

# COMPETITIVENESS OF SOCIAL ENTERPRISES IN SLOVAKIA: THE STRUGGLE FOR CONTRACTS IN PUBLIC PROCUREMENT

<sup>a</sup>DANIELA HADAČOVÁ, <sup>b</sup>LENKA MALIČKÁ

*Technical University of Košice, Faculty of Economics,  
Department of Finance, Némcovej 32, 040 01 Košice, Slovak  
Republic  
email: <sup>a</sup>daniela.hadacova@tuke.sk, <sup>b</sup>lenka.malicka@tuke.sk*

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**Abstract:** This paper examines public procurement contracts on the e-contracting portal (EKS) in Slovakia from September 2014 to January 2023, analysing 160,387 contracts. Social enterprises participated in 1,642 bids, representing 0.44% of unique bidders, with a notable success rate of 33.13% for contracts they contested. Financial allocations to social enterprises remained below 1% across all reviewed periods. The analysis reveals that social enterprises primarily engage in service-oriented contracts, while commercial suppliers focus on specialized goods. Using machine learning methods and logistic regression, the key determinants of success for social enterprises are identified. They include the number of bidders and submitted bids, bid type, and short-term bank loan value. These findings provide insights into the role of social enterprises in public procurement and inform strategies to enhance their participation.

**Keywords:** decision trees, determinants of success, logistic regression, public procurement, social enterprises, social procurement

## 1 Introduction

Public procurement is vital in ensuring the efficient and transparent utilization of public resources. Involving social enterprises in this process offers numerous benefits, including promoting employment opportunities for individuals from disadvantaged groups and developing innovative solutions that enhance the quality of services. This approach not only enhances economic efficiency but also fosters social justice, thereby contributing to the overall advancement of society and reinforcing the integration of diverse social groups into economic activities. Emphasizing these dimensions of public procurement can facilitate systemic changes that bolster democratic values and accountability within public administration.

This paper examines the use of public procurement as a funding mechanism for social enterprises, addressing a gap in research within the broader field of public procurement, and more specifically, in social procurement. Specifically, it examines the extent of Slovak social enterprises' participation in public procurement and their success rates within this process. It provides a comparative analysis of the funds allocated to social enterprises versus commercial entrepreneurs. Additionally, the study seeks to identify the factors influencing the success rates of social enterprises in public procurement. Furthermore, it explores opportunities for greater involvement of social enterprises, based on their economic activities and the goods and services demanded in public procurement, as classified by Common Procurement Vocabulary (CPV), which standardizes procurement terminology across EU countries (Commission Regulation (EC) No 213/2008). Given the limited scholarly attention in this domain, the study aims to contribute valuable insights into how public procurement can support the financial sustainability and growth of social enterprises.

## 2 Literature review

An examination of the worldwide institutional frameworks often uncovers notable variations in how people organize themselves for social, economic, and political activities. Different forms of governance along with a range of economic entities illustrate the diverse institutional arrangements that exist in the contemporary world (Salamon & Anheier, 1992).

Despite the diversity of institutional realities, we recognize the existence of two major complexes of organizations into which social life is conventionally divided: the market and the state.

While the actual institutional entities encompassed by these abstract concepts are numerous and varied, these abstractions have proven to be meaningful and, indeed, indispensable analytical tools for understanding and describing modern life (Salamon & Anheier, 1992).

However, since the 1990s, there has been a concerted global effort to seek alternatives to the public sector. This movement was primarily driven by dissatisfaction with the costs and effectiveness of the public sector, along with a growing acknowledgement that relying solely on the government to address social and developmental issues was inadequate. This re-evaluation of the state's role has effectively challenged the fundamental ways we conceptualize the structure of social and economic life (Salamon & Anheier, 1996).

Over the past two decades, entrepreneurial activities and business approaches have transformed significantly, particularly with the growing focus on social enterprises (Peter et al., 2022).

### 2.1 Social enterprises

Social enterprises (SEs) are frequently discussed within the framework of the social economy, which is regarded as either an alternative to or a complement of both the public sector and the traditional market (Plaček et al., 2021).

Social enterprises emerged in the not-for-profit sector as a response to decreasing government involvement in the economy and society. They are often viewed as more proactive than the state in addressing social needs, being deeply embedded in communities and capable of offering flexible, alternative, or complementary interventions to state services (Defourny & Nyssens, 2006; Stevens et al., 2015; Kelly et al., 2019).

The primary goal of social entrepreneurship is to uncover innovative combinations of resources that generate social value by promoting social change or addressing societal needs (Břanda & Urbančíková, 2020). Social entrepreneurs typically target areas where they perceive unmet social needs or seek to create new social opportunities that the public or private sectors have inadequately addressed (Hynes, 2009; Břanda & Urbančíková, 2020). This form of entrepreneurship can be characterized as a process that accelerates social transformation and tackles social issues without prioritizing immediate financial gain for the entrepreneurs (Austin et al., 2006; Defourny & Nyssens, 2008; Hynes, 2009; Stevens et al., 2015; Defourny & Nyssens, 2017; Břanda & Urbančíková, 2020).

According to Šebestová & Mačkinová (2019), a fundamental principle of social entrepreneurship is thus the effective utilization of local resources. Although these resources may be limited, they can help mitigate the negative impacts of globalization processes to some extent. By leveraging local assets, social enterprises contribute to building resilient communities and promoting sustainable practices that align with the broader goals of the social economy (Defourny & Nyssens 2017, European Commission, 2020; Břanda & Urbančíková, 2020, Plaček a kol. 2021).

Social enterprises therefore encompass a broad and diverse range of economic activities. However, the challenge in analysing them lies in the ambiguity of the concept's boundaries, as it refers to different interpretations depending on the context in which it is used (Peter et al., 2022). Only a handful of countries have established clear policies that offer specific and consistent fiscal incentives tailored to meet the unique needs of social enterprises and support their growth (Hemels, 2023).

Until 2018, social enterprises in Slovakia were often met with scepticism due to unfair financing practices and the connotations associated with the term "social" (Brozmanová-Gregorová &

Murray-Svidroňová, 2020). In the realm of social entrepreneurship, there is often a conflation of the "social" aspect, which is associated with non-economic values and altruism, with "enterprise," a fundamental element of the private market that embodies individualism and self-interest (Polačková, 2020).

A significant milestone for Slovak civil society was the enactment of Act No. 112/2018 Coll. on Social Economy and Social Enterprises, along with amendments to certain other laws, in 2018. This legislation introduced the concepts of "social economy entity" and "social enterprise." According to this law, a social enterprise is defined as an entity that engages in independent economic activities aimed at achieving measurable positive social impact, dedicating over 50% of its post-tax profits to this goal, and involving stakeholders in its management.

In Slovakia, a registered social enterprise can take one of three forms:

- Integrative Enterprise;
- Housing Social Enterprise and
- General Registered Social Enterprise (Act No. 112/2018 Coll.)

As of December 31, 2023, there were 650 entities recognized as social enterprises in Slovakia. Legally, these enterprises must demonstrate measurable positive social impact, which can be assessed through various criteria. The most common metric is the percentage of disadvantaged and vulnerable individuals employed, with up to 99% of registered social enterprises reporting such measurable positive social impact.

This framework not only highlights the role of social enterprises in fostering social inclusion and economic participation but also aligns with the overarching goals of the Slovak legislation aimed at enhancing the social economy.

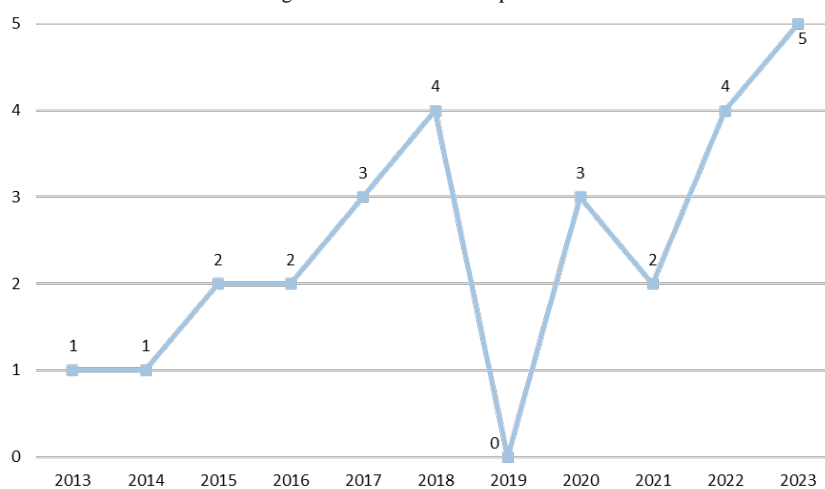
## 2.2 Public procurement

Public procurement (PP) is increasingly recognized as a crucial mechanism for fostering innovation, addressing societal challenges, and facilitating structural change (Uyarra et al., 2020; Januska & Palacka, 2023). Uyarra et al. (2020) further assert that the transition from a predominantly supply-driven innovation policy to one centred on innovation-focused public procurement necessitates substantial political, cultural, and organizational transformations. Moreover, the authors note that public procurement can serve as an incentive for developers of new technologies, many of whom may not receive support from traditional R&D funding subsidies. Similarly, Stehlík (2018), Bauhr et al. (2020), and Kubak et al. (2023) emphasize that the effectiveness of public procurement in promoting fair and corruption-free competition is fundamentally dependent on the transparency of public procurement procedures.

The significance of social entrepreneurship is increasingly recognized within the framework of public procurement, leading to the development of the concept of socially responsible public procurement, which includes criteria for bidders related to social responsibility.

The relevance of this topic is underscored by the increasing number of scientific publications available on the Web of Science portal that address this issue (see Figure 1).

