces the names of Tsvetaeva’s first lesbian love, Maria Bashkirtseva (Maria, like Marina in the text) and her friend, the poetess Sofia Parnok (like Marina of Sorokin, the “real” last love) (Smirnova 2012, 229).

The question arises: why does Sorokin play so freely with the name and facts of the biography of the talented poetess Marina Tsvetaeva in the text of a conceptual (conceptualist) novel?

According to M. Smirnova, this is how Sorokin “solves one of the problems of gender: the transmission of a female voice by a male writer” (Smirnova 2012, 229). The critic’s considerations are well-founded, but, in our opinion, they should be recognized as excessively local. It can be assumed that Sorokin would have the talent to speak not just in a female voice, but in the voice of a “Lolita-child” or a “little ballet dancer” (the heroines of D. Prigov’s lyrics, Sorokin’s older friend and mentor in conceptual practices). Already in the early novel “The Queue”, “the novel of direct speech” (Dobrenko 2004, 34), Sorokin demonstrated a vivid gift of speech and language stylization – the voices of his characters, male and female, deprived of figurative status, are distinguishable and individualized (and in gender terms too), endowed with expressive signs of personalization. In addition, in the second conditional part of the novel “Marina’s Thirtieth Love”, the “gender problem” disappears altogether (as discussed below). That is, it is hardly acceptable to agree with the critic that Tsvetaeva’s name (not poetry) was needed by the prose writer to solve the “gender problem”. Rather, the matter is different.

Sorokin, a conceptualist, needed a non-Soviet, “forbidden” topic to implement his conceptualist project – and access to it was provided by non-public facts of M. Tsvetaeva’s private life: a fairly open and quite frank allusion projected on the lesbian hobbies of the poetess. In our opinion, Sorokin conceptually “overthrows” the former Soviet prohibitions and puts new ideals, norms and principles on a pedestal. The point is that the name of Marina Tsvetaeva, known today to any student (her poetry is included in the school program), was under an unofficial ban in the post-war period of the mid-twentieth century. The education authorities “tacitly” avoided the question of acquaintance with Tsvetaeva’s poetry and its study (as well as the works of S. Yesenin or F. Dostoevsky, and a little later A. Solzhenitsyn).

At the sub-plot level, Tsvetaeva turns out to be a significant background character who creates the atmosphere of the first part of the novel. Real Tsvetaeva is the antagonist of the leading character of the second conditional part of the novel “secretary of the party committee of the plant” (Sorokin 2002, 155) Sergei Nikolaevich Rummyantsev. Tsvetaeva’s image marks the opposite and antithetical pole of Sorokin’s narrative: a decadent Silver Age against an optimistic and confident socialism looking to the future. The off-stage image of sapphic Tsvetaeva, a lesbian poet, compositionally balances the image of the factory party organizer Rummyantsev, a Soviet heterosexual man with the correct sexual orientation.

6 The two-faced novelistic image of Solzhenitsyn

Note that the name and textual outline of Alexander Solzhenitsyn also do not directly appear in the text of Sorokin’s novel, but, as in the case of Tsvetaeva, this outline is clearly and projectively outlined. The photo of the mentally mythologized lover of the heroine Marina, hanging on the wall of her room (“hanging over the table”), recognizably recreates the portrait of the author of the “brand new volume of the recently released Gulag” (Sorokin 2002, 131). “Broad-browed, with narrow cheeks framed by a skipper’s beard, a small, tightly compressed mouth and fiercely blue eyes”, with a characteristic portrait “a barely noticeable vertical scar on a high wrinkled forehead” (Sorokin 2002, 99).

Next to the guessed outline of M. Tsvetaeva, the shadow of A. Solzhenitsyn, who served time in the Kazakh camps, becomes another symbol of new industrial relations – the professionalism of not only the Soviet dissident heteroera, but also the selfless hard work of a prisoner of the Soviet Gulag. The camp motif allows us to emphasize once again that Sorokin does not imitate the features of a “female” novel (according to A. Genis), and a new “production” novel mixing the features of the erotic decadent text of the early twentieth century and genre variants of the camp theme, taboo in Soviet literature (“Kolyma Stories” by V. Shalamov, “Faithful Ruslan” by G. Vladimov, “Black Stones” by A. Zhigulin, “Faculty of Unnecessary Things” by Yu. Dombrovsky, etc.).

Solzhenitsyn is an image, he is an imaginary and coveted lover of the heroine Marina. You can add a dreamlike one, since all dialogues with Marina’s mental lover take place in a dream. However, Sorokin does not create an idol for the heroine. Unlike Tsvetaeva, the image of an unpersonalized Solzhenitsyn is ambivalent and ambiguous (and largely ironic).

On the one hand, the author of “The Gulag Archipelago” is the coveted lover of the lesbian heroine and dissident Marina: “She often imagined this acquaintance, either in the past, before her expulsion, or in the future, after that very meeting in Sheremetyevo-Vnukovo...” (Sorokin 2002, 99).

On the other hand, Solzhenitsyn is superreal. He is not a person, but a mystical Russia: “Marina is looking more closely... yes, this is Russia! The Ural Ridge reared up, the deep line of the mind flashed with the Volga, the line of Life with the Yenisei, Fate with Lena, the Caucasus Mountains rose below...” (Sorokin 2002, 121).

The scale of Solzhenitsyn’s image in the novel is prohibitively large, huge, epic. Sorokin seems to be playing with the role (concept) of a writer-prophet, intending not just to speak on behalf of Russia, but to be it, he himself is Russia (almost according to D. Andreev — “heavenly Russia”, mentioned in the text of the novel). The instructions of the mystical Solzhenitsyn to Marina reflect the speech and language style of an omniscient prophet who is able to clearly foresee the future and offer the only true instructions that require precise execution (see “How to equip Russia”, 1990). Solzhenitsyn in Sorokin’s novel is a superman of the “superpower” (Sorokin 2002, 167), although on a different level it is an image both travestied and ironic.

It is noteworthy that the portrait of Marina’s mystical lover is similar to the portrait of party organizer Sergei Rummyantsev from the second part of the novel to the last physiognomic line. “Marina was more and more amazed by the similarity. “Yeah. This is how he <Solzhenitsyn> came from exile thirty years ago... this is how ‘Denisych’ wrote...” (Sorokin 2002, 155).

The Solzhenitsyn image appears to be on the border of two spaces, but he does not localize this border, does not draw it, but, on the contrary, blurs and opens it, thereby marking the diffuse achievability of immersion in any of the border toposes (conditionally ideals of the first or second reality). At the same time, if the dominant conceptual principle of soc-art is the total and absolute inversion of the poles, the replacement of plus with minus, then Sorokin leads to the idea that the ideal vector of movement to the right can easily turn into a roll to the left, the forward direction can be replaced by a backward movement, the top will take the position of the bottom and vice versa. “It doesn’t matter” in Sorokin’s novel (Sorokin 2002, 133). The “reverse principle” of pictorial soc-art is complemented by the writer’s lax principle of Brownian motion, its disorder and chaotic nature, the permissibility of a random change of the desired “religions”.

Solzhenitsyn in Sorokin is like a two-faced Janus. In the structure of the novel narrative, he turns out to be an “intermediate”, bipolar image, a bridge from Tsvetaeva to Rummyantsev, from Marina the dissident to Marina the machine operator. From the image of a dream lover, Solzhenitsyn in Sorokin’s narration easily transforms into the image of a proletarian party organizer, a heterosexual lover and a production mentor, adopting and developing the style of the prophetic speech of the author of the “Gulag Archipelago” Rummyantsev: “I am speaking to you on behalf of all the people” (Sorokin 2002, 163).

There are no authorities or forbidden spheres for Sorokin, the previous literature is the sphere of a total game devoid of the author’s axiology. “I have never felt anything like what a Russian writer feels, I have no responsibility for Russian spirituality, nor for the Russian people, nor for the future of Russia. I have only a responsibility to myself for my texts” (Sorokin 1994, 40). The ethical component is conceptually outside the scope of the aesthetics of “Marina’s Thirtieth Love”.

7 Soc-art narrative scrapping

The researchers noticed that Sorokin's novel "Marina's Thirtieth Love" almost mathematically precisely splits into two conditional parts – out of 58 unnumbered chapters, after the 30th, Sorokin's characteristic method of "breaking the narrative" comes into force (Erofeev 1996, 5). According to V. Rudnev, there is a soc-art "shifter": "At first there is an ordinary, slightly excessively juicy parody soc-art text: a narrative about hunting, a Komsomol meeting, a meeting of the party committee – but suddenly, quite unexpectedly and unmotivated, a pragmatic breakthrough occurs into something terrible, which, according to Sorokin, is the reality" (Rudnev 1999, 138).

The critic P. Weil clarifies that the techniques used by Sorokin "are not reducible <...> to soc-art" (Weil 2012, 167). And it really is. Conceptualist painters I. Kabakov, V. Pivovarov, E. Bulatov also used partially similar techniques. Thus, Kabakov's paintings often have two equal terms separated on a plane: for example, a landscape is depicted on half of the canvas, and its verbal (literal) description is given on the other (see: Rubinstein 1991; Bogdanova 2005). In the same strategy, the well-known "two-part" works of Bulatov were performed: "Sky – Sea", "Black Wind – White Snow", etc. The plane of Bulatov's conceptualist painting is clearly divided into two parts, outwardly correlating with each other, but ironically and conceptually opposed ("Horizon") upon careful examination. Authoritatively important for the formation of Sorokin, the pictorial practices of conceptual artists turn out to be an exemplary visual pretext (in fact, a metatext) for expropriation and its introduction into the space of literary (written) text. It is no coincidence that the quoted image of Bulatov's "Sky – Sea" flashes in the delusional dream of the heroine Marina ("boundless sky-sea" (Sorokin 2002, 171)).

In "Marina's Thirtieth Love", Sorokin's "scrapping of the narrative" is motivated by the lesbian heroine Marina's orgasm with a man. "An orgasm, and even what an orgasm – unprecedented in strength and duration" (Sorokin 2002, 172) to the beat of the Kremlin chimes sounding from the radio, and the anthem of the USSR. "Marina feels the joy that she has lacked all her life" (Sorokin 2002, 173). The scrapping of the narrative marks the awakening of the civil and political maturity of a Soviet man in the egocentric dissident heroine, the birth and formation of an exemplary collectivist personality of a Soviet woman worker.

A former dissident, "newborn" Marina (who has just celebrated her thirtieth birthday) burns bridges behind her (metaphor), or rather burns a bag with more recent sacred shrines: "The Bible, Chukovskaya, Gulag, everything tumbled open, flashing photos and lines <...> the flame engulfed them" (Sorokin 2002, 179). Acquaintance with the production workshops of the plant awakens the previously unfamiliar delight of the heroine: "Marina watched, forgetting about everything in the world. <...> Something very important was happening in front of her, she felt it with her whole being <...> with her heart" (Sorokin 2002, 189). In the text of Sorokin's novel, the "decadent" motifs of the Silver Age give way to the stylistics of Soviet cinema (according to the prose writer, who seriously influenced him), and the novel's narrative is colored by the optimistically brisk dialect of factory machine workers, clearly copied (conceptually projected) from the Chulyukinsky film "Girls" (1962), and the spring landscape creates the dominant of the surrounding natural atmosphere, clearly borrowed from the Khutsievsky film "Spring on Zarechnaya Street" (1956). "Sublimation of erotic energy into mechanical energy", as proposed to consider this process of rebirth critics A. Genis [Genis 2018], E. Dobrenko [Dobrenko 2004], etc., is not happening. In the conceptualist Sorokin text, the heroine becomes truly – typologically – different.

8 The rebirth of the "newborn" heroine

The stamps of Soviet prose and Soviet cinema powerfully permeate the text of the second part of the novel. "An elderly worker with a big white mustache was sitting next to Marina.

<...> Marina liked his strong working hands, calm intelligent eyes and the same calm face with regular facial features..." (Sorokin 2002, 194). Sorokin does not mask the impression of the heroine: "He somewhat resembled one actor who played personnel workers in many Soviet films" (Sorokin 2002, 194). The appearance, demeanor, and speech of factory (= Soviet) characters are saturated with recognizable formulas of Soviet art, whether it is the characterological replica of party member hero Davydov from M. Sholokhov's "Raised Virgin Land" ("Fact!") or the human ("with a human face") speech formula of addressing the heroine and her new acquaintances – "daughter", "girlfriend", "girls" (Sorokin 2002, 194, 195, 207, 213, 214 and others).

The realities of Marina's private apartment in the first part of the novel are decisively replaced by the signs of dorm life ("A bathtub is not our way. Whether it's a shower"). Personal love interest is replaced by the approved program of the "All-Union Communist Clean-up" (Sorokin 2002, 202). The heroine now goes to the House of Culture for a festive concert of factory amateur performances, and even more desirable – for a "lecture on the international situation" (Sorokin 2002, 208). The musical taste of the heroine has been transformed: Chopin's previously beloved Thirteenth Nocturne has been forgotten for the sake of the symbolic song lines "And the dawn is already becoming more noticeable..." (Sorokin 2002, 216). The subjectivized "I" of the heroine is replaced by the objectified Soviet "we": "We do all this – the workers" (Sorokin 2002, 196), "We? So it's me! Me too?" (Sorokin 2002, 197). There is a consistent and confident dissolution of the heroine Marina in a healthy Soviet team, the "newborn machine operator" soberly (and conceptually) realizes that "she did not live before, but simply existed" (Sorokin 2002, 206).

Gradually, the appeal to the heroine by name is replaced by the appeal by surname — Alekseeva (Sorokin 2002, 219–221, etc.) and "honorary" — comrade Alekseeva (Sorokin 2002, 182, 195, etc.). If in the first part Marina's lovers Valentin and Tony in the "affectionately diminutive" name acquired the "vocative" form of Valechka and Ton'ka (graphic design according to the type of a feminine noun), then in the second part of the novel, Comrade Alekseeva is increasingly represented by masculine nominatives — "our new true friend" (Sorokin 2002, 213). Aesthetically labeled and different in atmosphere, the halves of the novel seem to stabilize each other, equalize and balance, while conceptually forcing us to think about the sum of "+" and "–", which tend to zero in their convergence.

Newspaper and poster formulas and clichés penetrate into the speech of the heroine Alekseeva. In a conversation over a friendly cup of tea among the "girls", the heroine already expresses her opinion in a special way: "And I, in turn, want to touch on the issue of mittens <...> The fact is that mittens, despite the ability to protect hands from chips, constrain finger movements, and this in some way affects the speed fixing the part <etc.>" (Sorokin 2002, 217–218). As it becomes clear, the judgment is of a collectivist nature – it is not hers, not her own, but a collective, common labor one, formulated by her in a Soviet way and declared in a friendly way "over tea". Therefore, the subsequent development of Sorokin's text in the style of a Soviet newspaper editorial, the minutes of a production meeting or administrative and state resolutions is no longer surprising, but becomes an expected "equilibrium", zeroing out the extreme points of the novel opposition.

Gradually, the replicas of Sorokin's characters lose their personality, the author's speech is withdrawn from the textual narrative, the paragraph division eventually transforms into a single and indistinguishable text, metaphorically similar to the flow of collective Soviet consciousness, more precisely the unconscious. In one of the interviews, Sorokin's idea about the loss of Marina's individuality by the heroine finds its textual embodiment – the metaphor is realized: not only the central heroine is depersonalized, but also the entire system of novel characters, as well as the narrative reality itself, which turns into a set of words devoid of meaning.

9 The perspective of conceptualist perception

Along with the fact that the implementation of metaphor is one of the most common techniques of conceptual artists. Recall, for example, I. Kabakov's installation "Ruisdael's Hand", which includes a reproduction of a painting by Jacob van Ruisdael and a mannequin's hand placed next to it, "objectifying" a metaphorical formula (see: Bogdanova 2005), the nature of the incoherent text raises the question that make up a significant part (more than 30 pages) of "Marina's Thirtieth Love". As in a number of other cases, artistic practices of Moscow conceptualism can offer decoding of the reception. However, in this case, we should be talking about "junior conceptualists" – in particular, about the projects of Andrei Monastyrsky, about his "Trips out of town" (Monastyrsky 2009–2016), in which Sorokin was also a participant.

In the performance actions invented and embodied by A. Monastyrsky, the important link was not the act of any action itself, but its perception. Monastyrsky invited a group of friends to take a "trip out of town", during which the most inexplicable events took place. For example, 20 performance participants pulled a rope for three hours, the coil of which was hidden in a thicket of trees, waiting for what would end up at the end of the rope. But in the end, there was nothing at the end of the rope — it was not the result, not the meaning of the action that was important to the Monastery, but the nature of the perception of this monotonously prolonged and incomprehensible action for the participants of the performance. Monastyrsky was fascinated not by the trip out of town itself, but by its subsequent pronouncing, an apartment discussion of the behavior of intrigued participants and a demonstration of photographic documents from the "scene of action" (the name of a number of Monastyrsky's performances is "Place of action", "Time of action", "Appearance of the hero", etc.).

Sorokin, an indispensable participant in "trips out of town", exploits the monastic reception – the action of his novel also does not reveal the meaning, outcome, completion. Like Monastyrsky, it is important for Sorokin to break up the recipients' usual ideas about the familiar and understandable, to make them look at the familiar from an unusual point of view. Sorokin destroys the stereotypes of the Soviet way of life and, as a result, breaks the canons of the socialist realist novel, forcing the reader to face the deliberate lack of purpose of the narrative, with the deliberate lack of ideas and thoughtlessness of the epic narrative. If the theory of socialist realism dictated the requirement of a high ideological character of the Soviet novel (Timofeev 1997, 365-370), then Sorokin does not have such an attitude, it is intentionally – conceptually – reduced, annihilated. The skeleton of the realist novel is destroyed by Sorokin, turning into a set of meaningless non-contextual phrases. In fact, the author of "Marina's Thirtieth Love" uses a move repeatedly demonstrated by D. Prigov, when his texts ended with only the letter "a" (cf. Sorokin's "Norm"). The same technique is embodied at the visual level by V. Komar and A. Melamid in their "Quote". For Monastyrsky, this move is consistent with his well-known love for a white, clean, snow-covered field, a kind of blank text sheet that allows you to visually or mentally put one or another meaning into it.

Sorokin creatively transfers this "spatial" conceptual technique to the pages of the novel he is creating, forcing the reader, like the character in L. Rubinstein's poem "The Appearance of a Hero", to "stop and think" (Rubinstein 2012, 56). As it is clear from the "open finale" of Sorokin's novel, it is not about the meaning of what is written, but about the meaning of the unwritten, which remains outside the sheets of paper covered with letters. Or, as another conceptual option, to withdraw oneself from the futile search for meaning.

10 Results and prospects

Thus, it can be concluded that Vladimir Sorokin actively uses the artistic strategies and tactics of Moscow conceptualism in his literary work, skillfully transferring the techniques of visual

experience to the verbal field. The novelist masterfully rethinks the practical moves of Ilya Kabakov, Eric Bulatov, Dmitry Prigov, Lev Rubinstein, playfully uses the socio-artistic finds of Vitaly Komar and Alexander Melamid, focuses on "Trips out of Town" by Andrei Monastyrsky. In all cases, the imitative basis for conceptual reflection is the art of socialist realism, in the case of Sorokin's novel "Marina's Thirtieth Love" – the art of the so-called *production* novel, the thematic prose of socialist realism.

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BO	BIOPHYSICS

ANALYSIS OF TRAFFIC ACCIDENTS AND THE DEPLOYMENT OF THE FIRE RESCUE SERVICE IN THE CZECH REPUBLIC

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Abstract: Traffic accidents remain a topical safety issue. The aim of this article is to use the statistical apparatus to describe a random variable, the daily number of accidents, and to model it. The data on traffic accidents for the period 2012–2021, including time and location information, came from the database of the Fire Rescue Service of the Czech Republic. The study utilised an analysis of variance for statistical analysis with a count variable, following a Poisson distribution. One-factor and two-factor analyses are used to describe the dependence of the daily number of accidents involving the deployment of the fire rescue service on the day of the week, and month. The use of generalised linear model for count data to analyse the number of traffic accidents is unique in the Czech Republic.

Keywords: Traffic accident, fire rescue service, generalised linear models, Poisson distribution.

1 Introduction

Passenger vehicle transport is an integral part of the modern world. Although modern vehicles are equipped with all sorts of technologies and are, compared to the past, manufactured with a much greater regard for safety, they are becoming more accessible and more prevalent on the roads, resulting in denser traffic, as well as more powerful, contributing to an increasing number of accidents. The deployment of the fire rescue service is required after traffic accidents for the purposes of car extrication, the cleanup of leaked operating fluids, the need to carry out fire protection measures, or to restore smooth traffic flow. In the past 10 years, there have been 198,773 such accidents in the 14 regions of the Czech Republic. The focus of the study presented in this article is traffic accidents that involved the deployment of the fire rescue service in the Czech Republic in the period 2012–2021. The records of accidents come from the database of the Fire Rescue Service of the Czech Republic. The accidents are identified by geographical location and the time of occurrence. The time of occurrence is of particular interest in terms of the extent to which the month and day of the week influence the occurrence of a traffic accident. The aim of the presented study is to analyse the accident rate involving the deployment of the fire rescue service in the Czech Republic, to estimate the probability of the daily number of accidents, and to model this random variable using an appropriate regression function.

There are many articles from both the Czech Republic and abroad that are devoted to the topic of traffic accidents. Several studies deal with the analysis of traffic accidents registered in the database of the Police of the Czech Republic (Kvet, 2022; Senk, 2012). Senk (2012) introduces the possibility of using accident prediction models to identify dangerous places on roads. These models are based on a generalised linear model, namely negative binomial regression. Traffic accidents in a selected area of the Slovak Republic are discussed in Harantová (2019). The aim was to analyse the probability distribution of the number of traffic accidents, the number of injuries, and the number of deaths in a certain area using various methods. In terms of causes, the vehicle, the driver and the road are examined as factors. Bačkalić (2013) presents a time analysis of traffic accidents, focusing on the creation of time maps. These maps can be compiled for individual months, days, hours, and for different road users – motorists, cyclists, pedestrians, etc.

The topic of fire rescue service deployment is currently also being researched by experts from the University Burgundy Franche-Comté in France. As the basis for their research, the authors are using data on the deployment of the fire rescue service in the Doubs department of France for the period 2012–2017. They added up to 747 statistical characters to the data obtained from the fire rescue service's database, e.g.

meteorological data, astrological data, calendar data and traffic events (Guyeux, 2020). Cerna (2019) mentions the long short-term memory method (LSTM) from the field of artificial neural networks. This research is further extended and developed in Cerna (2020), in which the method is compared to another method – extreme gradient boosting (XGBoost). The aim was to make predictions for each year based on data from previous years. The predictions for the years in which natural disasters occurred, and which therefore saw an unexpected increase in rescue operations, were less accurate. Regarding the method of comparison, the results proved comparable, with the XGBoost approach proving better for extreme event recognition during natural disasters. However, the authors also concluded that none of the neural network designs used were ideal due to the limits of the numbers of neurons and hidden layers, and that it is therefore important to continue the search for another approach in order to create the best neural network for the description of fire rescue service deployment. Mallouhy (2022) chooses a different approach. The aim of the study was to predict the number of fire rescue service deployments through the application of the exponential smoothing method. Three types of exponential smoothing were used on a specific dataset, namely simple, double (Holt) and triple (Holt-Winters) smoothing. The results of the calculations showed that the Holt-Winters method results in the fewest prediction errors and is therefore the most suitable of the three methods. This conclusion corresponds to the seasonal nature of the researched data, which appears to reflect hourly or weekly periodic changes in human activities that affect the need for fire rescue service deployment.

Using neural network models is a common approach in the field of traffic accident research. Zheng (2020) deals with the precise determination of traffic rush hours based on the deep learning method and LSTM, which are compared to the traditional time series approach models, namely ARIMA (autoregressive integrated moving average) and BPNN (backpropagation neural network). The conclusion of this comparison is that the predictions made via the LSTM method are the most accurate in comparison to real measured data. Time series models are used in Quddus (2008), which introduces integer autoregressive (INAR) Poisson models that feature Poisson regression properties, but describe time series. Although the INAR model was found to be better than the ARIMA model at describing serial correlations, it has its limits in terms of the seasonality and heterogeneity of the data.

There are a number of variations of the Poisson regression model depending on the properties. The Poisson regression approach is discussed in Njå (2021). The authors study accidents involving fire in Norwegian road tunnels. Two Poisson regression models were used to find the key factors influencing fires in tunnels. The authors compare their results with those in articles with a similar focus and in conclusion suggest the use of other methods, namely Bayesian Poisson regression. Lord (2005) deals with the comparison of Poisson regression, Poisson-gamma and zero-inflated models on motor vehicle accident data. They note that the Poisson and negative binomial models serve as statistical models for accident processes, with the Poisson model showing better results for almost homogeneous conditions, while the negative binomial model is better suited to describe other conditions.

Among the factors influencing the occurrence of traffic accidents is undoubtedly the influence of weather. Gao (2016) analyses traffic accidents in the Chinese city of Shantou and examines the impact of meteorological parameters on accident rates using time series methods, correlation analysis and multiple linear regression analysis. The results show that road traffic injuries correlate positively with temperature and duration of sunshine, and correlate negatively with wind speed.

2 Data and methods

The initial dataset contained records of traffic accidents investigated by fire rescue service units from 1 January 2012 to 31 December 2021. During this period 198,773 such accidents occurred in the Czech Republic. Each accident was described with the precise time and location data. This article focuses on analysing the dependence of the daily number of traffic accidents on such factors as *day of the week* and *month*. An overview of the basic statistics regarding the daily number of traffic accidents across the Czech Republic, including the median and upper and lower quartiles, is shown graphically in the boxplots in Figures 1–2 and described in Tables 1–2.

Figure 1: Boxplots of the daily number of accidents for day of the week

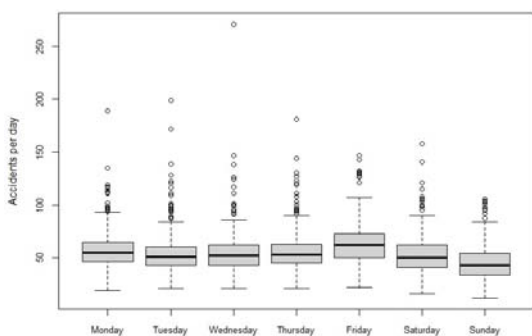
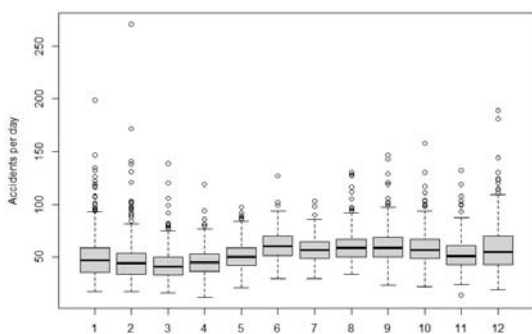


Figure 3: Boxplots of the daily number of accidents in months



Tab. 1: Characteristics of the daily number of accidents for day of the week

Day	n	Mean	Median	Standard deviation	Min	Max
Monday	522	56.54	55	17.85	19	189
Tuesday	522	53.42	51	18.44	21	199
Wednesday	522	54.05	52	19.06	21	271
Thursday	522	55.56	53	17.82	21	181
Friday	522	63.31	63	18.84	22	147
Saturday	521	52.86	50	17.34	16	158
Sunday	522	45.15	43	15.54	12	106

Tab. 2: Characteristics of the daily number of accidents in months

Month	n	Mean	Median	Standard deviation	Min	Max
January	310	52.44	47	23.78	17	199
February	283	48.63	44	25.01	17	271
March	310	42.82	41	15.58	16	139
April	300	45.42	45	13.45	12	119
May	310	51.47	50	13.08	21	97
June	300	61.24	60	13.90	30	127

July	310	58.03	57	11.80	30	103
August	310	60.20	59	14.80	34	130
September	300	60.98	59	16.80	23	147
October	310	58.98	57	16.59	22	158
November	300	53.59	51	16.05	14	132
December	310	58.78	55	23.76	19	189

The discussion now turns to the chosen modelling methods and a brief summary of the theory. The modelled variable is the average number of accidents per day in the Czech Republic. Information on the geographical location of the accident and the exact time of the accident were available as part of the data regarding the accidents. The aim of the study presented in this article is to verify the dependence of the daily number of accidents on the day of the week and month. The analysis of variance ANOVA for count data (Poisson distribution) used for the dependency analysis in this article is a method based on a generalised linear model, for more details see Dobson (2008).

ANOVA for count data is an example of generalised linear model, whereby the Poisson distribution of the explanatory random variable is assumed. The estimate of the mean value of this variable is then expressed using a logarithmic link function. To determine whether the variable in question is subject to the Poisson distribution, the Kolmogorov-Smirnov, Cramer-von Mises or Anderson-Darling tests can be used. For the Poisson probability distribution of a random variable, the mean value and the variance parameter are identical and correspond to the parameter λ , i.e. the average number of observed events per unit of time. If the dispersion parameter happens to be ϕ -times the mean, the model is said to exhibit overdispersion and the calculations need to take into account the estimate of the dispersion parameter ϕ , which can be done in the computational setting quasi-Poisson. Explanatory variables, referred to as factors, have only a small number of variations by which their values can be classified into groups. Proving the dependence of an explanatory variable on factors consists in demonstrating different variations of this variable in different groups created by sorting the values of the explanatory variable by factor. In doing so, the Poisson probability distribution of the explanatory random variable is assumed.

Parametric ANOVA can be used if several assumptions are met: 1) the error components of the explanatory variable have a normal distribution; 2) the mean error is zero; 3) the errors are independent; 4) the errors have the same variance within groups. To verify the normality of the explanatory variable, the Shapiro, Lilliefors and Anderson-Darling tests can be used. The ANOVA method then determines whether the mean values of the explanatory random variable differ between groups. Parameters that characterise the mean of the assumed probability distribution of the explanatory variable can be estimated from empirical data in advance using the method of maximum likelihood estimation.

When the assumptions of normality for parametric analysis of variance are not met, one of the options is to assess the dependence of variables by means of nonparametric analysis, such as the Kruskal-Wallis test, see for example Devore (2012), or to choose a generalised linear model. The result shows whether the explanatory random variable depends on the given factor. Conducting Nemenyi's All-Pairs Rank Comparison Test, a multiple comparison test, further shows which sorted groups differ. Finally, it is possible to calculate from the coefficients of the linear model, how the mean of the groups changes with respect to a specified reference value, e.g. the mean. Compared to the linear model, the conditions of the generalised linear model are more general, which allows its use in cases where the explanatory variable is not normally distributed, or when it is a non-linear function of parameters, or when error terms are correlated or heteroscedastic, see Dobson (2008).

3 Results

At the beginning of the model creation, tests of the normal distribution of the daily number of accidents throughout the Czech Republic were performed, namely Shapiro, Lilliefors and Anderson-Darling tests. Test p-values were studied for all months of the period in question. Most of the values were less than the chosen significance level of 0.05, implying that the normality hypothesis could be rejected. Since this implies a different than normal distribution, a Kruskal-Wallis test, a nonparametric alternative to one-factor analysis of variance, was conducted for each factor, *day of the week* and *month*.

A sample of data for which the tests did not reject the Poisson probability distribution were chosen for analysis. The result would be similar even for another small part of the studied dataset. The dataset was therefore modelled using generalised linear model for count data (Poisson distribution). In the computational programme, the natural logarithm was chosen as the link function. The calculations were performed in R, version 4.3.1.

3.1 One-factor analyses

According to the Kruskal-Wallis test, the p-value is much smaller than 0.05 for each of the factors *day of the week* and *month* (p-value < 0.001), so the null hypothesis of equality of the mean values between the groups of explanatory variables, sorted by the factors *day of the week* and *month*, can be ruled out. This means that there is always at least one group which is statistically different from the others. Based on this test, it can be said that the daily number of accidents depends on the factors monitored. Nemenyi's multiple comparison tests, in which p-values less than 0.05 are significant, show that when sorted by the factor *day of the week*, Friday and Sunday differ statistically significantly from the other days (see Table 3). When sorted by the factor *month*, several statistically significant different groups emerge, with the group of summer months differing the most from the others (see Table 4).

Tab. 3: Multiple comparison test for days of the week (p-values)

	Mon.	Tues.	Wed.	Thur.	Fri.	Sat.
Tuesday	0.004	–	–	–	–	–
Wednesday	0.112	0.944	–	–	–	–
Thursday	0.850	0.205	0.832	–	–	–
Friday	<0.001	<0.001	<0.001	<0.001	–	–
Saturday	0.002	1.000	0.894	0.144	<0.001	–
Sunday	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Tab. 4: Multiple comparison test for months (p-values)

Month	1	2	3	4	5	6
2	0.148	–	–	–	–	–
3	<0.001	0.173	–	–	–	–
4	0.027	1.000	0.457	–	–	–
5	0.906	0.001	<0.001	<0.001	–	–
6	<0.001	<0.001	<0.001	<0.001	<0.001	–
7	<0.001	<0.001	<0.001	<0.001	<0.001	0.690
8	<0.001	<0.001	<0.001	<0.001	<0.001	0.995
9	<0.001	<0.001	<0.001	<0.001	<0.001	0.999
10	<0.001	<0.001	<0.001	<0.001	<0.001	0.427
11	0.259	<0.001	<0.001	<0.001	0.997	<0.001
12	<0.001	<0.001	<0.001	<0.001	0.015	0.001
Month	7	8	9	10	11	
2	–	–	–	–	–	–
3	–	–	–	–	–	–
4	–	–	–	–	–	–
5	–	–	–	–	–	–
6	–	–	–	–	–	–
7	–	–	–	–	–	–
8	0.999	–	–	–	–	–
9	0.996	1.000	–	–	–	–
10	1.000	0.982	0.954	–	–	–
11	<0.001	<0.001	<0.001	0.001	–	–
12	0.471	0.059	0.036	0.734	0.302	–

The model of one-factor analysis of variance for the day of the week shows that the average number of accidents involving fire rescue service deployment per day in the Czech Republic is 54.18 (see Table 5). The boxplots in Figure 1 and the ANOVA model show that on Fridays, 63.31 accidents on average occur, which represents 1.17 times the average. Mondays, with 1.04 times the average, and Thursdays, with 1.03 times the average, are both also above the average number of accidents. Wednesdays do not differ statistically significantly from the average. The fewest average accidents (45.15) occurred on Sundays.

Tab. 5: GLM – one-factor – parameter estimates for day

Factor	Estimate	p-value	Times	Mean	
Intercept	3.9923	<0.001	***	54.18	
Monday	0.0427	<0.001	***	1.04	56.54
Tuesday	-0.0141	0.011	**	0.99	53.42
Wednesday	-0.0024	0.662		1.00	54.05
Thursday	0.0251	<0.001	***	1.03	55.56
Friday	0.1558	<0.001	***	1.17	63.31
Saturday	-0.0246	<0.001	***	0.98	52.86
Sunday	-0.1823	<0.001	***	0.83	45.15

Analysis for the factor *month* shows significant differences in all sorted groups (see Table 6). In January, February, March, April and May, the number of accidents decreases; in June, July, August, September and October, the number of accidents is above average; and in November and December, the number of accidents corresponds the most to the annual average of the daily number of accidents involving the deployment of the fire rescue service.

Tab. 6: GLM – one-factor – parameter estimates for month

Factor	Estimate	p-value	Times	Mean	
Intercept	3.9895	<0.001	***	54.03	
January	-0.0298	<0.001	***	0.97	52.44
February	-0.1052	<0.001	***	0.90	48.63
March	-0.2326	<0.001	***	0.79	42.82
April	-0.1736	<0.001	***	0.84	45.42
May	-0.0486	<0.001	***	0.95	51.47
June	0.1253	<0.001	***	1.13	61.23
July	0.0714	<0.001	***	1.07	58.03
August	0.1082	<0.001	***	1.11	60.20
September	0.1211	<0.001	***	1.13	60.98
October	0.0877	<0.001	***	1.09	58.98
November	-0.0082	0.277		0.99	53.59
December	0.0843	<0.001	***	1.09	58.78

The parameters estimated according to the one-factor model did not yield any surprising results, they just correspond to the statistical characteristics shown in Tables 1–2.

3.2 Multifactor analyses

A comparison was subsequently made for two-factor additive (without interactions) and multiplicative (with interactions) analysis with the factors *day of the week* and *month* using a generalised linear model (Poisson distribution). The additive two-factor analysis model shows the difference between the averages for each day of the week and month and the reference value (unweighted overall average), assuming the influence of both factors on the daily number of traffic accidents. Based on the p-values, the model appears statistically significant; the day of the week and the month significantly affect the value of the daily number of accidents involving the deployment of the fire rescue service. The differences are shown in Table 7, where the first column contains the groups sorted by factor, and the second column represents the calculated estimates, i.e. the difference of the logarithms of the estimated means. The estimated logarithmic value is accompanied by the p-value and statistical significance marker in the adjacent columns. The “Times” column is a multiple of the overall average, with the last column showing the daily average number of traffic accidents involving the deployment of the fire rescue service.