Figure 1: Annual scientific production



Source: Own processing from RStudio software based on Web of Science database

The European Commission (a, b) defines public procurement as a process by which public authorities, such as ministries or local government bodies, acquire labour, goods, or services from private companies. Consequently, public procurement is regarded as a fundamental component of public administration development and a core function of public organizations (Nemec et al., 2019; Trammell et al., 2019). It serves as one of the market-based instruments aimed at achieving smart, sustainable, and inclusive growth while ensuring the most efficient use of public funds (Lukáčka & Kubolek, 2018; European Commission a).

Trammell et al. (2019) highlight that procurement is often responsible for enhancing efficiency by reducing costs while maintaining the quality of goods and services provided by the organization. Furthermore, Lukáčka and Kubolek (2018) emphasize that effective regulation of public procurement and its consistent application are critical pillars for ensuring the efficient

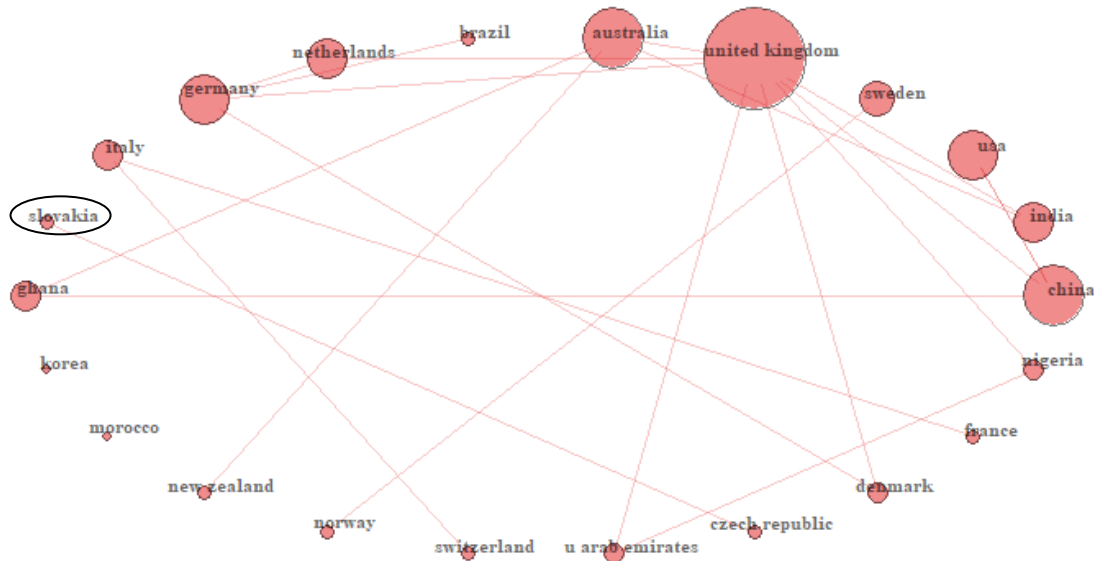
and economical use of public funds. Ultimately, the quality of public services relies on modern, well-managed, and efficient procurement processes (European Commission a).

In Slovakia, the regulation of public procurement has been governed by several legal acts, including Act No. 263/1999 Coll. on Public Procurement and Act No. 25/2006 Coll. on Public Procurement, along with their subsequent amendments. Currently, since 2015, Act No. 343/2015 Coll. on Public Procurement has been in effect, defining public procurement as the process of "awarding contracts for the supply of goods, the execution of construction works, the provision of services, the solicitation of proposals, and the granting of concessions for construction works and services, as well as the administration of public procurement". This Act outlines the rules and procedures for awarding contracts, concessions, and tenders, with the primary objective of ensuring the efficient use of public funds.

While scholarly activity on public procurement with a social dimension exhibits geographical fragmentation, it is evident that certain collaborations and connections among authors emerge

due to geographical or historical proximity, as observed in the case of Slovakia (see Figure 2).

Figure 2: Collaboration among authors from various countries in research focused on public procurement with a social dimension



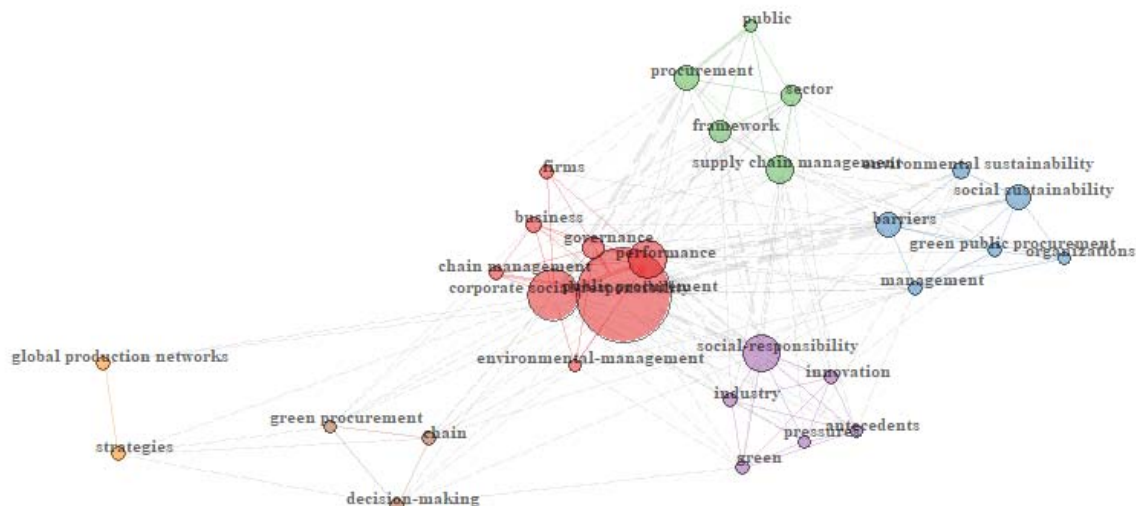
Source: Own processing from RStudio software based on Web of Science database

The connections among authors signify a more comprehensive analysis of this issue, underscoring its significance.

Based on an analysis of the co-occurrence of keywords in the existing literature on public procurement with a social dimension (see Figure 3), we can identify six primary areas of research interest:

- Public Procurement and Corporate Social Responsibility: Examining the performance and oversight of corporations within the context of supply chain management and environmental management.
- Social Responsibility and Innovation: Investigating the relationship between social responsibility and the promotion of green business practices.
- Social Sustainability: Exploring barriers to green public procurement and broader environmental sustainability.
- Supply Chain Dynamics: Analysing the role of supply chains within the public procurement sector.
- Decision-Making Processes: Assessing the decision-making mechanisms within green procurement chains.
- Strategic Considerations: Evaluating strategy concerning global production networks.

Figure 3: Occurrence of Keywords in the Literature on Public Procurement with a Social Dimension



Source: Own processing from RStudio software based on Web of Science database

Loosemore et al. (2020) highlight the resurgence of the concept of social procurement as a favoured public policy mechanism for governments to address increasing social disadvantage and inequality. Public authorities can engage in socially responsible public procurement by acquiring ethical products and services and utilizing tenders to generate employment opportunities, promote decent work, foster social and professional inclusion,

and improve conditions for individuals with disabilities and other disadvantaged groups (European Commission b). Loosemore et al. (2020) provide a simplified definition of social procurement as the acquisition of various assets and services aimed at intentionally generating social outcomes.

Social value can be created in various ways, however, the most prevalent mechanism in emerging social procurement policies is the stipulation to generate employment opportunities for disadvantaged individuals. This broad category may encompass people with disabilities, at-risk youth, long-term unemployed individuals, as well as migrants and refugees (Loosemore et al., 2020).

A positive development for Slovakia in this regard is the public procurement process, which allows – and indeed encourages – the prioritization of vulnerable segments of the population, thereby promoting their integration into the country’s economic life and contributing to the resolution of economic, social, and environmental challenges. However, despite public procurement facilitating the competitive marketing of products and services by social enterprises, there remains a critical need to assist these enterprises in competing effectively against profit-oriented businesses.

Thus, under Act No. 343/2015 Coll. on Public Procurement in Slovakia, the social aspect of public procurement is defined as *“an aspect related to the subject of the contract that may lead to a positive social impact from the performance of the contract”*. This includes, but is not limited to, *“the creation or promotion of employment opportunities, the provision of decent, fair, and satisfactory working conditions that exceed legal obligations, the inclusion of disadvantaged, vulnerable, or excluded individuals and groups in social relations, and the facilitation of their access to the labour market”*. Additionally, it encompasses *“enhancing the accessibility and usability of goods, services, and works for individuals with disabilities, promoting ethical and fair trade, supporting the growth of a knowledge-based economy and innovation, ensuring resource sustainability and social and territorial cohesion, increasing supplier accountability concerning societal interests—particularly by integrating socially beneficial activities into the supplier’s operations—and collaborating with stakeholders affected by their activities or mitigating the consequences of economic and social underdevelopment in the least developed regions”*.

Under this legislation, contracting authorities are mandated to incorporate social considerations into public procurement practices and have the option to establish “reserved contracts.” A reserved contract is defined in the Act as a procurement opportunity exclusively available *“to registered integrative social enterprises, sheltered workshops, or natural persons with disabilities who operate or are self-employed in sheltered workplaces”*. Additionally, *“the performance of the contract may be reserved for sheltered workplace programs, provided that at least 30% of the employees in registered integrative social enterprises, sheltered workshops, or sheltered workplace programs are individuals with disabilities or other disadvantaged persons”*. Contracting authorities will face sanctions if they fail to adhere to the conditions of social procurement.

Flammer’s (2018) further indicates that organizations demonstrating higher social and environmental performance tend to receive a greater number of contracts. This suggests that corporate social responsibility can function as a signalling and differentiation strategy that influences the purchasing decisions of government agencies.

### 3 Methodology

This paper examines the use of public procurement as a funding mechanism for social enterprises. The analysis focuses on a comprehensive database of all public procurements conducted through the e-contracting portal (EKS) in Slovakia.

#### 3.1 Research objective

The objective of this analysis is to highlight the uneven involvement of social enterprises in public procurement, which can be attributed to both a lack of awareness and reluctance to compete.