Tab. 7: Generalised linear model – parameter estimates (the model without interactions)

Factor	Estimate	p-value	Times
Intercept	3.9852	<0.001 ***	
day1	0.0427	<0.001 ***	1.04
day2	-0.0144	0.009 **	0.99
day3	-0.0026	0.637	1.00
day4	0.0253	<0.001 ***	1.03
day5	0.1562	<0.001 ***	1.17
day6	-0.0248	<0.001 ***	0.98
day7	-0.1823	<0.001 ***	0.83
month1	-0.0303	<0.001 ***	0.97
month2	-0.1052	<0.001 ***	0.90
month3	-0.2325	<0.001 ***	0.79
month4	-0.1733	<0.001 ***	0.84
month5	-0.0490	<0.001 ***	0.95
month6	0.1255	<0.001 ***	1.13
month7	0.0713	<0.001 ***	1.07
month8	0.1076	<0.001 ***	1.11
month9	0.1223	<0.001 ***	1.13
month10	0.0872	<0.001 ***	1.09
month11	-0.0088	0.242	0.99
month12	0.0853	<0.001 ***	1.09

Table 8 displays the results of the analysis of variance for the model without interactions, indicating significant statistical values for both factors.

Tab. 8: ANOVA without interactions

	DF	Deviance	Resid. DF	Resid. Dev.	p-value
null			3652	21211	
day	6	1685.7	3646	19526	<0.001 ***
month	11	2515.5	3635	17010	<0.001 ***

Predicted values of daily number of traffic accidents for the model without interactions are summarized in Table 9.

Tab. 9: Predicted values of the daily number of accidents (model without interactions)

Month	Mon.	Tues.	Wed.	Thur.	Fri.	Sat.	Sun.
1	54.47	51.44	52.06	53.53	61.01	50.91	43.49
2	50.53	47.73	48.30	49.66	56.61	47.24	40.35
3	44.50	42.03	42.53	43.73	49.84	41.59	35.53
4	47.21	44.59	45.12	46.40	52.88	44.13	37.70
5	53.46	50.49	51.09	52.54	59.88	49.97	42.69
6	63.65	60.12	60.83	62.55	71.30	59.49	50.83
7	60.29	56.94	57.62	59.25	67.54	56.36	48.14
8	62.52	59.05	59.75	61.44	70.03	58.44	49.92
9	63.44	59.92	60.64	62.35	71.07	59.30	50.66
10	61.26	57.86	58.54	60.20	68.62	57.26	48.91
11	55.65	52.56	53.18	54.69	62.34	52.02	44.44
12	61.14	57.75	58.43	60.09	68.49	57.15	48.82

In the case of the multiplicative model, the interaction of the factors *day of the week* and *month* are also taken into account. Row d1 in Table 10, for example, indicates the result in the case that the average of the daily number of accidents on the first day is increased compared to the overall average, i.e. the Monday average. Row m1 represents the daily average for January. The line of interactions d1:m1 reveals that the logarithmic value of the difference from the overall mean is 0.025 greater on Mondays in January. If this interaction is included in the overall average, the change in d1 compared to the overall average, and the change in m1 compared to the overall average, it appears that Mondays in January represent a risk of 55.44 accidents per day across the Czech Republic on average. It may seem odd that although Tuesdays are below average and January is below average, the average for Tuesdays in January is above average. However, it should be noted that there are outliers present in the dataset that can cause this and that the Tuesdays of other months equalise the average. Likewise, other days in January equalise the average of January.

Tab. 10: Generalised linear model – parameter estimates (the model with interactions)

Factor	Estimate	p-value	Factor	Estimate	p-value
	3.9835	<0.001 ***	d5:m5	-0.0278	0.113
d1	0.0442	<0.001 ***	d6:m5	-0.0184	0.333
d2	-0.0092	0.099	d7:m5	0.0268	0.181
d3	0.0007	0.898	d1:m6	-0.0012	0.943
d4	0.0269	<0.001 ***	d2:m6	-0.0257	0.146
d5	0.1579	<0.001 ***	d3:m6	-0.0828	<0.001 ***
d6	-0.0303	<0.001 ***	d4:m6	-0.0265	0.132
d7	-0.1903	<0.001 ***	d5:m6	0.0248	0.126
m1	-0.0375	<0.001 ***	d6:m6	0.0543	0.002 **
m2	-0.1102	<0.001 ***	d7:m6	0.0571	0.002 **
m3	-0.2327	<0.001 ***	d1:m7	-0.0279	0.108
m4	-0.1748	<0.001 ***	d2:m7	-0.0641	<0.001 ***
m5	-0.0467	<0.001 ***	d3:m7	-0.0077	0.661
m6	0.1265	<0.001 ***	d4:m7	0.0104	0.550
m7	0.0751	<0.001 ***	d5:m7	-0.0365	0.029 *
m8	0.1116	<0.001 ***	d6:m7	0.0583	0.001 ***
m9	0.1221	<0.001 ***	d7:m7	0.0676	<0.001 ***
m10	0.0909	<0.001 ***	d1:m8	-0.0341	0.048 *
m11	-0.0084	0.266	d2:m8	-0.0413	0.021 *
m12	0.0841	<0.001 ***	d3:m8	-0.0237	0.175
d1:m1	0.0250	0.170	d4:m8	-0.0589	<0.001 ***
d2:m1	0.1101	<0.001 ***	d5:m8	-0.0238	0.144
d3:m1	0.0686	<0.001 ***	d6:m8	0.0544	0.002 **
d4:m1	0.0019	0.916	d7:m8	0.1274	<0.001 ***
d5:m1	0.0253	0.139	d1:m9	0.0216	0.203
d6:m1	-0.0781	<0.001 ***	d2:m9	-0.1070	<0.001 ***
d7:m1	-0.1529	<0.001 ***	d3:m9	-0.0544	0.002 **
d1:m2	-0.0192	0.328	d4:m9	-0.0660	<0.001 ***
d2:m2	0.0489	0.013 *	d5:m9	0.0637	<0.001 ***
d3:m2	0.1652	<0.001 ***	d6:m9	0.0442	0.011 *
d4:m2	-0.0511	0.012 *	d7:m9	0.0978	<0.001 ***
d5:m2	0.0357	0.054	d1:m10	-0.0493	0.005 **
d6:m2	-0.1088	<0.001 ***	d2:m10	-0.0245	0.163
d7:m2	-0.0707	0.002 **	d3:m10	0.0129	0.456
d1:m3	-0.0124	0.536	d4:m10	0.0092	0.592
d2:m3	0.1003	<0.001 ***	d5:m10	-0.0451	0.007 **
d3:m3	0.0070	0.733	d6:m10	0.0391	0.025 *
d4:m3	-0.0044	0.825	d7:m10	0.0577	0.002 **
d5:m3	-0.0052	0.785	d1:m11	0.0507	0.005 **
d6:m3	-0.0372	0.072	d2:m11	0.0017	0.927
d7:m3	-0.0480	0.031 *	d3:m11	-0.0236	0.210
d1:m4	0.0044	0.820	d4:m11	0.0362	0.046 *
d2:m4	0.0261	0.190	d5:m11	-0.0311	0.074
d3:m4	-0.0080	0.692	d6:m11	0.0033	0.860
d4:m4	0.0628	0.001 **	d7:m11	-0.0372	0.068
d5:m4	0.0113	0.549	d1:m12	0.0245	0.148
d6:m4	-0.0368	0.076	d2:m12	-0.0260	0.141
d7:m4	-0.0600	0.007 **	d3:m12	-0.0217	0.220
d1:m5	0.0178	0.332	d4:m12	0.0547	0.001 **
d2:m5	0.0015	0.935	d5:m12	0.0085	0.606
d3:m5	-0.0317	0.090	d6:m12	0.0258	0.144
d4:m5	0.0318	0.078	d7:m12	-0.0658	0.001 ***

Table 11 displays the results of the analysis of variance for the model with interactions. The values indicate significant statistical results for both factors and the interactions. Thus, for the final description of the number of accidents, we use a model with interactions.

Tab. 11: ANOVA with interactions

	DF	Deviance	Resid. DF	Resid. Dev.	p-value
null			3652	21211	
day	6	1685.7	3646	19526	<0.001 ***
month	11	2515.5	3635	17010	<0.001 ***
day:month	66	539.1	3569	16471	<0.001 ***

Predicted values of daily number of traffic accidents for the multifactor model with interactions are summarized in Table 12.

Tab. 12: Predicted values of the daily number of accidents (model with interactions)

Month	Mon.	Tues.	Wed.	Thur.	Fri.	Sat.	Sun.
1	55.44	57.22	55.44	53.24	62.13	46.42	36.70
2	49.32	50.05	56.78	46.95	58.38	41.85	37.05
3	43.93	46.61	42.88	43.52	49.58	39.78	33.53
4	47.34	45.86	44.77	49.33	53.40	42.17	35.12
5	54.53	50.86	49.69	54.36	58.38	48.82	43.52
6	63.63	58.86	56.14	60.98	73.16	62.43	53.35
7	58.84	53.80	57.49	60.09	65.36	59.53	51.20
8	60.66	57.09	58.68	58.16	68.67	61.51	56.39
9	64.81	54.02	57.51	58.36	75.74	61.53	55.32
10	58.52	56.87	59.62	60.98	65.84	59.34	51.51
11	58.56	52.86	52.05	56.72	60.45	51.84	42.42
12	62.58	56.40	57.20	63.39	69.00	58.16	45.22

From the predicted numbers of accidents shown in Table 12, it can be seen that the highest values are reached on Fridays, with the fewest accidents on Sundays. The influence of the month of the year is also significant. The results show that the lowest number of accidents corresponds to the months of March and April, while a higher number of accidents can be expected in the summer and winter months. These results are consistent with the results obtained using univariate analyses of variance. However, the advantage of the two-factor model is that it also describes the effect of the relationship (interaction) between the factors (day of the week and month), so the estimates are more accurate.

4 Discussion

The results obtained by analysis reflect the basic statistical description of the dataset. The obtained averages of the daily number of traffic accidents in days and months correspond to the traffic accident statistics shown in Figures 1–2 in the introduction. Outliers have not yet been removed from or replaced in the dataset, which is also reflected in the resulting averages.

In comparison to other articles on traffic accidents in the Czech Republic, such as Kvet (2022) and Harantová (2019), the fundamental difference lies in the source information included in the datasets and therefore in the focus of the analyses. Traffic accident records from the databases of the Police of the Czech Republic usually include a broad classification of traffic accidents, e.g. in terms of the culpability of the driver, type of vehicle, characteristics of the place of the accident, type of road, type of intersection, etc. The present analysis of the dependence of the occurrence of traffic accidents on time is important for creating traffic flow free of accidents and rush hour traffic jams. It is advisable to supplement the time analysis by location data, e.g. geographical coordinates of the accident site or at least a more precise administrative unit under which the accident falls. Inspiration can be found in Senk (2012) and Bačkalić (2013), which use the geographic information system (GIS) for the purposes of geographic statistics. There is also an opportunity for analyses using multifactor models with both time and location factors.

Abroad, modern analyses of traffic accidents are often carried out using neural networks: Cerna (2019), Cerna (2020), Guyeux (2020) and Zheng (2020). The more traditional method of time series analysis can be found in Mallouhy (2022). However, the probability distribution of a random variable which is not distributed normally complicates matters. An elaboration on the application of time series for random variables with Poisson distribution can be found in Quddus (2008). Available literary sources indicate that the incorporation of advanced statistical methods into the analysis of traffic accidents in the Czech Republic is not common. The application of generalised linear model for count data (Poisson distribution) to traffic accident data in the Czech Republic is an addition in this area and represents a contribution to research on the issue. The aim of further research will be to expand the field of dependent variables and seek and explore other dependencies on various

factors, such as weather phenomena mentioned in Guyeux (2020), Gao (2016) and other available records.

5 Conclusion

The objective of this study is to analyse the number of traffic accidents that required the departure of fire rescue service units. No changes in content have been made. The study investigates the relationship between the number of accidents and the days of the week and months of the year.

The analysis of the daily number of traffic accidents involving the deployment of the fire rescue service was carried out using data on traffic accidents that occurred in the Czech Republic in the period 2012–2021. The data was obtained from the database of the Fire Rescue Service and processed. The influence of the factors *day of the week* and *month* was investigated. The probability distribution of the explanatory random variable was tested. The hypothesis of normality was generally rejected. Good match tests did not rule out Poisson distribution. Subsequent modelling was carried out using Poisson analysis of variance.

Firstly, one-factor analyses were performed for the individual factors separately. Tests revealed that all the factors examined are statistically significant. The factor *day of the week* showed that in terms of accidents, Mondays, Thursdays and Fridays are above average, while on Sundays the risk of a traffic accident involving the deployment of the fire rescue service was below average. The development of the risk of traffic accidents during the year, based on the collected data sample, shows that from November to May the risk is below average, while from June to October the risk is above average, with a total annual average of 54 traffic accidents per day involving the deployment of the fire rescue service throughout the country.

Secondly, a two-factor analysis was performed for the factors *day of the week* and *month* in two forms, namely without interactions and with interactions. These two forms were tested and compared. The conclusion of this article is that the two-factor model with interactions seems to be a suitable model for analysing the dependence of the daily number of accidents involving the deployment of the fire rescue service according to the day of the week and month. From the results obtained, it can be summarised that the highest number of accidents occurs on Fridays and the lowest number of accidents on Sundays. In terms of the season (month), fewer accidents can be expected in March and April, and more accidents in the summer and winter months.

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Primary Paper Section: B

Secondary Paper Section: BB



C CHEMISTRY

CA	INORGANIC CHEMISTRY
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CC	ORGANIC CHEMISTRY
CD	MACROMOLECULAR CHEMISTRY
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CF	PHYSICAL CHEMISTRY AND THEORETICAL CHEMISTRY
CG	ELECTROCHEMISTRY
CH	NUCLEAR AND QUANTUM CHEMISTRY, PHOTO CHEMISTRY
CI	INDUSTRIAL CHEMISTRY AND CHEMICAL ENGINEERING

DETECTION AND IDENTIFICATION OF MICROPLASTICS IN SEDIMENTS ALONG THE COASTAL AREA OF BORONGAN CITY

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Abstract: Sedimentary particles or sand were collected from the areas of Baybay Boulevard and Hilangagan Beach Resort for qualitatively analyzing the presence of microplastics. Density separation was done using 20% NaCl solution and microscopic identification was done under wet conditions using a 30 micron filter at 40x magnification under a stereo microscope. Observations found out that microplastics are present in the sediments of Borongan City, Eastern Samar. From this, secondary microplastics were found to be prominent within the sample which indicates the degradation of these polymeric substances in the environment. Microfibers are the most common type of microplastics found in sediments. Almost all microplastics observed within the sediment samples were filamentous in shape. In terms of the coloration, blue was the most prominent color in most microplastics observed; this is seconded by the color red. A total of 30 microplastics were observed from the sediments collected from Baybay Boulevard and Hilangagan beach resort. Baybay Boulevard averages at 10.1 MP/Kg, while the average microplastic contamination in Hilangagan beach resort was calculated at 1.88 MP/Kg, this sums up to an average of 5.84 MP/Kg for both sampling sites in Borongan City.

Keywords: sediments, Borongan City, microplastics, density separation, microscopic examination, microcontaminants.

1 Background of the Study

For decades, scientists around the world have been studying the origin of manmade pollution and its effects. One of the most pervasive pollution problems our environment is facing is marine debris. Let us introduce you to marine debris, define what it is, and explore the impacts it has on the environment. You can then take the knowledge you gain and apply it as a citizen scientist to your local waterways or coastline, and along with it, plastics.

Plastics are polymers which are a chain of molecules that are derived from small molecules of monomers that are extracted from oil or gas.^{1,2,3}

Major negative effects can be outlined by the contamination of marine environments with microplastics. The National Oceanography and Atmospheric Administration (NOAA) stipulated that marine debris such as plastics can cause losses in aesthetic values of tourist attraction which in turn can result in substantial economic loss⁴. There is also the consumption of plastics and microplastics by marine animals can lead to false satiation, starvation and death.^{1,5}

Microplastics are plastic pieces smaller than 5 millimeters, which is about the width of a pencil eraser. They come in different forms, including microbeads, microfilms, microfibers, and microfragments. Many microplastics start out as larger plastic products (plastic water bottles, beach toys, or large fishing nets) that get broken up over time. Some begin as intentionally small plastics for cosmetic purposes (beads in face exfoliants, toothpaste).⁶

Microplastics have been found all over the ocean—from the surface water to deep-sea benthic zones (lowest level of the ocean). There are even reports of microplastics being found frozen in Arctic ice! These small plastic pieces are often mistaken as food and can be ingested by small organisms like plankton to larger organisms like whale sharks. Not only are plastics indigestible, but they may also be toxic to the animals that consume them.⁶

Plastic is absorbent, like a sponge, so it absorbs hydrophobic chemicals from the water it floats in. There are all kinds of chemicals in seawater—from pesticides to steroids to BPA—that can be very harmful to humans and wildlife. Plastic can absorb these chemicals.⁶

Primary microplastics are tiny particles designed for commercial use, such as cosmetics, as well as microfibers shed from clothing

and other textiles, such as fishing nets. Secondary microplastics are particles that result from the breakdown of larger plastic items, such as water bottles. This breakdown is caused by exposure to environmental factors, mainly the sun's radiation and ocean waves.⁷

The main route of microplastics to the marine environment is the effluent from sewage and storm water generated in areas contains a significant amount of plastic. This pose some difficulties for treatment because many sewage treatment plants are not able to capture and treat plastic materials that are less than .5mm in diameter.^{1,2,3} These plastics and micro plastics become an even greater threat to the marine environment.

In the context of the locality in Eastern Samar alone there is prevailing problem with the numerous numbers of plastics contaminants that are harbored after a rough season, increase in the use of plastic materials for various human use as well as the poor management of garbage and non-biodegradable wastes, hence, this research will be conducted to detect and approximately identify the presence of microplastics in the Coastal Area of Borongan City.

2 Objectives of the Study

This study aims to detect the presence of microplastics in the sediments along the coastal area of Borongan City. More specifically, this study aims to:

1. Classify the present microplastics as:
 - a. Primary microplastics
 - b. Secondary microplastics
2. Identify the types of microplastics as:
 - a. Microbeads
 - b. Microfilms
 - c. Microfibers
 - d. Microfragments
3. Determine the physical structure of microplastics as:
 - a. Round
 - b. Angular
 - c. Filament
 - d. Other shape
4. Determine the color of the microplastics as:
 - a. Blue
 - b. Red
 - c. Transparent/white
 - d. Black
 - e. Green
 - f. Other colors
5. Compute the total number of microplastics found in sediment samples.

2 Methodology

2.1 Research Design

This descriptive study used qualitative analysis in detecting and estimating the present microplastics in sediments along the coastal area of Borongan City with the use of density separation, filtration and sieving as well as Microscopic Technique.

2.2 Locale of the Study

This study will be conducted at the Chemistry Laboratory of the Biology Department of the College of Nursing and Allied Sciences. Sediment samples will be collected from the tourism areas of Borongan City such as the area of Baybay Boulevard. The Baybay Boulevard coastal area of the city along with its identified tourism areas with sedimentary particulates will be divided containing 2 sampling sites which will be established. The boulevard and all other identified sites is considered for its strategic location in the city and the flourish of food economy in

the area where plastics of various kinds are frequently used as food packaging.

2.3 Data Gathering Procedures

The following step-by-step processes was used in the study to detect the presence of microplastics in the sands along the tourism sites of Borongan City, Eastern Samar. All procedures will follow the Mississippi State University Microplastic Sampling and Processing Guidebook.⁶

2.3.1 Sediment Sampling

Sampling followed the standard procedures published by the Mississippi State University⁶ on sediment sampling.

Sediment sampling was done at the high, high tide line (wrack line). The wrack line is the accumulation of debris (sticks, seaweed, etc.) that marks the maximum extent of water height during high tide. The deposit of debris here is where microplastics (if there are any) are most dense, without much wave action to carry them away. For accurate data collection, collect at least three sediment samples.

2.3.2 Processing the Sediments

The process of separating the microplastics from the sediment sample was done by density separation. In density separation, salt water and air bubbles were pumped through the sediment sample, fluidizing it; because microplastics are less dense than the salt water and sediments, they float to the top where they can be counted.

2.3.3 Density Separation of Microplastics

Microplastics tend to float on the water surface due to their lower density than water. The target component and impurities can be separated by density flotation according to their density differences. To be specific, for density separation, the flotation solution was added to the sample, and then MPs were collected through a series of processes such as stirring, mixing, standing, and settling, and finally, the supernatant was separated. The density of most MPs is in the range of 0.80–1.40 g/cm³.⁸ Generally speaking, MPs with a density of 1.40 g/cm³ can be obtained using a flotation solution.

The solution of NaCl is used extensively for the separation of MPs because it is cheap, readily available, green, and non-toxic.⁹ Other flotation solutions are more efficient but limited to their expensive (SPT, NaI, etc.) or may pose a threat to the environment (ZnCl₂, etc.).⁸

2.3.4 Filtration and Sieving

Filtering or sieving is the most commonly used approach for separating the supernatant containing MPs from sediment samples and MPs from density separation of samples. However, there exist some differences. For example, for filtration, the MPs onto filter membrane are obtained using a vacuum pump and sieving is performed directly onto screens with different pore sizes through gravity (Baldwin et al., 2016). The particle size of MPs collected depends on the size of the sieve and filter apertures. Generally speaking, the pore size (0.45–2 μm) of the filter membrane is smaller than that of the screen.^{10,11,12}

2.3.5 Microscopic Identification of Microplastics

With the use of a Stereomicroscope at 40x magnification, tweezers, forceps and needles, a Microplastic identification reference materials, and disposable gloves and lab coat (as required for safety), the following procedures were followed to identify microplastics:

Prepare a clean and dedicated workspace in the laboratory or controlled environment to avoid contamination during the analysis. Wear disposable gloves and a lab coat to maintain a

sterile working environment and prevent contamination. Water samples were from the sediments and collected. The water samples with filtered using a 30 micron filter mesh. The filter was allowed to stand and placed into a Petri Dish. The Petri dish was then examined under a stereomicroscope at 40x magnification. The dish was scanned from side to side, moving across the sample area to search for particles that match the characteristics of microplastics, such as shape, color, and texture. Use the microscope's focus and illumination controls to obtain a clear view of the particles. Take note of any particles that appear consistent with microplastics based on their size, shape (e.g., fragments, fibers), and visual appearance. Optionally, compare the observed particles with microplastic identification reference materials or images to assist with accurate identification. If needed, capture images of potential microplastics using a digital camera or microscope camera attachment for further analysis or documentation.

Repeat the process with multiple other filters and Petri dishes to different representative water samples for thorough examination. Record and document the characteristics and quantities of identified microplastics, including their size, shape, color, and any additional relevant observations. Clean the filter paper for further use using distilled water and properly dispose any debris left from the previously observed filter mesh with adherence to laboratory's waste management protocols. Analyze and interpret the collected data to assess the presence, abundance, and characteristics of microplastics in the water sample. This was done under wet analysis for a thorough identification.

3 Results and Discussion

After sediments were sieved and possible microplastics (MP) were obtained via floatation, and density separation, microscopic analysis was done to the filtrate. The following data were obtained:

3.1 Microplastics Classification

One of the most important aspects of microplastics identification is for it to classify so as to have pre-determined knowledge on the source of the contamination. The sediments collected from the sampling sites were observed for the presence of primary or secondary microplastics.

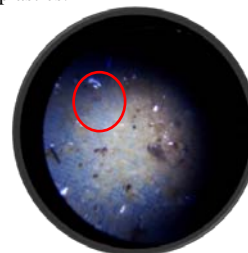


Figure 1. Microplastics Observed

As observed from the sediments collected via microscopic identification, it was found out that Baybay Boulevard has the highest observed number of microplastics suspended within the sediments with a total number of 25, while in Hilangagan, a total of 5 microplastics were observed. Of this enumerated contaminants, all were considered secondary microplastics, and that, none of the observed microplastics were considered primary microplastics.

Secondary MPs are more prominent in the environment as secondary microplastics form from the breakdown of larger plastics; this happen when larger plastics undergo weathering, through exposure to, for example, wave action, wind and sand abrasion, as well as ultraviolet radiation from sunlight. Moreover, these results make sense because primary microplastics are tiny particles designed for commercial use, such as cosmetics, as well as microfibers shed from clothing and other textiles, such as fishing nets. Secondary microplastics are particles that result from the breakdown of larger plastic items, such as water bottles.⁷

3.2 Types of Microplastics

Identifying the type of microplastics is crucial so as to further elucidate the physical properties of the the contaminants present in the environment. The observed microplastics in sediments along the whack line of the sampling sites were identified in terms of their types either as microbeads, microfibers, microfilms and microfragments.



Figure 2. Microplastics under 40x magnification

It was found out that the most common form of microplastics present in the sediments from the two (2) sampling sites were mostly microfibers, a total of 23 microfibers were observed in Baybay boulevard while, out of the 5 MPs observed in Hilangagan, 4 were considered to be microfibers. Moreover, the other remaining 3 observed microplastics were observed to be microfragments. However, no microbeads and microfilms were observed from all the sediment samples from all the sampling sites.

The presence of plastic microfibers can be attributed to some of the most common environmental pollution such littering, but much is the result of storms, water runoff, and winds that carry plastic—both intact objects and microplastics—into our oceans. Moreover, secondary microplastics result from the fragmentation of larger plastic products. Beach litter contributes to microplastic production as larger plastic pieces break down in the sun and waves.⁷

3.3 Physical Structure of Microplastics

Physical structure of microplastics present refers to the physical observation under the microscope at 40x magnification either as angular, filament, round and other shapes.



Figure 3. Filamentous Microplastic Sample Observed

In terms of the microplastics observed, it was found out that the most common structure of microplastics found in the sediments from the sampling sites were mostly filamentous, that is, they are somewhat long thread-like microplastics, which is in consonance to the results of the microplastics being microfibers.

Filaments are the most common physical structure because filament-type microplastics usually came from broken plastic bags. Moreover, water flowing towards the sea also carries out filament-type microplastics.¹³

3.4 Microplastics Color

Microplastics color is one of the most important indicators in determining its presence in water and sediments. The following data shows the most common color of microplastics obtained

from the sediments of Baybay Boulevard and Hilangagan beach resort:

It was observed that the most common color of the microplastics was blue, it was found to be abundant in the areas of baybay and hilangagan, and this was seconded by the color red. However, 2 transparent/white colored microplastics were found in hilangagan beach resort.

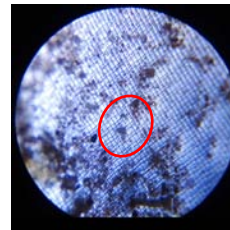


Figure 4. Blue-colored Microplastic Observed

Color distribution for microplastic particles are usually found to be black, blue and red representing the predominant colors of these water and sediment contaminants.¹⁴ Blue plastics cannot effectively absorb UV light, they age faster in the sun and a higher proportion of bluish microplastics is often found in the environment, especially toward the smallest sizes.¹⁵

3.5 Total Microplastics

Overall, a total of 25 microplastics were found and observed to be present in the sediments of Baybay Boulevard from a total of 2480 g sediments collected. This constitutes to an average of 10.1 MP/Kg in the area of Baybay boulevard. In hilangagan beach resort, a total of 5 microplastics were found and observed under the microscope, from a 2661 g sediment samples collected. This numbers constitute a average of 1.88 MP/Kg which is significantly lower than the average MP from Baybay Boulevard.

In general, a total of 30 microplastics were recorded from both sampling sites, wherein Baybay Boulevard was found to be significantly higher than the MPs present in Hilangagan, this result establishes an average of 5.84 microplastics (MP) found per kilogram (Kg) of sediments in the coastal sedimentary areas of Borongan City.

4 Conclusions

Based on the results of the laboratory analysis of the sediments collected from the two (2) sampling sites, the following conclusions are herein drawn by the researchers:

1. Microplastics were observed to be present in the sediments of Borogan City, Eastern Samar. From this, secondary microplastics were found to be prominent within the samples which indicate the degradation of these polymeric substances in the environment.
2. Microfibers are the most common type of microplastics found in sediments.
3. Almost all microplastics observed within the sediment samples were filamentous in shape.
4. In terms of the coloration, blue was the most prominent color in most microplastics observed; this is seconded by the color red.
5. A total of 30 microplastics were observed from the sediments collected from Baybay Boulevard and Hilangagan beach resort. Baybay Boulevard averages at 10.1 MP/Kg, while the average microplastic contamination in Hilangagan beach resort was calculated at 1.88 MP/Kg. this sums up to an average of 5.84 MP/Kg for both sampling sites in Borongan City.

4 Conclusions

Based on all results generated and the conclusions herein listed, the researchers recommend the following:

1. Conduct FT-IR spectroscopic analysis to further identify the molecular compositions of the present microplastics.
2. Conduct similar analysis on the presence of microplastics in mangrove areas and other marine areas in Borongan City or even in Eastern Samar.
3. Conduct similar study involving presence of microplastics in freshwater estuaries or areas in Borongan City.
4. Conduct similar study to further affirm or oppose the results of this study.
5. If possible, limit the use of plastics and observe proper disposal of plastic utensils and products to further limit microplastics contamination into the sediments in Borongan City.

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Primary Paper Section: C**Secondary Paper Section: CC, DD, DK**

D EARTH SCIENCES

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DM	SOLID WASTE AND ITS CONTROL, RECYCLING
DN	ENVIRONMENTAL IMPACT ON HEALTH
DO	PROTECTION OF LANDSCAPE

WATER QUALITY ASSESSMENT IN BORONGAN CITY, EASTERN SAMAR

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Abstract: Brgy. Maypangdan and Brgy. Tabunan, 2 of the many barangays of Borongan City are one of the beneficiaries of the ABTIC extension program of the Biology department of Eastern Samar State University. The ABTIC extension program aims in developing the mangrove areas in the two barangays which has already started in Brgy. Maypangdan. Mangrove development has something to do with water quality, hence, this study was conducted. The physical and chemical properties of the water in Balacdas River, found in Brgy. Tabunan and Maypangdan River in Brgy. Maypangdan were determined in situ. Results revealed that the physico-chemical profile of the rivers are in good condition, and that, all are within limits set by various departments in the environmental sector. Moreover, no significant relationship was found in almost all parameters except for temperature. Hence, this study suggest annual monitoring of water parameters in the area to further map the increase or decrease in the numerical data of the parameters and include additional factors of the rivers.

Keywords: water quality assessment, Borongan City, ABTIC extension program, physico-chemical characterization, limnology

1 Background of the Study

Our ecosystem are primarily affected by anthropogenic activities, over the past years, the environment has worn out and become ragged. In an ecosystem, water is primarily affected by these activities. Water quality assessment is hereby essential to determine the level or volume of such human destruction. Causes of water damage include enlarging human population which enables human wastes to contaminate and pollute watersheds that is the center of the ecosystem in an area isolated to humans.

Freshwater is a finite resource, essential for agriculture, industry and even human existence¹. Without freshwater of adequate quantity and quality sustainable development will not be possible. Water pollution and wasteful use of freshwater threaten development projects and make water treatment essential in order to produce safe drinking water. Discharge of toxic chemicals, over-pumping of aquifers, long-range atmospheric transport of pollutants and contamination of water bodies with substances that promote algal growth (possibly leading to eutrophication) are some of today's major causes of water quality degradation¹.

It has been unequivocally demonstrated that water of good quality is crucial to sustainable socio-economic development. Aquatic ecosystems are threatened on a world-wide scale by a variety of pollutants as well as destructive land-use or water-management practices. Some problems have been present for a long time but have only recently reached a critical level, while others are newly emerging¹.

Gross organic pollution leads to disturbance of the oxygen balance and is often accompanied by severe pathogenic contamination. Accelerated eutrophication results from enrichment with nutrients from various origins, particularly domestic sewage, agricultural run-off and agro-industrial effluents. Lakes and impounded rivers are especially affected¹. In small watersheds, (<100 km²) the influence of a single factor can cause a variation of several orders of magnitude. Water quality is generally more constant in watersheds greater than 100,000 km², and the variation is usually within one order of magnitude for most of the measured variables².

It is mostly important to determine the quality of water or a body of water to have a better understanding on the extent of damage of human activity for the past years and to have evidence on the prevailing climate change which do not only affect us humans, but also the total ecosystem of the earth.

Samar, an island of the Philippines situated in the Eastern Visayas region of the country is divided into three provinces and Eastern Samar is one of these provinces. In this province, numerous waterbeds can be found and these areas are somewhat affected by natural and anthropogenic activities that is currently happening. These bodies of water have the most number of biological and economical importances in the said province for it is known that Samar Island is one of the most diverse ecosystems in the Philippines. Over the time, civilization in Eastern Samar grew and with the development of each and every municipality in Eastern Samar comes the degradation of its freshwater resources and watercourses and its watersheds. Hence, water quality evaluation is important to describe and identify actual and emerging problems of water pollution in Eastern Samar, more specifically its surface waters which are the center of ecosystem in Eastern Samar.

The rivers lying in Brgys. Maypangdan and Tabunan of Borongan City, are two of the major rivers used by its constituents for economic and transportation purposes. In terms of its economic viability, these rivers are utilized for food and aquaculture. Since most of the populations in the said barangays are fishermen, they rely on the sea and river areas for their everyday food consumption and production. In these areas, the folks catch different types of animals of economic importance such as mud crabs, prawns and fish. In terms of its transportation capability, far flung sitios and other barangays of Borongan City uses boats and motorized pump boats to reach the said areas via these rivers. Hence, the rivers' importance and sustainability should be preserved and never be deteriorated. To preserve these rivers, one way of safeguarding them is studying their underlying physical and chemical properties which can make up a line of story to tell to the people on whether these rivers are okay or not, or tell the people the prospect of the rivers in the scientific community, hence, water quality monitoring is an adept start up plan for conserving these bodies of water.

Water quality monitoring is the foundation on which water quality management is based. Monitoring provides the information that permits rational decisions to be made on the following: this study describes water resources and identify actual and emerging problems of water pollution in Eastern Samar. Formulate plans and setting priorities for water quality management and develop and implement water quality management programs.

2 Objectives

This study's objective was to evaluate the water quality of Tabunan and Maypangdan Rivers found in Borongan City, Eastern Samar. Specifically, this study;

1. Determined the physico-chemical properties of the river waters in Brgy Tabunan and Brgy. Maypangdan, Borongan City in terms of:
 - a. Electrical Conductivity (EC)
 - b. Oxidation – Reduction Potential (ORP)
 - c. pH
 - d. Refractive Index (RI)
 - e. Salinity
 - f. Specific Gravity (SG)
 - g. Temperature
 - h. Total Dissolved Solids (TDS)
 - i. Turbidity
2. Determined if there is a significant difference in the physico-chemical properties between the two rivers.

3 Null Hypothesis

There is no significant difference in the physico-chemical properties of the water samples between the rivers located at Brgy. Tabunan and Brgy. Maypangdan, Borongan City, Eastern Samar.

4 Methodology

4.1 Research Design

Experimental research design was utilized by this study. All tests were done *in situ*, and replications were further utilized to determine the average physical and chemical properties of water samples. Sampling of water was based upon the Water Quality Monitoring Program Guide with the protocol of the UNEP and WHO³.

4.2 Locale of the Study

The rivers of Brgy. Tabunan and Brgy. Maypangdan were the zone in which this study was conducted. Found in Borongan City, Eastern Samar is a province in the Philippines located in the Eastern Visayas region.

4.3 Data Gathering Procedures

4.3.1 Selecting Sampling Site and Sampling Station

Sampling sites were 100 to 150 meters away from the bridge and the water at high tide with 1 meter in depth, a width of 5 meters and a length of 0.08 – 0.7 km to utilize complete mixing. The two rivers in the area of the two barangays were subjected as macrolocations with 4 sampling stations or microlocations. Microlocations have an interval of 100 to 150 meters from each other going upstream.

Each microlocations are separated by 100 to 150 meter distance, the first microlocation is located 100 to 150 meters from the bridge going seaward. Then, the second microlocation is under the bridge, the third is 100 to 150 meters away from the bridge going upstream and the last microlocation is 100 to 150 meters in distance from the third microlocation. Each microlocations are tested for its water quality, independent from the each other. Water quality testing was done from the 4th microlocation going downstream during high tides.

4.3.2 Sample Collection and Analysis

Water sample collection were done during high tide with at least 1 meter in depth, a width of 5 meters and a length of 0.08 – 0.7 km to utilize complete mixing of substances. Water samples were collected using a 250 mL beaker. Analysis was done on site using a 7 in 1 water parameter tester.

In situ water analysis was conducted from August to October 2023, 1 to 2 parameters per day was determined regardless of weather. Time of conduct was between 9:00 AM to 1:00 PM. Water samples were analyzed on the same day based on the availability of apparatus and instruments, or when weather and times approve. In times where the rain is favored by weather, an umbrella is utilized by the researchers to minimize water contamination from surrounding rainwater.

All physical and chemical assessment was done four (4) times to ensure firm data per microlocations. Before any tests are done, all procedures were tested in a laboratory for reference. All Instruments used were calibrated as per standard calibration procedures.

4.3.3 Physical Assessment of Water Samples

Assessment of water samples were done *in situ* using a portable digital water quality multimeter and a secchi disk, based on its electrical conductivity, pH, temperature, total dissolved solids (TDS), turbidity, salinity, refractive index, specific gravity and oxidation – reduction potential (ORP). All parameters were tested four times.

4.3.4 Statistical Analysis of Data

Mean and percentage computations were used to determine average and percent of the water parameters of the water coming

from the Balacdas and Maypangdan rivers. T-test for Independent samples was used to determine the significant differences between the Tabunan and Maypangdan rivers in terms of their physical and chemical characteristics.

5 Results and Discussion

The following data were collected and analyzed after the *in situ* analysis of water in the rivers of Balacdas at Brgy. Tabunan, and Maypangdan in Brgy. Maypangdan, both rural barangays of Borongan City Eastern Samar. Results were also compared to certain National and International Standards for Water Quality.

5.1 Water Quality Data

The following data were collected and analyzed after the *in situ* analysis of water in the two samples rived in Borongan City, Eastern Samar:

Table 1. Water Quality Data and Comparison

Water Parameters	Water Samples	Water Quality Data	Accepted Range and Standards	Interpretation
Electrical Conductivity	Balacdas	34.175 uS/cm	0 – 1500 uS.cm**	Within acceptable range
	Maypangdan	34.125 uS/cm		
Oxidation – Reduction Potential	Balacdas	33.325 mV	300 – 500 mV****	Within acceptable range
	Maypangdan	54 mV		
pH	Balacdas	7.9525	6.0 – 9.0*	Within acceptable range
	Maypangdan	7.9325		
Refractive Index	Balacdas	2.8	1.333	Outside acceptable range
	Maypangdan	2.9		
Salinity	Balacdas	20.125 ppt	18.0 ppt – 30.0 ppt (euhaline) ***	Within acceptable range
	Maypangdan	20.125 ppt		
Specific Gravity	Balacdas	1.012	1	Within acceptable range
	Maypangdan	1.01125		
Temperature	Balacdas	31.4°C	25°C – 32°C*	Within acceptable range
	Maypangdan	29.075°C		
Total Dissolved Solids	Balacdas	275.5 mg/L	150 mg/L*	Outside acceptable range
	Maypangdan	219.75 mg/L		
Turbidity	Balacdas	11.6 NTU	<10 NTU***	Within acceptable range

*DENR Class D – Water Quality Guidelines and General Effluent Standards⁴

**Mary River Catchment Coordinating Committee

*** Volunteer Estuary Monitoring Manual, A Methods Manual, Second Edition, EPA-842-B-06-003.6

****<https://datastream.org/en-ca/guidebook/oxidation-reduction-potential-orp7>

The above table shows that almost all water parameters are within the acceptable range for the different standards set by various organizations and government agencies. Of all the parameters, only RI and TDS are outside their standards which bear correlation since it is observed that the refractive index (RI) of water changes with a change in total dissolved solids (TDS). Hence, the high number of total dissolved solids resulted in a high refractive index and a relatively high turbidity which was seen in Balacdas river.

5.2 Significant Differences

T-test for independent samples was used to determine significant difference between the parameters per river. The working null hypothesis was that, there is no significant difference in terms of the recorded parameter between the two (2) rivers. And if the T-computed value is higher than or beyond the T-tabular value at

.05 level of significance, the null hypothesis can be rejected in favor of the saying that there are significant difference between the two rivers in terms of any given parameters.

Table 2. T-test table

Water Parameters	t-computed value	t-tabular value	Interpretation
Electrical Conductivity	0.877	1.943	Not Significant
Oxidation – Reduction Potential	1.430	1.943	Not Significant
pH	0	1.943	Not Significant
Refractive Index	0.379	1.943	Not Significant
Salinity	0	1.943	Not Significant
Specific Gravity	0	1.943	Not Significant
Temperature	-26.72	-1.943	Significant
Total Dissolved Solids	-1.794	-1.943	Not Significant
Turbidity	-1.07	-1.943	Not Significant

Now, since all T-computed values for almost all the water parameters, except for temperature are all lower than the T-tabular value of ± 1.943 . This indicates that the null hypothesis of this study is accepted in almost all the parameters except for temperature; therefore it indicates that there is no significant difference between the rivers situated at Brgy. Tabunan and at Brgy. Maypangdan in terms of all the parameters mentioned. However, there is a recorded significant difference in terms of temperature between the two river systems, indicating that the waters in Balacdas River has a higher surface temperature than in Maypangdan.

6 Conclusions

Based on the results of this study, the researchers claim the following conclusions:

- The average computed data on the parameters for Balacdas River are as follow:
 - EC – 34.124 uS/cm
 - ORP – 53.325 mV
 - pH – 7.95
 - RI – 2.85
 - Salinity – 20.125 ppt
 - SG – 1.012
 - TDS – 275.5 mg/L
 - Temperature – 31.4oC
 - Turbidity – 11.6 NTU
- The average computed data on the parameters for Maypangdan River are as follow:
 - EC – 34.175 uS/cm
 - ORP – 54 mV
 - pH – 7.93
 - RI – 2.9
 - Salinity – 20.125 ppt
 - SG – 1.011
 - TDS – 219.75 mg/L
 - Temperature – 29.075oC
 - Turbidity – 9.75 NTU
- There is no significant difference on the conductivity, ORP, pH, RI, salinity, SG, TDS and turbidity of the waters from the two river systems. However, there was a significant difference on the temperature between the two rivers, indicating that the water of Balacdas River has a higher temperature than that of Maypangdan River.

7 Recommendations

In reference to the collected and analyzed data, as well as the conclusion drawn, the researchers recommend the following:

- Conduct annual water quality assessment of the two river systems so as to monitor the parameters necessary to indicate healthy aquatic environment.

- Additional parameters such as DO, BOD and other chemical properties may be further tested so as to increase decision-making in indicating the health of the two rivers.
- Conduct similar studies to further affirm or oppose the results of the current study.
- Data can be used for the ABTIC extension program with emphasis on the measured parameters and its relationship to mangrove existence in the area.

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Primary Paper Section: D

Secondary Paper Section: DA, DJ

THE IMPACTS OF TOURISM ON SARAJEVO CANTON'S HEALTH INFRASTRUCTURE DEVELOPMENT WITH REFERENCE TO THE EXAMPLE OF THE PRIVATE POLYCLINIC „SANASA"

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The paper brings the key findings of the non-commercial scientific research project („Impakti turizma na razvoj zdravstvene infrastrukture u destinaciji Sarajevo- primjer poliklinike »Sanasa«", April–July 2024) conducted by the private polyclinic "Sanasa" (Sarajevo) and managed by the authors' team. This paper has never been published before.

Abstract: The paper aims to investigate the impact of tourism on health infrastructure development in Sarajevo Canton, with a focus on the private health sector. WHO promotes health via tourism and advocates greater collaboration between these two strategically vital sectors of the economy and society. A comparative analysis of qualitative, quantitative, and spatial parameters in the tourism and health domains was conducted, and the Sarajevo destination with its polyclinic "Sanasa," which has established itself as a popular element of the Sarajevo Canton tourism product, served as a demonstrative example of tourism and private health sector cohesion. The research highlights the coherence of tourism and health, emphasizing tourism's stimulating impact on the growth of the health infrastructure, the role of private healthcare institutions in tourism destinations, and encouraging the promotion of positive examples (the case of "Sanasa").

Keywords: Sarajevo, Sanasa, tourism, health, private health sector, cohesion, infrastructure, development.

1 Introduction

Tourism and healthcare cohesion emerge in collaborative growth and development because health is a human's main requirement, and healthcare infrastructure is an essential component of inbound tourism infrastructure. The largest number of private health care institutions in Sarajevo Canton were established at the end of the twentieth century and the beginning of the twenty-first century, coinciding with the postwar economic restructuring into service activities. Tourism is one of the key strategic branches of Sarajevo's economy; therefore, its growth has encouraged the development of health infrastructure, particularly in the private sector. Sarajevo Canton is the country's largest and most popular gravitational centre, attracting people from all over for work, administration, education, tourism, healthcare, and other purposes. The inflow of population from smaller places, particularly the influx of tourists throughout the year (March-October and December-February), imposed a significant burden on the health system and its supporting infrastructure. The late 1990s and early 2000s saw a surge in the number of private polyclinics, and this trend continues today. Examples include the establishment of various private-sector polyclinics: "Sanasa," and "Eurofarm," (1999); "Al-Tawil" (2004); "Blue Polyclinic" and "Karabeg" (2005); "Dr. Nabil" (2015); "Heart" (2018); and so on. Tourism promotes the development of health infrastructure, which is an important component of overall tourism infrastructure, as visitors, among other things, use medical services in the destination. Health insurance is an essential component of travel packages; thus, tour operators collaborate with different insurance and health organisations both domestically and internationally. Regardless of whether health is the major motive for travel, welcoming destinations must invest in high-quality health infrastructure to provide visitors with a safe and secure environment. In this way, tourism and health complement each other because the influx of tourists in the receiving destination places an additional burden on the health system, necessitating the expansion of health capacities, regardless of whether the primary reason for arrival is health or medical tourism or an unplanned need for medical care (injury, illness, or accident during a visiting or tourist stay). The increase in global tourism (e.g., 2009–2019 is a decade of consistent growth in tourism), including Bosnia and Herzegovina, with

Sarajevo Canton as the country's leading tourism destination, encouraged the development of health infrastructure, particularly in the private property sector, which has driven the growth of health and medical tourism. Various motives for demanding medical services, as well as diverse types of tourists, contribute to the growing diversity of the health tourism structure: medical, spa, wellness, alternative, diasporic medical tourism, and so on. Trends in the parallel development of tourism and health are explored in the area of Sarajevo Canton, notably in relation to private health institutions. One of the well-positive examples is the private polyclinic Sanasa, which has positioned itself as a supplementary subject of Sarajevo Canton's tourism product.

2 Methodology

The paper aims to investigate the positive impacts of tourism on the health infrastructure development in the area of the blooming destination Sarajevo Canton, using the example of the private polyclinic Sanasa. A comparative analysis of qualitative, quantitative, and spatial parameters in the field of tourism and health was conducted, with a focus on the Sarajevo area and with reference to the polyclinic "Sanasa," which has established itself as a popular component of Sarajevo Canton's tourism product. An interview and questionnaire with the management and administration of the polyclinic were conducted to determine its profile and development trend in connection to visitor flows to the destination. Geographic analysis using orthophoto images was used to investigate the characteristics and relationships between the spatial distribution of private health care institutions and significant tourism zones, including the project of creating a synthetic thematic map to determine the spatial distribution of existing Sanasa branches in the canton and the tourism significance of the location on polyclinic attendance. Approximately twenty thousand online reviews were assessed to ascertain the tourist image of the polyclinic, in addition to regular promotion within the tourism offer of Sarajevo Canton. The paper supports the promotion of tourism's beneficial impacts and positions Sarajevo Canton as a health-friendly, welcoming destination with supportive medical facilities. Based on the successful examples of the Sarajevo area and Sanasa polyclinic, the work encourages its popularisation at the scientific level (affirmative image strengthening) through the key results of the project available in the international science database.

3 Results & Discussion

3.1 Tourism and Health Cohesion with Reference to Health, Medical, and Diasporic Medical Tourism

„Today tourism is considered to be one of the most perspective directions of social-economic development of the country, regions, towns as the tourist industry generates 11 % of the gross product in the world“ (Pidgirna & Filipchuk, 2020). There are various interpretations of tourist service by different authors, but mostly they consider tourist service as a concept that includes all material and intangible components for tourists, and it provides for meeting the needs of people and realising their activities in the process of recreation, development, leisure, and travel.

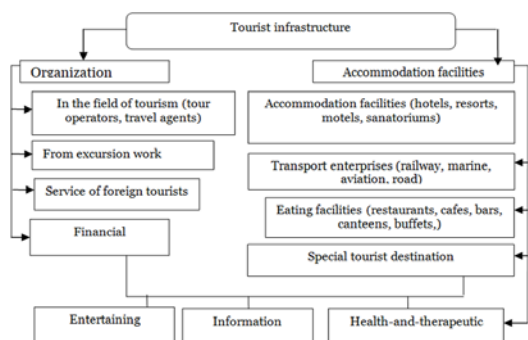


Fig.1 Tourist infrastructure including health component (Pidgirna & Filipchuk, 2020)

The diagram above illustrates the concept of tourist infrastructure, which is made up of multiple types of interconnected categories that are necessary for tourism planning, including health and therapeutics. The categories shown are essential for receptive tourism destinations in order to manage travel and stay and supply visitors with the amenities they require while visiting, while health infrastructure is a crucial part of the tourism system and is incorporated into the tourist infrastructure as its relevant constitutive component. According to WHO Policy Brief. (2022), main focus is on the putting health at the heart of tourism development in small countries of the WHO European Region, as there's no sustainability without health. Tourism plays in contributing to better health and stronger health systems links naturally with the three pillars of the European Programme of Work 2020-2025 – United Action for Better Health, and its commitment to leaving no one behind. For tourism to be healthy and sustainable, travellers must be assured universal access to quality care, and systems aimed at protecting them from health emergencies should be in place. Tourism has the real potential to improve health and well-being for both tourists and host communities. According to the IUCN (2015), tourism encourages the development of health infrastructure in protected areas too, compensating for the main needs of local communities that are frequently isolated and lack adequate medical and health infrastructure.

Increased tourism imposes additional pressure on the destination's physical resources, particularly its healthcare system. The literature suggests that during the peak tourism season, when both locals and visitors use healthcare services concurrently, health facilities are substantially overburdened, particularly in the private health sector. According to the Health and Tourism Study by the Pan American Health Organization and the World Health Organization (1997), the link between tourism and health sector can be analyzed in terms of the overburdening of services in the host countries and communities and the quality and efficiency of the services offered to visitors, as well as the interaction between the countries' health care systems. Emergency care and specialized treatment for elderly tourists or those suffering from certain health conditions tend to be channeled toward services in the private sector, when the services are located reasonably nearby and can provide sufficient and appropriate care. However, these conditions are not always met. Furthermore, the burden placed on emergency services tends to be heavier during the tourist season, a phenomenon that affects emergency medical services and public and private blood banks. The tourist season is accompanied by a large influx of teenagers, increased alcohol consumption, tourist and transport congestion, a lack of road signs, and an increased number of accidents, which is reflected in the boosted health sector activities, urgent centres, and private clinics. „This situation can create excessive demand for the limited resources, with consequences for both the host community and the traveler“ (PAHO & WHO, 1997). „It is necessary to strengthen the role of primary health care in the health system within the context of the relaunch of tourism for host communities and tourists alike. Both the health and the tourism sectors need to strengthen their

cooperation and coordination at all levels with a view to placing health high on the tourism agenda and improving community health, the environment and economies“ (WHO, 2022).



Fig.2 Health dimensions in tourism development (WHO, 2022)

„The interconnection between health and tourism is multifaceted. This encompasses direct and indirect health impacts, the tourism workforce and businesses, safety and security related to travel, water and sanitation, food, and hygienic conditions, and socioeconomic and environmental aspects important for health and well-being in host communities. Multiple health benefits and impacts are linked to different tourism types and forms, travel modes, individual characteristics of travellers, traveller behaviour, the tourism workforce, host-community characteristics, the quality of the health system, public health, and existing safety, security and hygiene measures. Health, safety, security and hygiene are critical factors for the tourism competitiveness. Destinations with solid health systems are better positioned to attract visitors. Access to quality health services when and where needed by tourists and host communities, should be guaranteed“ (WHO, 2022).

Among the leading motives of visit, health, together with VFR, is the 2nd largest category in total world inbound tourism in 2019. with a share of 28%:

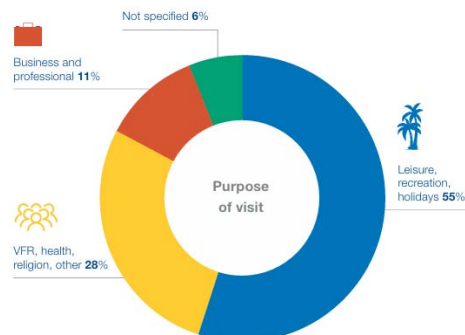


Fig.3 Inbound tourism by purpose of visit, 2019 (% share) (UNWTO, 2020)

The World Tourism Organization (2022) stated that health and tourism promote economic growth and development, creating jobs and supporting livelihoods for millions. In 2019, the tourism sector alone accounted for 7% of the world's exports and US\$ 3.5 trillion measured in direct tourism GDP (4%). The extensive and complex tourism value chain indirectly generates millions of jobs and continued employment in other sectors, such as e.g. health care, and others. In 2018, the tourism sector directly and indirectly employed 27 million people in the European Union (EU) (11.7 % of total EU employment). Multisectoral cooperation among actors in the areas of economy, tourism, internal migration and health policy is required to strengthen monitoring and surveillance and apply a risk-based approach when implementing public health and social measures

related to international travel while respecting the dignity, human rights and fundamental freedoms of travelers.

Medical tourism is a natural byproduct of the destination's growing tourist prominence, expanding organically and spontaneously alongside the increase in the number of visitors. „Medical tourism entails receiving medical care while traveling to another country. It consists of traveling across borders to receive medical treatment unavailable in the tourist's country of origin“ (Latief & Ulfa, 2024). The terminological definitions of medical, spa, and wellness tourism range slightly, however, they all fall within the category of health tourism. „Health tourism covers those types of tourism which have as a primary motivation the contribution to physical, mental and/or spiritual health through medical and wellness-based activities“ (UN WTO, 2019). According to WHO and PAHO (1997), health tourism includes the movement of patients to countries specialising in certain pathologies and treatments, a concept that is increasingly part of the framework of the international services trade, with the institutional service providers promoting “transnational service packages” that include not only medical care but also transportation from the country of origin, lodging for the patient's companions and for convalescence, translation services, and support groups.

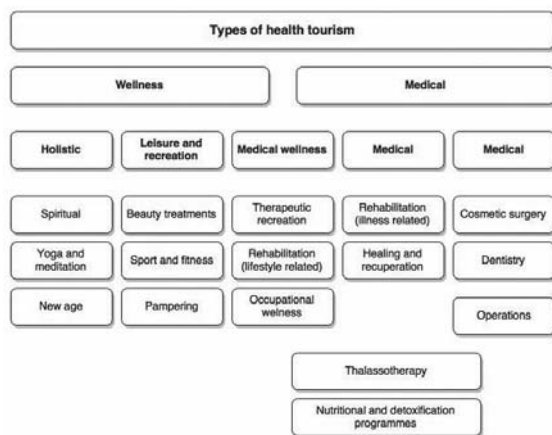


Fig.4 Smith & Puczkó's Concept of Health Tourism (Csapó & Marton, 2017)

Mathijssen & Dziedzic (2024) stated that medical tourism has been one of the fastest-growing tourism sectors worldwide and includes all those travelling abroad to obtain medical treatment. It is often portrayed as the flow of affluent, foreign, patients from high-income countries to low or middle-income countries.

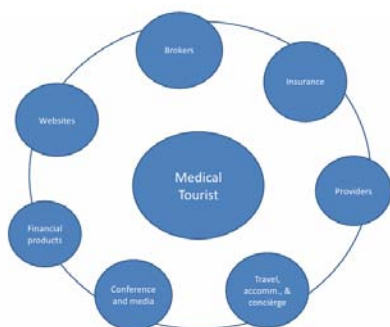


Fig.5 The Medical Tourism Industry (Lunt et al., 2011)

Lunt et al. (2020) stated that key segments for the medical tourism industry are: web promotion, quality of information, advertising and marketing, brokers, travel insurance, providers, national strategies. A key driver in the medical tourism phenomenon is the technological platform provided by the

internet for consumers to access healthcare information and advertising from anywhere in the world (portals, media site, and others). Medical tourism sites satisfy a range of ends and needs. The scope of such sites is to introduce and promote services to the consumer. The main services of the sites can be separated into five main functions: as a gateway to medical and surgical information, connectivity to related health services, the assessment and/or promotion of services, commerciality and opportunity for communication. Key factors related to medical treatment are: quality, patient satisfaction, clinical outcomes, privacy, etc. Other important segments of the medical tourism are related to the country of origin and destination country, competitive pressure on local providers, economic impacts, etc.



Fig.6 Global medical tourism market according to US Market Research (Deb, 2024)

„The global medical tourism market size is expected to be worth around USD 35.9 Bn by 2032 from USD 11.7 Bn in 2022, growing at a CAGR of 12.20% during the forecast period from 2022 to 2032. The medical tourism industry is growing at an estimated rate of 15-25% annually. The medical tourism industry is estimated to contribute over \$100 billion annually to the global economy“ (Deb, 2024).

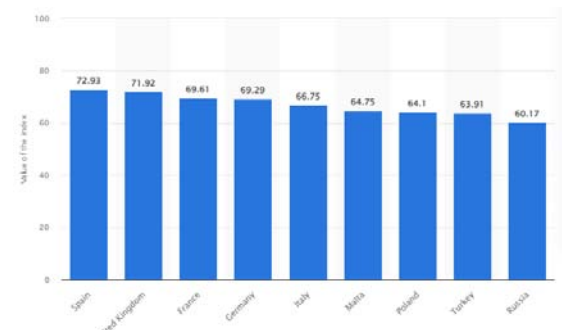


Fig.7 The most attractive countries for medical tourism in Europe in 2020, by Medical Tourism Index (Statista, 2024)

Lunt et al. stated that a number of private (and public) providers have targeted a lucrative medical tourism market. Positive experiences of many UK and American private patient hospitals and hospital wings for wealthy patients encouraged the strategies of emergent medical tourism destinations with an emphasis on quality and customer service. „Medical tourism is an emerging global industry, with a range of key stakeholders with commercial interests including brokers, health care providers, insurance provision, website providers and conference and media services“ (Lunt et al., 2022).

Diasporic medical tourism (DMT) is an intriguing aspect of medical tourism that primarily occurs in private health facilities around the world. „DMT is the travel of migrants to their root countries of origin with the intention to use and access healthcare services through their own volition“ (Mathijssen & Dziedzic, 2024). According to UNWTO, visiting home from

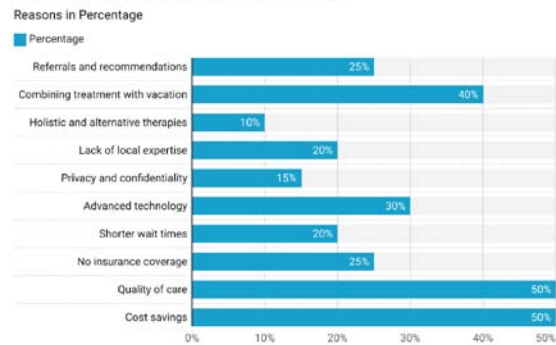
non-residents in some countries contributes with 15%, while in others (mostly in Central America) up to 70% of total inbound tourism (Žunić, 2022). Mathijssen & Dziedzic stated that increased mobility around the world (for large migrant, sojourner, and expatriate populations) encouraged diasporic medical tourism. The diaspora might have even accounted for the majority of medical travellers in certain countries (e.g. Turkey). Return visits of migration-led tourists are periodic but temporary sojourns of members of diasporic communities to their external homelands characterised by three elements: 1) the existence of extensive social and cultural foundations in the country of origin (CoO), 2) return visits function as a means to renew, restate, and solidify familial and social networks, and 3) the involvement of individuals who are part of a larger (self described) diasporic community formed from past migration. There has been recognized impact of diaspora tourism on four critical areas of everyday life: healthcare, well-being, migration, and economy. Many diaspora members visited their countries for healthcare and medical treatment ('health-returning'). DMT occurred frequently in the direction running from the countries with well-performing healthcare systems to those whose healthcare systems were categorised as under resourced and underperforming. For example, Turkish immigrants went from Denmark to Turkey. Diasporic medical travellers used healthcare services in their origin countries complementary fashion rather than as an alternative to their healthcare usage in their resident countries, as a form of 'top-up care', or as a 'safety valve'. DMT has been chiefly associated with healthcare provisions based on out-of-pocket fee-for-service.

3.2 Reasons for pursuing medical care in popular tourism destinations, with reference to Sarajevo Canton and the Sanasa polyclinic

Types of tourists who seek medical assistance in a tourism destination differ according to their motives, which can range from personal injuries sustained while visiting to the deterioration of a chronic illness brought on by cultural stress or climate change, traffic accidents, drug or alcohol narcotics, etc. "There are four broad categories of medical tourists: a) individuals who suffer injuries or develop medical conditions while on holiday; b) people who visit a country with the primary aim of receiving treatment and those who decide to make use of the healthcare services of a particular nation after visiting it; c) persons who make the journey for tourism-related purposes while receiving treatment and d) individuals who seek treatment without any connection to tourism" (Latief & Ulfa, 2024).

According to Global Advisor-Ipsos data (Croatian Tourist Board, 2016), 1 out of 5 respondents would go abroad for cheaper health services; in the example of India, Indonesia, and China, this is the attitude of over 75% of participants. People of an earlier mature age (under 35 years) are the most represented group that would consume medical or dental services outside the country under more favourable conditions, especially in India (86%), as well as in Italy, Russia, and China (over 70%). The world's leading medical tourism destinations (500,000–700,000 passengers) are Malaysia, the USA, Thailand, etc., while in Europe (200,000–400,000 passengers), Poland, Germany, and Turkey are leading the way. The world's leading medical tourism destinations are Indonesia, the USA, China, and Germany (200,000–600,000 passengers). The rich seek specialised treatment in Germany, Switzerland, and the UK, so Germany and Switzerland are the leaders for medical tourists from the wealthy Arab countries who go abroad regardless of the relatively high standard of health institutions in their homelands (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, UAE). Mathijssen & Dziedzic (2024) stated that specific motivational factors for diasporic medical tourism include: trust in doctor, knowledge of how to navigate the healthcare system, past experience, social norms, second opinion, transport, quality service, waiting time, language and communication, types of care, etc. On the other hand, for foreign medical tourism, the key motivational factors are: quality service, waiting time, language and communication, types of care (including dental care as very important).

Top 10 Reasons for Medical Tourism



(Reasons in %)
Source: Market.us Media

Fig.8 Leading motives for medical tourism according to the US Market Research (Feb, 2024)

According to the graph above, the leading motives in the structure of medical tourism are cost savings of medical services and better quality of medical care with the participation of 50%, then combined vacation with vaccine 40%, and advanced technology 30%, etc.

Lunt et al. (2011) identified the wide range of treatments available overseas for prospective medical tourists, including:

- Cosmetic surgery (breast, face, liposuction)
- Dentistry (cosmetic and reconstruction)
- Cardiology/cardiac surgery (by-pass, valve replacement)
- Orthopaedic surgery (hip replacement, resurfacing, knee replacement, joint surgery)
- Bariatric surgery (gastric by-pass, gastric banding)
- Fertility/reproductive system (IVF, gender reassignment)
- Organ, cell and tissue transplantation (organ transplantation; stem cell)
- Eye surgery
- Diagnostics and check-ups.

Top medical procedures in global medical tourism, accounting for 72% of total medical treatments, are: cosmetic, dental, fertility, orthopedic and ophthalmic:

- Cosmetic surgery account for approximately 25% of medical tourism, with popular treatments including breast augmentation, liposuction, and facelifts;
- Dental treatments make up around 15% of medical tourism, including services like implants, veneers, and teeth whitening;
- Fertility procedures like IVF are sought by couples, contributing to about 12% of medical tourism, often due to availability and affordability;
- Joint replacements and orthopedic procedures constitute about 10% of medical tourism, with significant cost savings compared to many developed countries;
- Ophthalmic procedures like LASIK and cataract removal are popular, comprising about 10% of medical tourism;
- Others 28% (cardiac, cancer and neurological treatments, bariatric surgery, gastric procedures.)

In Bosnia and Herzegovina, particularly in Sarajevo, the number of visitors from the Gulf GCC countries (Bahrain, Kuwait, Iraq, Oman, Qatar, Saudi Arabia, and the United Arab Emirates) is continuously increasing, making up one of the largest groups of visitors and leading the way in the structure of total overnight stays in Sarajevo Canton. Observations in the field, including interviews with employees in the tourism and health sector, revealed that wealthy Arab visitors are primarily motivated by health, particularly balneological tourism, and the fact that the destination has healthcare facilities that provide medical services in Arabic. The thermal water and spa hotels are located in the southwest of the destination (Ilidže region), where one of the

three branches of Sanasa in Sarajevo is located. During the extended summer tourist season (March-October), a significant number of visitors use the services of the Sanasa polyclinic, etc. This clarifies the relationship between tourism and healthcare as well as the impact of a tourist destination on the selection of a neighbouring healthcare facility. Good marketing within Sarajevo's tourism offer through the Sarajevo Canton Tourist Board (Sarajevo Navigator), together with high-quality service and multilingual medical services (available in Arabic, English, Turkish, and Bosnian), all contribute to its significance. The thermal mineral waters of Ilidža, along with its spa and thermal riviera, draw tourists from all over the world, including Turkey, the Middle East, the GCC, Central Europe, and residents in Bosnia and Herzegovina. „Thermal, thermineral and mineral waters of Sarajevo have been used in balneology since Roman period in Bosnia and Herzegovina (I cent.). The waters were found at the hydrogeothermal region of Ilidža at southwest of Sarajevo destination. The region of Ilidža is famous because of the thermomineral water with the highest temperature in the country” (Žunić et al., 2019). „The region of Ilidža is extremely important as the geotrafical nucleus and terminal, while it's also of a great tourism importance because of the rational exploitation of thermomineral waters for the tourist and resident's purpose, and its general natural and cultural attractiveness. There were built a popular hotels and recreative rehab centres, some of them kept authentic style from Austria Hungarian period in Bosnia and Herzegovina (e.g. lux hotels Austria and Bosnia). Ilidža has progressive tourism development over the last decade with the leading participation in the overall tourism growth of Sarajevo” (Žunić et al., 2019). Furthermore, it's evident that medical tourism among the diaspora is expanding in the Sarajevo region. The diasporic group of tourists in Sarajevo Canton is worthy of special attention because it accounts for a large number of displaced persons during the last war in Bosnia and Herzegovina (1992–1995), with most of them owning real estate in the area of the capital and representing returning tourists in the country. During their stay in Sarajevo, which typically lasts longer (e.g., for three months), a large number of visitors from the diaspora (USA, Germany, Sweden, etc.) use a variety of dental and medical procedures (radiological, orthopaedic, internist, ophthalmic, surgery, etc.), particularly in the private health sector. More affordable costs, second opinion, and linguistic adaptation (native language) are the main reasons.

3.3 Tourism-geographical analysis of the Sarajevo Canton development

Sarajevo is the capital of Bosnia and Herzegovina, a Balkan Peninsula country (land: 51,187 km²; water: 10 km²) that shares borders with Croatia, Serbia, and Montenegro. Bosnia and Herzegovina, including Sarajevo, is a developing region with a dominant tertiary sector of the economy, including tourism as one of its strategic activities. It's a "blooming" destination with a significant rate of tourist growth" (Žunić, 2023), and „in 2019, Bosnia and Herzegovina had the third-highest tourism growth rate in the world“ (USAID, 2019). Sarajevo is the leading tourism destination in the country, with a share of over 40% of the total tourist traffic (tourism income in 2019 amounted to 456 million USD, and for the Sarajevo Canton, about 200 million USD). The territory of Sarajevo Canton includes nine municipalities, with four municipalities forming the urban whole—the City of Sarajevo (see map 1). "The area of Sarajevo Canton occupies a central position in Bosnia and Herzegovina. It is a place where East and West, North and South meet, layers of history and diversity of different cultures and their spiritual and material sediments permeate" (Sarajevo Cantonal Development Planning Institute, 2021).

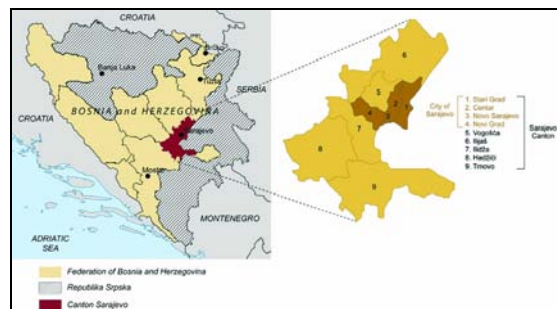


Fig.9 Gül & Dee Map of Sarajevo Canton position in Bosnia and Herzegovina, Balkan, SE Europe (Turhan and Ayataç, 2020)

The Sarajevo region is home to an extraordinarily rich natural and cultural heritage, as well as a plethora of protected natural and cultural heritage assets (such as national monuments, archaeological sites, protected eco-areas, water protection zones, and thermal mineral waters), sports and recreational facilities, and a developed tourist and hospitality infrastructure, including modern healthcare services. "A combination of social and environmental factors creates Sarajevo's advantageous geographic location. This region comprises the meeting of various civilisations and peoples, which left a distinct mark. The basic road intersection was mostly caused by natural factors. The connection of Bosnia and Herzegovina and Canton Sarajevo with the European trade routes in the north and the Mediterranean Sea in the south is mostly due to Corridor Vc. Air travel connects Sarajevo to the entire world" (Sarajevo Cantonal Development Planning Institute, 2021). „Sarajevo, as the capital, has a favourable geographic, traffic and tourism position, and it's well connected with Europe and the rest of the World, while it's also the part of a very important European tourism corridor which connects the continental Middle Europe and the Mediterranean Europe. Sarajevo has a positive tourist growth over the last decade, but it's still counted as a "city break destination" because of the shorter overnight stay- less than 3 days" (Žunić et al., 2019). „Sarajevo is a European developing tourism destination. The territory of 5 municipalities (four urban plus Ilidža) has majority of the tourism receptive contents (accommodation, catering, transport, information, museums and tourist attractions). The destination has a positive tourism growth over the two passed decades- the number of overnight stays increased by 9%, reaching approx. 1 million nights in 2017 (925198) with a high participation of international tourists 89%. The hospitality industry of Sarajevo had a gross traffic of 200 million € in 2017. There's progressive growth rate at accommodation by 20% because the "blooming tourism" requires the new and modern hotels, such as recently built Novotel Sarajevo Bristol, Hills, Marriot, etc. Sarajevo has 160 accommodation units (2017), while the "hotels" takes 32%. Majority of hotels is concentrated at the city zone, while the most beautiful- luxurious hotels are mostly located on the southwest around the thermal waters which is 10-15 km distance from the city centre" (Žunić et al., 2020). "The geopolitical position of Sarajevo is determined by its advantageous location and role as Bosnia and Herzegovina's capital, that is, by the functions it performs in that capacity. Sarajevo is the administrative-political, economic-financial, educational-scientific-research, health-care, and cultural capital of the country, as well as the Olympic city and headquarters of the most important international organisations functioning in BiH. Sarajevo Canton was designated a European Region in 2006, bringing it back into the ranks of European metropolises and promoting it as a destination of pleasant living and profitable business" (Sarajevo Cantonal Development Planning Institute, 2021).

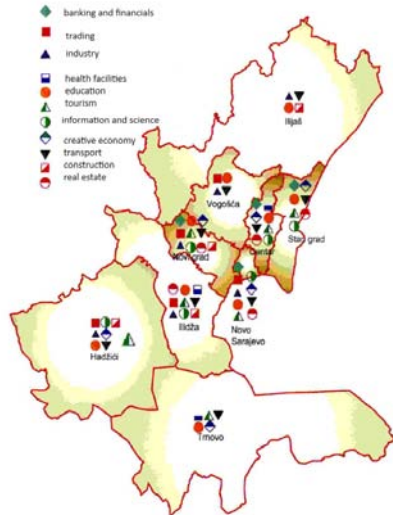


Fig.10 Spatial distribution of strategic sectors of the economy in Sarajevo Canton (Authors' modified map of the Ministry of Spatial Planning of the Canton of Sarajevo—language adaptation of the map and addition of a symbol for tourism in the area of the municipality of Hadžići)

The map above demonstrates that tourism and healthcare are key economic and social sectors in Sarajevo Canton's local self-government units (7 out of 9 municipalities), with the exception of only 2 municipalities (Vogošća and Ilijaš, with a pronounced residential and industrial function). Therefore, tourism and health development dominate around 78% of the canton's administrative territory. In Hadžići, tourism wasn't planned as a strategic sector according to the original map. However, the municipality recognised its opportunities for inclusion in tourism development thanks to its rich natural and agricultural potential. Since tourism today represents one of its major strategic branches, the symbol for tourism was added to the map. The development of tourist resort settlements for the rich Arab clients in this part of the canton will encourage the development of complementary infrastructure, including healthcare.