Motivated by the existing gap in scientific research within this area, we aim to address the following research questions:

1. Are social enterprises in Slovakia reasonably involved in public procurement compared to commercial enterprises?
2. What factors determine the success of social enterprises in public procurement?
3. Is there untapped potential for greater social enterprise involvement in public procurement?

To address these carefully formulated research questions, we focus on:

- a comparative analysis of the participation levels of social enterprises versus commercial enterprises in public procurement in Slovakia;
- a comparative evaluation of the financial resources allocated to social enterprises and commercial enterprises via public procurement processes;
- an evaluation of the success rates of social enterprises in public procurement;
- an identification of the factors influencing the success rate of social enterprises in public procurement, including legal, financial, and operational variables;
- a determination of the economic sectors where social enterprises serve as suppliers, based on CPV codes;
- an analysis of the goods and services most in demand in all public procurements; and
- an identification of potential areas for increasing the involvement of social enterprises in public procurement, based on the demand for goods and services in public procurement categorized by CPV codes and the economic activities of social enterprises.

#### 3.2 Methods

To address the stated research question, we employ a range of methodological techniques, beginning with basic descriptive statistics. In addition, we utilize advanced data science and knowledge discovery methods, specifically machine learning algorithms such as decision trees, for classification and prediction tasks. Furthermore, we incorporate regression techniques, with a particular emphasis on binary logistic regression.

The selection of these methods is grounded in their prevalence and effectiveness within contemporary scientific research in the field of business, where the integration of data science techniques, including decision trees and logistic regression, has become increasingly common (e.g. Deal & Edgett, 1997; Kipkoge et al., 2021).

A decision tree is a type of supervised learning model that organizes data into a hierarchical structure to arrive at a set of outcomes. The objective of the optimization algorithm in a decision tree is to classify the data and identify the distribution that maximizes information gain, leading to a more straightforward classification (Suthaharan, 2016). Decision trees are therefore commonly used in machine learning for tasks such as prediction and description, i.e. classification. This method is favoured for its simplicity, ease of interpretation, accuracy, and strong predictive capabilities (Rokach & Maimon, 2007). In recent years, decision trees have also been utilized in fields like entrepreneurship and social entrepreneurship to assess potential success (e.g. Ochuenwike, Ofozor & Ejiofor, 2019; Yin & Wang, 2020).

Logistic regression is widely used by economists and is frequently applied in procurement and entrepreneurship analysis (e.g. Reijonen, Saastamoinen & Tammi, 2018; Gyamfi, Anderson & Prokop, 2019). Logistic regression models are commonly used to examine the impact of predictor variables on categorical outcomes, typically when the dependent variable is binary (Nick, & Campbell, 2007). In such models, the dependent variable takes on one of two possible values: 1 (success) or 0 (failure) (Aldrich & Nelson, 1984; Wooldridge, 2012). Logistic

regression works by modelling the natural logarithm of the odds of success as a function of the independent variables, establishing the relationship between the binary outcome and the predictors. This allows for an understanding of how each predictor influences the likelihood of the outcome occurring (LaValley, 2008; Stoltzfus, 2011).

In this paper, we quantify the involvement of social enterprises in public procurement using descriptive statistics. To evaluate the success of social enterprises in public procurement and identify the factors influencing that success, we apply the decision tree methodology. Additionally, we employ regression techniques, with a specific focus on binary logistic regression, to assess the impact of these factors on the success of social enterprises in public procurement. This combination of methods provides a comprehensive view of both statistical trends and underlying determinants of social enterprise success in this context.

### 3.3 Data and variables

For this research, we analyse data for public procurement from the EKS portal covering the period from September 30, 2014, to January 31, 2023, which comprises 513,651 records.

Utilizing these records, we identified social enterprises participating in public procurement contracts based on their Unique Identification Number (IČO), cross-referencing with databases from the Register of Social Enterprises (RoSE) maintained by the Ministry of Labour, Social Affairs, and Family of the Slovak Republic. However, it is important to note that the Social Enterprise Act was enacted in Slovakia on May 1, 2018. Consequently, the register of social enterprises contains

data starting from September 17, 2018, which marks the date when the first social enterprise was officially registered in Slovakia. Thus, in our analysis, we include all social enterprises that have existed from the time the Act came into force until 2023, amounting to a total of 608 registered social enterprises.

As for the involvement of social enterprises in public procurement, we consider the entire period analysed, from 2014 to 2023. However, for the years 2014–2017, the recorded involvement reflects a time when currently registered social enterprises were competing for public procurement contracts as traditional commercial enterprises before their formal registration under the Social Enterprise Act introduced in 2018. This distinction is important to acknowledge, as it highlights the transition of these entities from conventional commercial roles to their current status as social enterprises.

Additionally, we incorporated financial data related to social enterprises bidding for public procurement contracts, which was obtained through a paid Finstat license. This financial data encompasses all information included in the financial statements submitted by social enterprises during the specified period.

The methods outlined in subchapter 3.2 were applied to analyse these secondary data. A detailed list of all variables used in this study, along with their respective sources, is presented in Tables 1–3.

Table 1: Variables derived from EKS

Label	Characteristic	Source	Label	Characteristic	Source
SUCCESS FAILURE (dependent variable)	A binary variable representing the success of the SE in the PP if it contains the value 1, and the failure of the SE in the PP if it contains the value 0	EKS	Number of notified suppliers	The count of relevant potential suppliers informed about the opportunity to participate in the PP	EKS
CA City	City where the headquarters of the contracting authority is located	EKS	Entry price	The price of the tender suggested by the first tenderer	EKS
Descriptive form type	The subject of the procurement including the goods, services, or a combination of both	EKS	Number of contestants	The total count of potential suppliers bidding for a contract in the PP	EKS
Descriptive form service category	Category of procured services, classified according to the CPV code	EKS	Number of submitted bids	The total number of bids submitted by tenders	EKS
Region of Fulfilment	The region where the goods or services are to be delivered	EKS	Offer type	A binary variable indicating whether the tender is classified as a contractual tender or an auction tender	EKS
Maximum resources amount	The maximum financial limit set by the contracting authority at the time of the call for tenders	EKS	Final value amount	The final price established for the PP	EKS
Contractual relationship	The nature of the contractual arrangement under which the procurement will be executed	EKS	Evaluation criteria	A binary variable representing the criterion for selecting the winning tender, with options for price including VAT and price excluding VAT	EKS
EU funding	A binary variable indicating whether EU resources will be used to finance the procurement (TRUE/FALSE)	EKS			

Source: Own based on EKS

Table 2: Variables derived from RoSE

Label	Characteristic	Source	Label	Characteristic	Source
Type of RSE	The classification of the registered SE in Slovakia	RoSE	LLC	A binary variable expressing whether the legal form of the SE is a Limited Liability Company	RoSE
Legal form	The legal structure of the SE	RoSE	Cooperative	A binary variable indicating whether the legal form of the SE is a Cooperative (1) or not	RoSE

				(0)	
Registered office of the enterprise Region	The region where the headquarters of the SE is located	RoSE	SE	A binary variable indicating the creation and operation of the SE, where a value of 1 signifies that it is a SE, and 0 indicates it is not	RoSE
Measurable positive social impact	The specific type of positive social impact reported by the SE	RoSE			

Source: Own based on RoSE

Table 3: Variables derived from Finstat

Label	Characteristic	Source	Label	Characteristic	Source
SK NACE	The specific code associated with the business activities of the supplier	Finstat	Profit from operations line	Income generated by the SE from its economic activities in €	Finstat
Type of ownership	The type of ownership for the bidder (SEs)	Finstat	Revenue from the sale of goods	Total revenue earned from the sale of goods by the SE in €	Finstat
Number of employees	The total number of employees working for the SE	Finstat	Revenue from the sale of own products	Total revenue from the sale of the SE's products in €	Finstat
EBITDA	The EBITDA for the SE in €	Finstat	Current financial assets	Current financial assets of SE in €	Finstat
Statutory body binary	A binary variable where 1 indicates the SE's statutory officer is female, and 0 indicates the officer is male	Finstat	Revenue from the sale of own services	Total revenue earned by the SE from the sale of services in €	Finstat
DEBTS	A binary variable where 1 indicates that the SE has existing debt, and 0 means the SE has no debt	Finstat	Changes in internal inventory	The changes in the internal inventories within the SE in €	Finstat
Non-current financial assets	The total amount of non-current financial assets of the SE in €	Finstat	Own work capitalized	The capitalisation of materials and goods within the SE in €	Finstat
Non-current receivables	The total amount of non-current receivables of the SE in €	Finstat	Current bank loans	Loans taken by the SE from banks with current repayment schedules in €	Finstat
Current receivables	The total amount of current receivables of the SE in €	Finstat	Operating result	The operating result of the SE in €	Finstat
Revenue from the sale of own products and services	Total revenue earned by the SE from the sale of its own products and services (MFIs) in €	Finstat	Other operating income	Additional income from economic activities of SE in €	Finstat
Equity	The total equity held by the SE in €	Finstat	Profit from financial activities	Income from the SE's financial activities in €	Finstat
Long-term Provisions	The amount of long-term financial provisions of the SE in €	Finstat	Interest income	Revenue from interest earned by the SE in €	Finstat
Long-term bank loans	Loans taken by the SE from banks with long-term repayment schedules in €	Finstat	Exchange rate gains	Profits generated by the SE due to foreign exchange gains in €	Finstat
Short-term Provisions	The amount of short-term financial provisions of the SE in €	Finstat	Payment orders	A binary variable where 1 indicates that a payment order has been issued to the SE, and 0 indicates no payment order	Finstat
Sale of non-current intangible and tangible assets and material	Income of SE generated from the sale of non-current intangible and non-current tangible assets, as well as materials in €	Finstat	Net assets	The total net assets of the SE in €	Finstat
Short-term financial assistance	Short-term financial assistance provided to SE in €	Finstat	Added value	The increased utility of a product supplied by SE in €	Finstat
Net turnover	The total net turnover of the SE in €	Finstat	Other income from financial activities	Additional income related to the financial activities of the SE in €	Finstat

Source: Own based on Finstat

## 4 Results

This section presents the key findings of the research, focusing on the involvement of social enterprises in public procurement, the financial allocations to these enterprises, and the business activities contracted through public procurement, as categorized by CPV codes.

### 4.1 Involvement of social enterprises in public procurement

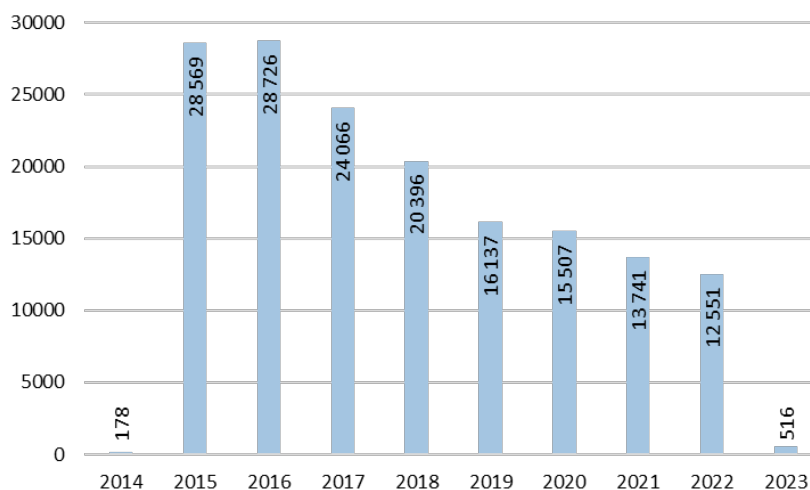
In the area of public procurement, we analysed all public procurement contracts launched and implemented through the EKS from September 2014 to January 2023 (see Figure 4). Thus, a total of 513,651 records from the EKS portal were analysed, with a total number of 160,387 contracts.

In the Public Procurement through the EKS portal, out of 160,387 contracts, social enterprises were involved a total of 1,642 times, with 38 unique social enterprises bidding for the contracts, representing 0.44% of all unique bidders (8,644). The data analysed thus shows that social enterprises were involved in 1% of the contracts launched on the EKS portal.

The success rate of social enterprises was 0.34% (544 wins) of all contracts published on the portal (160,387 contracts) over the

period under review. However, the success rate of social enterprises for the contracts for which they bid (1,642 contracts) was 33.13% (544 wins). This shows that when social enterprises were involved in public procurement, almost a third of social enterprises were successful and won the contract.

Figure 4: Number of PP launched on EKS platform from September 2014 - January 2023



Note: The displayed numbers represent all public procurements announced through the EKS portal from its launch in September 2014 until the end of January 2023.

Source: Own processing based on EKS database

Based on the yearly overview (see Table 4), we can conclude that social enterprises experienced the most successful public procurement outcomes in 2015 and 2022. However, it is important to highlight that in 2015, there were no registered social enterprises in Slovakia; instead, they operated as ordinary commercial enterprises. Notably, the years 2020 and 2021 also proved to be strong for social enterprises, coinciding with the highest number of newly established or newly registered social enterprises, including those that transformed from commercial enterprises into social enterprises.

Table 4: Yearly overview of winners in public procurement

Year	Number of non-SE contractors	Number of SE contractors
<b>Total</b>	160,387	544
2014	178	0
2015	28,569	110
2016	28,726	55
2017	24,066	41
2018	20,396	27
2019	16,137	41
2020	15,507	82
2021	13,741	76
2022	12,551	107
2023	516	5

Source: Own processing based on EKS and RoSE database

Interestingly, in 2023, despite only analysing data from the first month of the year (see Table 4), we observed that the success rate of social enterprises in public procurement closely mirrors that of 2022, showing no significant deviation from the established trend.

Out of the pool of 38 unique social enterprises that bid for contracts on the EKS portal, 73.68% (28) of them were successful. Thus, a total of 28 different (unique) social enterprises won contracts through the EKS portal, representing 0.46% of all unique winners (6,144).

Of all the contracts that social enterprises competed for,

- 19.85% of them (326) ranked 2nd,
- 12.85% of them (211) in 3rd place,
- 6.21% of them (102) in 4th place,
- 4.75% of them (78) in 5th place, and
- the remaining 23.39% (384) in the higher ranks (lower overall ranking).

On average, social enterprises ranked 4th based on the last bid price for the contract. The average number of bids submitted per contract recorded in the EKS portal in the analysed dataset was 3.2, with the most frequent number of bids submitted per contract being 1 and the highest number of bids submitted per contract being 30.

#### 4.2 Financial amount allocated to the social enterprises in public procurement

Another area of interest of this paper was the comparison of funds allocated to social enterprises versus other companies participating in public procurement. Given that social entrepreneurship in Slovakia was only introduced in 2018, we divided the SEs sample into two subsamples. This division reflects the existence and involvement of enterprises in public procurement before 2018 when they were not yet recognized as part of the social economy. We examined the total funds allocated to all contractors in public procurement, the funds earned by enterprises that later transformed into SEs for the years 2015-2017, and the funds allocated directly to SEs from 2018 to January 2023.

Based on the analysis conducted, it is evident that the volume of funds allocated to social enterprises through public procurement did not exceed the 1% threshold in any of the reviewed periods. The highest allocation to social enterprises occurred in 2020, coinciding with the peak in the registration of new social enterprises (see Table 5).

Considering that only one calendar month is included in the analysis for 2023, we can conclude that the ratio of financial resources allocated to social enterprises compared to conventional commercial enterprises remains relatively unchanged from the previously analysed periods.

Additionally, during the period from 2014 to 2017, organizations that later transitioned into social enterprises participated in public procurement. However, the financial amounts awarded during that time did not significantly differ from those in the subsequent period starting in 2018.

Table 5: An overview of the funds allocated through public procurement during the analysed period

YEAR	All contractors	SE contractors		Non-SE contractors	
	€	€	%	€	%
2014	1,309,982.06	-	-	1,309,982.06	100.00
2015	217,537,958.61	578,879.45	0.27	216,959,079.16	99.73
2016	331,906,525.84	1,163,452.13	0.35	330,743,073.71	99.65
2017	340,821,921.31	1,695,048.61	0.50	339,126,872.70	99.50
2018	339,379,236.58	686,985.48	0.20	338,692,251.10	99.80
2019	270,426,582.59	824,815.60	0.31	269,601,766.99	99.69
2020	230,871,050.24	1,847,312.53	0.80	229,023,737.71	99.20
2021	236,172,971.77	1,291,490.49	0.55	234,881,481.28	99.45
2022	204,238,494.72	1,459,945.44	0.71	202,778,549.28	99.29
2023	8,925,752.86	17,413.95	0.20	8,908,338.91	99.80
<b>TOTAL</b>	<b>218,159,047.58</b>	<b>9,565,343.68</b>	<b>0.44</b>	<b>2,172,025,133.90</b>	<b>99.56</b>

Source: Own processing based on EKS and RoSE database

### 4.3 Business activities (CPV) contracted through public procurement

Subsequently, we examined the business activities that social enterprises can provide by analysing the Common Procurement Vocabulary (CPV) codes associated with individual calls for tenders. This analysis included both all contracts and those specifically involving social enterprises. We focused on level 4 of CPV codes, which are formatted as XXXX.

In the procurement process, a single procurement may feature multiple CPV codes, resulting in a substantial increase in our database. We processed a total of 510,783 CPV codes across 160,387 procurements.

The overall number of unique CPV codes identified for all contracting authorities was 1,061. The most frequently occurring CPV code across all contracts, as well as those involving SEs, was code 6000, which pertains to transport services for the delivery of ordered goods. Consequently, we excluded this code from further analysis. The actual goods or services most requested from procuring entities were represented by CPV group 30190000, which encompasses Various office equipment and supplies (25,620 occurrences). Following this, the next most frequent codes for all contracts included 30230000 - Computer-related equipment (16,264 occurrences), 30120000 - Photocopying and offset printing equipment (16,138 occurrences), and 39830000 - Cleaning products (12,230 occurrences). The remaining 1,056 codes were requested fewer than 10,000 times, and a detailed list of the 85 most frequent CPV codes, each occurring more than 999 times across all contracting authorities, can be found in Annex.

Regarding the public procurements in which social enterprises participated, the sample comprised 194 unique CPV codes. The most frequently used codes included 98310000 - Washing and dry-cleaning services (463 occurrences), 79710000 - Security services (370 occurrences), 90910000 - Cleaning services (357 occurrences), 18830000 - Protective footwear (141 occurrences), 30210000 - Data-processing machines (hardware) (139 occurrences), and 30230000 - Computer-related equipment (117 occurrences). A comprehensive list of the 71 most frequently occurring CPV codes (with more than three occurrences) is available in Annex.

The analysis thus indicates that business activities contracted through public procurement vary significantly depending on the type of suppliers involved. Social enterprises are more actively engaged in tenders focused on service performance, such as laundry, cleaning, security, and janitorial services. This finding aligns with the predominant economic activities of social enterprises registered in Slovakia, where the majority report engaging primarily in business services, construction work, hospitality (including hotels and restaurants), retail services, as well as social services and services for individuals. In contrast, commercial suppliers predominantly participate in contracts related to the supply of specialized goods, including office equipment, computer-related equipment, and cleaning products. This distinction highlights the differing roles of social enterprises and commercial suppliers within public procurement, with SEs playing a more service-oriented role.