Statistical indicators for the period 2007–2023 show continuous growth of Sarajevo's tourism, with a decline during COVID-19, but with an important note that tourism has been rapidly revitalised and experienced its greatest expansion in the post-pandemic period—in 2023:

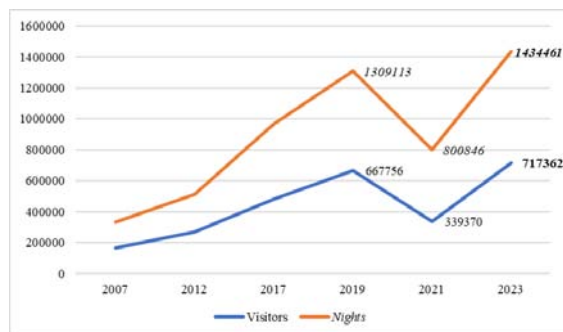


Fig.11 Growth of the total number of visits and overnight stays in Sarajevo Canton in the period 2007-2023 (Authors. Based on statistical data from the Institute for Development Planning of Sarajevo Canton)

The aforementioned graph illustrates the overall pattern of growth in tourist arrivals and overnight stays in Sarajevo Canton from 2007 to 2023. The only year there is a decline in this data is 2021 (which can be attributed to travel restrictions and the global pandemic crisis). The tourism industry was devastated by

COVID-19, which nearly cut the number of overnight stays in half. However, in 2023, both the number of tourists and the number of overnight stays experienced a significant increase in value that surpassed all previous records, indicating that tourism is a strategic branch of the Sarajevo and that it is given significant priority.

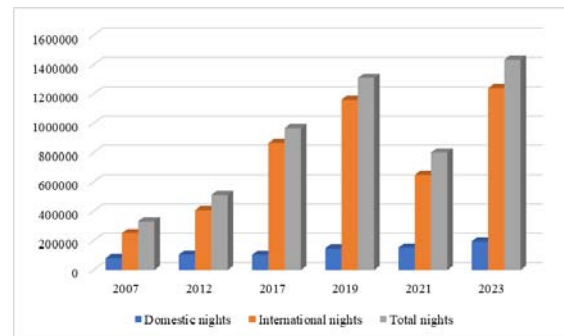


Fig.12 Growth of foreign overnight stays in Sarajevo Canton in the period 2007-2023 (Authors. Based on statistical data from the Institute for Development Planning of Sarajevo Canton)

The graph above illustrates the continuing rise of foreign overnight stays in Sarajevo Canton between 2007 and 2023, highlighting the significance of international tourism growing in Bosnia and Herzegovina's most popular travel destination.

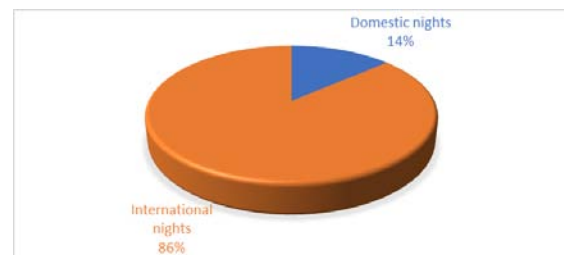


Fig.13 Structure of overnight stays in Sarajevo Canton in 2023 (Authors. Based on statistical data from the Institute for Development Planning of Sarajevo Canton)

Foreign overnight stays accounted for 86% of all overnight stays in 2023, up from 76% in 2007. Ten countries account for 58.9% of total overnight stays in Canton Sarajevo: Turkey, Croatia, the Kingdom of Saudi Arabia, Serbia and the United Arab Emirates, the United States, Germany and Kuwait, Slovenia and Oman, and the remaining 41.1% is accounted for by other countries (Montenegro, China, Austria, Great Britain, Italy, Holland, Sweden, France, Poland, etc.).

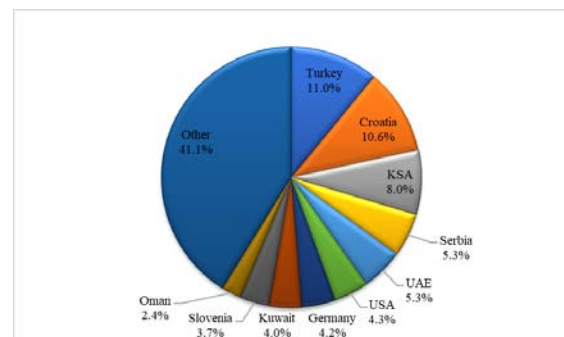


Fig.14 Structure of total overnight stays in Sarajevo Canton according to arrivals in 2023 (Authors. Based on statistical data from the Institute for Development Planning of Sarajevo Canton)

The graph above depicts the structure of overnight stays in Sarajevo Canton for 2023, with the ten most represented countries (approximately 59%), noting that the first five countries (Turkey, Croatia, Saudi Arabia, Serbia, and the United Arab Emirates) account for the statistical majority of 53% of total overnight stays.

By analysing tourism data from the Sarajevo Canton Development Planning Institute's documents (2010, 2018, and 2024), we determine that capacity utilisation in the last decade of 2013-2023 was mostly stagnant (2023: 29%, 2013: 30%), despite the fact that the growth rate of accommodation utilisation for the period 2017-2023 was positive and amounts to about 4% at the Sarajevo canton level. With an average stay of just two days in Canton, the growth rate of staying for the past ten years (2013–2023) has zero value (stagnation). The global pandemic played a role in this stagnation, as the number of registered accommodation facilities fell from 171 in 2019 to 141 in 2023. However, a significant portion of overnight stays occur in the private sector, which has the greatest rate of overnights stays malversations too, and in comparison to 2019 (13,529), 2023 (13,541) has more registered beds. Spatial analysis revealed that Hadžići (36%), Centar (34%), Stari Grad (31%), and Ilidža (30%) had the highest capacity utilisation growth rates during the same period, and since their value is 30% (the required standard for sustainable utilization), they are considered as municipalities profitable and sustainable with potential for tourism improvement. The growing demand for accommodation in Hadžići (e.g., Arab tourist resorts Osenik Resort and Countryside Resort in Hadžići) and Ilidža (Spa) highlights the importance of Sarajevo Canton's natural resources, including thermal mineral waters, protected areas, mountain landscapes, and forest ecosystems in the immediate green environment. Natural sites attract the majority of foreign tourism investments, particularly from Gulf countries, and "hoteliers stated an increasing number of Arab tourists with majority contribution to the overall nightstays" (Žunić, 2018).

3.4 Development of health infrastructure in Sarajevo Canton, with a focus on the growth of private health sector

According to Dobre et al. (2004), the tourism industry is a set of economic and non-economic activities that directly or indirectly contribute to addressing tourists' demands, including healthcare. „Health care is a system of social, group, and individual measures, services, and activities aimed at preserving and improving health, disease prevention, early detection, timely treatment, health care and rehabilitation, and the application of health technologies“ (Institute for Public Health of Canton Sarajevo, 2023). „Health infrastructure relates to all the physical infrastructure, non-medical equipment, transport and technology infrastructure (including ICT) required for effective delivery of services“ (Masaba et al., 2020). „An adequate health care infrastructure has many components: physical facilities that make care accessible; laboratory, training, and other support facilities; reliable supplies of pharmaceuticals and other materials; trained staff and professional training systems; and mechanisms to distribute resources and expertise“ (Rouzbehani, 2019). „A strong public health infrastructure includes a capable and qualified workforce, up-to-date data and information systems, and agencies that can assess and respond to public health needs“ (The Office of Disease Prevention and Health Promotion).

Tourism encourages the development of the health infrastructure in receptive tourist destinations around the world, including the Canton of Sarajevo. According to Institute for Public Health of Canton Sarajevo, health care in the Canton Sarajevo is provided through health care in the public and private sectors and is organised and implemented at the primary, secondary, and tertiary levels of health care. According to Žunić (2018), public and private health institutions provide healthcare in Sarajevo, while travel agencies, insurance companies, and modern hotels market health insurance and related services as part of their travel packages. Tourists can benefit from private polyclinics that provide specialist treatments in English, such as "Sanasa,"

and have open access with a passport and a defined price list for medical services.

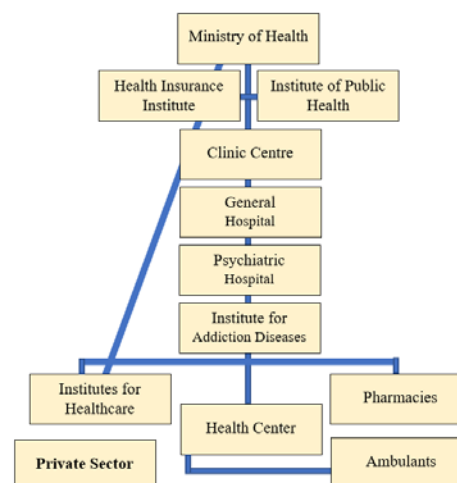


Fig.15 Organisational structure of the health care system in Sarajevo Canton with focus on private sector (bolded) as the most important for tourists' healthcare (CA Author. Based on the scheme of the Medical Chamber of Sarajevo Canton, linguistically and graphically adapted)

Health institutions where primary health care is provided are: health centres, pharmacies, health care institutes, emergency services, and the private sector (ambulants, pharmacies, and dental practices). "General or family medicine is the basic discipline in primary health care and the spine of many health systems in Europe" (Institute for Development Planning of the Canton of Sarajevo, 2023). Secondary health care is divided into two categories: a) specialist-consultative activities (hospitals, health centres, health care institutes, and the private sector, which includes polyclinics, centres, institutes, sanatoriums, and laboratories), and b) hospital health care (clinical centres, hospitals, and specialised health care institutes). "The activity of specialist-consultative health care is organised as hospital specialist-consultative health care in the public sector and as outpatient specialist-consultative health care in the public and private sectors" (Sarajevo Cantonal Development Planning Institute, 2023). Tertiary health care is implemented at the level of a university-clinical hospital, and it is the most complex because it "encompasses the provision of the most complex forms of health care, i.e., highly differentiated and more expensive diagnostic tests and therapeutic procedures in the field of specialist-consultative and hospital health care, scientific research work, and teaching for the needs of the Faculty of Health" (Institute of Public Health of the Canton of Sarajevo, 2023). Tertiary health care is provided at the university-clinical hospital level and is multidimensional because it "includes the provision of the most advanced forms of health care, i.e., highly differentiated and expensive diagnostic tests and therapeutic procedures in the field of specialist-consultative and hospital health care, scientific research work, and classes for the needs of the health studies" (Institute of Public Health of the Canton of Sarajevo, 2023).

Tab.1 Characteristics of the health sector in Sarajevo Canton in the period 2013-2022

	2013	2022
Population	413.593	419.543
Healthcare workers	7.651	7.786
Ambulants of primary healthcare per 100.000 inhabitants	36,82	38,38
Family medicine teams	200	223
Private healthcare institutions	417	471+
Pharmacies	118	171

(Authors. Based on the observed data from the Institute for Public Health of the Sarajevo Canton and the Institute for Development Planning of Canton Sarajevo)

The above table shows a slight increase in Sarajevo Canton's overall population between 2013 and 2022. However, it should be noted that there are indications that the actual situation on the ground may be higher than the demographic statistics show because many immigrants never deregister from their former residence administration in other municipalities in Bosnia and Herzegovina in order to obtain socioeconomic benefits, e.g., for transport, vacations, and other activities ("holes in the system"). The parameters that define the health system have increased, along with the slightly positive demographic growth: health-care workers, health centres, family medicine teams, private health institutions, and pharmacies.

Tab.2 Structure of health workers in Sarajevo Canton

Healthcare workers	2013		2022	
	Count	%	Count	%
Doctors, specialists, dentists, pharmacists	5.522	72.2%	5.795	74.4%
Healthcare collaborators	134	1.8%	122	1.6%
Administrative and technical staff	1.995	26.0%	1.869	24.0%
Total:	7.651	100%	7.786	100%

(Authors. Based on the observed data from the Institute for Public Health of the Sarajevo Canton and the Institute for Development Planning of Canton Sarajevo)

According to the table above, the total number of health workers increased by over a hundred in the period 2013–2022, primarily in the category of higher education (doctors, etc.), from 72 to over 74%.

Tab.3 The basic structure of health centers in Sarajevo Canton in the period 2013-2022

Ambulants per 100.000 inhabitants	2013	2022
Primary healthcare	36,82	38,38
Emergency medical assistance	2,03	2,15
Pharmacies	9,26	9,53
Physical medicine and rehab. (aps.)	7	9

(Authors. Based on the observed data from the Institute for Public Health of the Sarajevo Canton and the Institute for Development Planning of Canton Sarajevo)

In Sarajevo Canton, the overall number of health centres increased in all categories between 2013 and 2022, with primary health care centres, pharmacies, and physical centres accounting for the majority of the growth.

Tab.4 Spatial distribution of family medicine teams in Sarajevo Canton in the period 2013-2022

Family medicine teams	2013	2022
Stari Grad	21	19
Centar	36	42
Novo Sarajevo	29	40
Novi Grad	52	57
Ilidža	26	26
Vogošća	11	14
Hadžići	10	12
Ilijaš	11	10
Trnovo	4	3
Total:	200	223

(Authors. Based on the observed data from the Institute for Public Health of the Sarajevo Canton and the Institute for Development Planning of Canton Sarajevo)

"Healthcare activity in the private sector in the area of Sarajevo Canton has a well-developed network of health care institutions, especially at the level of secondary health care, followed by

dental health care and pharmacy activities" (Institute of Public Health of Sarajevo Canton, 2013). "Sarajevo's touristic development encouraged the growth of private health institutions that provide services in English (Al Tawil, Sanasa, Sara-Vita, etc.) (Žunić, 2023). The growth of the private health sector is significantly expanding, so "for the provision of family medicine services in private health institutions in the period January–December 2022, funds in the amount of BAM 381,236 (approx. EUR 194,643) were allocated, which is 89% of the planned funds for the 2022 year and 10% more compared to the same period of the previous year" (Sarajevo Canton Development Planning Institute, 2023). The constant influx of residents (from other cantons and municipalities) and the influx of tourists to Canton Sarajevo increase the burden on the health system, so local and foreign patients are often referred to the services of private polyclinics. However, the growth of private health institutions is particularly stimulated by the growth of tourism, because medical services are charged directly from one's own pocket, which is the preferred practice with foreign and diasporic tourists as it contributes to faster income generation.

Tab.5 Structure and growth of the private health sector in Sarajevo Canton

Private health sector	2013	2022
General medicine offices	3	NA*
Specialist ordinations	79	83
Health polyclinics, centres, institutes and spas	39	42
Ambulants for healthcare and rehabilitation	2	3
Dental ordinations, polyclinics and centers	156	191
Pharmacies	118	131
Medical-biotechnic laboratories	5	NA*
Dental laboratories	15	21
Total:	417	471+*

*no data for private general medical practices and laboratories available in 2022 (NA); hence, the total number of private health facilities is higher than displayed

(Authors. Based on the observed data from the Institute for Public Health of the Sarajevo Canton and the Institute for Development Planning of Canton Sarajevo)

According to the table above, in the overall structure of the private healthcare sector, the majority accounts for dental institutions at around 41%, pharmacies at 28%, specialist surgeries at 18%, followed by polyclinics at 9%, etc. The total number of private healthcare institutions increased from 417 in 2013 to over 471 in 2022.

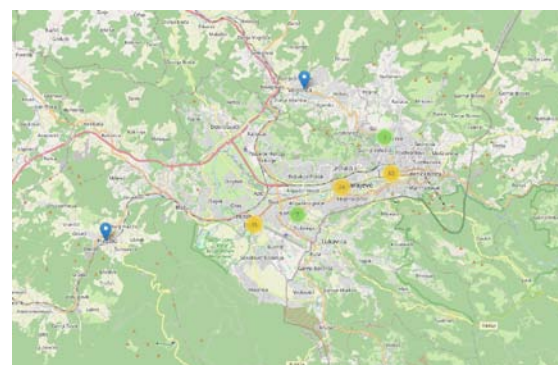


Fig.16 Spatial distribution of private clinics in Sarajevo Canton (Sarajevo Canton Ministry of Health)

The map above shows that the downtown region of Sarajevo has the highest density of private clinics, while the municipality of Ilidža leads in the suburbs.

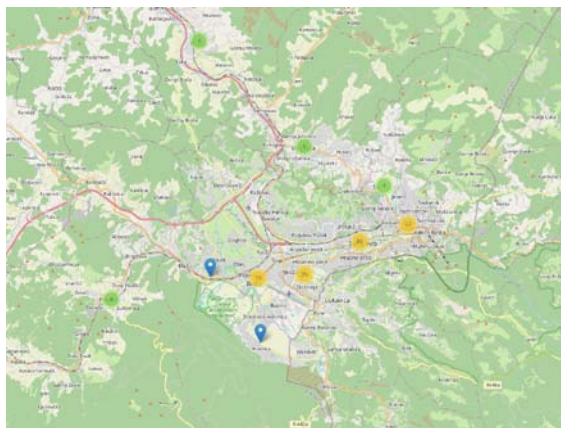


Fig.17 Spatial distribution of private dental institutions in Sarajevo Canton (Sarajevo Canton Ministry of Health)

According to the map above, the highest density of private dental institutions is in the urban zone (Centar and Novo Sarajevo) and in the area of Ilidža (outside or non-urban zone).

The total number of pharmacies in the private sector significantly exceeds the number of public pharmacies, so private pharmacies account for the majority (77% of the total number of pharmacies in Sarajevo Canton in 2022).

Tab.6 Pharmacies in the public and private health sector of Sarajevo Canton

Pharmacies	2013	2022
Public	41	40
Private	77	131
Total:	118	171

(Authors. Based on the data from the Institute for Public Health of the Sarajevo Canton and the Institute for Development Planning of Canton Sarajevo)

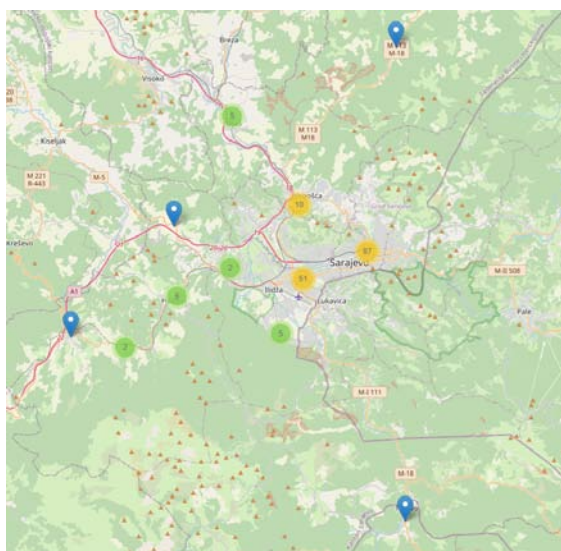


Fig.18 Spatial distribution of pharmacies in Sarajevo Canton (Sarajevo Canton Ministry of Health)

According to the map above, the highest density of pharmacies is in the urban zone (Centar and Novi Grad) and in the area of Ilidža (outside or non-urban zone).

Tab.7 Spatial distribution of pharmacies in Sarajevo Canton in 2022 year

Pharmacies	Total	Public	Private
Stari Grad	16	6	10
Centar	35	9	26
Novo Sarajevo	31	9	22
Novi Grad	41	8	33
Ilidža	23	2	21
Vogošća	9	2	7
Hadžići	9	1	8
Ilijaš	6	2	4
Trnovo	1	1	0
Total:	171	40	131

(Authors. Based on the data from the Institute for Public Health of the Sarajevo Canton and the Institute for Development Planning of Canton Sarajevo)

The above table shows the densest concentration of pharmacies at around 72% in the urban area, and the Novi Grad municipality leads with around 24% (the most populous municipality in Canton), while in the non-urban area, Ilidža leads with around 14%. Only the municipality of Trnovo has one on public property but no private pharmacies (the least populated municipality in Sarajevo Canton).

A strong positive correlation has been observed between the municipality of Ilidža's tourism expansion and the growing density and increasing diversity of private health care institutions within its area. Despite not having the legal title of an urban municipality, Ilidža enjoys a prime location right next to Sarajevo International Airport and is only 15 minutes from downtown, with good rail and bus connections. Its progressive urban and tourism development—"the highest growth rate of tourism in Sarajevo Canton" (Žunić, 2018)—is largely due to its popular natural and cultural attractions, advantageous location, and well-developed transportation system; thus, it has also reflected in the development of the health infrastructure.

3.5 The profile and evolution of the "Sanasa" in Sarajevo Canton in correlation to the impacts of tourism development

Established in 1999, Polyclinic "Sanasa" is the first private medical institution in Sarajevo and the project of foreign investors. It is included in the list of legitimate and accredited private healthcare facilities in Sarajevo Canton that offer medical services in Bosnian and four foreign languages: English, Arabic, Turkish, and German (for foreign citizens and other foreign patients, such as foreign visitors). It has professional medical staff, sophisticated treatment and diagnostic technology, and adheres to European standards. It employs more than 80 health workers, including around 30 specialist doctors with extensive experience. It provides a wide range of specialist medical services: internal medicine, cardiology, pneumophthysiology, gastroenterohepatology, dermatovenerology, ophthalmology, rheumatology, neurology, surgery, urology, dermatology, radiology, dentistry, ultrasound diagnostics, endocrinology, gynaecology, laboratory (biochemistry, haematology, microbiology, and immunology), occupational medicine, nephrology, orthopaedics, otorhinolaryngology, paediatrics, family medicine, and psychology. There are three branches located in the Sarajevo Canton: one in the urban area (Novo Sarajevo) and two in the non-urban area (Ilidža, Vogošća).



Fig.19 Spatial distribution of three „Sanasa“ branches in Sarajevo Canton
(CA Author's Project supported by the Google My Maps and Google Earth)

"The vision of the Sanasa polyclinic is to be a role model of private medical practice in Bosnia and Herzegovina and the first choice of clients for top-quality diagnostic, therapy, and rehabilitation health services, as well as one of the leading polyclinic centres in the region, recognised in the world" (Official Website of Sanasa). "The goals of the polyclinic are:

- a) Health protection for all citizens;
- b) Employment of professional domestic staff who will perform their work professionally and humanely;
- c) Constant improvement of existing services and introduction of new activities that are in short supply in the city and the state;
- d) Permanent education of employees;
- e) Providing quality medical services through a price list adapted to the standard of the majority of citizens" (Sanasa).

The polyclinic has successfully collaborated with numerous respected clients, companies from various branches, foreign organisations, and a large number of embassies via various types of contracts and agreements. Among them are tour operators, hence, as previously stated, the Sarajevo Canton Tourist Board (Sarajevo Canton Ministry of Economy) has included the "Sanasa" polyclinic in Sarajevo Canton's regular tourist offer as a complementary element to the destination.

To better understand the image of the Sarajevo private polyclinic "Sanasa" and its role in Sarajevo Canton's tourism destination, numerous reviews on the Internet via social networks, the polyclinic's official portal, and tourist information portals were analysed and evaluated, leading to the following conclusions:

- a) The average rating of all reviews that are currently available on the Internet is 4.6 out of 5 stars, based on 18,548 reviews total, with the note that some individuals may have multiple accounts because they are fans on different networks;
- b) Summarised reviews on Google: Sanasa Vogošća received 4.7 out of 5 (75), Sanasa Ilidža 4.4 out of 5 (155), Sanasa Grbavica 3.6 out of 5 (274), and a total of 4.23 (504);
- c) Polyclinic Sanasa: 4.8 out of 5 (8955) on the official portal;
- d) Facebook: 10.5 thousand followers, 10138 likes, and 5 out of 5 stars (9063);
- e) Glassdoor: 26 reviews with 4.2 out of 5 stars, 78% recommend it;
- f) The largest number of reviews with the maximum rating (5) was registered on Facebook (over 9 thousand), then on the official portal of the polyclinic (close to 9 thousand and a rating of 4.8), and on Google, where the reviews are classified by Sanasa branch offices in 3 locations in the Canton of Sarajevo, of which the polyclinic in Vogošća leads the way according to the rating (4.7) (over 70

reviews), while the office in Grbavica leads the way according to the number of reviews (over 270 reviews);

- g) Sanasa as the part of the Sarajevo Canton's tourism product (included in the regular destination's promotion: Sarajevo Destination, Sarajevo Canton Tourist Board);
- h) Sanasa as the part of the tourist guide of Sarajevo (Sarajevo Navigator);
- i) Sanasa as the part of the MEDEX Emis information database (Cantonal clinics);
- j) Sanasa as the leading sarajevo's private polyclinic in terms of the number of followers on social networks and the number of reviews with a prestigious rating.

In order to understand the development trend of the Sanasa polyclinic, several relevant parameters were determined: the total number of employees and employees with a university degree; the number and type of medical services; the total number of users of medical services (patients); and the number of foreign patients, including their structure by arrivals; the impact of the main tourist season and foreign visitors on visits, as well as the role of the touristic location in the sustainability of business and income; the number of polyclinic branches in the canton, and the vision of further spatial development, including awareness of the importance of tourism and tourist locations for the development of the polyclinic in the Sarajevo Canton area. According to the results of a closed questionnaire (conducted with the management and administration), it is stated that the polyclinic "Sanasa" has had a positive development trend since its establishment until today, which refers to the continuous increase of the observed parameters:

- a) The total number of employees and employees with a higher professional qualification (specialist doctors, etc.) is increasing, so the share of employees with a higher professional qualification in the total structure of health workers in the polyclinic is 30–50%;
- b) the number of users of medical services, domestic and foreign patients, is growing, so the share of foreign users during the summer tourist season is up to 30%, and in their structure according to arrivals, the most represented are: Turkey and Arab countries (KSA, UAE, Qatar, Kuwait, Syria, Egypt, Iran, Jordan, etc.);
- c) The total annual income of the polyclinic is growing, and the highest traffic in terms of the highest number of visits and the best earnings is achieved during the summer season, although it is believed that the share of foreign patients in the sustainable income of the polyclinic is weaker;
- d) The Sanasa Ilidža branch office has the largest number of foreign patients;
- e) The highest revenues are generated by the Grbavica Novo Sarajevo branch;
- f) The range of medical services in the polyclinic has grown and expanded by 30–50% since its establishment until today, and the most in demand are: internal medicine, family medicine, occupational medicine, dermatology, gynaecology, ultrasound diagnostics, and laboratory services;
- g) There are no plans to open a new office of the Sanasa polyclinic in Sarajevo Canton, and the tourism significance of the municipality is "perhaps" important for the choice of the location of the polyclinic.

4 Conclusion

The research's results confirmed the global connection between tourism and healthcare, particularly in Sarajevo Canton and the private healthcare sector, as demonstrated by the private polyclinic "Sanasa." Health infrastructure is a component of tourist infrastructure that serves tourists; thus, health is in 2nd place among tourist motives for visiting in the world's inbound tourism. The use of health services contributes to health, medical, and diasporic-medical tourism development, and similar trends are identified in the area of Sarajevo Canton, Bosnia and Herzegovina's leading tourism destination (the country with the world's third highest tourism growth rate in

2019). Although the increase in tourism is more progressive, a strong relationship has been determined between the expansion of tourism and healthcare in the aforementioned destination, with a particularly pronounced dynamic of growth in the private health sector. The impacts of tourism, along with demographic development, have contributed to the expansion of the private polyclinics, including Sanasa with its three branches in Sarajevo Canton. The prior findings indicate how tourism affects health in the observed area: greater investment in the health system, improved infrastructure development, greater expansion in the private health sector, and, in terms of geography, enhanced development of health infrastructure in the main tourist zones (downtown or the centre with the old core, Ilidža, and Hadžići). The cooperation between tour operators (Sarajevo Canton Tourist Board) and private healthcare institutions (e.g., "Sanasa"), the polyclinic's promotion under Sarajevo Canton's tourism offer (official website "Sarajevo Destination"), and its inclusion in the tourist guide (Sarajevo Navigator) are further examples of the relationship between healthcare and tourism. "Sanasa" has been promoted through these tourism channels as a modern Sarajevo's private polyclinic that provides medical services in five languages (Bosnian, English, Turkish, German, and Arabic). Sanasa Ilidža has the most favourable position from the tourism aspect because it's located in one of the most popular tourist zones, since the municipality Ilidža leads the canton in its tourism development. The cohesion of tourism and the private health sector, on the example of the Sanasa polyclinic, is also demonstrated in the highest number of visits to its branch in Ilidža, where the highest traffic of tourists is. In addition, in the structure of foreign tourists in the municipality of Ilidža, as stated by Žunić (2018) based on interviews with tourism and hotel managers, visitors from Turkey and Arab countries represent the most represented clientele, and the same composition is found in Sanasa Ilidža. The "Sanasa" polyclinic's medical services have been linguistically tailored to correspond with the most represented tourist clientele in Sarajevo Canton, who, among others, use medical services at the destination as well. The growing number of diasporic visits, including diasporic medical tourists who travel to their former country of origin for a second opinion, is also one of the trends in Canton Sarajevo's tourism industry that has been recognised. As such, healthcare institutions should consider promoting their health products in this market. „DMT can be promoted in an increasingly competitive medical tourism market, with the diaspora tourism niche gaining popularity. Transnational healthcare-seeking practices should be encouraged by advertising 'health packages' tailored for diasporas to attract them to the countries of origin and geographical closeness, accounting for the importance of motivational factors in planning promotion. Marketing medical services to this segment has proven beneficial for certain countries“ (Mathijssen & Dziedzic, 2024). Sanasa Polyclinic could play an important role in this market with its rich medical offer, due to numerous excellent reviews on the Internet and scientific validation. However, the objectives of the Strategic Plan of the Institute for Public Health of the Federation of Bosnia and Herzegovina for the period 2014–2019 (2014), for example, neglected the tourism sector as important for strengthening cooperation, which highlights one of the major issues that the relationship between health and tourism in Bosnia and Herzegovina, including Sarajevo Canton, hasn't been understood. Given that the World Health Organisation places health at the heart of tourism and, through its mission, vision, and documents, advocates and promotes the cohesion of health and tourism as one of the priority strategic goals, this paper contributes to the inclusion of Sarajevo Canton in the contemporary models imposed by the WTO and WHO, clarifying the current trends of cohesive tourism and the health growth of the destination. The findings presented in this paper will contribute to an enhanced understanding of the relationship between the tourism and health sectors, as well as more optimal strategic planning of health resources in the Canton area, including the opportunities for potential further territorial expansion of the private polyclinic "Sanasa" considering the tourist importance of the location (accounting for downtown, Ilidža, and Hadžići as SMART options).

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Primary Paper Section: D

Secondary Paper Section: DE, DN, AE, AK, FQ, FS

F MEDICAL SCIENCES

FA	CARDIOVASCULAR DISEASES INCLUDING CARDIO-SURGERY
FB	ENDOCRINOLOGY, DIABETOLOGY, METABOLISM, NUTRITION
FC	PNEUMOLOGY
FD	ONCOLOGY AND HAEMATOLOGY
FE	OTHER FIELDS OF INTERNAL MEDICINE
FF	ENT (IE. EAR, NOSE, THROAT), OPHTHALMOLOGY, DENTISTRY
FG	PAEDIATRICS
FH	NEUROLOGY, NEURO-SURGERY, NUERO-SCIENCES
FI	TRAUMATOLOGY AND ORTHOPAEDICS
FJ	SURGERY INCLUDING TRANSPLANTOLOGY
FK	GYNAECOLOGY AND OBSTETRICS
FL	PSYCHIATRY, SEXOLOGY
FM	HYGIENE
FN	EPIDEMIOLOGY, INFECTION DISEASES AND CLINICAL IMMUNOLOGY
FO	DERMATOLOGY AND VENEREOLOGY
FP	OTHER MEDICAL FIELDS
FQ	PUBLIC HEALTH SYSTEM, SOCIAL MEDICINE
FR	PHARMACOLOGY AND APOTHECARY CHEMISTRY
FS	MEDICAL FACILITIES, APPARATUS AND EQUIPMENT

VALIDATION OF INTERVENTIONS FOR THE NIC NURSING DIAGNOSIS – RISK FOR INFECTION (Code 00004) BY EXPERTS OF ACUTE ANAESTHESIOLOGY AND INTENSIVE NURSING CARE IN CLINICAL PRACTICE IN CZECH AND SLOVAK REPUBLICS

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Kega project 022UKF-4/2020 entitled Implementation of Nursing Interventions into Multimedia Technologies in Nursing Education.

Abstract: The purpose of the study was to determine which NANDA nursing diagnosis are made and which related NIC nursing interventions are carried out most frequently by acute anaesthesiology and intensive nursing care experts in the Slovak and the Czech Republics (hereinafter as SR and CR). **Methods:** The Likert Scale and Fehring's Diagnostic Content Validity Model (DCV model) were used for the research. **Sample:** Experts in acute anaesthesiology and intensive nursing care. The cohort consisted of 132 ($n_A=132$; 81 from SR and 51 from the CR) experts meeting Fehring's criteria. The number of Slovak academic nurses was $n_{A1}=47$ (31.8%); Czech academic nurses were $n_{A2}=16$ (10.8%); Slovak clinical nurses were $n_{A3}=34$ (25.8%); Czech clinical nurses were $n_{A4}=35$ (26.5%). Experts were part of the total sample. The total number of all participants of the validation research, i.e. academic nurses/educators/experts and clinical nurses/experts ($n_c=848$) from two countries – SR and CR. A total of 69 items – activities of two interventions for NIC nursing diagnosis: Risk for Infection 00004 were evaluated. **Results:** We found out that the total set of experts rated all activities/practices of Intervention I and II as significant. **Conclusion:** The results of an international study provide valid evidence for the development of nursing care and present validated NIC nursing interventions in relation to the diagnosis of Risk for Infection 00004 for practice, research, and education.

Keywords: Acute anaesthesiology and intensive nursing care. NIC. NANDA Clinical Nursing. Expert. Validation.

1 Introduction

The presented scientific study builds on the empirical outputs published by the universities in two countries in the field of nursing diagnostics and nursing interventions, i.e. the Faculty of Social Sciences and Health Care, the University of Constantine the Philosopher in Nitra in collaboration with the Faculty of Health Care Studies, the University of West Bohemia, Faculty of Health Care, the University of Presov and their clinical departments. First with the support of the Kega project entitled *Implementation of Nursing Interventions into Multimedia Technologies in Nursing Education* and now with the support of the follow-up Kega project entitled *Implementation of Nursing Interventions into Multimedia Technologies in Nursing Education 2*. The research investigations and implementation of the findings into nursing education are expected to be completed in 2023. The current research communications present findings of the research studies conducted to validate NANDA nursing diagnoses and NIC interventions internationally at academic institutions and clinical workplaces, where future health professionals are being trained. All the involved respondent pools are made up of nursing experts. Universities employ highly erudite academic staff with both professional and especially specialised competence in particular areas of clinical nursing practice, who are competent to create and manage teams of expert nurses to validate a set of nursing diagnoses and nursing interventions. The respondents meet the new research-based expert criteria for validation studies in the clinical setting (Archalous, 2022). Given the breadth and scope of the investigation, we present a validated set of empirically verified nursing interventions for NIC nursing diagnosis: Risk for Infection 00004 in acute anaesthesiology and intensive nursing care. It is designed for clinical practice and implementation into the training of health professionals, leading to the acquisition of exit competences after completion of undergraduate study programmes (Creason, 2004; Carpenito-Moyet, 2004). With the author's permission, we used in our validation study two nursing interventions included in the Nursing Interventions Classification (NIC; 7th edition) relevant to the nursing diagnosis Risk for Infection 00004 from Taxonomy II NANDA – International (2021-23) entitled *Minimizing Acquisition and Transmission of Infectious Agents* with 36 activities/practices

and *Prevention and Early Detection of Infection in a Patient at Risk* with 33 activities/practices. The validation study was conducted during the Covid pandemic and became highly relevant in all sections of nursing care.

2 Purpose

The purpose of the research was to assign nursing interventions of the Nursing International Classification system (NIC) to the nursing diagnosis evaluated by experts in *acute anaesthesiology and intensive nursing care* as the most common, and to validate them in clinical practice. Within the research investigation, experts/clinical nurses and experts/academic nurses defined the most important and most frequently used nursing diagnosis in each nursing discipline, by which means the nursing diagnosis of *The NANDA International: Nursing Diagnoses. Definitions and Classification 2021-2023 Risk for Infection Code 00004, Domain 11, Class 1, defined as susceptibility to infestation and multiplication of pathogenic organisms that may lead to impaired health* was included in the research. To the diagnosis, activities/practices of two interventions of the *Nursing Interventions Classification (NIC) 7th edition, St. Louis: Elsevier: 2018* were assigned. A group of experts constructed a measurement tool with criteria for the selection of a nursing intervention validation expert and with the items (activities/practices of interventions NIC) identified for validation (with respect to NIC copyright). The purpose of the study was to determine which activities/practices of two NIC interventions for the nursing diagnosis Risk for Infection 00004 are rated as significant, i.e. core (acute) and secondary by experts/nurses/midwives from academic and clinical nursing settings in the Slovak Republic (hereinafter as SR) and the Czech Republic (hereinafter as CR). Furthermore, to find out which of them are considered as insignificant, i.e. discarded, in care.

3 Methods

For the validation study, a measurement tool, i.e., an anonymous questionnaire that included the activities/practices related to the chosen nursing diagnosis was used. All 69 activities/practices of the two interventions NIC for the nursing diagnosis Risk for Infection 00004 NANDA-I were validated by the clinical and academic experts/nurses who met the established criteria. The first intervention applying to the nursing diagnosis Risk for Infection 00004, entitled *Intervention I: Infection Control*, defined as - *Minimizing of Acquisition and Transmission of Infectious Agents*, code 6540 (NIC, 7th Edition), was included in the measurement tool and contained a total of 36 items (activities/practices) plus one false item. A second intervention, *Intervention II: Infection Protection*, defined as *Prevention and Early Detection of Infection in the Patient at Risk*, code 6550 (NIC, 7th ed.) was included in the measurement tool with a total of 33 items (activities/practices) plus one false item (Table 1, Table 2). The Diagnostic Content Validity Model (DCV) was used for validation. Fehring's method was used for the research utilizing an anonymous questionnaire that included selected interventions NIC (Fehring, 1986; 1994). The total number of all participants in the validation research, i.e. academic nurses/educators/experts and clinical nurses/experts ($n_c=848$) of two countries – SR and CR included four subsets ($n_1=443$, $n_2=342$, $n_3=47$, $n_4=16$). The number of experts/nurses was 785 (92.25%), the number of experts/academic nurses/educators was 63 (7.75%), and the total sample size was 848.

Table 1 Activities/practices of Intervention I **Infection Control**, code 6540 (items No.1-37; one false item)

1.	Allocate the appropriate square meters per patient, as indicated by Centers for Disease Control and Prevention (CDC) guidelines
2.	Clean the environment appropriately after each patient use
3.	Change patient care equipment per agency protocol
4.	Isolate persons exposed to communicable disease
5.	Place on designated isolation precautions, as appropriate
6.	Maintain isolation techniques, as appropriate
7.	Limit the number of visitors, as appropriate
8.	Teach improved hand washing technique to health care personnel
9.	Instruct patient on appropriate hand washing techniques
10.	Instruct visitors to wash hands on entering and leaving the patient's room
11.	Use antimicrobial soap for hand washing, as appropriate
12.	Wash hands before and after each patient care activity
13.	Institute universal precautions
14.	Wear gloves as mandated by universal precaution policy
15.	Wear scrub clothes or gown when handling infectious material
16.	Wear sterile gloves, as appropriate
17.	Scrub the patient's skin with an antibacterial agent, as appropriate
18.	Shave and prepare the area, as indicated in preparation for invasive procedures and/or surgery
19.	Maintain an optimal aseptic environment during bedside insertion of central lines
20.	Maintain an aseptic environment when changing total parenteral nutrition (TNT) tubing and bottles
21.	Maintain a closed system during invasive haemodynamic monitoring
22.	Change peripheral IV and central line sites and dressings according to current Centers for Disease Control and Prevention guidelines
23.	Ensure aseptic handling of all IV lines
24.	Ensure appropriate wound care technique
25.	Use intermittent catheterisation to reduce the incidence of bladder infection
26.	Teach patient to obtain midstream urine specimens at the first sign of return of symptoms as appropriate
27.	Encourage deep breathing and coughing, as appropriate
28.	Promote appropriate nutritional intake
29.	Encourage fluid intake, as appropriate
30.	Encourage rest
31.	Administer antibiotic therapy, as appropriate
32.	Administer the immunizing agent, as appropriate
33.	Instruct patient to take antibiotics, as prescribed
34.	Teach patient and family about signs and symptoms of infection and when to report them to the health care provider
35.	Teach patient and family members how to avoid infection
36.	Promote safe food preservation and preparation
37.	Serve an ice cream sundae

Table 2 Activities/practices of Intervention II **Infection Protection**, code 6550 (items No.1-34; one false item)

1.	Monitor for possible systemic and localized signs and symptoms of infection
2.	Monitor vulnerability to infection
3.	Review histories of international and global travels
4.	Monitor absolute granulocyte count, WBC, and differential count
5.	Follow neutropenic precautions, as appropriate
6.	Limit the number of visitors, as appropriate
7.	Avoid close contact between pet animals and immunocompromised hosts
8.	Screen all visitors for transmissible disease
9.	Maintain asepsis for patient at-risk
10.	Maintain isolation techniques, as appropriate
11.	Provide appropriate skin care to oedematous areas
12.	Inspect skin and mucous membranes for redness, extreme warmth, or dryness
13.	Inspect condition of any surgical incision and wound
14.	Obtain cultures, as needed
15.	Promote sufficient nutritional intake
16.	Encourage fluid intake, as appropriate
17.	Encourage rest
18.	Monitor for change in energy level or malaise
19.	Encourage increased mobility and exercise, as appropriate
20.	Encourage deep breathing and coughing, as appropriate
21.	Administer an immunizing agent, as appropriate
22.	Instruct patient to take antibiotics as prescribed
23.	Maintain judicious use of antibiotics
24.	Do not attempt antibiotic treatment for viral infections
25.	Teach the patient and patient's family the differences between viral and bacterial infections
26.	Teach the patient and family about the signs and symptoms of infection and when to report them to the health care provider
27.	Teach patient and family members how to avoid infections
28.	Eliminate fresh fruits, vegetables, and pepper in the diet of patients with neutropenia
29.	Remove fresh flowers and plants from patient areas, as appropriate
30.	Provide private room, as needed
31.	Ensure water safety by instituting hyperchlorination and hyper-heating, as appropriate
32.	Report suspected infections to infection control personnel
33.	Report positive cultures to infection control personnel
34.	Discharge the patient

Out of the total pool of $n_c=848$ experts, the total number of Slovak and Czech experts/clinical nurses was $n_k=785$ (Table 3 Expert/clinical nurse sets in the process of validation of Nursing Diagnosis Risk for Infection 00004 Interventions I, II). The experts of the total set were from universities and teaching hospitals of SR and the CR. Two interventions for the nursing diagnosis (NIC) Risk for Infection 00004 (NANDA-I) containing a total of 71 activities/practices (two were false items) were validated in academic and clinical settings of different nursing disciplines. The experts of the total sample ($n_c=848$) identified all 69 validated items as significant (i.e., core and secondary) in the nursing diagnosis of Risk for Infection 00004, with 49 core (acute) and 20 secondary items. The first intervention with a weighted score – VS 0.91 - 0.71 (37 activities (one false), 33 core, 3 secondary), the second intervention VS 0.89 – 0.53 (34 activities (one false), 16 core, 17 secondary).

Table 3 Expert/clinical nurse sets in the process of validation of Intervention I, II for nursing diagnosis Risk for Infection 00004

Sets	n_k	%
Slovak Republic – nurses n_1	443	52.24
Czech Republic – nurses n_2	342	40.33
Slovak Republic – nurses $n_{A \text{ acute, anaesthesiology and intensive nursing}}$	81	61.35
Czech Republic – nurses $n_{A \text{ acute, anaesthesiology and intensive nursing care}}$	51	38.75

NIC intervention activities for nursing diagnosis Risk for Infection in acute anaesthesiology and intensive nursing

The aim of the research study was to determine which activities/practices of the two NIC interventions for the nursing diagnosis Risk for Infection 00004 are evaluated by experts/nurses from the academic and clinical obstetric-neonatal nursing care settings in SR and CR as significant, i.e. core (acute) and secondary within acute anaesthesiology and intensive nursing care. Furthermore, to find out which of them they consider as insignificant, i.e. excluded, in obstetric and neonatal nursing. The research was carried out at the Faculty of Social Sciences and Health Care, the University of Constantine the Philosopher in Nitra in collaboration with the Faculty of Health Care Studies, the University of West Bohemia and Faculty of Health Care, the University of Presov with the support of the Kega project entitled *Implementation of Nursing Interventions in Multimedia Technologies in Nursing Education 2*. The research investigations and implementation of their results in nursing education took place from 2020 to 2023.

Methods and Data Set. The Likert Scale and Fehring's Diagnostic Content Validity Model (DCV model) were used for the research. The Likert Scale with a five-point significance rating on a scale of 1 to 5 (1-no significance, 2-low significance, 3-medium significance, 4-high significance, 5-topmost significance). In the next stage of Fehring's Diagnostic Content Validity Model (DCV model), a weighted score for each item/activity was calculated by summing the values assigned to each response and then dividing it by the total number of responses. The values are assigned to the answers as follows: 5=1; 4=0.75; 3=0.5; 2=0.25; 1=0. Responses that achieve a weighted score greater than 0.80 (0.75 according to Fehring, 1986, p. 188; Creason, 2004, p. 124) are considered significant. These activities are referred to as highest priority, core, or acute (major, critical). Activities with a weighted score of less than 0.80 and more than 0.50 are of lower priority. Activities with a weighted score ≤ 0.50 were considered clinically invalid and therefore diagnostically insignificant and suitable for exclusion. A total of four measurement tools in two languages were used for the validation study in acute anaesthesiology and intensive nursing care. The measurement tool was an anonymous questionnaire consisting of an anamnestic section that contained selection criteria for the nursing intervention validation expert, and an investigation section. The latter one included the activities of the two interventions NIC for Infection Control (defined as *Minimizing Acquisition and Transmission of Infectious Agents*), code 6540, and Infection Protection (defined as *Prevention and Early Detection of Infection in the Patient at Risk*), code 6550 related to the NANDA-I Nursing Diagnosis Risk for Infection 00004. A total of 71 items (code 6540 items No.1-37; code 6550 items No.1-34) were included in the questionnaire (Table 4, Table 5).

The selected sample included a total of 132 experts/nurses ($n_A=132$) of the academic and clinical acute anaesthesiology and intensive nursing care. It consisted of four subsets (n_1, n_2, n_{A3}, n_{A4}) of which 81 experts meeting Fehring's criteria were from SR and 51 experts from CR. Slovak educators were $n_{A1}=47$ (31.8%); Czech educators $n_{A2}=16$ (10.8%); Slovak clinical

nurses $n_{A3}=34$ (25.8%); Czech clinical nurses $n_{A4}=35$ (26.5%). A total of 71 items of the two NIC interventions for the nursing diagnosis Risk for Infection were evaluated, which included 69 activities/practices and two false items.

4 Results

We found out that Slovak and Czech experts/nurses and experts/educators unanimously evaluated all activities/practices as important. For Intervention I, the overall set of experts rated items No. 4 and 19 as the most significant ($VS=0.95$) and excluded one item (false item). Items rated by the overall expert set with the highest weighted score were *Isolate persons exposed to communicable disease* and *Maintain an optimal aseptic environment during bedside insertion of central lines*.

For Intervention II, the overall set ranked item No.10 ($VS=0.95$) as the most important. The overall set of experts gave the item *Maintain isolation techniques, as appropriate* the highest weighted score. There were differences between the subsets of experts in rating the magnitude of importance of activities/practices for both interventions. Table 4 Validation of the activities/practices of Intervention I named Infection Control, code 6540, in acute anaesthesiology and intensive nursing care by experts $n_{A1} - n_{A4}$ presents the validated results for Intervention I. Table 5 Validation of the activities/practices of Intervention II named Infection protection, code 6550, in acute anaesthesiology and intensive nursing care by experts $n_{A1} - n_{A4}$, presents the validation results for Intervention II.

Table 4 Validation of the activities/practices of Intervention I named Infection Control, code 6540, in acute anaesthesiology and intensive nursing care by experts $n_{A1} - n_{A4}$

Aktivita/NIC ₃₇	I1	I2	I3	I4
15	16	17	18	19
110	111	112	113	114
115	116	117	118	119
120	121	122	123	124
125	126	127	128	129
130	131	132	133	134
135	136	137		
$n_{A1}=SR/$ Educators	0,59	0,87	0,84	0,93
	0,9	0,89	0,77	0,84
	0,86	0,82	0,89	0,63
	0,8	0,91	0,81	0,83
	0,91	0,92	0,91	0,94
	0,82	0,81	0,81	0,79
	0,73	0,84	0,78	0,88
	0,83	0,71	0,28	
$n_{A2}=CR/$ Educators	0,56	0,92	0,89	0,89
	0,88	0,86	0,64	0,84
	0,8	0,69	0,89	0,69
	0,69	0,75	0,59	0,73
	0,81	0,88	0,83	0,84
	0,66	0,52	0,55	0,61
	0,5	0,67	0,61	0,78
	0,59	0,59	0	0,7
$n_{A3}=SR/$ Nurses	0,68	0,96	0,81	0,98
	0,93	0,96	0,9	0,94
	0,91	0,95	0,97	0,8
	0,92	0,93	0,9	0,86
	0,88	0,93	0,9	0,96
	0,83	0,68	0,74	0,73
	0,71	0,93	0,87	0,88
	0,73	0,73	0,15	0,76
$n_{A4}=CR/$ Nurses	0,54	0,88	0,89	0,91
	0,91	0,92	0,76	0,91
	0,88	0,91	0,91	0,74
	0,71	0,86	0,76	0,8
	0,84	0,91	0,89	0,91
	0,72	0,69	0,78	0,84

	0,79	0,89	0,79	0,83	0,85
	0,83	0,79	0,24		
Total (n _{A1} – n _{A4})	0,61	0,92	0,85	0,95	
	0,92	0,94	0,83	0,92	0,82
	0,89	0,93	0,94	0,77	0,93
	0,82	0,89	0,83	0,83	0,95
	0,86	0,92	0,9	0,94	0,87
	0,78	0,68	0,76	0,78	0,8
	0,75	0,91	0,83	0,85	0,8
	0,78	0,76	0,2		

The subset of Slovak educators n_{A1}=47 marked all items as significant. The most significant items were No. 19 and 23 (VS=0.96; 0.94). Slovak experts/educators marked items *Maintain an optimal aseptic environment during bedside insertion of central lines* VS 0.96 and *Ensure aseptic handling of all IV lines* with VS 0.94 as the most significant. The subset of Czech educators n_{A2}=16 marked 23 items as significant, the most significant item being No. 2 (VS=0.92). Czech experts/educators scored the item *Clean the environment appropriately after each patient use* as the most significant – VS 0.92 and four items reached the same significance VS 0.89: *Ensure aseptic handling of all IV lines*; *Wash hands before and after each patient care activity*; *Change patient care equipment per agency*; *Isolate persons exposed to communicable disease*. The subset of Slovak nurses n_{A3}=34 labelled all items as significant. The most substantial one being No. 4 (VS=0.98). The subset of Czech nurses n_{A4}=35 considered all items as substantial. The most significant was No.6 (VS=0.92). The total set of experts marked all activities/practices as significant. For Intervention I, activities/practices included within items No. 4 and 19 *Isolate persons exposed to communicable disease*; *Maintain an optimal aseptic environment during bedside insertion of central lines* were marked as the most substantial. According to the total set of experts, none of the activities/practices were excluded.

Table 5 Validation of the activities/practices of Intervention II named Infection Protection, code 6550, in acute anaesthesiology and intensive nursing care by experts n_{A1} - n_{A4}

Activity/NIC ₃₄	II1	II2	II3	II4
II5	II6	II7	II8	II9
II10	II11	II12	II13	II14
II15	II16	II17	II18	II19
II20	II21	II22	II23	II24
II25	II26	II27	II28	II29
II30	II31	II32	II33	II34
n _{A1} =SR/ Educators	0,91	0,74	0,72	0,71
	0,71	0,76	0,64	0,91
	0,9	0,8	0,81	0,9
	0,8	0,84	0,74	0,68
	0,78	0,77	0,84	0,81
	0,78	0,81	0,82	0,66
	0,68	0,55	0,81	0,85
				0,45
n _{A2} =CR/ Educators	0,78	0,64	0,47	0,48
	0,47	0,48	0,5	0,42
	0,78	0,66	0,67	0,83
	0,72	0,72	0,61	0,61
	0,61	0,69	0,86	0,89
	0,55	0,7	0,61	0,42
	0,44	0,44	0,73	0,77
				0,25
n _{A3} =SR/ Nurses	0,84	0,78	0,75	0,71
	0,69	0,76	0,68	0,63
	0,95	0,82	0,79	0,87
	0,74	0,76	0,71	0,63
	0,79	0,77	0,86	0,85
	0,5	0,67	0,66	0,57
	0,53	0,45	0,78	0,78
				0,56
n _{A4} =CR/ Nurses	0,91	0,77	0,61	0,75
	0,72	0,76	0,57	0,6
	0,94	0,83	0,83	0,93
				0,88

	0,86	0,86	0,81	0,71	0,81
	0,8	0,74	0,86	0,88	0,72
	0,68	0,81	0,81	0,63	0,53
	0,58	0,56	0,8	0,78	0,53
Total (n _{A1} – n _{A4})			0,87	0,78	0,68
	0,73	0,71	0,76	0,62	0,62
	0,92	0,95	0,83	0,81	0,9
	0,85	0,8	0,81	0,76	0,67
	0,78	0,8	0,75	0,86	0,86
	0,62	0,59	0,74	0,74	0,6
	0,53	0,55	0,5	0,79	0,78
	0,54				

The subset of Slovak educators n_{A1}=47 marked all items as significant. The most significant items were No. 1 and 9 (VS=0.91); the subset of Czech educators n_{A2}=16 marked 23 items as significant, the most significant item being No. 23 (VS=0.89). Eleven items (including one false item) were insignificant/excluded – No. 3, 4, 5, 6, 7, 8, 28, 29, 30, 31, and 34 (VS=0.5-0.25). The subset of Slovak nurses n_{A3}=34 marked all items as significant, except item No. 31 (VS=0.45); the most significant item was No. 10 (VS=0.94). The subset of Czech nurses n_{A4}=35 marked all items as significant, the most significant item being No. 10 (VS=0.94).

The total set of experts rated all activities/practices as significant. The most significant was item No. 10 (VS=0.95) of Intervention II: *Maintain isolation techniques, as appropriate*. According to the total set of experts of acute anaesthesiology and intensive nursing care none of activities/practices of Intervention II were excluded.

6 Discussion

The SENIC (Study on the Efficacy of Nosocomial Infection Control) showed the possibility of reducing infections by one-third through a combination of infection surveillance and infection control programmes (Hughes, 1988). There has been some reduction in the incidence of certain HAIs as a result of greater awareness and robust preventive measures taken in the hospital setting. The implementation of thorough infection surveillance and prevention practices has led to some success in the prevention of HAIs. According to the CDC, CLABSI rates decreased by 46% between 2008 and 2013 (Boev, Kiss, 2017). In 2014, the CDC published a multi-state point survey on healthcare-associated infections that included 11,282 patients from 183 U.S. hospitals (Magill et al., 2014). According to this report, about 4% of hospitalized patients had at least one HAI. In absolute numbers, an estimated 648,000 hospitalized patients suffered from 721,800 infections in 2011 (Magill et al., 2014). The dominant infections (in descending order) include pneumonia (21.8%), surgical site infections (21.8%), gastrointestinal infections (17.1%), urinary tract infections or UTIs (12.9%), and primary bloodstream infections (9.9%), comprising catheter-associated bloodstream infections (Magill et al., 2014). Among the pathogens causing HAIs, *C. difficile* (12.1%) is the main pathogen followed closely by *Staphylococcus aureus* (10.7%), *Klebsiella* (9.9%) and *Escherichia coli* (9.3%) (Magill et al., 2014). Skin and surgical site infections are usually caused by *Staphylococcus aureus*, and sometimes they involve methicillin-resistant *Staphylococcus aureus* (MRSA).

Pavelova's 2021 study states: "We found that in minimizing acquisition and transmission of infectious agents, respondents collectively considered the most important intervention being *Maintain an optimal aseptic environment during bedside insertion of central lines* (95%) and the least important *Allocate appropriate square meters per patient* (61%). The difference was between the subset of Czech nurses/experts and the subset of Slovak nurses/experts for the activity/practice called *Teach patient and family about signs and symptoms of infection* (81%; 67%). Educators from Slovakia were significantly more likely to *Encourage fluid intake* (89%) than educators from the Czech Republic (50%). In the section on Prevention and early detection

of infection in at-risk patients, all respondents considered the item *Maintain isolation techniques* to be the most important intervention (95%). The item *Avoid contact between pet animals and immunocompromised hosts* showed the most significant difference between nurses (SK 68%; CR 57%). Among educators, the most significant difference was in *Limit the number of visitors* (SK 76%; CR 48%) (Pavel, 2021). Prevention of infection development in the acute patient who is at risk of failure of basic life functions is one of the most important priorities in the work of the intensive care nurse (Pavel, 2021).

The experts confirmed the validity of almost all the listed activities of the selected NIC sets that can be used in internal medicine nursing for the nursing diagnosis Risk for Infection 00004 but did not consider them all to be of equal importance. The results of the international validation study provided insights for the development of clinical practice in internal medicine nursing, as well as for the development of a curriculum for future nurses and the possibility of objective validation of NIC nursing interventions in relation to the selected nursing diagnosis Risk for Infection. Nurses' self-assessment regarding their competence to perform these activities is also important in making nursing diagnoses and performing subsequent interventions from classification systems. Wake et al. (1994), conducted research that included data from six different countries (Belgium, Canada, Colombia, UK, France, and USA). Zelnik et al. (2010) supplemented it with data from the Czech and Slovak Republics and found that nurses from France (2.4), Colombia (2.5) and the UK (2.5) showed the lowest self-evaluation. Nurses from the USA (3.96), Czech Republic (3.3), Slovak Republic (3.2), Canada (3.19), and Belgium (3.14) had the highest self-assessment. The authors conclude that the highest self-assessment of the U.S. nurses may be related to the fact that NANDA originated in a North American setting. U.S. nurses reported that they had used nursing diagnoses 82% of the time during their studies and 100% of the time during their practice. This suggests a clear need to work with classification systems and the issue of nursing diagnoses and related interventions systematically during study and subsequently in clinical practice (Wake et al., 1994; Zelenik et al., 2010; Archalous, 2023).

For comparison, we present the results of foreign studies related to the application of the NIC classification system interventions. The authors Shin, Choi, and Lee (2021) list the top 30 NIC interventions most commonly used in nursing homes. The most frequently applied NIC intervention was *Medication Management*. It was applied to the majority of residents (56 of 57). The second most frequently applied NIC intervention was *Vital Signs Monitoring* for 55 residents. The third most frequently used one was *Environmental Management: Comfort*. This intervention was applied to 54 clients. The fourth most frequently applied NIC intervention was *Fall Prevention*, applied to 53 clients. *Surveillance: Safety* was the fifth most frequently used nursing intervention, applied to 52 clients. Authors Asghari, Archibald, Roshangar (2022) found top 10 nursing interventions in both a ward and ICU in relation to influencing COVID-19 infection; these were *Admission Care* (7310), *Environmental Management* (6486), *Health Education* (5510), *Infection Protection* (6550), *Medication Administration* (2300), *Positioning* (0840), *Respiratory Monitoring* (3350), *Vital Signs Monitoring* (6680), *Nausea Management* (1450), and *Diarrhoea Management* (0460). Some of the nursing interventions such as *Admission Care* (7310), *Medication Administration*, and *Vital Signs Monitoring* (6680) are predictable because they are performed on all admitted patients regardless of their nursing diagnoses. Some other nursing interventions were related to common symptoms in COVID-19 positive patients and included *Respiratory Monitoring* (3350), *Nausea Management*, and *Diarrhoea Management* (0460). Nursing care and intervention effectiveness evaluation is done at some level in all hospitals, but because no common language is used to express them, it is not possible to aggregate research and data. The lack of use of standardized language to document interventions also reduces the sustainability of comparative and

longitudinal studies of nursing interventions. The most commonly identified nursing interventions for COVID-19 identified in this study provide an evidence-based perspective on the scope of nurses' practice in the context of COVID-19 in hospitalized patients. This study also provides a starting point to consider the scope of practice in the Iranian nursing context and can help inform professional nursing education for students who will be tasked with successfully implementing these strategies in the future (Asghari, Archibald, & Roshangar, 2022).

7 Conclusion

The risk of hospital-acquired infections depends on the infection control practices of the facility, the immune status of the patient, and the prevalence of various pathogens within the community. Risk factors for HAIs include immunosuppression, advanced age, length of hospital stay, multiple underlying comorbidities, frequent visitors to medical facilities, mechanical ventilatory support, recent invasive procedures, built-in devices, and stay in the intensive care unit (Sydnor and Perl, 2011). Systematically validated interventions can be used not only there but also in community care.

The validation processes of NIC Nursing Diagnosis Risk for Infection 00004 interventions enable the quality of nursing care to be improved. The results of international studies provide new knowledge for the development of nursing clinical practice in nursing and allow comparison of nursing interventions and their activities between Czech-Slovak and international validation studies. The current ones strengthen the implementation of the results of research investigations into clinical nursing care, study programmes, and the development of curricula for future nurses and midwives, consequently expanding the possibilities of objective validation of NIC (Nursing Interventions Classification) nursing interventions in relation to selected nursing diagnoses. They contribute to the professionalization of care for clients and patients.

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Primary Paper Section: F

Secondary Paper Section: FK, AM

G AGRICULTURE

GA	AGRICULTURAL ECONOMICS
GB	AGRICULTURAL MACHINES AND CONSTRUCTION
GC	PLANT GROWING, CROP ROTATION
GD	FERTILIZATION, IRRIGATION, SOIL TREATMENT
GE	PLANT CULTIVATION
GF	DISEASES, PESTS, WEEDS AND PLANT PROTECTION
GG	ZOOTECHNICS
GH	NUTRITION OF FARM ANIMALS
GI	FARM ANIMAL BREEDING AND FARM ANIMAL PEDIGREE
GJ	BDISEDAISES AND ANIMAL VERMIN, VETERINARY MEDICINE
GK	FORESTRY
GL	FISHERY
GM	FOOD INDUSTRY

NGOS WANT TO REDUCE RISKS AND START WORKING MORE WITH COMPANIES AFTER THE COVID 19 PANDEMIC MAINLY ON CSR TOPICS

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Abstract: The aim of the article is to define the key motives of non-profit organizations for cooperation with companies on socially responsible issues. The case study was conducted in two interrelated parts. Namely, using qualitative interviews with non-profit organizations operating in the Czech Republic. Subsequently, focus groups were applied for a deeper analysis and evaluation of the attitudes of experts on the issue. The findings suggest that NGOs focus on the needs of local communities which is a key element for possible cooperation with companies that are also seeking to serve these areas. Another key point for collaboration is the desire of both NPOs and companies to address the issues of the community in which the organization is located, to this end companies are willing to sponsor NPOs to help them address these issues. This study fills a gap in the literature on collaboration between the nonprofit and for-profit sectors on socially responsible issues by applying the concept of integrative and community relations in the context of locally owned businesses and community-based nonprofit organizations, which distinguishes this study from the usually studied issue of multinational organizations and their collaboration with the nonprofit sector. The findings from this study offer key points for the leadership of community-based nonprofit organizations interested in establishing relationships with local businesses.

Keywords: nonprofit organizations, corporate community involvement, risks, Covid 19 pandemic, non-profit organization, a nonprofit-business collaboration, CSR

1 Introduction

This research was inspired by informal semi-structured interviews with a group of NGO managers from the two largest Czech cities, namely Prague (the capital of the Czech Republic) and Brno (the second largest city of the Czech Republic). Until the covid 19 pandemic, NGOs in these locations relied solely on funding from grants provided by the Czech government and possible earnings from the sale of additional services or products. The covid 19 pandemic contributed to the instability of the overall situation and the existence of the NGOs, which began to look for other ways to diversify their income and expand their portfolio of activities, i.e. to reduce the risks that could lead to the closure of their activities due to lack of financial resources. Thus, among other things, non-profit organizations are seeking to cooperate more intensively with local businesses and the topics they see as suitable for cooperation are mainly in the field of social responsibility. The topic of corporate social responsibility is strongly resonating in the Czech Republic, as from 2024 there is a reporting obligation for large enterprises, of which there are a significant number in Brno and Prague. Also, for companies that are not newly obliged to report, the area of socially responsible activities, their implementation and reporting is important, because if they want to remain in the supply and customer chain of large companies that are obliged to report, they will also be asked by these large companies to prepare reporting. Many companies are thus looking for other ways in which they can collaborate with other organizations on socially responsible activities and their reporting. For non-profit organizations, this opens up opportunities for cooperation, as the essence and activities of non-profit organizations are often those that fall within the concept of CSR, and thus non-profit organizations and companies find a point of contact for developing cooperation. Thus, companies can support NGOs through sponsorship, and based on this cooperation, they can in turn seek solutions to support local issues facing companies in that locality. (Writh & Walmsley, 2022) Examples include cooperation on tree planting, support for mothers with young children, and counselling for the socially disadvantaged. (Lee & Babiak, 2017; Dutta & Talegaonkar, 2022) In the interviews that were conducted, leaders of NGOs expressed some concern about their existence in the challenging environment in which

many NGOs have been operating recently, not only in Brno and Prague, but also throughout the Czech Republic (Lukáš & Aleš, 2023) NGOs thus experienced crisis management during the Covid 19 pandemic, moved partially or fully online and strengthened relationships within their teams. According to Mahmud (2021), it is the crisis periods that bring the opportunity to build stronger bonds between employer and employees. During the Covid pandemic, 19 NGOs distributed scarves, disinfectants, protective suits, etc., bringing them into line with the functioning and philanthropy of local companies (Marom, Shaikhe, 2020; Pelikanova, 2021; Carroll, 2021). Thus, NGOs would like to continue their socially responsible activities in cooperation with the corporate sector (He, 2020), and in other topics such as the war now underway in Ukraine, where again NGOs provide support, as do many companies (Păceșilă, M., & Colesca) and this again brings up the idea of joint synergistic cooperation. For family businesses overall, ethical management principles and responsible behavior are applied not only in emergency situations but as a regular activity in the context of a long-term vision and values that are part of their corporate culture (Rivo-lopez et al, 2021). The purpose of the research in this study was to (A) explore the situation of NGOs after the covid 19 pandemic, both in semi-structured interviews and in the literature, in terms of their willingness to continue and develop collaborations with local businesses to promote and develop CSR themes (B) to better understand what specifically motivates NGOs to engage in collaborations with local businesses or firms in their locality, (C) explore ways to strengthen the relationship between NGOs and businesses.

The case study draws on corporate philanthropy, nonprofit management, and nonprofit marketing literature (Choto et al., 2022). The originality of the scholarly article is that, in contrast to the studies presented so far (Yin, 2021), it does not only focus on multinational companies and their cooperation with the nonprofit sector but contributes to: i. capturing the possibility of cooperation between nonprofit organizations and local businesses (Mackiewicz & Spodarczyk, 2022); ii. clarifying the interplay between corporate giving opportunities; iii. charitable organizations (Liu et al, 2022) with local businesses and community-based non-profit organizations. The business environment of the selected country - the Czech Republic - is the subject of the research due to its strong involvement (Mammadova, 2022) not only locally but also internationally. The structure of a scientific article consists of logically following parts. In the theoretical level, the motivation for writing a scientific article is formulated, clarifying the scientific gap along with emphasizing originality. Subsequently, a biblical analysis has been developed with keywords such as CSR, non-profit organization and collaboration of non-profit organizations.

2 Literature review

Collaboration between the non-profit and business sectors is widely regarded as a process of value creation that benefits society, business and non-profit organizations (NPOs). However, this process has rarely been considered from the perspective of the non-profit sector. In this paper, we discuss a new framework to assist NPOs in developing strategic collaborations with businesses. We argue that by being strategically proactive rather than reactive to what businesses have to offer, NPOs can increase the scope of their cross-sector collaboration, thereby increasing their sustainability and competitiveness.

There is increasing pressure on businesses to change their approaches to CSR from traditional practices (e.g. corporate giving) to new forms of engagement with society, such as the NBC - Nonprofit-Business Collaboration (Austin 2000b). NBC allows businesses to deepen their understanding of societal problems and become empowered to help develop better solutions (Barkay2011 ; McDonald and Young 2012). This

change presents an opportunity for nonprofits to position themselves as attractive to the business sector.

The reason and framework for cooperation between the non-profit sector and companies is the concept of social responsibility. Corporate social responsibility extends to all areas of a company's operations. It deals with its environment, the quality of life of its employees and customers, but also with its relationships with profit and non-profit stakeholders. And although there is no single, universally accepted definition of CSR, it is generally understood as the linking of business intentions with ethical values, with the main aspect being people with regard to their needs, interests and the environment. However, we must not neglect the external environment of the company's operations, where the form and scope of social responsibility is reflected and comprehensively intertwined with all sectors, including the non-profit sector in addition to the commercial sector. In a socially responsible company, the same values are at stake as those held by people active in non-profit organizations. What defines a non-profit organization is that the purpose of setting up the organization is not to make a profit, hence the strongest connection within companies and NGOs is not financial or material, but in people who share common goals and values. NGOs supported by companies are able to provide new alternative solutions to social and environmental problems. Mutual cooperation between NGOs and companies will ensure that both types of societies benefit and thus highlight the common denominator, which is the human being. What will not change is the focus of the company to satisfy the needs of the customer and investor, as well as the focus of the NGO to satisfy the needs of the human being and the environment we live in. (Austin, 2000a).

Non-governmental non-profit organizations (NGOs) are legal entities established for purposes other than making a profit and then distributing it to beneficiaries. On the other hand, NPOs are established to meet the needs of a particular group of the population or to achieve a particular objective. Through their activities, NGOs very often complement the activities of the public administration, or even in certain areas directly provide services instead of the state, especially thanks to their ability to work more efficiently and more directly than the public administration. Just as the law does not define the concept of NGOs, neither does it specify which legal forms are considered to be such organizations. However, in view of the above characteristics, the above legal forms can be considered as NGOs. Non-profit non-governmental organizations (NGOs) are supported by the state, European Union projects and other financial sources. NGOs facilitate public benefit activities in various fields, including, for example, the integration of migrants (Bagavov & Kourachanis, 2022). There are four basic types of NGOs (Chikoto-Schultz, et al., 2019): (A) Service: they provide direct services to their clients. These include health, humanitarian, social, cultural, charitable, and educational organizations. (B) Advocacy: fight for the rights of defined groups or selected public interests. These include human rights, environmental, and anti-corruption organizations, as well as consumer rights advocates. (C) Philanthropic: support materially and financially public benefit activities dot typically refer to foundations and endowments (D) Interest-based: focus on the development of interest-based activities. These are mainly sports clubs, community groups, hunting, beekeeping, gardening and leisure. Another motivation for firms to collaborate is that, according to Lee (2021), firms that had ethical collaboration principles in place did not experience as significant a decline in employee productivity during the Covid 19 pandemic compared to firms that did not (Lee, 2021). Thus, companies that have been responsible to their suppliers and employees since their inception were at a definite advantage during the Covid 19 pandemic (Mao et al., 2020), and thus this is an opportunity for companies to strengthen their position in a turbulent time full of change and challenging situations. Large corporations during the Covid 19 pandemic helped the public through corporate social responsibility (CSR) projects. AR, Anil Yasin and Asad ABBAS, 2021. For small and medium enterprises, this path is an opportunity and a challenge to further develop them. Based on

interviews with leaders of nonprofit organizations and the literature, this mixed-method study examined the following research questions:

VO1: What did you learn during the Covid 19 pandemic that is important for the functioning of your NGOs?

VO2: What is the motivation of non-profit organizations to cooperate more deeply with business suites operating in a given locality/addressing local community issues?

3 Objective and methods

The aim of the article is to define the key motives of non-profit organizations for cooperation with companies on socially responsible issues. Research Design - Qualitative Research (Case Study).

Phase 1: Semi-structured Interviews. Participants were Executives of non-profit organizations in the Czech Republic that have experience with CSR activities. Participants were selected by purposive sampling method from non-profit organizations in the Czech Republic that have the potential to address CSR issues. Specifically, organizations focusing on environmental issues, human rights, education and social work were approached. Participants were selected based on their relevant experience and potential to contribute to a deeper understanding of the research issue. The interviews were guided by a prepared list of questions focusing on motivations, expectations, barriers and lessons learned with companies during the COVID-19 pandemic, thus including key topics related to motivations for collaboration, challenges and expectations from corporate partners. The questions were designed to allow for open discussion and deeper insight into the experiences and views of participants. Each interview lasted approximately 60 minutes. The phase was conducted between April 2023 and June 2023. The interview data was analyzed using qualitative content analysis. Each interview was recorded, transcribed and then coded to identify key themes and patterns. Coding was iterative, allowing for feedback and adjustments during analysis.