### 4.4 Determinants of success of social enterprises in public procurement

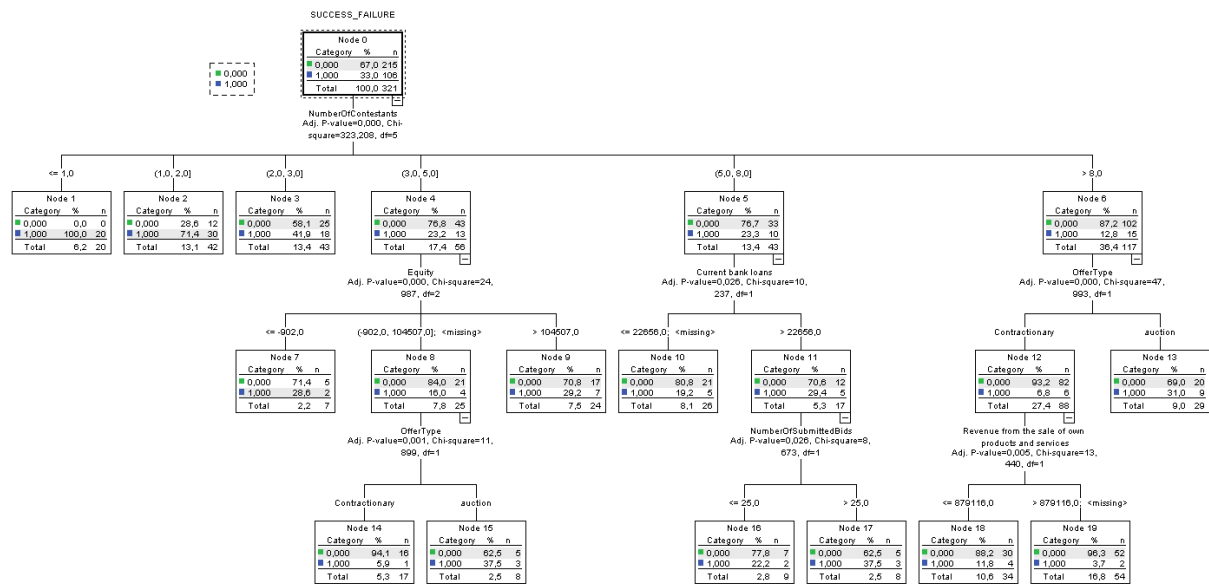
Consequently, our analysis focused on identifying the determinants influencing the success of social enterprises in public procurement through decision trees and subsequent regression analysis showing the direction of action of each of the identified variables.

The initial step in the analysis was the identification of statistically significant variables shaping the success of social enterprises in public procurement using regression and classification trees CHAID (see Figure 5), EXHAUSTIVE CHAID (see Figure 6), and CRT (see Figure 7), and the classification algorithm QUEST (see Figure 8).

In all the machine learning methods used, the fundamental assumptions included dividing the analysis sample into training and test sets in an 80:20 ratio, setting the significance level at 0.05, and pruning at a maximum level of 5 as recommended in the relevant literature (e.g. Friedman, Kohavi & Yun, 1996; Doan, 2005; Boonamnuay, Kerdprasop & Kerdprasop, 2018; Han, Jeong & Kim, 2023).

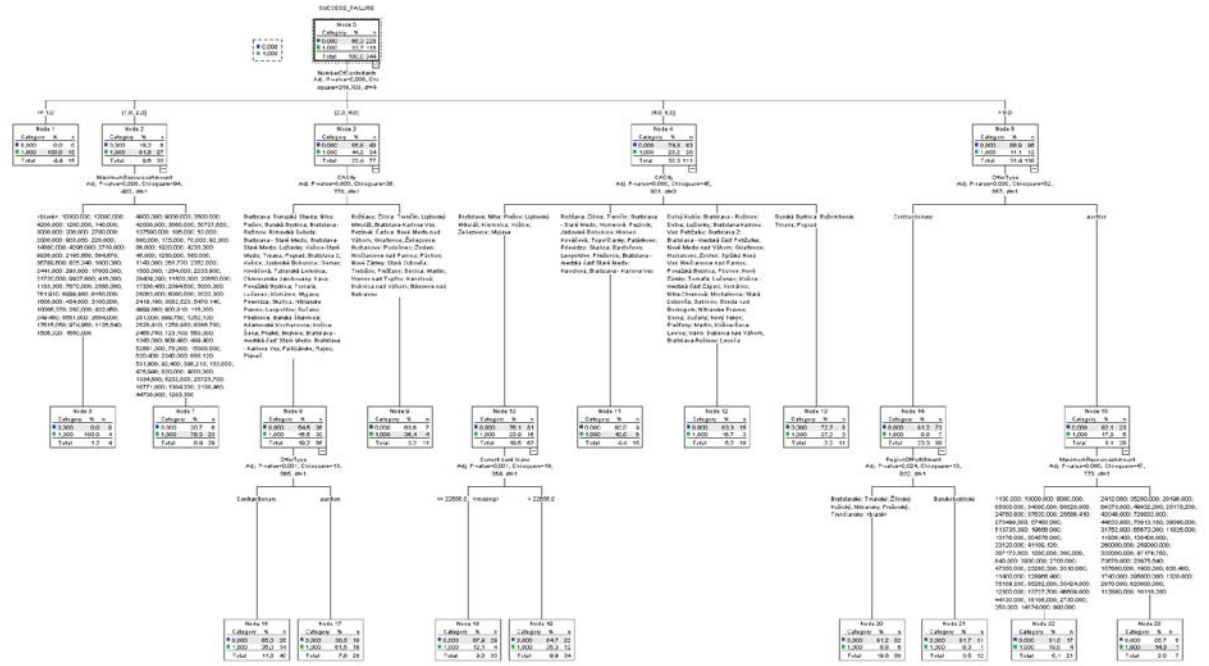


Figure 5: CHAID for the variable SUCCESS\_FAILURE



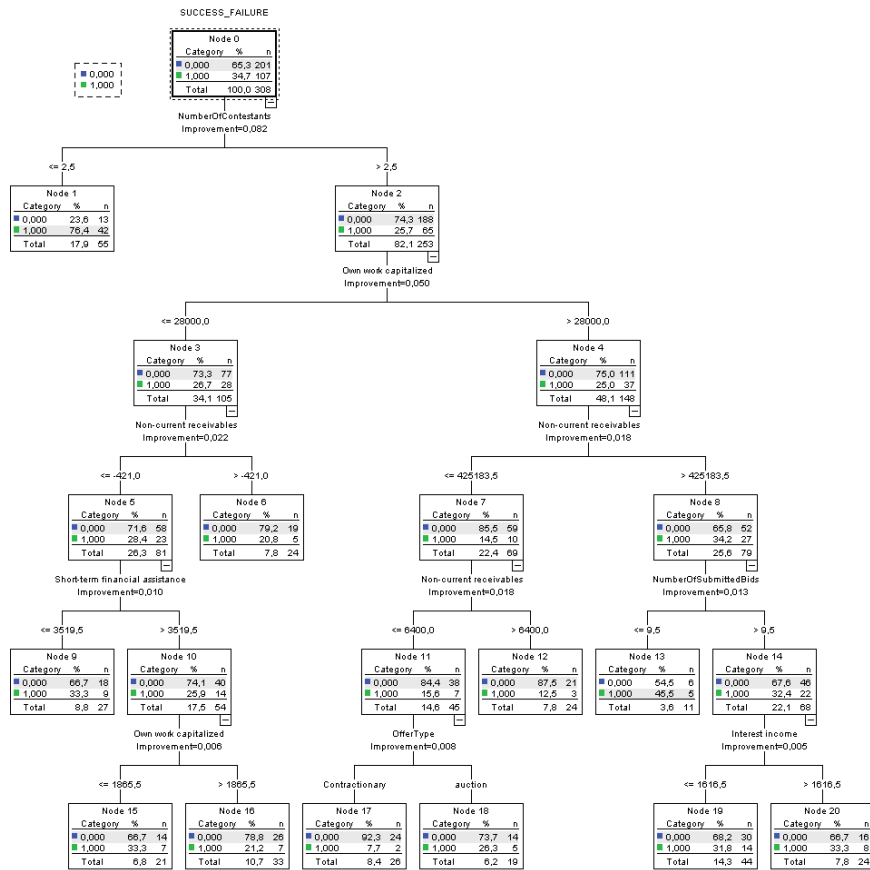
Source: Own processing from SPSS software

Figure 6: EXHAUSTIVE CHAID for the variable SUCCESS\_FAILURE



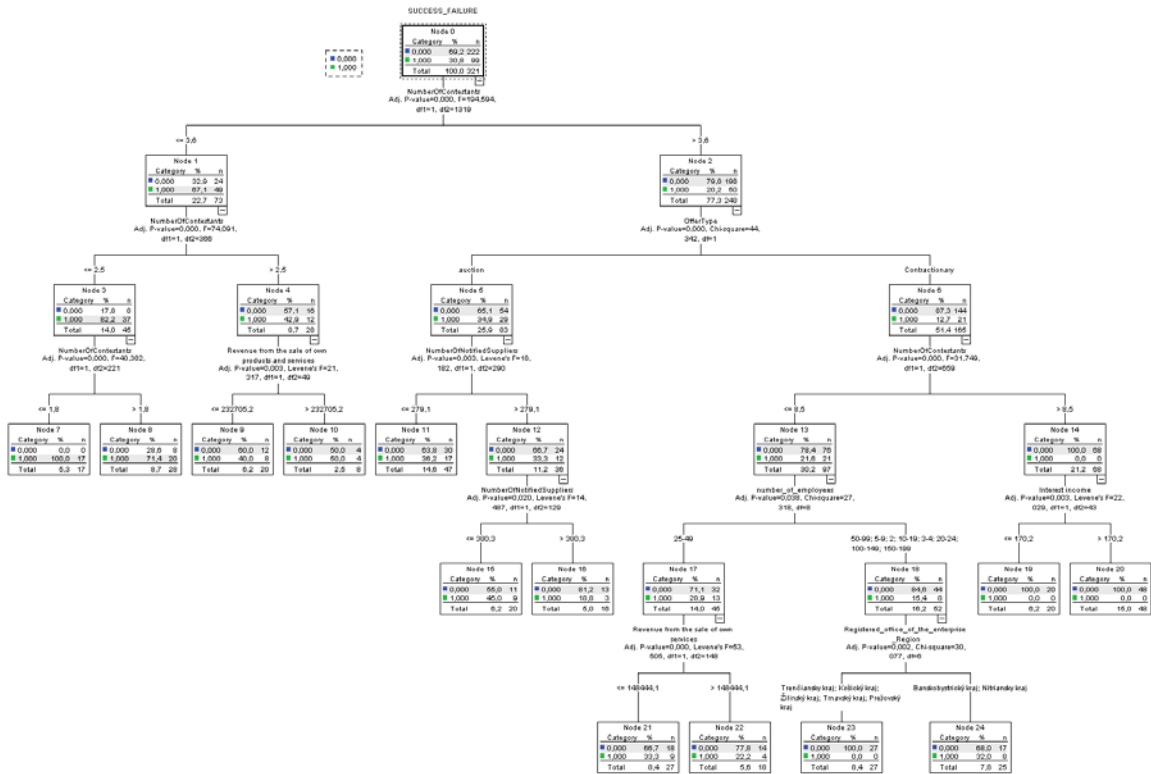
Source: Own processing from SPSS software

Figure 7: CRT for the variable SUCCESS\_FAILURE



Source: Own processing from SPSS software

Figure 8: QUEST for the variable SUCCESS\_FAILURE



Source: Own processing from SPSS software

Based on this method, we determined the most significant variables influencing the success rate of the analysed social enterprises in public procurement, expressed through a binary variable, where a value of 0 meant the failure (loss) of the social enterprise in bidding for a public procurement contract and a value of 1 meant the success (win) of the social enterprise in bidding for a public procurement contract.

The most important variables influencing the success of social enterprises in public procurement, as predicted by at least two decision trees, include:

- number of bidders for a given contract;

- type of bid available for public procurement (contracting vs. auction bid);
- value of short-term bank loans taken by the social enterprise;
- number of tenders submitted by the tenderers for the contract;
- revenue from the sale of own products and services by the social enterprise; and
- interest income received by the social enterprise.

In Table 6, we present the list of all significant variables affecting the success of social enterprise in the public procurement revealed by the decision trees.

Table 6: The most significant variables affecting the success of SE in the PP based on the decision tree analysis

Variable	Method			
	CHAID	EXHAUSTIVE CHAID	CRT	QUEST
Number of contestants	x	x	x	x
Offer type	x	x	x	x
Current bank loans	x	x		
Number of submitted bids	x		x	
Revenue from the sale of own products and services	x			x
Equity	x			
Maximum resources amount		x		
CA City		x		
Region of fulfilment		x		
Interest income			x	x
Own work capitalized			x	
Non-current receivables			x	
Short-term financial assistance			x	
Number of notified suppliers				x
Number of employees				x
Revenue from the sale of own services				x
Registered office of the enterprise region				x

Source: Own processing from SPSS software based on EKS, RoSE and Finstat database

These variables were identified as key factors influencing the likelihood of social enterprises' success in public procurement processes. Regarding the predictive performance of the regression and classification trees (see Table 7), their predictive accuracy is notably high, with all models demonstrating a predictive ability of at least 72%.

Table 7: Predictive performance of the decision trees

Method used	Predicted Correct
CHAID	77.9%
EXHAUSTIVE CHAID	72.4%
CRT	74.4%
QUEST	78.2%

Source: Own processing from SPSS software

Based on the results from the regression and classification decision trees, we proceeded with regression analysis to assess the direction of their impact on the success of social enterprises in public procurement. We employed logistic regression, using the binary variable representing the success or failure of social enterprises in public procurement as the dependent variable, and included all the previously identified variables (shown in Table 6) as predictors.

Our regression analysis identified the most significant variables as the number of bidders for a contract, the number of tenders submitted, the type of procurement bid (contracting vs. auction), maximum resource availability, number of employees, interest income, and current bank loans, with the significance levels detailed in Table 8.

Factors that contribute positively to the success of social enterprises in public procurement include:

- Maximum number of resources, where for each unit increase in the maximum allocated resources by contracting

authority, the odds of success increase proportionally by a factor of 1, holding all other factors constant.

- Offer type, where if the procurement process is conducted via auction, the odds of success are 139% higher compared to failure, assuming no changes in other conditions.
- Current bank loans, where a unit increase in current bank loans leads to a corresponding increase in the odds of success by a factor of 1, *ceteris paribus*.

Based on the regression analysis, we found that while the maximum contract price is a significant factor, it does not guarantee that social enterprises will win the public procurement. Interestingly, when procurement is decided solely based on the initial contract offer from each bidder – without proceeding to further ordinary action – social enterprises are less likely to succeed in these tenders.

Another noteworthy finding is the amount of current debt that the social enterprise holds with the bank; since its presence and greater amount appear to enhance the social enterprises chances of success in procurement. To explore this insight further, we consulted with staff at the Regional Centre of Social Economy established by the Implementation Agency of the Ministry of Labour, Social Affairs, and Family of the Slovak Republic. We learned that social enterprises seeking state aid must demonstrate self-sufficiency and co-finance with the aid provided for their operations. Consequently, social enterprises may take out loans from banks equivalent to 20% of the state aid received. This may explain why well-established social enterprises engaged in public procurement have bank debts, thus highlighting the importance of this factor in their success.

On the other hand, factors negatively affecting SP's success in public procurement include:

- Number of participants, where for every additional participant in the procurement process, the odds of failure are 18% higher than odds to success, *ceteris paribus*.
- Number of submitted bids, where an increase in the number of bids submitted raises the odds of failure by a factor of 1 for each additional bid, assuming no changes in other conditions.
- Number of employees, where each additional employee corresponds to 12% higher odds of failure compared to success, holding all other factors constant.
- Interest income, where a unit increase in interest income increases the odds of failure by a factor of 1, *ceteris paribus*.

In examining the factors that negatively affect the odds of success of social enterprises in public procurement, the number of bidders emerges as a critical issue. A higher number of participants diminishes the chances of success for the social enterprise, as commercial competitors often drive down contract prices to unacceptably low levels. This situation significantly undermines the competitiveness of social enterprises, which frequently cannot reduce their bids sufficiently due to the higher operating costs associated with providing a supportive work environment for disadvantaged and disabled employees. A similar dynamic exists when there are numerous bids submitted; increased competition can be detrimental, especially since social enterprises may not engage in aggressive pricing strategies.

Table 8: Logistic Regression Analysis Results

Variable	Coefficient	Std. Error	z	p-value		Odds ratio
const	0.3132	0.3177	0.9858	0.3242		-
CA City	-0.0021	0.0023	-0.8993	0.3685		0.9979
Region of fulfilment	-0.0223	0.0265	-0.8396	0.4011		0.9780
Maximum resources amount	2.7e-06	1.2e-06	2.3710	0.0178	**	1.0000
Number of notified suppliers	-0.0007	0.0004	-1.6430	0.1003		0.9993
Number of contestants	-0.2034	0.0274	-7.4170	<0.0001	***	0.8160
Number of submitted bids	-0.0031	0.0010	-2.9390	0.0033	***	0.9969
Offer type	0.8720	0.1368	6.3750	<0.0001	***	2.3917
Number of employees	-0.1247	0.0544	-2.2930	0.0218	**	0.8828
Registered office of the enterprise	-0.0889	0.0644	-1.3810	0.1674		0.9149
Noncurrent receivables	-2.1e-07	9.3e-07	-0.2243	0.8226		1.0000
Equity	1.2e-07	3.3e-07	0.3569	0.7211		1.0000
Current bank loans	1.4e-06	7.8e-07	1.7260	0.0843	*	1.0000
Short term financial assistance	3.6e-06	3.6e-06	0.9783	0.3279		1.0000
Revenue from the sale of own property	-3.2e-07	2.8e-07	-1.1480	0.2508		1.0000
Revenue from sale of own services	-7.8e-09	2.7e-07	-0.0286	0.9772		1.0000
Own work capitalized	-0.0002	0.0002	-0.9930	0.3207		0.9998
Interest income	-0.0004	0.0002	-2.3690	0.0178	**	0.9996

Note: Significance codes marked as (\*), (\*\*) and (\*\*\*) correspond to significance levels of  $p < 0.1$ ,  $p < 0.05$  and  $p < 0.01$ , respectively.

Source: Own processing from Gretl software based on EKS, RoSE and Finstat database

Another intriguing factor related to social enterprises challenges is the number of employees. However, it is essential to note that this observation might be manipulated by the specific structure of the sample, which primarily included social enterprises with employee counts between 25 and 49 (a total of 773). In contrast, the other size categories, comprising a total of 836 social enterprises, ranged from fewer than 25 to more than 49 employees (i.e. 9 separate categories). Therefore, it is reasonable to conclude that an increase in employee numbers should not significantly affect the success of social enterprises in the procurement process.

Additionally, interest income poses another challenge for social enterprises in public procurement. It is important to highlight that only 16.2% (266) of the social enterprises in our sample reported having interest income, which could introduce bias in the regression results.

## 5 Discussion

*RQ1: Are social enterprises in Slovakia reasonably involved in public procurement compared to commercial enterprises?*

Based on our analysis, we conclude that the participation of social enterprises in public procurement in Slovakia remains significantly low, with only 38 out of 650 registered social enterprises involved during the monitored period. Moreover, the share of public procurement contracts bid on by these social enterprises was less than 1%, indicating insufficient engagement. To address this, it is crucial to raise awareness about the opportunities for social enterprises to secure funding through public procurement. Simultaneously, contracting authorities

should be encouraged to consider awarding more contracts to social enterprises rather than relying solely on traditional commercial entities (Polačková, 2021).

*RQ2: What factors determine the success of social enterprises in public procurement?*

Our analysis revealed that key factors determining the success of social enterprises in public procurement include both the number of bidders and the volume of bids submitted. This reflects a "competitive effect", where a higher number of participants drives prices down (Stehlik, 2018). Social enterprises, however, often struggle to compete with the lower bids offered by commercial entities, which significantly limits their competitiveness.