Phase 2: Focus Groups, participants: Representatives of the corporate environment who have experience with CSR activities and cooperation with NGOs. Participants were selected through a purposive sampling method based on their experience with CSR and cooperation with NGOs. Focus groups consisted of 5-8 participants and were moderated by an experienced facilitator. For the focus groups, companies from the local area that already work with NGOs were selected. The selection included different types of companies (large corporations, small and medium-sized enterprises) in order to get diverse perspectives. The discussion focused on companies' motivations for working with NGOs, expectations and specific examples of successful collaboration. Each session will last approximately 90 minutes. The phase was implemented in the period January 2024-March 2024. The focus group data was analyzed using thematic analysis. Major themes and patterns were identified and then compared with the results of the semi-structured interviews to identify the commonalities and differences between NGO and corporate perspectives.

Demographics: Participants' demographics included age, gender, education, and length of time with the nonprofit organization. This data was recorded to better understand the context and ensure the sample was representative.

The aim of the case study presented here is the need for an in-depth understanding of the motivations and challenges of collaboration between NGOs and companies

4 Results

VO1: What did you learn during the Covid 19 pandemic that was important to function?

NGO view

The COVID-19 pandemic has brought many challenges to non-profit organizations (NGOs), but also important lessons that

have contributed to their adaptability and innovation. Based on qualitative interviews with NGO leaders in the Czech Republic, key lessons were identified that have influenced their functioning and approach to work. One of the most important lessons that NPOs learned during the pandemic was the need to maintain constant contact with the team, even under difficult conditions. While it was not always possible to hold face-to-face meetings, organizations learned to use alternative methods of communication such as phone calls or video conferencing. This ability to respond flexibly to connectivity failures or other unexpected situations has proved crucial in maintaining the teams' operability and cohesion. As one of the managers said, "During COVID-19, it was important not to lose contact with the team, either through phone calls or shared conferences, when the connection was down. This constant communication was essential to overcome the challenges of the pandemic." Another critical step was adapting to the digital environment. Nonprofits had to move quickly to online platforms, which involved not only conducting activities over the Internet, but also ensuring cybersecurity and data privacy. This change brought with it the need for new skills and technologies, which increased demands on infrastructure and staff. The move to an online environment was necessary, which included new challenges such as cyber security and data protection. "Our organization had to quickly implement new technologies and improve our digital skills," noted one executive. The pandemic led to a change in mindset and attitudes towards work, particularly around flexibility. Organizations have found that they can operate effectively with remote working, which has led to greater acceptance of home office and flexible working arrangements. This involved not only technical adjustments, but also adapting internal communications and setting up new processes. As one employee said, "People realized they could work effectively online, which changed the way they approached work. This new way of working required changes in internal communication and process setup, but also brought more flexibility and efficiency." The pandemic also accelerated the need for automation and standardization of processes. Nonprofits have begun to make greater use of technology tools such as artificial intelligence and cloud-based solutions to streamline their operations. This digitization of processes has brought the operations of nonprofits closer to those of small and medium-sized businesses. A senior executive explained, "Automation and standardization of processes became necessary, which included the introduction of new technology tools such as artificial intelligence. This has helped us streamline our operations and get closer to running smaller companies." The pandemic has increased pressure on nonprofits to hire permanent staff instead of relying solely on volunteers or temporary workers. This shift has required the implementation of formalized HR processes and a greater emphasis on professional development and staff stability. "It was necessary to focus on employing permanent staff, which included setting up and overseeing HR processes. This move has contributed to greater stability and professionalization of our organisation," said a senior executive. Many NGOs saw the crisis as an opportunity for innovation. New organizations were formed to address pandemic-related issues, which led to the development of new approaches and strategies in service delivery. As one leader explained, "The crisis inspired us to innovate. Some organizations were created in response to the pandemic and developed new ways to address the issues at hand. This situation encouraged innovative thinking and new approaches." Nonprofits expect several key benefits and advantages from working with companies. Among the main expectations are financial and material support, with nonprofits expecting companies to provide the resources necessary to implement their projects and programs. In addition to financial support, they also value material donations such as technology, equipment, or event space. The involvement of corporate volunteerism, where company employees help with various activities and projects, is another significant benefit. This involvement can include manual work as well as expert advice and support. "In general corporate volunteering for me is a great thing if it is grasped conceptually, so that it fits in with the strategy that the company has in this area, because I think it is important to involve employees so that they can try it out for

themselves and know why the company is doing it and feel that they are part of it too," explained one NGO leader. However, volunteering also brings challenges, for example in organizing and effectively engaging a large number of volunteers at once. Another benefit is professional support, where companies can provide NGOs with valuable knowledge and experience in the areas of management, marketing, legal matters or technology. This support contributes significantly to the effective functioning of NGOs. "The company in our case, Google, Microsoft, wants to help with the technological development of the nonprofit sector, so they go to us and actually do it through us," noted one staff member. Companies such as Google and Microsoft, for example, help with the technological development of the nonprofit sector through financial support and product provision. Long-term partnerships with companies based on mutual trust and shared goals are another advantage that allows for stability and sustainability of projects and programs. Such partnerships provide reliable sources of support that enable NGOs to better plan and implement their projects. Working with reputable companies can give NGOs greater visibility and raise awareness of their activities. Companies can help promote NGO activities through their communication channels and marketing campaigns. "They give away products as promotional items or as gifts for their partners. They want to boast that they have supported our social enterprise, and we want to get the word out," said one NGO representative. Getting donations and sponsorships right is also important. NGOs prefer financial donations to sponsorship because they are easier to account for and do not require additional advertising costs. "We also want to have non-financial donations included in their revenues, for example, but it is more challenging for companies because VAT is paid on non-financial donations," said one staff member. Companies prefer to provide sponsorship because it usually comes out of the marketing budget and is taxable for them, while financial donations can be more challenging to depreciate.

The COVID-19 pandemic has provided nonprofit organizations with valuable lessons in communication, digitalization, flexibility and innovation. These lessons have not only helped organizations cope with the crisis, but also laid the foundations for their future resilience and ability to adapt to future challenges. Adaptation to the digital environment, process automation and a focus on permanent staff have proven to be key elements that have enabled nonprofits to respond more effectively to changing conditions and continue to deliver on their missions.

View of Companies

The COVID-19 pandemic has presented a number of significant challenges for companies, forcing them to rethink their working practices, adapt to new conditions and invest in innovation. Based on interviews with company representatives, key insights were identified that influenced their operations and strategic direction during the pandemic. Firms had to move quickly to digital platforms to continue their operations, which included significant investments in technologies supporting remote working, online communications and digital marketing. "Firms had to move quickly to digital platforms, which included investments in tools to support remote working and online communication platforms. This move was necessary to maintain operations and efficiency during the pandemic." The digital transformation allowed firms not only to maintain operations, but also to increase efficiency and improve their ability to respond quickly to changing market conditions. Firms that had already implemented digital technologies gained an advantage in adapting more quickly to the new situation. Taking care of the health and safety of employees became a priority to keep them productive and satisfied. "Ensuring a safe working environment, including the mental well-being of employees, has become a priority. Many companies have introduced new policies to promote mental health and work flexibility." This emphasis has led to the implementation of new measures such as flexible working arrangements, mental health support programs and improved hygiene standards in the workplace. "The pandemic has exposed the vulnerabilities of global supply chains,

prompting companies to diversify their resources. Companies have learned to diversify their resources and build more resilient supply networks." This strategy included establishing relationships with alternative suppliers, localizing parts of the supply chain, and increasing inventories of key materials and products. Effective communication became critical to maintaining trust and loyalty among employees, customers, and partners. "Effective communication was critical, both within the companies and towards customers and partners. Transparency and regular communication helped maintain trust and loyalty among all stakeholders." The introduction of better communication channels and tools for internal and external communication has enabled companies to better coordinate their activities and respond to the needs of all stakeholders. The crisis has reinforced awareness of the importance of corporate social responsibility (CSR) and ethical values. "The crisis has strengthened awareness of the importance of CSR. Companies have become more involved in community projects and have looked for ways to contribute to solving wider societal problems." This engagement led to the development of new initiatives and projects that had a positive impact on communities and improved the company's image. As a result, social responsibility became an integral part of corporate strategy, with companies looking for ways to better integrate their activities into their overall mission. Companies see partnering with nonprofit organizations as a strategically beneficial move that can improve their image and reputation, strengthen employee engagement, and open up new markets and customer segments. Working with NGOs allows companies to demonstrate their social responsibility, which improves their image in the eyes of the public, customers and employees. Companies engaging in CSR activities are perceived as ethical and responsible, which strengthens their market position. Corporate volunteering and employee involvement in non-profit projects can increase employee engagement and loyalty to the company. Employees value opportunities to participate in meaningful activities that benefit the community. This engagement improves work ethic and the overall atmosphere in the company. Partnering with NGOs can open up new markets and customer segments for companies. "Partnering with NGOs can open up new markets and customer segments for companies. Supporting community projects can increase brand awareness and attract customers who place a premium on social responsibility," explained one staff member. Companies also value the innovative ideas and new opportunities that can come from working with nonprofit organizations. These partnerships bring new perspectives and solutions to societal problems, which can lead to the development of new products, services or business models that are sustainable and responsible. Strengthening relationships with the community is another benefit of working with NGOs. Companies can better understand the needs and problems of local communities and contribute to their solutions. This strengthens relationships with the community, which can lead to greater support and loyalty from local residents and institutions. Regulatory and legislative benefits are another factor that motivates companies to work with NGOs. Engaging in CSR activities and working with NGOs can help companies meet regulatory requirements and gain benefits such as tax breaks or better access to public procurement. As one of the executives noted, "I think that the company can often try to do that simply as a way to show that they are exactly in the field of some socially responsible activities to help some NGO and in turn exchange for maybe their know-how or a part simply for that organization, that some kind of symbiosis can happen there."

VO 2: What is the motivation of non-profit organizations to cooperate more deeply with business suites operating in a given locality/addressing local community issues?

NGO view

Non-profit organizations (NGOs) often prefer to work with companies because of the greater flexibility and innovative possibilities that these partnerships offer compared to public funding. NGO representatives stress that public funding is often

constrained by strict rules, which hinders creative problem solving and limits the possibility of innovation. In contrast, companies provide funding with less administrative burden, allowing nonprofits to try new approaches and respond more quickly to community needs. "I think it's because those public resources, which are often grants, are often so rule-bound that even if you want to innovate, you can't. When I talk to companies and say 'look, I want us to do this because here's the data, here's the conversations,' they hear that, and they leave us space and trust. The company gives us money because they trust that we are the experts and they trust that we will do the best, whereas the state gives us money to do exactly what they want and ignores that expertise." Opportunity to learn from mistakes. Collaborating with companies gives nonprofits room for experimentation and the opportunity to learn from mistakes, which is limited with public funding sources. Companies often allow nonprofits to try new projects and approaches, knowing that failure is part of the learning and improvement process. This approach not only encourages innovation, but also fosters trust between companies and nonprofits, leading to long-term and productive partnerships. "The cool thing about working with companies is that there's this freedom, and if I come up with a stupid idea, I don't get the money for it, and sometimes I get the money for it. If it doesn't work out, like okay, usually nobody even wants that money back. With public funding I'm afraid to make a mistake and get out of the way, but with a company I know that 'failure is progress as well'. There's room for me to make a mistake, so the company and I will say, we thought, okay, stupid, we'll never do it that way again, but it doesn't have to completely damage the relationship with the company, depending on what the mistake was." Support through referrals. Nonprofits often find it crucial to have referrals from staff or partners who have contacts in the companies. These personal relationships can make it much easier to establish collaborations because they increase the nonprofit's credibility and its ability to attract support. Thus, relationships with key staff or company representatives play an important role in attracting financial support and establishing partnerships. "It's best if someone knows someone in that company and can recommend us, like an employee of that company and can recommend us. For example, right now we have someone from CEZ, so if there is someone who can lobby for us a little bit, that organization works. Especially in those commercial companies, I think they have to briefly talk about us, or if there is an employee there who recommends us, then they will recommend that organization more." Addressing burnout syndrome. The COVID-19 pandemic not only brought new challenges to nonprofit organizations, but also increased pressure on their staff, leading to burnout syndrome. Working with the corporate sector can be a boost for nonprofits and provides an opportunity for a fresh start. This impetus can include not only financial support, but also new projects that renew motivation and improve the working environment in nonprofits. "We have to do everything we've been doing and more, which has been a problem for a large number of nonprofits. After a year there, everybody burned out, and I think it's dragged on with the nonprofit sector until now some burnout after the first year of the pandemic. I sense a kind of fatigue in that sector were working with the corporate sector could be a kind of impetus for NGO development." The role of NGOs as a "karma washing machine". Some NGOs realize that they are perceived by companies as a tool to improve their social image. This pragmatic view does not bother nonprofits as long as the collaboration brings real benefits to the community and enables them to effectively fulfill their mission. "It's set up from the beginning that we are close to the corporate sector, without wanting to glorify it in any way, it has its own problems too and we often realize that we are a 'karma washing machine' for them." These factors show that NGOs are primarily motivated to work with companies by the flexibility and innovation that these partnerships bring, along with the opportunity to learn from mistakes and maintain personal relationships that facilitate collaboration. Working with companies also helps nonprofits address burnout and allows them to respond more effectively to the needs of local communities.

Company view

Companies stated that their motivation for cooperating with non-profit organizations is primarily to strengthen their position in the community and improve their public image through CSR activities. They see this collaboration as a way to contribute to solving local problems while getting positive feedback from customers and other stakeholders. Companies expect that working with non-profit organizations will enable them to better understand the needs of the community and allocate their resources more effectively to projects that have a real impact. Companies value the expertise and experience of nonprofit organizations to help them identify and implement meaningful projects. Some firms emphasize the importance of the synergies that arise from collaboration, where joint efforts produce better results than individual activities. Overall, they perceive collaboration with NPOs as a mutually beneficial relationship that allows them not only to contribute to community development but also to strengthen their reputation and gain a competitive advantage. Collaboration should be aligned with corporate pillars of support and a sustainable strategy. Companies seek to work with sustainability and environmental impacts, and if collaboration makes sense within these combinations, they usually support it. Most companies express a willingness to participate in projects that fit their stated goals and regionally meaningful locations. "If it was a project that aligned with our pillars of support, I don't think we would see a problem with it and it would also be in line with our sustainability strategy, for example, when we are trying to work with sustainability and environmental impacts. If it made sense within that mix, there wouldn't be a problem." Companies also evaluate projects individually, which increases their effectiveness and relevance. An important factor is that these projects fit with their strategic goals and make regional sense. "Making sense to us would again depend on it fitting into our stated objectives in some way and being within some locations that make sense to us and regionally. We cover the whole of the country. Again, it's not possible to look at it comprehensively, but it depends on that particular project, what it would look like and what all it would contain, but we're not primarily opposed to that kind of collaboration." The companies are active in finding partners among nonprofits to create sustainable activities together. These solution proposals are a two-way street, with companies proposing their initiatives and nonprofits communicating what needs to be addressed. "We see that companies are very active and that they want to collaborate and are also looking for partners from the nonprofit perspective, for example, with whom they can team up to do some sustainable activities. Those solution proposals are going in two directions - companies are proposing and at the same time nonprofits are saying what needs to be addressed. Certainly, those ideas are coming from all directions." Specific examples of NGO and corporate collaboration in CSR include various forms of support that bring mutual benefits. For example, working with a nearby textile company that is environmentally responsible. The company provides used textiles to the NGO, which turns them into promotional items such as cupcakes or key chains. This collaboration is mutually beneficial - the company gets rid of waste in an environmentally friendly way and the non-profit gets material for its activities. "We currently have a cooperation with a nearby company that produces textiles. They know that textiles are very polluting. We make promotional items out of their used textiles that they would throw away. We make designs and then we make the promotional items mostly - cupcakes, key rings, etc... Otherwise, we work with the surrounding companies very individually. We try to cover their needs according to what they require." Another form of support is the provision of space and services for events by non-profit organizations. The companies provide the space, take care of the organization and catering, and are also part of the events, which strengthens their involvement in the activities of the nonprofits. "We have companies that provide us with spaces where we hold events, with the understanding that they take care of the organization and catering and are part of the events, so they are doing something at the same time. We don't have as many activities that are transferable, but we generally take it as a positive when a

company is directly involved." Financial support for innovative projects is another major benefit of collaboration. For example, Google has provided funding for an accelerator focused on combating misinformation, showing how tech companies can support nonprofits in their innovative projects. "Google has given us a lot of money to do an accelerator to fight misinformation, which is largely spread through the tools that they provide, and now like obviously the awareness is there and it has its problems, but in terms of the innovation, the collaboration with those companies is more functional because it gives space to do that." Long-term partnerships are the ideal state of collaboration, where companies remain part of the nonprofit community and support them over the long term. This model provides stability and the opportunity for nonprofits to expand their activities. "For us, basically the continuous collaboration is the membership, we have companies that have been with us for multiple years. It's kind of our ideal situation. Those companies stay part of the community and support us for a long time, and at the same time we open the door to nonprofits other than us and that enriches those companies."

5 Discussion

During the COVID-19 pandemic, NGOs learned several critical lessons that are essential to their functioning. First, the importance of adaptability and agility was highlighted, as many NGOs had to quickly adjust their programs, add new ones, or discontinue others to meet the changing needs of their communities, the same conclusions reached by the authors (Ma & Beaton, 2023). Effective crisis management emerged as a core competency, with NGOs having to balance service delivery and stakeholder safety while adopting creative solutions to new challenges. Thus, the conclusion of our study is consistent with the findings of Ahmed et al. (2023). Like the Rosenbusch et al. (2024) study, our case study highlights that the pandemic highlighted the need for robust communication practices, both internally and externally, to maintain volunteer engagement and ensure effective decision-making. Collaboration with other organizations and stakeholders was also essential as pooling resources and expertise helped NGOs manage the crisis more effectively (Bista & Kerr, 2023). In addition, NGOs recognized the need for compassionate leadership to ensure the well-being of their staff, which in turn increased their commitment and effectiveness in crisis management (Fuller et al., 2023). The crisis also prompted NGOs to focus on online accountability practices, particularly in maintaining donor engagement and fund flow, which became more critical as traditional fundraising methods were disrupted (Naughton-Doe et al., 2023). The pandemic further highlighted the importance of planning based on vulnerability assessments and building trust through transparent communication (Windon et al., 2024). NGOs have also learned the value of using technology to address issues such as isolation and loneliness among vulnerable populations (Uygun & Napier, 2023). Finally, experience with pandemics has shown that strategic changes made in response to crises can have lasting impacts, requiring a focus on long-term resilience and sustainability (Esteves et al., 2024). Together, these lessons underscore the need for NGOs to be flexible, communicative, collaborative, and compassionate to effectively manage future crises.

Non-profit organizations (NPOs) are increasingly motivated to partner with business initiatives to address local community issues due to a variety of factors following the end of the Covid 19 pandemic. One of the main motivations is the potential for greater social impact through resource sharing and combined efforts, as seen in cross-sector partnerships that address societal problems and promote local economic development (Antolín-López et al., 2022). NPOs recognize that businesses can provide valuable resources, expertise, and legitimacy that are essential to the sustainability and effectiveness of community projects (Cohen et al., 2022). Moreover, the moral and ethical imperatives of business leaders often align with the social missions of NPOs and foster a collaborative environment driven by shared values such as duty, caring, and selflessness (McMullin, 2022). The desire for long-term, committed

partnerships rather than one-time contributions is also a significant motivator because it allows for a more substantial and lasting impact on the community. In addition, nonprofit organizations are motivated by the need to strengthen their organizational identity through both altruistic and egoistic motivations, with a stronger impact observed when collectivism is high. The integration of stakeholder engagement strategies that include understanding and incorporating the needs of key stakeholders is another critical factor that drives NPOs to collaborate with businesses as it positively impacts their operations and promotes sustainable development. In addition, the potential for improved recruitment, retention and goodwill among businesses further motivates NPOs to engage in these partnerships. Finally, the complexity of local issues such as environmental protection and community well-being requires a collaborative approach where both sectors can leverage their strengths to achieve common goals (Li & Zhang, 2020). Thus, the convergence of these motivations highlights the strategic importance of closer collaboration between nonprofit organizations and business initiatives in addressing local community issues.

6 Conclusion

The COVID-19 pandemic represented a significant turning point for non-profit organizations (NGOs) and companies, leading them to rethink their strategies, relationships and approaches to work. Based on qualitative interviews with NGO leaders and the use of the Delphi method with experts, key factors that influenced the functioning of NGOs and companies during the pandemic and their motivations for collaboration were identified. During the pandemic, NPOs found that flexibility, adaptability and innovative approaches were essential for their survival and development. The pandemic showed them the importance of maintaining communication with their teams, moving to digital platforms, automating processes and focusing on permanent staff. Moving online and leveraging modern technology has enabled nonprofits to respond more effectively to community needs and presented opportunities for increased collaboration with businesses. Businesses, on the other hand, faced challenges related to rapid digital transformation, ensuring employee health and safety, and supply chain vulnerabilities. They were forced to improve internal and external communication and increase their engagement in CSR activities. Collaborating with non-profit organizations allowed them to improve their image, understand the needs of their communities and effectively allocate resources to projects with real impact. This study has shown that NPOs prefer to work with companies because of the greater flexibility and innovative opportunities that these partnerships offer compared to public funding. Companies provide funding with less administrative burden, allowing nonprofits to try new approaches and respond more quickly to community needs. Working with companies offers nonprofits financial and material support, engagement of corporate volunteers, professional support, long-term partnerships, and greater visibility for their work. Companies see collaboration with NPOs as an opportunity to improve their CSR position and strengthen their relationships with the community. This cooperation enables them to respond more effectively to the needs of local communities and contributes to solving social and environmental problems. Companies value the expertise and experience of non-profit organizations to help them implement meaningful projects and bring innovative ideas and opportunities. This synergistic effect of collaboration produces better results than individual activities and strengthens the reputation of companies, giving them a competitive advantage. In conclusion, collaboration between NGOs and companies in the field of social responsibility represents a strategic opportunity for both parties. Non-profit organizations gain the necessary resources and professional support to carry out their missions more effectively, while companies improve their standing in the community and strengthen their responsibility to society. This win-win collaboration contributes to solving important social and environmental challenges. However, the research has limitations, particularly geographical and methodological ones, which need to be taken into account when interpreting the results. For future

research, it would be advisable to conduct similar studies in different geographical areas and implement a quantitative methodology to provide a more solid basis for conclusions.

However, the present study also identified several limitations that need to be taken into account when interpreting the results. The geographical limitation to the Czech Republic and the qualitative nature of the research may affect the generality of the findings. The combination of qualitative interviews and the Delphi method provided deep insight into the issues, but also carried the risk of subjective interpretation of the data. For future research, it is recommended to conduct similar studies in different geographical areas and implement a quantitative methodology for a more solid basis for conclusions. Further research that could build on this study on cooperation between non-profit organizations (NGOs) and companies in the area of corporate social responsibility (CSR) is to conduct similar studies in different countries to compare the cultural, economic and political factors that influence cooperation between NGOs and companies. This research could identify how collaboration differs between countries and what can be transferred as best practices from one context to another.

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I INFORMATICS

IN INFORMATICS

SYSTEM APPROACH TO THE DEVELOPMENT OF CLOUD SERVICES AND ITS IMPLEMENTATION PROPOSAL IN AN ACADEMIC ENVIRONMENT

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Abstract: The article provides a comprehensive overview and practical contribution to the development, implementation, and deployment of cloud services in an academic environment. A systematic approach is applied throughout the paper. The result of the solution is a cloud service design methodology and an example of cloud service deployment in an academic environment.

Keywords: Cloud Computing, System Approach, Service, SDLC

1 Introduction

In today's digital age, there are countless services all around us that help users simplify and optimize their work. With the rapid and dynamic development of Information and Communication Technologies (ICT), these technologies and related services have become an integral part of our daily life in all areas. With the increase in the volume of data that we need to process, store and share, together with the availability of computing resources and diverse supporting applications, the use of cloud services becomes an increasingly interesting and effective means. One of the main benefits of cloud services is the possibility of storing and processing data from any location without the need to invest large funds in own hardware and software. Of course, it is important for the user to know what options such a cloud service provides and what advantages it brings. But the user often does not see what technical processes and infrastructure are behind these cloud services, and how it is solved so that the services meet their needs. Before a service can become available, it must be properly designed, developed, and deployed. On the contrary, in the case of its inefficient use or technical problems, the service may be taken out of operation, and our article is devoted to this area and issue.

2 Materials and Methods

The aim of our work and of this article is to review the existing works devoted to the issue of Cloud Computing (CC) and the development of CC services. Based on the knowledge, we develop and apply a systematic approach to the design of a new cloud service. As part of the solution, we developed a methodology for the design of CC services. We will present the methodology in the example of an effective design and deployment of a CC service for the needs of a small academic organization such as the Department of Information Networks at the Faculty of Management and Informatics of the University of Žilina, Slovakia. As the last part of the solution, we propose evaluation forms that will allow you to verify the quality of the provided cloud service and its actuality.

In the next parts of the paper, we will deal with specific steps and approaches to the design and deployment of cloud services. We analyze the existing procedures and studies and based on them we will develop a methodology that will enable the systematic and effective development and management of CC services. We will thus combine theoretical knowledge with practical examples and experiences from the real world to provide relevant and up-to-date information on the development and management of cloud services.

Ultimately, we believe that our article will provide valuable insights for cloud computing professionals, researchers, and

developers. Our work is aimed at improving the current state and providing concrete recommendations for the design, development and deployment of cloud services that will be used by our department and its students.

3 Related works

The topic of cloud computing and the use of cloud services are becoming more and more popular, as they provide easier and more efficient operation of IT services. Using remote storage or software stored on remote hardware is very attractive, convenient, and beneficial for current users and companies. Thanks to this, many researchers are working on CC issues in various fields, as evidenced by the number of published scientific works in globally recognized databases. In our paper, we focus on a partial area of CC service development, which is related to the following analyzed areas.

The problem of the service development process was addressed by the authors in [1], the result of which is the finding that the design and development of cloud services is a complex task. This includes specification of requirements, secure deployment of services, maintenance, and assurance that the right measures have been taken to support security while also considering legal aspects. The study [2] investigates the effects of personal interaction and IT (Information Technology) integration and how, thanks to interaction with customers, the necessary knowledge is obtained, which subsequently facilitates the process of developing a new CC service. The research found that face-to-face interaction still plays a key role in supporting IT integration and empowering such innovative activities as service development. The authors in [3] focused on productivity, efficiency, and access to public CC services. They are dedicated to supporting the use of the PCP (Pre-Commercial Procurement) model, which supports the benefit of innovation and thereby increases the quality of the developed service. The PCP model was used in the development of the information service (in the phase before commercial use) and this model is considered the basis of success in the implementation of CC services [3]. The study [4] deals with the ability to effectively manage the life cycle of services within SOA (Service Oriented Architecture) already in the design and development phase before its introduction to the market. The authors summarized the needs for the given service, followed by their prioritization and identification for the design phase. The strategy of dividing the development process into several smaller tasks was dealt with by the authors [5] who decomposed the cloud service into several layers according to the tasks. Thus, they brought layers of subsystem tasks, component tasks, individual part tasks, and function tasks. Individual task solutions are combined to create a new CC service.

From the analysis of works devoted to the issue of development, it follows that the development of CC products and services has three basic phases: design, implementation, and maintenance. During the analysis, it was found that these phases are adapted by different authors according to needs, whether it is a larger number of phases, a different naming of individual steps, or categorization into phases [4, 6, 7, 8] stage [7], cycle [6] or tasks [5].

Currently, there is a whole range of models [5, 9, 10] and methodologies [11] that serve to optimize the development of CC services. These models aim to simplify the development of the service process and improve its time efficiency, flexibility in response to changes in requirements and fulfillment of the agreed budget.

To deploy the developed CC service, it is necessary to consider the cloud provider. Choosing a suitable CC service provider is a challenging process, mainly due to the large number of Cloud Service Providers (CSPs) that offer these services. Therefore,

several studies describe methods [12] or applications [13, 14] aimed at facilitating the selection of a suitable CSP provider. During and after the selection of a CSP, an interactive relationship between the user and the CSP is important, because the more the customer is involved in the service development process, the more he specifies his requirements and introduces changes during the development process, thus preventing the introduction of changes after the development itself. This avoids higher costs, non-compliance with the planned product delivery and the resulting unsatisfactory product [15]. The conclusion of a mutual contract between the user and the CSP not only improves mutual trust, but also ensures clear and well-defined obligations and responsibilities of both parties involved, as well as data protection and privacy rights and obligations [8]. Another of the studies [2] points to the diversity of requirements and adaptation to their implementation during the development of services, which according to several studies is a problematic part [2, 15].

During When choosing a CSP, it is necessary to establish the parameters of cloud services [16]. Among them we recommend the following.

Technical parameters: The study [17] is devoted to the description of the architecture of the developed cloud service from the point of view of access to data and computing resources and defining the hardware and system requirements for the computing nodes of the developed application.

Economic parameters: The authors [18, 19] monitor the initial costs for the introduction of cloud services, the saving of operating costs and time when renting cloud services, the return on the provided investments and the item in the form of payment for the rented service. Subsequently, they monitor the effectiveness of the investment for the established solution.

Security: The study [11] focused on security from the point of view of the risk of service failure due to insufficient protection against dangers such as DNS (Domain Name System) server failure, natural disaster, etc. The authors [1] focused on emphasizing security requirements already in the phase of development and subsequent deployment of CC services. Among the most important part of security is network security, where the customer must rely on the security provided by the CSP provider. From the point of view of security, the parameters were divided into data protection, operational security, network protection and physical security [18]. Another study focused on data control and the main problems arising from dependence on CSP providers. Protection of information and infrastructure are considered key. For the provider to ensure information security, it is necessary to solve data separation, data classification and management of information rights. The protection of the infrastructure is based on a CC solution built from safe components, constructed according to valid safety rules, which has treated communication with the environment [19].

Quality: Customer satisfaction is the most important factor in service provision, so providers pay attention to feedback and service evaluation to have the opportunity to reveal strengths and weaknesses in development and thereby obtain better quality service results and satisfied customers. The work [8] mainly focuses on the evaluation of services with detail on the Quality of Service (QoS) and the subjective perception of the end user with the overall acceptability of the application or service (QoE), including the combination of monitoring data and the subjective perception of different users and their unique requirements. The aim of the research [20] is to develop an effective way to evaluate trust in the provider, reliability and product quality based on feedback, thereby ensuring the quality of CC services. The scheme proposed by the study has precisely determined cloud service trust values based on the aggregation of real feedback trust, reputation trust, and service quality. The results of the analysis show that a reliable monitoring system based on feedback is desirable and necessary for the reliable provision of cloud computing services.

4 Analysis of the use of cloud services

The topic of cloud computing and the development of cloud services are dealt with by various working groups in the world and in Slovakia. In the past, several surveys have been prepared on the topic of CC, which analyze cloud computing and the use of its services from different perspectives. Part of the research focused on factors influencing the adoption of cloud computing services, other studies examine the adoption of CC services in specific organizations (health care, government organizations, education, private sector). To process the analysis of the use of cloud services, we used information obtained from surveys conducted in Saudi Arabia and in Slovakia [21, 22].

The mentioned surveys show that:

- CC is used in various sectors, both public and private.
- The deployment of CC is important mainly because of cost reduction and improvement of service availability.
- Public, private, hybrid and community clouds are built and deployed in organizations, which use service deployment models (Service as a Service SaaS, Platform as a Service - PaaS) and infrastructure (Infrastructure as a Service - IaaS).

The findings also revealed:

1. There is no correlation between interest in cloud computing and organization size. This difference is more obvious when using free services among small and medium-sized enterprises, which are more interested in free services.
2. The theory that if the organization uses an external supplier for technical support, it will be more interested in using cloud services has not been confirmed.
3. The assumption was confirmed that the larger the organization is, the more interested it is in storing data in data repositories or servers located directly in the organization.
4. With the wider adoption of CC solutions, caution is needed when transferring data, fear of losing control over data, its security, protection of personal data, guarantee of administration.
5. The biggest barrier in the introduction of CC solutions is "security" (concern about security, data protection and their guarantee) and "trust" (it is difficult to identify which services are trustworthy).
6. Scalability of resources in cloud services, which is directly related to the size of the organization, and "mobility" (unlimited access to services and applications) are identified as benefits of cloud computing.

The surveys show that cloud computing has applications in the future, but it is necessary to invest more in CC education on the one hand and in the development of cloud computing on the other hand. The influence of the external environment is also of great importance, such as competitive pressure, external support, government support, various regulatory policies, and regulations, and just the adoption of the necessary rules and regulations, would facilitate the adoption of CC across organizations.

4.1 Analysis of the use of cloud services in the educational process

The authors in [23] compiled a checklist of cloud services so that academic organizations can choose the most suitable cloud services for them. However, they mainly dealt with services for research in medicine. This list covered areas such as security, functionality, performance, and rights.

In studies [24], a questionnaire survey was processed, which monitored the use of cloud services in an educational environment on 240 respondents from the Faculty of Medicine of the Medical University of Tabriz, Iran. The goal was to find out the attitude and intention to use cloud services and what is the perception of security and privacy in the cloud.

Work [25] focuses on the use of a cloud storage service and how the use was affected by the arrival of the Covid-19 pandemic with an emphasis on students. The analysis of the use of cloud services for data storage was carried out in the form of a questionnaire on 137 students at the University of Žilina. The results showed that, despite some students' concerns about data protection, cloud storage is widely used, whether for school or private purposes.

The studies also show that the use of cloud services contributes to the improvement of the quality of education and the efficiency of this process. Here are some of the identified benefits of using CC in education:

- **Availability** – enabling access to information and services from anywhere via the Internet.
- **Resources** – providing access to a variety of educational documents, books, and videos to help understand the curriculum and issues students or teachers are dealing with.
- **Cost savings** – cloud solutions are often more affordable than buying different licenses, hardware, or books.
- **Flexibility** – sharing of information and documents through cloud services between teachers and students.

4.2 Linking the results of CC utilization analysis to key characteristics

The key characteristics of CC specify the possibilities of CC technology in the development of cloud services in a specific implementation environment. They do not prescribe or limit any method of deployment, service provision or operability. In the recommendation ITU-T Y.3500 [26] and NIST SP 800-145 [27], the following key/basic characteristics of cloud computing are specified:

- On-demand self-service.
- Access via the network (Broad network access).
- Resource pooling.
- Rapid elasticity and scalability (Rapid elasticity and scalability).
- Measured service.
- Multitenancy (allows multiple customers to use the same service, while each user has access only to their settings and data).

The results of the analyzed surveys overlap with the following key characteristics:

- Self-service on demand.
- Rapid elasticity and scalability.
- Wide availability and easy access via the network.
- Multitenancy.

The overlap of survey results was also demonstrated in the following cross-sectional aspects (defined in ITU-T recommendation Y.3502 [28]):

- Mobility.
- Security.
- Performance.
- Regulation and protection of personal data.

4.3 Conclusion from surveys of the use of cloud services

Cross-sectional aspects and key characteristics of CC are important factors for the development of CC services, especially personalized ones, where services are developed based on user requirements. Specific user requirements require analyzes of a specific implementation environment.

5 System approaches to CC service proposal

A service is a resource that is provided to customers to achieve certain goals, needs or results, and thus value, benefit or experience. It is an immaterial result of human effort that can satisfy some human needs.

Service is characterized by immateriality, irrevocability, inseparability, heterogeneity, and customer involvement [29].

5.1 Cloud service

It is a form of service provided to users on demand and is designed to provide access to applications and resources without the need to purchase and deploy your own internal infrastructure or hardware. The CC service is managed by cloud computing vendors and Cloud Service Providers (CSPs).

According to the ITU-T Y.3500 standard, a cloud service is one or more functionalities offered through cloud computing delivered through defined interfaces.

A cloud service can be infrastructure, platform or software. To connect to cloud services, the user only needs a device with a network connection and an operating system [30].

The main indicators that influence the choice of a cloud deployment model are considered to be the availability of management, requirements during deployment, reliability and security conditions. A cloud deployment model identifies a specific type of cloud environment based on ownership, scale and access, as well as the nature and purpose of the cloud. The location of servers that users use and who manages them are defined by cloud service deployment models [31].

5.2 Lifecycle of cloud service development

The cloud affects the service development lifecycle and presents developers with multiple challenges and issues to address. When developing CC services, it is important to pay attention to cost optimization, management of possible risks, service security and service quality assurance.

The lifecycle of a cloud service consists of six basic phases as shown in Figure 1.

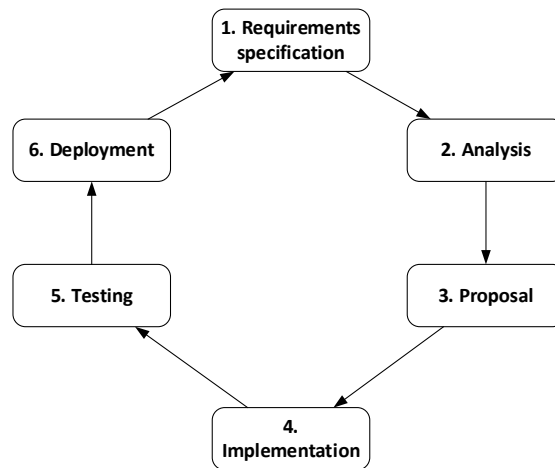


Figure 1 Lifecycle of cloud service

In order to improve the overall quality of the service and to guarantee its security, it is essential to consider security aspects in all phases of service development. Service development begins with business, security and functional requirements, which are later included in the implementation [1]. Service providers are responsible for the implementation and reliable operation of the services. Organizations that want to use the service are responsible for the appropriate selection of the service, integration of the service into their applications and systems, and ensuring continuity of operation [6].

After the service is put into operation, it is followed by its monitoring and possible optimization, in order to ensure the continuous operation of the service and that the service still

meets the customer's requirements. The termination of the service occurs at the moment when the service no longer fulfills its function.

5.3 CC service proposal

Currently, there are several models and procedures for designing and creating a service. In general, we distinguish between two approaches to development, namely systematic and non-systematic. The basic difference is that the systematic approach looks at the problem as a whole and takes into account all relationships. A non-systematic approach focuses rather on individual components and parts, regardless of possible connections and mutual influence.

When developing a particular service, it is important to consider which approach will be most appropriate for the given outcome. A non-systematic approach may be easier to implement, but leads to more deficiencies in individual parts of the service, as the service is not tested as a whole.

The basic feature of the system approach is to define the problem, determine the result (what needs to be achieved) and then decide how to get to this goal, as Figure 2 shows.

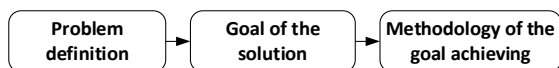


Figure 2 System methodology principle

Problem definition deals with understanding and defining the problem that needs to be solved. This includes determining its scope, causes, consequences, and significance to the organization.

The goal of the solution determines what specific goal must be achieved in order to solve the problem. The goal must be clear and measurable for the organization.

The method of achieving the goal - the methodology - deals with the selection and implementation of specific measures to achieve the goal. These measures include the use of specific technologies, methods, processes, procedures, or tools to help solve a given problem and achieve a stated goal.

The system approach includes a sequence of steps and processes that help to identify, analyze, solve problems in the development of a new service and will allow to obtain comprehensive views of the given problem and find effective and sustainable solutions.

The system approach has the following features:

- Complexity – Focus on examining the whole and considering the interaction between individual parts and the environment in which they are located, which affect the resulting solution.
- Hierarchy – A greater number of subordinate and superior parts that are interconnected.
- Dynamism – Development is not a static process, but a dynamic one that changes according to needs and circumstances and is capable of operational response.
- Sequence – The gradual introduction of new functionalities and subsequent testing and verification brings new knowledge and experience.
- Orientation on performance and efficiency – The system approach tries to achieve maximum performance and efficiency by taking into account not only the functionality but also the economic aspects of the organization.
- Applicability in various areas – the system principle is so general that it can be used in various areas, not just technical ones.

6 Analysis of the implementation academic environment for cloud service deployment - department level (KIS FRI UNIZA)

In order to successfully deploy the cloud service, an analysis of the implementation environment was processed. This process includes an assessment of the existing ICT infrastructure, the cloud services offered, as well as staff availability to determine whether it is possible to provide cloud operations and what are the needs for the deployment of the new service.

The Department of Information Networks (KIS) is one of the seven departments at the Faculty of Management and Informatics and is part of the University of Žilina in Žilina.

In addition to communication solutions, the department's research also focuses on CC, CC integration and networks, and of course education in these areas, which is offered in all three degrees of study through twenty-seven subjects.

The main reasons for introducing CC at the KIS department is to provide a better way of teaching by offering services through virtual machines. Among the benefits of introducing CC, it is expected to reduce the workload of employees and students, increase the possibility to learn, test and experiment on new technology with the possibility to research new technologies.

At the same time, the department has been trying for several years to solve the problem with the insufficient amount of suitable test platforms on which it is possible to experiment without restrictions. Before the introduction of the cloud at the department, the XenServer/XCP-ng virtualization solution implemented on several servers, or VirtualBox, was used. Due to the limitations of the solutions, the department began to deal with the CC issue in 2014, where it started building a new cloud platform.

Among the specified main requirements for the implementation of a particular cloud solution were:

- Flexible provision of virtual Linux/Windows servers.
- Use in the solution primarily of the operating system Debian and Ubuntu.
- A solution with public connectivity and continuous connectivity.
- Building the environment by users using a simple GUI.
- Cloud with open source.
- Support for virtualization of network devices.

In 2014, according to the specified requirements, a private cloud solution was deployed on the OpenStack platform.

The cloud is currently used for research in the topic of CC, for hosting VMs for other research needs, teaching or solving final theses. CC primarily uses an IaaS service that provides virtual servers.

The Horizon web interface is used for the administration of the entire cloud, mainly for creating user accounts and creating topologies. The business owner of the departmental cloud is the head of the department, with whom the administrators consult on priorities, tasks, changes, what services need to be added, etc.

6.1 Hardware equipment

The current departmental cloud uses the following hardware components that enable its proper functioning. Security and access control, in addition to OpenStack resources, is provided by the NextGen Fortigate 100F firewall, which also provides private addressing for internal communication and redirection of network traffic to the outside using NAT technology. It includes 10 GbE ports for connecting to the Internet and connecting to a Nexus switch.

Network connectivity is formed by a cluster of two Cisco Nexus data-center switches, which serves to connect all servers and the

firewall. This network is internally divided into VLAN subnets that separate internal communication of OpenStack components and VxLAN tunnels for customer/student data traffic.

The network connection also includes one gigabit Cisco Catalyst switch for IPMI (Intelligent Platform Management Interface) out-of-band management solution.

The server infrastructure itself consists of a dedicated server for the controller, a virtualization machine for service things such as monitoring, logging, management of hardware resources, and nine computing nodes. In total, the hardware solution consists of eleven servers that support hardware virtualization. The controller and virtualization server are from Cisco, the computing servers are a combination of IBM, Lenovo and HP.

Figure 3 shows the current physical topology of the departmental cloud. Each server has two 10GbE (Gigabit Ethernet) network cards bundled together for higher reliability and data transfer speed. This solution ensures that the servers can effectively communicate with each other. Also, each server contains one 1GbE RJ45 port for hardware management using the IPMI protocol.

The virtualization server runs several additional virtual machines, including MAAS (a software tool that enables the management of physical servers and their resources) and Juju (a tool for configuring, managing and deploying applications in cloud environments) [33]. In the near future, we work to introduce a monitoring solution by the Prometheus system and possibly other support services.

Computing nodes serve to provide computing capacities and storage space for virtual machines. Each of them contains 2 CPU units with multiple cores and threads, a large amount of operational memory and a combination of spinning and SSD hard drives for system operation and data storage. Each server has the Ubuntu operating system installed.

This section describes the devices that are part of a cloud suitable for a small academic organization such as a department and ensure its proper functioning. Each of these devices has a specific role, such as securing the cloud from threats from the Internet, networking servers, providing computing capacity and storage space for virtual machines, and managing the cloud.

Given the growing threats in cyberspace, it is important to have a data backup and recovery plan to minimize potential losses in the event of a disaster. The goal for the future is the introduction of private IPv6 for local communication, which would help increase the security of the department's cloud, the introduction of support for lighter containerization solutions within the CC platform and, above all, the expanded offer of CC services.

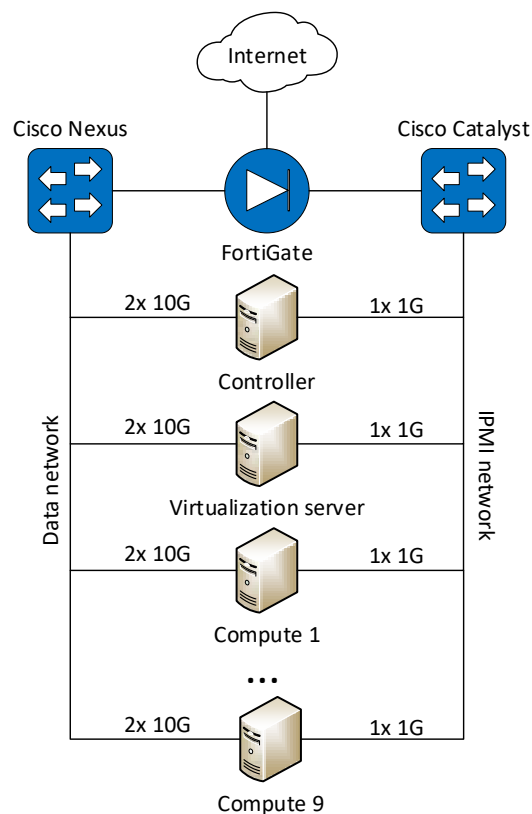


Figure 3 Physical cloud topology

Based on the analysis of the current state and the plan to expand the range of services in our private cloud, it appears to be necessary to transition from the current non-systemic approach to a systemic approach with the design and use of suitable methodologies for the design and deployment of a cloud service, which will be similar to the methodology for introducing a commercial cloud service. It also includes the processing of processes, for example quality, where it is necessary to design evaluation forms that will help ensure the quality of the service provided, as well as decommissioning an inefficient service.

7 Methodology for the development of a new CC service

Deploying a new cloud service is a challenging and complicated task. Therefore, we proposed a methodology for the development of a cloud service, which consists of nine steps, the observance of which will ensure the effective development and subsequent provision of a new service. The methodology contains recommendations, processes, and procedures for the provision of the service, its implementation, testing and management.

For the development of the CC service, we suggest following the following steps:

Goals definitions – Based on the needs of students and staff. It is necessary to find out the requirements and expectations from students and faculty employees, with the help of which the goals of the service are defined and through the analysis the functionalities and the overall purpose of the service are proposed.

Team creation – Creation of a team that will cooperate with each other on the design and implementation of a new cloud service and subsequently manage, maintain, monitor and provide service support to users when necessary.

Defining functionalities and requirements – Individual functionalities and service options must be precisely defined. Subsequently, the technical and functional requirements must be

specified, which must be measurable, in order to evaluate and monitor the service, and the financial requirements.

User interface design – It is necessary to design a user interface that is intuitive and simple from the point of view of users (students/teachers). Such an interface can be referred to as CAS (Cloud Administration System).

Cloud service design and development – The design and development of the cloud service itself according to established procedures and its subsequent testing on a small group of selected students provides feedback on the functionality, advantages, and possible shortcomings of the service.

Service security – Secure the service by obtaining security certificates ISO/IEC 27001 (Information security, cyber security, and privacy protection) and ISO/IEC 27018 (Certification for increasing the security of sensitive data in the cloud) and comply with Act 69/2018 on cyber security.

Implementation and deployment – After the successful design and testing of the service, the service is put into operation, and it is necessary to ensure the constant quality and the greatest possible error-free service.

Testing and feedback – Testing the service will ensure the functionality of the service provided. When testing, it is important to write a document that will contain a description of the testing process and all methods that will be used to verify the functionality of the service provided. Feedback will provide information about satisfaction with the service or suggestions for possible improvements.

Monitoring – Monitoring of service operation is carried out on measurable parameters that are declared in the Service Provision Agreement (SPA). It is necessary to keep monitoring records for the entire period of service operation.

8 Methodology for implementing a cloud service on KIS

The methodology of the new service which will be used at the department contains procedures that must be followed for the successful introduction of the service and compliance with the rules determined by the legislation of the Slovak Republic.

Analysis of the implementation environment – It is important to analyze the environment in which the service will be deployed so that it is technically ready and sufficient and ready to put the service into operation. It is also necessary to collect and evaluate the requirements for the introduction of the service and process the draft of functional and non-functional requirements for the given service.

Deploying the service to the cloud – The base is the preparation and therefore the determination of the non-functional requirements for the architecture such as the operating system, licenses, and hardware requirements (processor, operating memory and disk space). If all hardware and software requirements are met, the stage of installing the ready cloud service and configuring the server begins.

Setting up cloud services for basic use – will take place after the introduction of a new service (including licenses), user and administrator accounts will be created for individual users.

Contracts between the department and users (students/employees) – In the case of commercial deployment, several important agreements need to be concluded between the user and the provider - the user-provider agreement, the Service Level Agreement (SLA) and the license agreement.

Monitoring the quality of services – The quality control of the service is carried out periodically through the monitoring system, possibly also through the evaluation form. Monitoring of service operation is carried out on measurable parameters that are declared in the SPA. Subsequently, user satisfaction with the provided service is checked through a service evaluation form for users. Management can be automated by constantly checking the network, servers, availability, etc., while the automated check notifies the administrator in case of irregularities. Another management method is manual remote management of the entire infrastructure.

Support services – Providing support and managing the service includes monitoring the performance and availability of the service, managing backup and recovery of data, managing changes in requirements, managing incidents and their subsequent resolution. It is important to ensure as much time as possible to provide support to users.

Training of students and employees for effective use – User training can also take place through a user manual prepared by the provider, through video tutorials or personal training.

Adding a service to the service catalog – Inclusion of the newly provided service in the KIS catalog of provided services.

9 Cloud Service Evaluation Forms

For services to be successful and useful for their users, they must be of high quality and reliable. For this, a cloud service quality evaluation form is used to assess various aspects of cloud services. The form provides the provider with a comprehensive view of the provided cloud services and helps to decide whether to continue using the service in the same form, or if something needs to be changed, or if the time has come to remove the given service from the catalog of offered services.

9.1 Evaluation form of the quality of cloud services

The quality assessment form considers following factors:

- Availability: How often was it available and what were the service downtimes?
- Power: How quickly does the service load and how quickly do the tasks performed in it run?
- Security: How is data protected and what security measures are used?
- Scalability: How well can the service adapt to growing demands and increasing load?
- Usability: How easy and intuitive is the service to use?
- Affordability: How affordable is the service and is it worth it?

The overall rating is calculated as the sum of the points for each factor. A higher rating means a better service. If the required number is not reached, the offered service is poor quality.

9.2 Evaluation form to verify the actuality of the offered service

The form determines whether the provided service still fulfills its purpose and should remain in the catalog of offered services. The evaluation is repeated periodically (in the case of the offered cloud services of an academic institution such as KIS FRI UNIZA, it is after the end of the semester and after the end of the academic year) to ensure that the offered services are up to date. The form considers the following factors:

1. What is the number of users for the last monitored period (e. g. last year)?
2. How many and what kind of complaints have come from users about the service?
3. Is it necessary to change the offered service (if so, how)?
4. Is the given service beneficial for KIS users?
5. Does KIS have sufficient technical security for offering the given service?
6. Does the KIS have personnel security for the further provision of the service?

Evaluation of the form provides a quick and easy verification of whether the given service will continue to be offered, whether it will be in the same state, or whether the service will be modified, or if it is found that the service is no longer used, it will be removed from the offer of the service catalog.

10 Results and discussion

Research of cloud computing and the development of cloud services is of great importance in today's IT world. Working on this topic brings many opportunities for innovation and development of new services.

Developing a new cloud service requires considerable effort, resources, and many more aspects to consider. It is important to choose a systematic approach to its development, which helps ensure success in the development of the service and that it is

subsequently able to meet the needs of customers. A systems approach enables better risk management, improved communication, and coordination between team members, and thus ensures the successful delivery of a quality cloud service.

The use and analysis of the available private cloud solution offered at the KIS department allowed us to realistically explore the potential of using the cloud in an academic environment and to develop methodologies for the design, deployment and implementation of new cloud services suitable for similar academic institutions or wider practice. The methodologies contain all the important and necessary steps and information that the provider should ensure in the design, development and provision of CC services.

Therefore, we created evaluation forms for evaluating the quality and success of the CC service on the part of the provider and the user when using it. These forms help in monitoring and improving the quality of the provided services and at the same time in obtaining feedback from users. Overall, it was shown that for the introduction of services, it is necessary to have in mind not only technical and economic aspects, but also aspects related to security, legal matters, and evaluation of service quality. The article provides a comprehensive overview and practical contribution to the development, implementation, and introduction of services.

11 Recommendations and future plans

Before a similar academic institution offers new CC services, it is necessary to ensure the stability of the CC solution so that it can be maintained and developed without threatening the functionality of the entire system and its services. After solving these aspects and ensuring the stability and sustainability of the solution, the interest of expanding this community project is to open its use to the entire faculty. This still requires improvement in overall management, security, and administration.

Another plan for the future is to create a flexible catalog of services as an automated form, where the user will be able to click and select services from the catalog, which contains all available services offered by the cloud. It will also be necessary to introduce the assignment of responsibility for virtual machines to users, in the event of the occurrence of threats.

The last of the plans and improvements is a proposal to implement a tool for receiving requests from users. This tool will benefit mainly to the administrators of the department's cloud, as problems and requests are currently entered in spoken form or through communication technologies such as email or the Microsoft Teams application. This improvement would collect comments and requests in one place, where administrators could sort them, for example, by severity. Over time, it could be expanded to include several useful functionalities.

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Primary Paper Section: I

Secondary Paper Section: IN

SYSTEMS MODELLING: QUEUING SYSTEM TO OPTIMIZE WORKLOAD

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Abstract: For pharmacists to fulfil their roles in the provision of pharmaceutical healthcare, it is necessary to ensure the effective organization of the work of individual healthcare professionals. We performed measurements at a selected pharmacy, which, among other things, allowed us to determine the time between people arriving and the average number of pharmaceuticals purchased. Using the available measurement data, we created a queueing system that can simulate the operation of a pharmacy. The system can save time for other pharmacists to fully devote themselves to other activities related to the provision of pharmaceutical healthcare, such as consultation, preparation of medicines in the laboratory, back-checking of prescriptions, or stock control.

Keywords: queueing system; pharmacy; modeling; simulation

1 Introduction

The term pharmacy is derived from the Greek word *pharmakon*. This word denoted a medicinal/poisonous substance or a magical remedy. We can say that pharmacy is a system of pharmaceutical industries that include Pharmaceutical education, Pharmacy, Pharmaceutical research, Pharmaceutical production, Pharmaceutical control, Pharmaceutical wholesale distribution, Historiography, and Organization and management of pharmacy [1]. Community pharmacies are easily accessible healthcare facilities that provide pharmaceutical healthcare for patients. A pharmacist is both a medicine expert and the end link in healthcare delivery who can control the patient's treatment process. All registered medicines are effective, high quality, and safe and their use is essential for improving patients' health outcomes. Medicines are a tool for healthcare delivery. They have not only therapeutic but also social, ethical, and economic value [2,3,4,5,6].

Like medicine and pharmacy, the profession of a pharmacist has undergone many changes in the historical development of society. In prehistoric times, the function of a physician and pharmacist was performed by a healer or shaman. He diagnosed diseases, suggested treatment procedures (empirical knowledge about treatment), searched for suitable drugs (plants, animal products, minerals), and prepared medicines from them. In the period of antiquity, a separate profession of root cutters was separated from the profession of a healer. This began to form the beginnings of an independent pharmaceutical function. Later, other separate professions were carved out of the healing profession for example manufacturers of ointments and sellers of medicines, aromatic waters, spices, and plants. In the ancient world was significant for example medicine and pharmacy in Ancient Greece, Rome, Egypt, India and, China. The first community pharmacies were established in the territory of the Arab Empire during the Middle Ages. At the same time as community pharmacies, pharmacy literature was created. Requirements for pharmacy equipment and ethical principles for the practice of the profession of pharmacist were also developed. From the 11th century, community pharmacies were also created in Europe. For several centuries, they were the only representative of pharmacy in society. Pharmaceutical research, education of apprentices, pharmaceutical control, preparation of medicines, and dispensing took place in community pharmacies. This period came to an end in the 19th century, when separate pharmaceutical industries were carved out of the pharmacy environment, such as Pharmaceutical education, Pharmacy, Pharmaceutical research, Pharmaceutical production, Pharmaceutical control, and Pharmaceutical wholesale distribution [1,4,7].

The role of pharmacists in society has also undergone significant historical development. From artisan and manufacturer to a teacher in apprenticeship training, trader and scientist to the current perception of the pharmacist as a consultant to the doctor and advisor to the patient. The change in the role of pharmacists in society has also contributed to the change in the orientation of pharmacy in the 20th century from a primary interest in drugs and medicines to an interest in the provision of individualized pharmacotherapy to the individual patient (pharmaceutical care, personalized medication therapies) This is why pharmacists have a greater responsibility to improve their knowledge. Pharmaceutical care leads to improvement in health outcomes and cost-effective therapy [4,8,9]. Some of the activities carried out by pharmacists in the context of dispensing medicines or in the context of pharmacy consultation activities include checking for interactions, contraindications, and duplications within the medicines being taken, checking for errors on prescriptions, and providing information on the correct use of medicines and on the risks of pharmacotherapy, for example, in the form of side effects, on the proper storage of medicines, on the management of unused medicinal products. They also include health promotion, disease prevention, and chronic disease management. In addition to dispensing medicines, pharmacists in community pharmacies may also provide consultation services to patients or other health professionals. Consultation activities may focus, for example, on providing information on the correct and safe use of medicines, on resolving medication problems, on recording adverse reactions, or on informing about healthy lifestyle options [3,8,10,11]. Effective verbal and nonverbal communication with the patient or other healthcare professionals is essential in the practice of pharmacists. This includes, for example, using simple and easy-to-understand terms that the patient can easily understand and checking that the patient has understood the information correctly by asking follow-up questions. It is also necessary to pay attention to the patient's non-verbal expressions [12,13]. Pharmacists had also important roles during the COVID-19 pandemic, working alongside other health professionals on the frontline of patient care. Pharmacies have adapted pharmaceutical care to new needs and challenges, such as the preparation and delivery of disinfectants, information, and counselling for COVID-19 patients, or the introduction of home drug delivery systems [14].

The development of information and communication technologies and their implementation in practice has enabled the introduction of eHealth and ePrescription systems in pharmacies. These systems have been used in practice for a long time and are applied not only in the Slovak Republic but also in many other countries of the world. In the Slovak Republic, the eHealth system has been introduced since 1 January 2018 to improve the quality of healthcare provided. Electronic prescribing and dispensing of medicines, medical devices, or dietetic food, Patient's Electronic Health Record, eExamination, and other system functions are currently used in practice. The benefits of introducing ePrescribing into practice include, for example, improving the quality of healthcare provided, increasing the efficiency and effectiveness of prescribing and dispensing medicines, reducing prescribing errors, reducing healthcare costs, increasing patient safety, preventing adverse drug reactions, preventing the occurrence of fraudulent prescriptions, reducing over-prescribing and, most importantly, saving time for doctors, pharmacists, and patients. An electronic prescription is the equivalent of a paper prescription. The stamp and signature of the prescribing doctor are replaced in the electronic prescription by the electronic passport of the healthcare professional. The system performs a background check for possible drug interactions or duplications in prescribed medications. Once the patient is identified by presenting his/her insurance card or eID card with a chip at the pharmacy, the system will show the pharmacist all the prescribed medicines, medical devices, and dietetic food that have not been dispensed [15,16].

Community pharmacists are among the key health professionals who contribute to the health of the individuals and communities they serve, while strengthening Europe's health systems. For pharmacists to have enough time for patients and to be able to give them their full attention, it is necessary to streamline and improve the organisation of work in the pharmacy. The launch of eHealth can contribute to this goal, as well as programmes and applications enabling the streamlining and improvement of the organisation of work in the pharmacy by taking into account the average number of patients in the pharmacy during the opening hours of the pharmacy. The saved time that pharmacists gain through the implementation of programs and applications aimed at better organization and streamlining of their work in dispensing medicines can then be used for consultations with specific patients regarding the solution of drug problems, control of interactions, contraindications, duplications in the medicines taken, to provide information on the correct and safe use of medicines, on the risks of pharmacotherapy, adverse effects and how to record them, on the correct storage of medicines, on the disposal of unused and overexpired medicines, on the possibilities of health promotion, healthy lifestyles, disease prevention. They may also cover the management of chronic diseases. Changes in the organization of pharmacists' work could contribute to the fulfilment of the Pharmacy 2030: A vision for Community Pharmacy in Europe. Pharmacy 2030 is the vision of a European association called the Pharmaceutical Group of the European Union (PGEU) whose role is to represent community pharmacies in relation to legislative and policy initiatives at EU level that affect pharmacists and public health. It is aimed at developing the pharmacy profession and responding to current challenges in healthcare. It also seeks to promote the maximum contribution of pharmacists in the field of patient pharmacotherapy and its safety, but also in the context of medication adherence interventions [8]. These changes in the organization of pharmacists' work may also have a positive impact on the role of pharmacists in society, not only in relation to the pharmacotherapy of patients but also in the field of public health protection.

2 Theoretical background

The Danish mathematician A. K. Erlang founded the queuing theory in the early 1900s with his publication "The Theory of Probabilities and Telephone Conversations". The problem that researches at the time was trying to solve was how to manage and optimize the telecommunications network. Queuing systems have a server unit(s) (e.g. cashier in the store) which provides service to the entities (e.g. customers) waiting to be served (See "Figure 1"). The number of entities can be served per unit of time is the capacity of the serving channel (characterized by μ), and the number of individuals to be served in a unit of time is the intensity of arrival of individuals (characterized by λ).

Figure 1. Single server queuing system

The serving intensity is derived from the time intervals between the two outgoing demands with a certain distribution. In this case, $\mu = 1/t_0$, where t_0 is the mean of the service time. Also valid: $t_0 = 1/\mu$. We specify the μ parameter in units of time, e.g. hours, minutes, days. The intensity of the arrival, i.e. λ , is obtained by observation or experimentation. In general, the time intervals between consecutive requests are described using a probability distribution. If queuing system serves μ claim in one unit of time, then serving one claim is $1/\mu$. If the demands come into the system with λ intensity, the time between each incoming request is $1/\lambda$. Based on this, we can define the following

parameter: $\rho = \lambda/\mu$, which specifies the utilization factor (traffic intensity), that is, the average occupancy of the serving channel.

Service times and the times between arrivals can be constant, variable, or random. Typical applications of Queuing systems include e.g. telecommunications systems, computer networks, Internet communications, transport systems (road, rail), airports, ports, repair shops, banks and post offices, hospitals, specialist clinics, manufacturing processes, intersections, deliveries and many, many other similar systems. From this we can see that queuing systems are also encountered on a daily basis.

Queuing systems examinations can be divided into two large groups: Analytical solutions, where, based on the known parameters of the model, we calculate or estimate the additional parameters of the model using probabilistic or mathematical tools. e.g. queue length, number of requests in the system and etc. This can be used in simple cases.

Modeling and simulations, when we simulate a case based on the known parameters of the model, or cases and from these we obtain an estimate of the model's behavior. This is mainly used for complex systems.

The stability of the system will be examined in terms of the parameter ρ . As stated above: $\rho = \lambda/\mu$. There are three basic cases:

$$\rho = 1$$

For deterministic systems, this is the ideal case. If we assume that we have a serving unit, then this serving unit is continuously operating, and no queue is created. The moment one demand is served, another is just arriving.

$$\rho < 1$$

In this case, requests arrive more slowly and are served more quickly. Such a system is stable, the serving unit will occasionally stop working because there are no pending requests in the system at times. It follows that no queue is generated in such systems.

$$\rho > 1$$

In such systems, requests arrive more quickly and are served more slowly. The queue will grow until it reaches infinity. Such systems are not stable systems. The solution to stability is to limit the queue length. The simplest case is when incoming requests that do not fit in the queue are automatically rejected. We should also mention that fully deterministic systems are rarely encountered in practice. More common are cases where the arrival is stochastic and the service deterministic, or the arrival is deterministic and the service stochastic.

Systems with multiple server units are similar to the systems discussed above, but instead of the parameter ρ we use the parameter α : $\alpha = \lambda/n\mu$, where n is the number of server units (See "Figure 2").

Figure 2. Queuing system with n server

The service principles may be:

FIFO - (First In First Out): if a request arrives in the system and at least one of the serving units is empty, it will be served immediately. If, on the other hand, the serving units are not

empty - occupied, then the requests are queued and served in the order in which they came in.

LIFO - (Last In First Out): this principle is similar to the previous one, but the last incoming request is served first and so on.

SIRO - (Selection in Random Order): Requests waiting in the queue are randomly selected for service.

FCFS and LCFS - (First Come First Served and Last Come First Served): First Come First Served and Last Come First Served are served first. It is very similar to FIFO and LIFO, and the result is often virtually the same, and may even be used synonymously, but there is a difference. Consider a queuing system with parallel server units in the figure above. If we assume that the serving time can vary, then the FIFO principle should not occur, but the FCFS principle should be satisfied.

PRI - (Priority). In these systems, demands are different, with a finite number M of priority indices. The priority can be:

Relative priority: when a serving unit is released, the higher priority demand is served. Equal priorities are queued and selected according to one of the principles mentioned above.

Absolute priority: If another higher priority request enters the system while a request is being serviced, the request being serviced is terminated - it is interrupted, returned to the queue and the higher priority request is serviced immediately.

Time-shared serving: nowadays used mainly in computer processing, but also in telecommunications and where serving is done on high performance and high traffic server units. An incoming request is only partially serviced at a time and then returned to the queue so that another request can be partially serviced. This is repeated cyclically until the requests are fully serviced. There is some feedback between the service and the queue.

GI - (General Discipline): means Free Discipline, i.e. there is no service principle for the queued requests. This principle is also found in many literatures, but it is very rare in practice and makes a numerical or analytical approach difficult. [17]

3 Result

In this work, simulations were created in MATLAB software using the SimEvents library. The data were sorted and arranged in Microsoft Excel. The visualizations were also created using the aforementioned software, which was greatly assisted by the article [18].

3.1. Simulate arrival times

Our goal is to quantify the measurements with the help of a curve that similar to the measured data as best as possible. To determine the coefficients of the approximation polynomial, we used the least squares method (hereinafter referred to as LSM), for which the algorithm is shown in Figure 3. [19].

```
clear all, clc
x = [0 10 ...];
y = [0.1 0.2 ...];
m=5;
w=ones(size(x));
A=zeros(m+1,m+1);
I=ones(1,length(x));
for i=1:m+1
    Y(i)=(y.*x.^(i-1))*w';
    for j=1:m+1
        A(i,j)=x.^(i-1+j-1)*w';
    end
end
a=(A\Y')
```

Figure 3. LMS MATLAB algorithm

With the program, we were able to determine the coefficients of a fifth order polynomial that is sufficiently representative of the measured data (See "Figure 4").

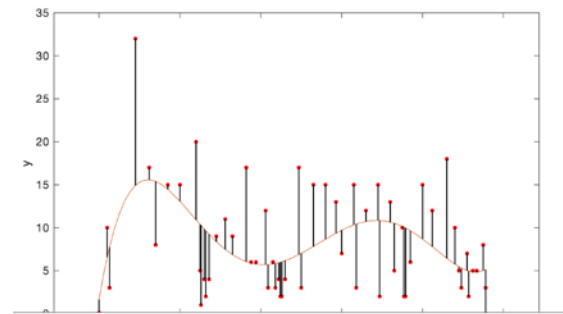


Figure 4. Obtained fifth order polynomial

From the coefficients obtained as the output of the program, we can write the polynomial, which is:

$$f(x) = 5.6923 \cdot 10^{-11}x^5 - 7.6377 \cdot 10^{-8}x^4 + 3.6635 \cdot 10^{-5}x^3 - 0.0074x^2 + 0.5626x + 1.6366$$

In Simevents, with the help of the Entity Generator block, it is possible to create entities, in our case to simulate the arrival of customers at the pharmacy (See "Figure 5"). To determine the time elapsed between the arrivals of each customer, we use the previously mentioned polynomial, which is embedded in a MATLAB function block. The independent variable of the function is determined by simulation time. This block is located in the right branch of a fork, which is marked in red in the figure. In order to simulate the possible overtime, it was necessary to simulate this condition. The true branch provides the entity generating block with the arrival times using the polynomial defined above, while the false branch stops the arrival in the system. In our case, we set an overtime of half an hour, while the total working time was set at 8 hours, i.e. 480 minutes.

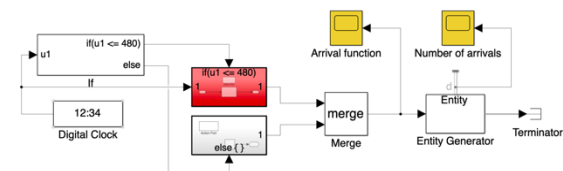


Figure 5. Entity generation with Simevents

With this method, it was possible to achieve results similar to real data (See "Figure 6"). It is clear from the simulation output that there are roughly 60 customers a day, which coincides with the measured results.

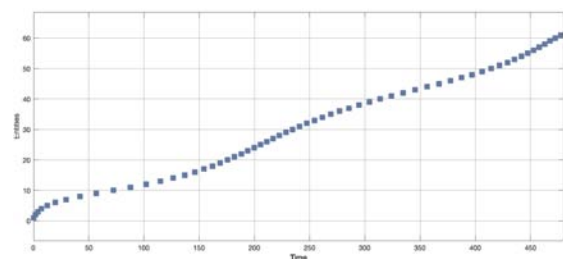


Figure 6. Arrival of customers to the pharmacy during the entire opening hours

3.2. Determining service times

The measured data were used to determine the average amount of medicines a customer buys (See "Figure 7"). For the resulting proportions, we determined the most ideal distribution curve,

which in our case was the exponential distribution with a mean of 4,06.

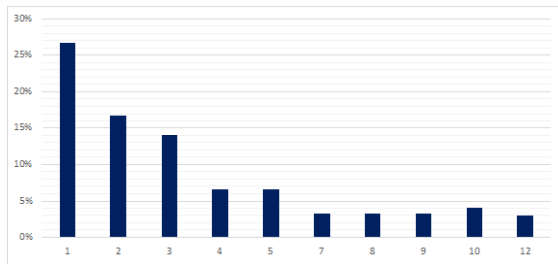


Figure 7. Distribution of the number of purchased pharmaceuticals

To determine the service time of each customer, i.e. how much time they will spend at the checkout, we had to measure how much of each pharmaceutical they buy. From this data, we have determined the frequency with which each item is purchased (See "Table 1"). Tables should be placed in the main text near to the first time.

Table 1. Frequency of buying pharmacy

Pharmaceutical	Frequency	Average service time
Paralen 500	8,85%	42s
Carbo medicinalis	5,31%	25s
Helicid 40	5,31%	72s
Anopyrin 100 mg	4,42%	40s
⋮	⋮	⋮
Condrosulf 800 tbl	0,88%	60s

To determine the final service time, we derive discrete values using the exponential distribution mentioned above. The resulting value (Let n be) determines how many medicines the customer will buy. To calculate the service time, choose n medicines from Table 1 and add up their average service time.

3.3. Single server solution

Almost all components are available to create the final simulation environment. First, let's look at the case of a checkout in a pharmacy (See "Figure 8"). Entities entering the system are generated as described above. Customers are line up in a FIFO queue of infinite length after arrival. In this case, we did not consider the length of the queue, as in reality there is no limit to the number of people waiting in front of a pharmacy or inside a pharmacy. From the queue, customers move on to a single server, which represent a checkout. The service time is determined as described above. Once served, the entities will be terminated.

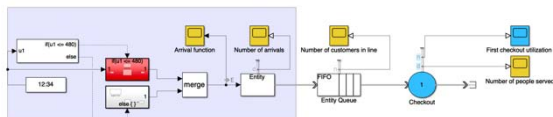


Figure 8. Single server solution

Sub result

No surprising values were obtained from the simulation results. The system worked as expected. In the pharmacy under study, two cash registers operate most of the time, so in our case the expected outcome was that the queue would become saturated, and the single server would not be able to serve all participants by the end of the day (See "Figure 9"). During the first half of the day, the cashier was able to service the incoming requests, but as we reached the midday rush hour, the queue started to fill up, and it didn't empty until the end of the day.