Additional factors that significantly affect the likelihood of success for social enterprises in public procurement include the bid type variable, with social enterprises being less successful when contracts are awarded based on an initial bid. It is important to note, however, that the data analysed here suggests possible collusion in some tenders, where suppliers pre-negotiate and submit unrealistically low bids, later adjusting to a more realistic price due to changes in material or labour costs.

Variables that improve the chances of social enterprise success include the maximum contract amount set by the contracting authority and the current bank loans held by the social enterprise. While indebtedness may not be an ideal indicator of financial health, in the context of Slovakia, it can signal a positive aspect. Social enterprises awaiting state aid must demonstrate liquidity

of at least 20% of the granted aid, which often leads them to secure bank loans.

Regression and classification decision trees, along with logistic regression, also identified interest income and the number of employees as significant variables that decrease the likelihood of success of social enterprise in public procurement. However, these variables presented considerable bias in the sample, as only a few social enterprises reported interest income, and a large proportion of social enterprises fall into the same category of employee numbers within the nine categories recorded.

*RQ3: Is there untapped potential for greater social enterprise involvement in public procurement?*

Given the service-oriented nature of social enterprises, there is clear potential for increasing their participation in public procurement focused on service provision. Operating across diverse sectors and offering services in a wide range of economic activities, these enterprises could significantly benefit from additional funding. Expanding their capacities through increased support, including public procurement opportunities, would not only drive higher turnover but also amplify their positive social impact.

## 6 Conclusion

Social entrepreneurship refers to the establishment of ventures aimed at addressing social issues and fostering positive social change, with a particular emphasis on community impact over profit generation. Social enterprises often focus on areas where traditional market players or public services inadequately meet social needs, providing innovative and flexible solutions to these challenges. Thus, promoting social procurement, which integrates social considerations into public procurement practices, is essential for fostering both economic and social progress. This approach enables contracting authorities to leverage their purchasing power not only for the acquisition of goods and services but also to address societal challenges, including inequality, unemployment, and social exclusion. The involvement of social enterprises in public procurement can facilitate job creation for disadvantaged groups, enhance social cohesion, and promote the delivery of innovative, community-focused services.

This paper aims to analyse the participation and success rates of social enterprises in public procurement in Slovakia from 2014 to 2023. We seek to identify the key factors that influence these enterprises' success in securing public contracts. By comparing the engagement of social enterprises with that of commercial suppliers, this study contributes to a deeper understanding of how public procurement can serve as a crucial mechanism for fostering the growth of social enterprises and enhancing their role in societal development.

The analysis of public procurement contracts launched through the EKS from September 2014 to January 2023 revealed a total of 513,651 records, corresponding to 160,387 contracts. However, social enterprises participated in only 1% of these contracts, with less than 6% of the total registered social enterprises in Slovakia engaging in public procurement. Social enterprises secured a mere 0.34% of these contracts, yet an interesting finding was that when a social enterprise competed for a contract, it achieved success in up to a third of cases. In terms of financial volume, contracts awarded to social enterprises represented only 0.44% of the total volume awarded in all tenders during the review period. To explore the factors influencing the success of social enterprises in public procurement, we employed regression and classification trees, and logistic regression methods. Our analyses revealed that the most significant variable enhancing the likelihood of success for social enterprises was the type of offer; when procurement processes were conducted via auction, the odds of success increased by a factor of 2.39, assuming other conditions remained constant. Conversely, the variables that negatively impacted the chances of success included the number of participants and the number of submitted bids. This indicates

that popular contracts are challenging for social enterprises to secure, due to both high competition and the nature of negotiations, where these enterprises cannot leverage price reductions owing to their high operational costs, which fund their social impact initiatives.

Additionally, our analysis indicated that social enterprises tend to be more service-oriented, primarily engaging in public procurement contracts focused on service delivery rather than the supply of goods. However, these findings align with the primary economic activities undertaken by social enterprises in Slovakia, which include business services, construction work, hospitality, retail services, and services for individuals, among others.

Based on our analysis, there is significant potential for greater involvement of social enterprises in public procurement. However, there remains a gap in measures to ensure their success within this process. While there is an instance of a "reserved contract" in Slovakia, it is not reflected in the EKS portal, making it unclear whether social enterprises are winning contracts due to competitive participation or other factors. A limitation of this study is also the relatively short period examined, as registered social enterprises have only been formally recognized in Slovakia since 2018. Moreover, support for the creation and sustainability of social enterprises, particularly through the National Project Institute of Social Economy (I, II) managed by the Implementing Agency of the Ministry of Labour, Social Affairs and Family, is still in its early stages. Future research should focus on analysing public procurement based on the type of participants, distinguishing between purely commercial, mixed, and social procurement. This would help better identify success factors and the conditions under which social enterprises can effectively compete and win public contracts. Additionally, examining the motivations of contracting authorities to prioritize social outcomes over simply securing the lowest price would provide insights into the broader societal benefits of public procurement. It would also be valuable to explore the financial support provided by the state to social enterprises through direct public procurement contracts, subsidies, or grants aimed at employing disadvantaged groups.

## Literature:

1. Act No. 112/2018 Coll. on Social Economy and Social Enterprises, accessible on <https://www.slov-lex.sk/pravne-predpisy/SK/ZZ/2018/112/20230801>
2. Act No. 25/2006 Coll. on Public Procurement, accessible on <https://www.slov-lex.sk/pravne-predpisy/SK/ZZ/2006/25/20160418>
3. Act No. 263/1999 Coll. on Public Procurement, accessible on <https://www.slov-lex.sk/pravne-predpisy/SK/ZZ/1999/263/20030101>
4. Act No. 343/2015 Coll. on Public Procurement, accessible on [www.slov-lex.sk/pravne-predpisy/SK/ZZ/2015/343/20160418](https://www.slov-lex.sk/pravne-predpisy/SK/ZZ/2015/343/20160418)
5. Aldrich, J., & Nelson, F. (1984). *Linear Probability, Logit, and Probit Models*. SAGE Publications, Inc. <https://doi.org/10.4135/9781412984744>
6. Austin, J., Stevenson, H., & Wei-Skillern, J. (2006). Social and commercial entrepreneurship: same, different, or both? *Entrepreneurship Theory and Practice*, 30(1), 1–22. <https://doi.org/10.1111/j.1540-6520.2006.00107.x>
7. Bauhr, M., Czibik, Á., De Fine Licht, J., & Fazekas, M. (2019). Lights on the shadows of public procurement: Transparency as an antidote to corruption. *Governance*, 33(3), 495–523. <https://doi.org/10.1111/gove.12432>
8. Břanda, J., & Urbančíková, N. (2020). Social Entrepreneurship as a Tool of Sustainable Development. *Quality Innovation Prosperity*, 24(3), 21–36. <https://www.qip-journal.eu/index.php/QIP/article/view/1463>
9. Boonamnuay, S., Kerdprasop, N., & Kerdprasop, K. (2018). Classification and Regression Tree with Resampling for Classifying Imbalanced Data. *International Journal of Machine Learning and Computing*, 8(4). <https://doi.org/10.18178/ijmlc.2018.8.4.708>