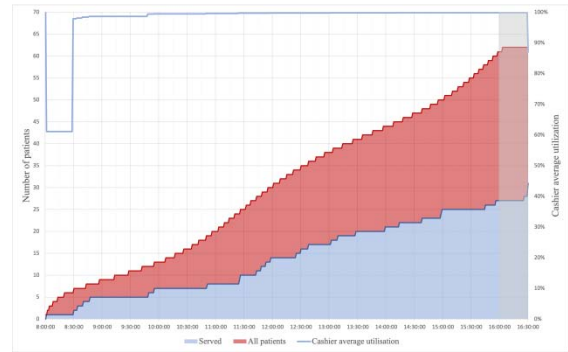


Figure 9. Single server solution result

3.4. Three server solution

As we have seen in the previous section, one checkout cannot deal with the demands that come into the system, so it is necessary to add new server units. For the pharmacy operator, it is not optimal to have unused checkout open, so we open and close them based on a decision system (See "Figure 10"). The checkout is opened when the number of queues rises above a certain value and closed when it falls below another value. These thresholds are monitored by a "Hit Crossing" block, which is used to switch an SR gate. These gate outputs are used to control an "Entity Gate" block, which corresponds to the opening and closing of the checkout.

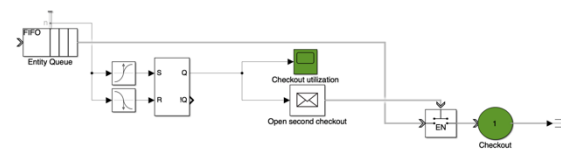


Figure 10. Control logic for open and close the checkout

The simulation was built with three checkouts (See "Figure 11"). The main cash desk is open throughout the opening hours. The second cashier is opened when there are at least 4 people in the queue and closed when there is at maximum 1, while for the third cashier these numbers are set to 8 and 4.

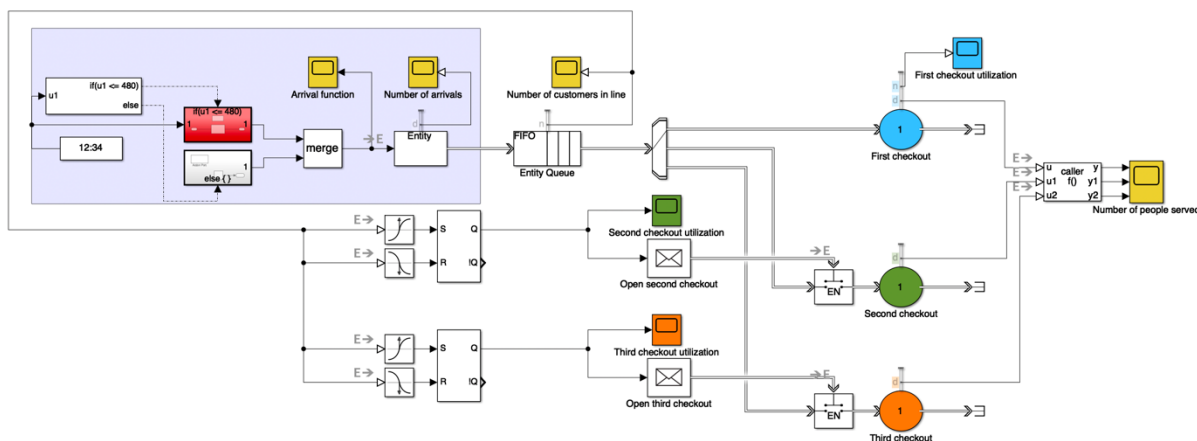


Figure 2. Three server unit solution with automatic unit controller

Final result

On the polynomial defining the demand arrivals into the system, it can be clearly observed that there are three periods when the time between each arrival is small. The first of these is the morning after opening, followed by a quiet period. During this period, even one server can cope with the demand (See “Figure.

12”). The second busy period lasts much longer and is followed by a less calm period. This is when the second cashier opens and will remain open until the end of the day. The two checkouts serve customers with satisfactory performance until the last rush before closing time. This is when the third cashier opens, and the last customer is served 30 minutes after closing time.

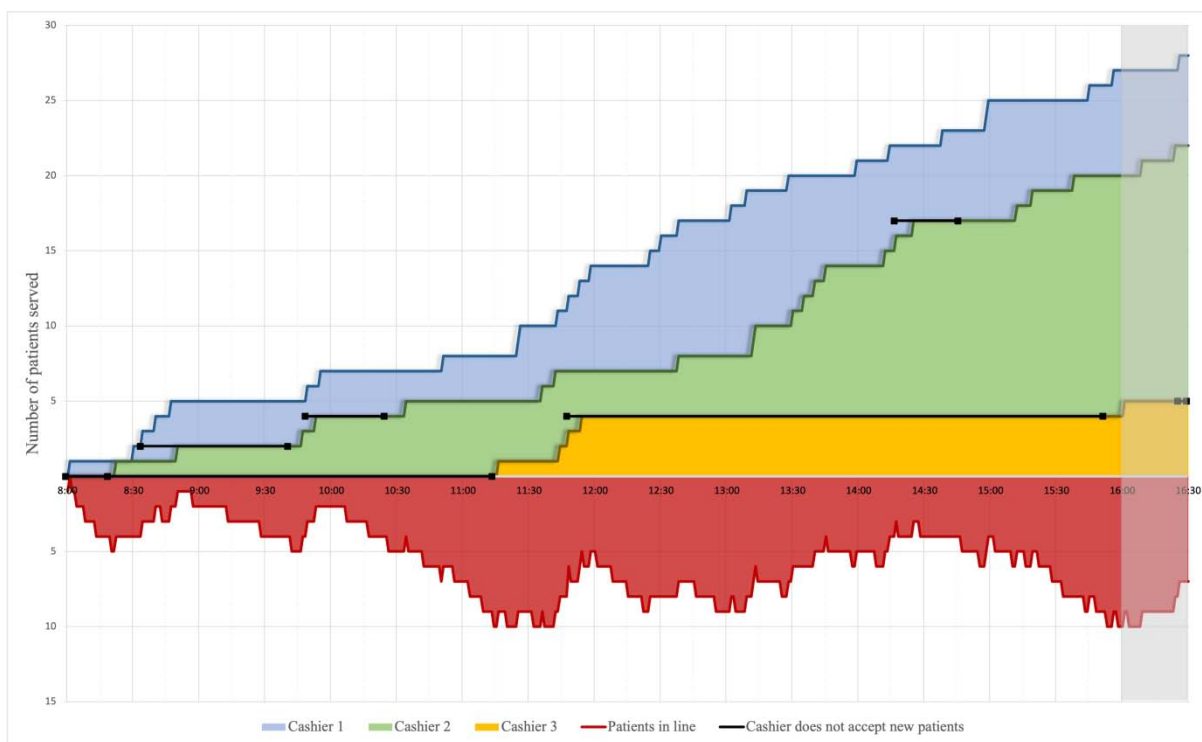


Figure 3. Three server solution result

4 Discussion

The model we have built can represent the operation of a pharmacy with sufficient accuracy. The inputs to the tool can be modified to represent other institutions. The measured time span can be extended or contracted, but in all these cases the polynomial that generates the inputs must be modified. The model is a suitable tool for optimizing the working time of individual pharmacists. It is also good for the institution from an economic point of view, since it does not have to pay unnecessary staff, and for the employees, since they know when

they have to work in the cashier's office or do other tasks. In the model presented, each cashier is opened and closed according to different thresholds, which can be modified at our discretion. This ensures that the model can be parameterized according to different needs. Optimization of these values is an option for further development.

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Primary Paper Section: I

Secondary Paper Section: IN, BB

J INDUSTRY

JA	ELECTRONICS AND OPTOELECTRONICS
JB	SENSORS, DETECTING ELEMENTS, MEASUREMENT AND REGULATION
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JD	USE OF COMPUTERS, ROBOTICS AND ITS APPLICATION
JE	NON-NUCLEAR POWER ENGINEERING, ENERGY CONSUMPTION AND UTILIZATION
JF	NUCLEAR ENERGY
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JY	FIREARMS, AMMUNITION, EXPLOSIVES, COMBAT VEHICLES

CAR ACCIDENTS IN THE CZECH REPUBLIC AND LIGHT AS A CONTRIBUTORY FACTOR

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Abstract: Ensuring road safety and preventing car accidents are vital concerns for public health and safety. Despite advancements in vehicle technology and traffic management, the number of road accidents remains alarmingly high, leading to significant loss of life and injuries. The study aims to assess the relationship between causes and types of car accidents depending on lighting conditions when an accident happens. The quantitative content analysis of the car accidents recorded by the POLICE between October 2022 and October 2023 provided relevant data, processed by cluster analysis and illustrated via a heat map. Road safety and preventing car accidents have always been a public priority. The authors analysed crucial aspects of traffic safety and alarming numbers of casualties, including 440 deaths, 1,466 badly and 18,389 slightly injured people. The most common types of accidents involved head-on collisions with solid obstacles and ongoing non-rail vehicles. Careless drivers were the main provokers of the tragic events over the monitored period. Looking at the time of accidents, we can see interesting parallels in their causes, irrespective of the day or nighttime. Our recommendations included raising drivers' awareness and police imposing preventative measures against the common causes of accidents. The study did not consider other factors behind traffic collisions.

Keywords: Road safety, car accidents, lighting conditions, causes of car accidents, road manners, accident prevention.

1 Introduction

Car accidents cause irreparable harm to public health, affecting social development and public safety [1]. Road collisions take a terrible toll on human lives, the national economy and society, inflicting millions of casualties on the global population every year [2]. Experts predict car accidents to be on par with heart disease as the most common cause of death in the world [3]. Insufficient road safety is a contentious issue, taking millions of lives every year and inflicting severe losses on the global economy and humanity [4].

The population and urban growth lead to a higher demand for transport, giving rise to many traffic habits [5]. Identifying how infrastructure and other risk factors affect car accident rates is vital for pushing the research forward. An increasing number of studies focus on local conditions causing high accident rates over a period [6]. Car crashes were fatal for many people involved in an accident throughout the world, attributed to multiple risk factors [7]. Analysing critical determinants of road collisions to discover the underlying cause of the accident is a burning issue to deal with [8]. Car crashes are a global problem, predominantly among young people, who cause most accidents [9].

To make transport systems sustainable, we must reduce accident rates and impose measures to diminish their adverse impacts on society [10]. In the last decade, most developed countries have seen a sharp cutback in car crashes thanks to improved vehicles and road conditions, advanced medicine, healthcare, education, and driver training [11]. Safety analyses often assess accident rates and the effects of the measures for reducing collisions [12]. When we have successfully identified the places of frequent car accidents and road sections with high accident rates, transport officials may adopt preventative measures and introduce traffic regulations to reduce car accidents, deaths, injuries, and financial losses [13]. Road collisions result from many factors, including people, vehicles, roads, and visibility. Exploring connecting links between the risk determinants will help us identify the primary causes of the accidents [14].

1.1 Goal of the paper

The study aims at assessing the relationship between the causes and types of accidents depending on lighting conditions when an accident occurs.

1.2 Research questions

The analysis involves total car accidents from October 2022 to October 2023. Answering the research questions will inform us about the extent of the issue, allowing us to conduct in-depth road safety analyses.

RQ1: How many car accidents happened in the Czech Republic from October 2022 to October 2023?

We must detect the most common types of accidents over the monitored period. This question will help identify the most serious risks and improve road safety.

RQ2: What are the most common types of car accidents over the monitored period?

The following question concerns the most common causes of car accidents over the monitored period, allowing us to understand the factors contributing to road collisions and impose effective preventative measures.

RQ3: What are the main causes of car accidents over the monitored period?

This question focuses on possible differences between the combinations of the types of car accidents and their causes relative to daylight. Analysing their combinations will inform us whether accidents are contingent on lighting conditions and if daylight affects some types.

RQ4: Is there any difference between the combinations of car accident types and causes depending on daylight?

2 Literary research

Car accidents directly reflect road safety levels. Predictions must be reliable for the Department of Transport to suggest rational decisions within the traffic management system [15]. The accurate prognosis of the traffic flow may increase effectiveness and road safety [16]. Nowadays, in times of various public transport systems, driver fatigue has become an underlying cause of car accidents [17]. Given diverse and volatile driving conditions, feelings of weariness and aggravating causative factors [18], we must develop a sophisticated safety system for detecting the drivers' lack of attention and preventing fatigue [19]. The increased skin temperature and heat dissipation marks the onset of sleep.

Risky behaviour significantly reduces drivers' ability to react, assess and act, increasing the risk of accidents [20]. Using a mobile phone when driving involves a high danger of a collision, seriously distracting the driver [21]. Given the technological advancement of social networks, recent years have seen a tremendous increase in the use of smartphones during driving, imposing a grave threat to road safety [22]. Safety systems of checking the following distance currently available on the market can largely contribute to accident prevention or, at least, make them less severe [23]. A bad condition of a vehicle imposes another danger on road safety, dramatically increasing accident rates, as the transport industry lacks relevant tools for detecting the poor state of the car [24].

[25] devised a negative binomial model for statistical factor identification that significantly affects the duration of road closures using a non-negative integer. The results showed a strong correlation between the road closure duration and the collision type, seriousness, roadway type, driving under the influence of alcohol, involvement of heavy trucks and the number of vehicles involved, leaving lighting and road conditions, speed and surface insignificant. [26] applied the Apriori algorithm to find connections between risk factors, probing deeper into the causes of accidents on urban road

networks to detect links between risk factors of driving. [27] analysed data using approximate and standard mortality rates and potential and average premature deaths, revealing car crashes as the principal contributor.

[28] devised a regression model for predicting the lethality or injuriousness of accidents according to data observed from testing road sections using flexible neural networks. The experiments showed that analytical methods are highly efficient in assessing the conditions which may cause death or injury. [29] used correlation and cluster analysis to explore the relationship between holding a driving licence, intoxication, speeding, excessive load, vehicle performance, weather etc. Specific conditions like evening or nighttime, exiting the road, crashing into a solid object, passing through a tunnel, sharp bends, rainfall, fog, poor lighting, and a road narrower than seven metres contribute to higher accident rates among young drivers [30]. [31] investigated the relationship between the price of a vehicle and its safety using correlation coefficients, and found that these two factors are not so highly correlated.

[32] used a questionnaire survey to determine the factors endangering drivers, revealing reckless driving and speeding as crucial contributing factors in Cyprus over the monitored period. [33] applied content analysis for secondary data collection. [34] conducted interviews to explore factors and impediments hampering the cooperation between paramedic medical services and emergency hospital admission during car accidents, analysing the data using qualitative content analysis. [35] examined mobile applications on road safety and health using qualitative content analysis.

We apply content analysis to answer the first, second and third research questions. The cluster method will tackle the fourth, allowing the identification of patterns and interrelationships between factors and variables illustrated in heat maps.

3 Data and methods

We use quantitative content analysis of the official websites of the Police of the Czech Republic [36] to answer the first three research questions, informing about all car accidents the Police dealt with. The quantitative method deep probes and statistically analyses the data, allowing a better understanding of the dynamics of car collisions in the Czech Republic and contributing to introducing measures for extra road safety. We systematically record the data on traffic accidents, including the date, deaths, critically and slightly wounded people, damage caused and the type and cause of the accident.

This data collection system is imperative for a comprehensive overview of the nature of car accidents in the Czech Republic over the monitored period. These observations will suggest the most frequent types of accidents (e.g., crashes into another car, single-vehicle collisions, etc.) and their causes.

First, the collected data on the type and cause of accidents are subject to cluster analysis which enables answering RQ4 and analyse the factors of causes and types of accidents in a proxy context. This way, it is possible to determine the relationship between these variables. The analysis also allows the identification and clustering of similar patterns and characteristics of traffic accidents, thus making it possible to systematically group the data and providing a comprehensive insight into the differences and similarities between individual types of accidents. Cluster analysis is a machine learning and statistical method that enables grouping data into clusters (or groups) based on the similarities between individual observations.

A dataset is created (see below):

$$X = x_1, x_2, \dots, x_n \quad (1)$$

Where:

X_i represents a factor of various attributes or characteristics

k = cluster, or group

Types of accidents, such as vehicle collisions, collisions with pedestrians, etc. are indicated by numbers 1 – 10, while the causes of accidents are divided into individual categories and assigned values 11 – 96. The structure of the evaluation provides a basis for the data analysis and clustering of the most frequently occurring situations. For example, clusters such as the combination of the accident type identified as 2 and the cause with the assigned number 74 can represent a basis for the identification of specific scenarios recurring most frequently in the dataset.

The goal is to minimize the internal variation within individual clusters and maximize the variation between them.

Next, a heat map is created on the basis of the cluster analysis, which provides a visual tool to visualize the relationship between individual clusters or groups of data. A distance matrix is created that contains the distance values between the clusters.

The distance matrix is then visualized using a colour scheme where the values in the matrix are represented by various shades of colours, where shorter distances (lower values of distances), which indicate greater similarity between clusters, are usually represented by lighter colours, while for greater distances between clusters, darker colours are used.

Mathematically, the heat map can be expressed as follows:

$$\text{Heat map } (i, j) = f(d_{ij}) \quad (2)$$

Where:

f = function mapping the values of distances using a corresponding colour scale or intensity of colour for the visualization of the heat map.

f represents the distance between the i -th and j -th cluster. The values in this matrix are then transformed into values for coloured visualization using a specific colour spectrum or colour gradient.

This visualization enables easier identification of clusters showing similar characteristics or behaviour and provides a comprehensive overview of the data structure and relationships between the clusters within the data analysis.

Heat maps are divided according to the season and part of the day concerning daylight or darkness at the moment of accident occurrence. This classification enables the analysis of the relationships between the clusters in the context of the time of the day and visibility.

The division of the heat maps according to individual seasons is also because of the variability of traffic accidents' causes, as various seasons bring specific conditions on the roads, thus affecting the behaviour of drivers and types of accidents.

In the heat map, the x-axis shows different types of accidents, while the y-axis presents individual causes of these accidents.

4 Results

Based on the content analysis performed, it was found that during the monitored period, a total of 93,784 road accidents were recorded in the Czech Republic, which represents an extensive dataset for performing cluster analysis and examination of factors affecting this set of accidents.

Tab 1. Number of road accidents in the Czech Republic between 1 October 2022 and 30 September 2023

Type	Number of accidents	Number of persons
Deaths	440	474
Serious injuries	1,466	1,691
Minor injuries	18,389	23,358

No injuries	73,489	
In total	93,784	

(Source: Author based on Nehody.cdv.cz, 2023)

Table 1 provides a clear overview of the consequences of road accidents in the Czech Republic in the monitored period. Death as the saddest part of this statistics was a consequence of 440 accidents resulting in the death of 474 people. There were 1,466 accidents with serious injuries, affecting 1,691 people; minor injuries were recorded in 18,389 accidents affecting 23,358 people.

Tab 1. Accidents by types

Type of accident	Number
Collision with a fixed object	21,028
Collision with wild animals	9,656
Other types of accident	2,867
Domestic animal collision	264
Collision with a moving vehicle (not on rail)	26,777
Accident	5,562
Collision with a parked vehicle	22,572
Collision with a tram	455
Collision with a train	130
Collision with a pedestrian	2,417
In total	93,784

(Source: Author based on Nehody.cdv.cz, 2023)

Table 2 provides information on various types of road accidents in the Czech Republic during the monitored period. The most common type of accidents was a collision with a parked vehicle, a collision with a moving vehicle not on rail, and a collision with a fixed object.

Tab 2. Traffic accidents by causes in the CR between 1 October 2022 and 30 September 2023 including their causes

Main cause	Number of accidents	Deaths	Serious injuries	Minor injuries
The driver not fully focused on vehicle driving	18,334	58	197	3,063
Not caused by the driver	13,491	17	120	1,124
Improper turning or reversing	9,066	5	33	405
Loss of control of the vehicle	6,119	24	100	1,621
Dodging without sufficient side clearance	5,733	3	10	242
Not adjusting the speed to the conditions of the road	5,159	32	88	1,875
Failure to keep a safe distance behind the vehicle	4,755	3	40	1,78
Not adjusting the speed to road conditions (curve, descent, gradient, road width)	3,803	62	179	2,082
Failure to respect the traffic sign GIVE WAY	3,438	28	130	2,188
Other type of improper driving	2,948	11	18	337
Driving on the wrong side of the road, contraflow driving	2,898	72	139	1,324
Reckless, aggressive, inconsiderate driving	2,333	4	31	356

Not adjusting the speed to vehicle and load characteristics	1,694	30	79	765
During turning left	1,511	8	90	1,052

(Source: Author based on Nehody.cdv.cz, 2023)

Table 3 enables answering the third research question by means of listing the main causes of traffic accidents in the Czech Republic and their consequences. The highest number of accidents recorded occurred due to the failure of the driver to fully focus on driving, which resulted in 18,334 accidents and 58 deaths, 197 seriously injured persons, and 3,063 persons with minor injuries.

Tab 3. Classification of accidents by season and light conditions

Season	Time	Light conditions	Number of accidents	Period
Spring	6:00 - 21:00	Light	14,979	1 March 2023 – 31 May 2023
Spring	21:00 - 6:00	Dark	7,958	1 March 2023 – 31 May 2023
Summer	6:00 - 22:00	Light	21,037	1 June 2023 – 31 August 2023
Summer	22:00 - 6:00	Dark	2,996	1 June 2023 – 31 August 2023
Autumn	7:00 - 20:00	Light	16,056	1 October 2022 – 30 November 2022 ,1 September 2023 – 30 September 2023
Autumn	20:00 - 7:00	Dark	10,132	1 October 2022 – 30 November 2022 ,1 September 2023 – 30 September 2023
Winter	7:00 - 17:00	Light	11,29	1 December 2022 – 31 December 2022, 1 January 2023 – 28 February 2023
Winter	17:00 - 7:00	Dark	9,395	1 December 2022 – 31 December 2022, 1.1.2023 – 28 February 2023

(Source: Author)

Individual periods were divided into seasons (summer, spring, autumn, and winter) and times of the day with good and low light conditions. It follows from Table 4 that the highest number of traffic accidents was recorded in the summer and good light conditions (21,037 in total).

Tab 4. Brief specification of the x- and y-axis for heat maps

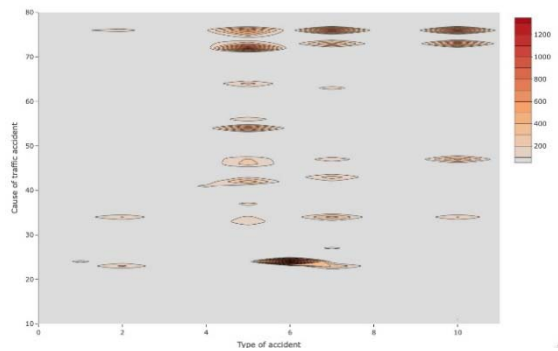
y	Type	x	Cause
1	Other type of accident	11	Reckless, aggressive, inconsiderate driving
2	Accident	12	Other type of improper driving
3	Domestic animal collision	15	overtaking with limited visibility (in or near an obscure bend, before the top of a gradient, etc.)
4	Collision with a pedestrian	16	During turning or reversing
5	Collision with a moving vehicle not on rail	23	Failure to adjust speed to crosswinds and gusts (even when passing or overtaking vehicles)
6	Collision with wild	23	Failure to adjust speed to

	animals		crosswinds and gusts (even when passing or overtaking vehicles)
7	Collision with a fixed object	33	Not adjusting the speed to road conditions (curve, descent, gradient, road width)
8	Collision with a tram	34	Not caused by the driver
9	Collision with a train	35	Overtaking a vehicle turning left
10	Collision with a parked vehicle	37	Driving on an unpaved road
		44	Loss of control of the vehicle
		45	During turning right
		47	Dodging without sufficient side clearance
		53	Not adjusting the speed to the conditions of the road (ice, potholes, mud, wet surface of the road, etc.)
		73	Improper turning or reversing
		76	Driver not fully focused on driving

(Source: Author)

As seen in Figure 1, during the spring period and in the daylight, the most common type of accident was a collision with wild animals not caused by the driver (1,364 accidents in total). The second most common type was a collision with another vehicle, where the cause was usually the lack of attention the driver paid to driving (1,039 accidents).

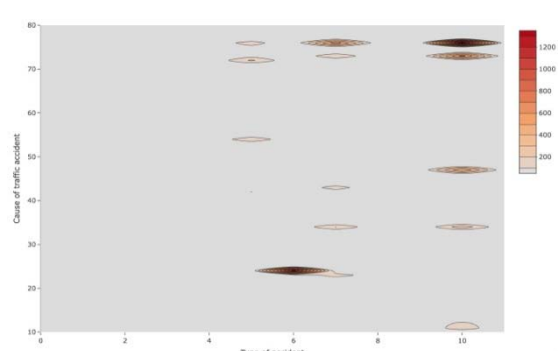
Figure 1. Heat map – types of traffic accidents and their causes – spring, in the daylight



(Source: Author)

Figure 2 shows that in the spring and in the darkness, the most common type of traffic accident is a collision with a parked or stopped vehicle (1,331), with the lack of attention paid to driving as a cause. There is a considerable difference when comparing with accidents occurring in the same season but in the daylight, as the number of accidents caused by not giving way to other vehicles decreased by 343.

Figure 2. Heat map – types of traffic accidents and their causes during the spring season – in the darkness

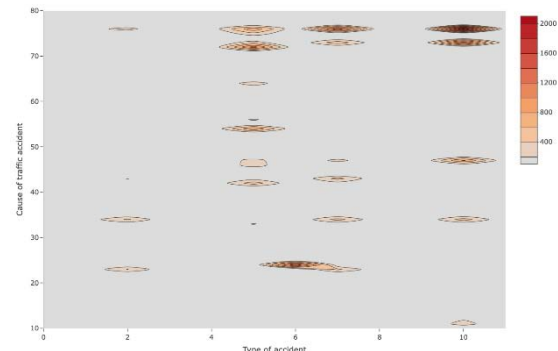


(Source: Author)

In the summer months, in the daylight, the most common type of accidents is caused by the lack of attention the driver paid to

driving, which leads to various types of traffic accidents. There were 747 cases of failing to respect the GIVE WAY sign, and 1,364 cases of collision with wild animals not caused by the driver (see Figure 3).

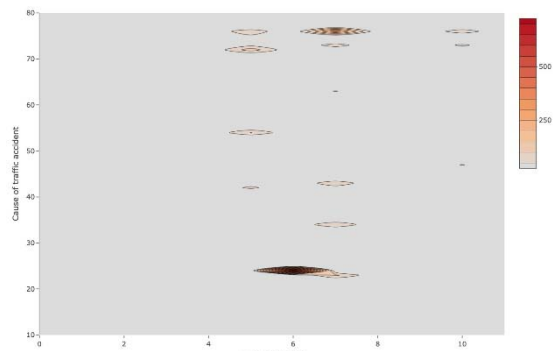
Figure 3. Heat map – types of accidents and their causes in the summer, in the daylight



(Source: Author)

In the same period, but in the darkness, a change was recorded in the form of a decrease in the number of traffic accidents caused by the lack of attention of the drivers. On the other hand, the number of traffic accidents not caused by the driver grew, as seen in Figure 4.

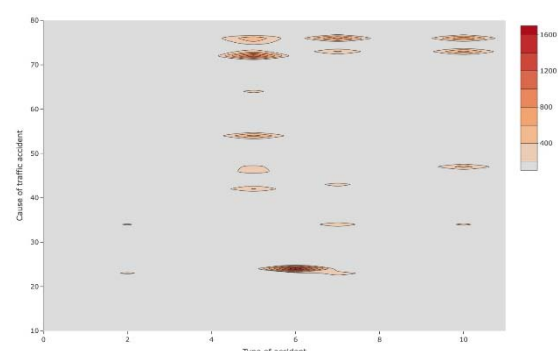
Figure 4. Heat map – types of traffic accidents and their causes in the summer, in the darkness



(Source: Author)

It follows from Figure 5 that in the autumn, the number of traffic accidents caused by failing to keep a safe distance between vehicles grew significantly (1,305 cases in total), which is a difference compared to previous periods. However, in other aspects, the characteristic of the map is very similar to the previous ones.

Figure 5. Heat map – types of traffic accidents and their causes in autumn, in the daylight

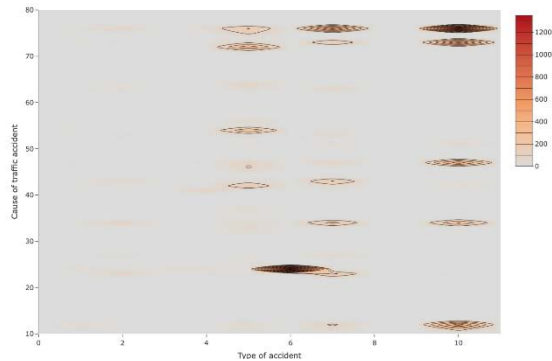


(Source: Author)

Figure 6 shows that compared to the number of traffic accidents that happened in the autumn in the daylight, there was a growth

in the number of accidents with the drivers not paying full attention to driving. This situation, which could not be seen in the summer and spring months, indicates a higher risk of insufficient attention paid to driving in the autumn night hours. Compared to previous periods, there is again a greater number of traffic accidents caused by improper driving.

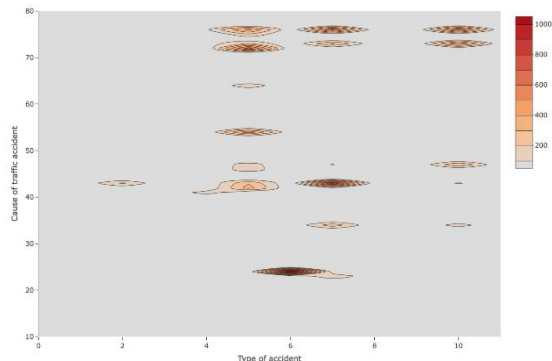
Figure 6. Heat map – types of traffic accidents combined with their causes during autumn - darkness



(Source: Author)

The heat map in Figure 7 indicates that in the winter season, there is a significant change compared to previous seasons, as factors typical of winter conditions can be noticed, such as an increased incidence of accidents caused by failure to adjust speed to road conditions. Moreover, there is also evident the cause of accidents related to failure to control the vehicle.

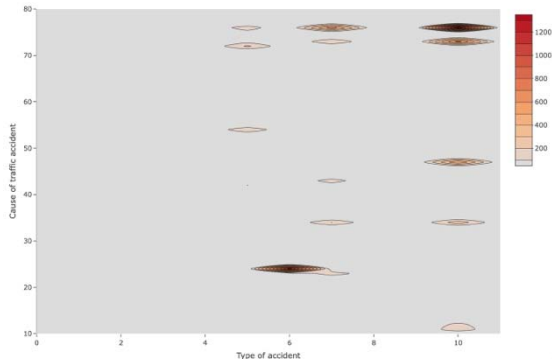
Figure 7. Heat map – types of traffic accidents and their causes in winter season in the daylight



(Source: Author)

The winter season is exceptional by showing the greatest similarities between individual heat maps, without any significant differences concerning the types and causes of traffic accidents that happened in the daylight or in the darkness.

Figure 8. Heat map – types of traffic accidents and their causes during winter, in the darkness



(Source: Author)

5 Discussion of results

RQ1: How many car accidents happened in the Czech Republic from October 2022 to October 2023?

Table 1 shows a significant effect of traffic accidents on road users during the monitored period. The most alarming statistics concern the number of dead people (440 deaths on roads), which is a tragic and unacceptable number. The consequences of traffic accidents also included 1,466 seriously injured people and 18,389 people with minor injuries, which indicates the serious impact of accidents on people's health. At the same time, the majority of accidents (73,489) were without any injury, which shows the importance of maintaining road safety and prevention of accidents. The figures are alarming and point to the need for implementing further measures to improve road safety. This is also confirmed by [37], who argue that more efforts should be put into this issue.

RQ2: What are the most common types of car accidents over the monitored period?

The results in Table 2 provide an overview of various types of traffic accidents that happened within the monitored period. It can be seen that collisions with fixed objects and with moving vehicles not on rails represent the most common type of accidents (21,028 and 26,777 respectively), which may indicate a high number of traffic accidents outside municipalities. Another major category is collisions with parked vehicles, amounting to 22,572 cases. This reflects an important issue of parking and the attention of drivers. According to [38], the lack of attention paid to driving is one of the main factors increasing the number of traffic accidents. A high number of accidents was recorded in the category of collisions with pedestrians (2,417 cases), which emphasizes the need for increasing pedestrian safety on the roads, as they represent a high-risk group in traffic that is at increased risk of injury and death in collisions with motor vehicles.

RQ3: What are the main causes of car accidents over the monitored period?

Two of the most common factors leading to traffic accidents are excessive speed and insufficient attention of drivers. Excessive speed can be due to various factors, including the failure to adjust the speed to the road condition and traffic intensity, which increases the probability of accidents. Insufficient attention of drivers paid to driving includes distractions such as the use of mobile phones while driving, which is also mentioned by [39] and other forms of improper behaviour. Here, emphasis should be put on drivers' education and training to make them more responsible and concentrated on driving.

Of the total number of 93,784 accidents recorded, 2,828 accidents were caused by drivers driving under the influence of alcohol, with blood alcohol of 1.5 ‰ and higher. Another 1,122 accidents involved drivers with blood alcohol ranging from 0.24 ‰ to 1.5 ‰. This means that more than 4,000 accidents involved drivers under the influence of alcohol. This is in line with [40], who state that there are still accidents caused by alcohol intoxication of drivers.

RQ4: Is there any difference between the combinations of car accident types and causes depending on daylight?

The analysis of individual heat maps for different seasons and light conditions provides interesting findings. During the spring season in the daylight, there were often recorded accidents involving a collision with wild animals not caused by the driver and collision with another vehicle caused by insufficient attention paid to driving. In the summer period, there is also a high number of accidents with drivers not paying attention to driving, probably due to the higher intensity of traffic.

In the spring in the darkness, collisions with other vehicles caused by insufficient attention paid to driving were recorded. In the summer period under the same light conditions, the number of this type of accident decreased, but the number of accidents due to causes other than drivers grew. In the night hours, there can be an increase in the number of accidents when the driver is not fully concentrating on driving due to tiredness or worse light conditions. The same conclusion was made by [31]. In the autumn, the increased incidence of accidents caused by failing to maintain a safe distance between vehicles can be related to changes in driving conditions. The winter season can then be associated with more accidents caused by failure to adjust speed to road conditions, e.g., slippery roads or generally worse road conditions.

The results indicate that there is an increased incidence of certain types of traffic accidents in specific seasons and under different light conditions. Insufficient attention of the driver is a constant factor that can be seen as one of the most common causes of accidents across all seasons and light conditions. Other common causes include improper turning or reversing and accidents not caused by the driver.

The incidence of these types of accidents and causes suggests certain consistency in risk situations throughout the year. Although individual seasons of the year show specific characteristics and features, there are recurring patterns in the occurrence of certain types of accidents and their causes. This can point to the need to focus on recurring road safety problems, to pay constant attention to them, and to adopt preventive measures. The police should thus focus on these major factors in order to ensure safer road traffic, which is also confirmed by [41].

6 Conclusion

The goal of the paper was to determine the relationship between various types of traffic accidents and their causes depending on various light conditions at the time of the accident. The data collection was carried out using quantitative content analysis of traffic accidents in the Czech Republic. The data were then processed using the cluster analysis and elaboration of heat maps, which enabled the achievement of the set goal.

An analysis of traffic accidents in the Czech Republic in the period between October 2022 and October 2023 identified several key aspects regarding road safety. An overview was prepared showing alarming figures, such as 440 people killed, 1,466 seriously injured people, and 18,389 people with minor injuries. These statistics undeniably point to the gravity of the situation and the need for adopting other preventive measures.

The analysis of the most common types of traffic accidents revealed a considerable frequency of collisions with fixed objects and moving vehicles not on rail. This trend suggests that accidents often occur outside communities. Moreover, other major categories of accidents were identified, especially collisions with parked vehicles, which may reflect the insufficient attention of drivers paid to parking and normal traffic.

Insufficient attention of drivers and failure to adjust their speed turned out to be two major factors increasing the number of traffic accidents. Insufficient attention can be caused by various factors, including the use of mobile phones while driving, various distractions, or other forms of inconsistent behaviour. Similarly, excessive speed can result from the failure to adjust the speed to road conditions or traffic volume, which increases the risk of crashes.

When looking at light conditions and different seasons, it can be seen that certain causes of accidents are recurring. Insufficient attention of drivers is one of the most common factors across various seasons. Although each season has its specificities, there are still some recurring patterns. This emphasizes the need for a

sustainable and systematic approach to accident prevention and improvement of road safety.

Proposals for improvement should be aimed at drivers' education and safety, increasing the awareness of the causes of traffic accidents. Measures adopted by the police should reflect the main factors leading to accidents and try to improve road safety systematically. The current findings bring important information that could lead to adopting measures to reduce the number of traffic accidents and increase road safety in the Czech Republic and all over the world.

The limitation of the research could be not considering other factors that may have an impact on the occurrence of traffic accidents, such as the road conditions, weather, or psychological aspects of drivers' behaviour.

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