10. Brozmanová-Gregorová, A., & Murray Svidroňová, M. (2020). Analysis of the state of social entrepreneurship in Slovakia. *Project BRESE - Border Regions in Europe for Social Entrepreneurship, InterregEurope*. [https://www.npc.sk/media/uploads/files/Analysis\\_of\\_the\\_state\\_of\\_social\\_entrepreneurship\\_in\\_Slovakia.pdf](https://www.npc.sk/media/uploads/files/Analysis_of_the_state_of_social_entrepreneurship_in_Slovakia.pdf)
11. Commission Regulation - 213/2008 - EN - EUR-Lex. (2024). Europa.eu. <https://eur-lex.europa.eu/eli/reg/2008/213/oj>
12. Deal, K., & Edgett, S. J. (1997). Determining success criteria for financial products: A comparative analysis of CART, LoGIT and Factor/Discriminant Analysis. *Service Industries Journal*, 17(3), 489–506. <https://doi.org/10.1080/02642069700000031>
13. Defourny, J. & Nyssens, M. (2006). Defining social enterprise. In *Routledge eBooks*. <https://doi.org/10.4324/9780203946909>
14. Defourny, J., & Nyssens, M. (2008). Social enterprise in Europe: recent trends and developments. *Social Enterprise Journal*, 4(3), 202–228. <https://doi.org/10.1108/17508610810922703>
15. Defourny, J., & Nyssens, M. (2017). Fundamentals for an international typology of Social Enterprise Models. *VOLUNTAS International Journal of Voluntary and Nonprofit Organizations*, 28(6), 2469–2497. <https://doi.org/10.1007/s11266-017-9884-7>
16. Doan, A. E. (2005). Type I and Type II Error. *Encyclopedia of Social Measurement*, 883–888. <https://doi.org/10.1016/b0-12-369398-5/00110-9>
17. European Commission. (2020). *Publications and documents - Employment, Social Affairs & Inclusion*. <https://europa.eu/!Qq64ny>
18. European Commission. (a). *Public procurement*. Internal Market, Industry, Entrepreneurship and SMEs. [https://single-market-economy.ec.europa.eu/single-market/public-procurement\\_en](https://single-market-economy.ec.europa.eu/single-market/public-procurement_en)
19. European Commission. (b). *Social procurement*. [https://commission.europa.eu/funding-tenders/tools-public-buyers/social-procurement\\_en](https://commission.europa.eu/funding-tenders/tools-public-buyers/social-procurement_en)
20. Flammer, C. (2018). Competing for government procurement contracts: The role of corporate social responsibility. *Strategic Management Journal*, 39(5), 1299–1324. <https://doi.org/10.1002/smj.2767>
21. Friedman, J., Kohavi, R., & Uun, U. (n.d.). *Lazy Decision Trees*. <https://cdn.aaai.org/AAAI/1996/AAAI96-107.pdf>
22. Gyamfi, S., Anderson, H. & Prokop, V. (2019). Effects of public procurement contract on firm product and service innovation – a case study of Czechia, Slovakia and Norway. In: 22nd INTERNATIONAL COLLOQUIUM ON REGIONAL SCIENCES. CONFERENCE PROCEEDINGS. *MUNI ECON*, 163-168. <https://doi.org/10.5817/cz.muni.p210-9268-2019-20>
23. Han, G., Jeong, J., & Kim, J.-H. (2023). Adaptive Bayesian Optimization for Fast Exploration Under Safety Constraints. *IEEE Access*, 11, 42949–42969. <https://doi.org/10.1109/access.2023.3271134>
24. Hemels, S. (2022b). Social enterprises and tax: living apart together? In *Springer eBooks* (pp. 77–100). [https://doi.org/10.1007/978-3-031-14216-1\\_5](https://doi.org/10.1007/978-3-031-14216-1_5)
25. Hynes, B. (2009). Growing the social enterprise – issues and challenges. *Social Enterprise Journal*, 5(2), 114–125. <https://doi.org/10.1108/17508610910981707>
26. Januska, M., & Palacka, A. (2023). Critical success factors for public procurement of innovative solutions in Central Europe: Empirical study. *E+M Ekonomie a Management*, 26(2), 24–41. <https://doi.org/10.15240/tul/001/2023-2-002>
27. Kelly, D., Steiner, A., Mazzei, M., & Baker, R. (2019). Filling a void? The role of social enterprise in addressing social isolation and loneliness in rural communities. *Journal of Rural Studies*, 70, 225–236. <https://doi.org/10.1016/j.jrurstud.2019.01.024>
28. Kipkoge, F., Kabano, I. H., Murorunkwere, B. F., & Joseph, N. (2021). Business success prediction in Rwanda: a comparison of tree-based models and logistic regression classifiers. *SN Business & Economics*, 1(8). <https://doi.org/10.1007/s43546-021-00104-2>
29. Kubak, M., Nemeč, P., Stefko, R., & Volosin, M. (2023). On competition and transparency in public procurement during the COVID-19 pandemic in the European Union. *E+M Ekonomie a Management*, 26(2), 4–23. <https://doi.org/10.15240/tul/001/2023-2-001>
30. LaValley, M. P. (2008). Logistic Regression. *Circulation*, 117(18), 2395–2399. <https://doi.org/10.1161/circulationaha.106.682658>
31. Loosemore, M., Alkilani, S., & Mathenge, R. (2019). The risks of and barriers to social procurement in construction: a supply chain perspective. *Construction Management and Economics*, 38(6), 552–569. <https://doi.org/10.1080/01446193.2019.1687923>
32. Lukáčka, P., & Kubolek, P. (2018). Contractual terms and conditions in the context of the public procurement principles and legal competence of the Public Procurement Office in Slovakia. *Bratislava Law Review*, 2(2), 119–126. <https://doi.org/10.46282/blr.2018.2.2.113>
33. Nemeč, J., Svidroňová, M. M., & Kovács, É. (2019). Welfare Co-Production: Hungarian and Slovak Reality. *NISPAcee Journal of Public Administration and Policy*, 12(2), 195–215. <https://doi.org/10.2478/nispa-2019-0019>
34. Nick, T. G., & Campbell, K. M. (2007). Logistic Regression. *Topics in Biostatistics*, 404, 273–301. [https://doi.org/10.1007/978-1-59745-530-5\\_14](https://doi.org/10.1007/978-1-59745-530-5_14)
35. Ochuenwike, G., N., Ofozor, F., J. & Ejiofor, C. F. (2019). APPLICATION OF DECISION TREE IN ENTREPRENEURIAL DEVELOPMENT. *Abacus Mathematics Science Series*, 44 (1). <https://mail.man-nigeria.org.ng/issues/AB-A-SCI-2019-60.pdf>
36. Peter, H., Vasserot, C. V., & Silva, J. A. (2022). The International Handbook of Social Enterprise Law. In *Springer eBooks*. <https://doi.org/10.1007/978-3-031-14216-1>
37. Placek, M., Vacekova, G., Svidronova, M. M., Nemeč, J., & Korimova, G. (2021). The evolutionary trajectory of social enterprises in the Czech Republic and Slovakia. *Public Management Review*, 23(5), 775–794. <https://doi.org/10.1080/14719037.2020.1865440>
38. Polačková, Z. (2020). Kontext a výzvy sociálneho podnikania na Slovensku. *Implementačná agentúra Ministerstva práce, sociálnych vecí a rodiny Slovenskej republiky*. <https://www.prog.sav.sk/portfolio/kontext-a-vyzvy-socialneho-podnikania-na-slovensku/>
39. Polačková, Z. (2021). The Landscape of Social Enterprise in the Slovak Republic. In: Defourny, J., & Nyssens, M. (Eds.). *Social enterprise in central and eastern Europe*. In *Routledge eBooks*. <https://doi.org/10.4324/9780429324529>
40. Reijonen, H., Saastamoinen, J., & Tammi, T. (2018). Does collaboration with public and private sector actors in public procurement of innovations improve SME competitiveness? *Edward Elgar Publishing eBooks*. <https://doi.org/10.4337/9781786439901.00007>
41. Rokach, L. & Maimon, O. (2007). Introduction to decision trees. In *Series in machine perception and artificial intelligence* (pp. 1–11). [https://doi.org/10.1142/9789812771728\\_0001](https://doi.org/10.1142/9789812771728_0001)
42. Salamon, L. M., & Anheier, H. K. (1992). In search of the non-profit sector. I: The question of definitions. *VOLUNTAS International Journal of Voluntary and Nonprofit Organizations*, 3(2), 125–151. <https://doi.org/10.1007/bf01397770>
43. Salamon, L. M., & Anheier, H. K. (1996). *The Emerging Nonprofit Sector: An Overview*. Manchester University Press, Manchester.
44. Šebestová, P., & Mačkinová, M. (2019). Development of Social Economy and Social Entrepreneurship in Slovakia. *CBU International Conference Proceedings*, 7. <https://doi.org/10.12955/cbup.v7.1427>
45. Stehlik, Petr. (2018). The competitive effect on public procurement for public service contracts: The case of the Czech Republic. *Ekonomicky casopis*, 66(4), 416-427. <https://www.sa.v.sk/journals/uploads/0514113504%2018%20Stehlik%20+%20RS.pdf>
46. Stevens, R., Moray, N., & Bruneel, J. (2014). The social and economic mission of social enterprises: dimensions, measurement, validation, and relation. *Entrepreneurship Theory and Practice*, 39(5), 1051–1082. <https://doi.org/10.1111/etap.12091>
47. Stoltzfus, J. C. (2011). Logistic Regression: A Brief Primer. *Academic Emergency Medicine*, 18(10), 1099–1104. <https://doi.org/10.1111/j.1553-2712.2011.01185.x>

48. Suthaharan, S. (2015). Decision tree learning. In *Integrated series on information systems/Integrated series in information systems* (pp. 237–269). [https://doi.org/10.1007/978-1-4899-7641-3\\_10](https://doi.org/10.1007/978-1-4899-7641-3_10)
49. Trammell, E., Abutabenjeh, S., & Dimand, A. (2019). A review of public administration research: Where does public procurement fit in? *International Journal of Public Administration*, 43(8), 655–667. <https://doi.org/10.1080/01900692.2019.1644654>
50. Uyerra, E., Zabala-Iturriagoitia, J. M., Flanagan, K., & Magro, E. (2019). Public procurement, innovation and industrial policy: Rationales, roles, capabilities and implementation. *Research Policy*, 49(1), 103844. <https://doi.org/10.1016/j.respol.2019.103844>

51. Wooldridge, J.M. 2012. *Introductory Econometrics: A Modern Approach*. Michigan State University, 2012. [https://cbpbu.ac.in/userfiles/file/2020/STUDY\\_MAT/ECO/2.pdf](https://cbpbu.ac.in/userfiles/file/2020/STUDY_MAT/ECO/2.pdf)
52. Yin, Z., & Wang, Z. (2020). Research on Enterprise Performance Evaluation based on Decision Tree Method. *Proceedings of the Fifth International Conference on Economic and Business Management (FEBM 2020)*. <https://doi.org/10.2991/aebmr.k.201211.024>

**Primary Paper Section: A**

**Secondary Paper Section: AH**

Annex: The most frequent CPV codes in PP

CPV4	Count	CPV4	Count	CPV4	Count	CPV4	Count
<b>All contractors</b>		<b>SE contractors</b>		<b>All contractors</b>		<b>SE contractors</b>	
3019	25,620	9831	463	1842	1,571	3373	11
3023	16,264	7971	370	3379	1,567	3582	11
3012	16,138	9091	357	7981	1,553	9800	11
3983	12,230	1883	141	1952	1,549	3953	10
3021	9,984	3021	139	3491	1,505	7131	10
3314	9,287	3023	117	1581	1,489	3374	9
3922	6,945	1814	91	3800	1,489	5041	9
0322	6,513	1810	89	3430	1,469	1830	8
3971	5,383	1811	71	2432	1,427	1841	7
3319	5,205	3511	68	3929	1,415	5051	7
3376	3,970	1881	65	3300	1,349	9051	7
3369	3,355	3314	64	2495	1,339	1840	6
4411	3,263	1842	62	4523	1,299	1921	6
3911	3,196	1880	54	5552	1,296	1964	6
9051	3,036	3983	53	3310	1,284	2445	6
3980	2,790	1513	35	3365	1,283	3916	6
1511	2,778	3020	35	3362	1,237	3952	6
3371	2,605	3019	32	0912	1,232	5071	6
1533	2,603	1833	31	0931	1,232	6651	6
2445	2,289	3929	31	7226	1,229	7981	6
3492	2,268	9834	31	1551	1,220	1813	5
3020	2,228	9090	30	2431	1,213	2246	5
3843	2,179	3371	29	3153	1,208	3300	5
3411	2,159	7970	28	3511	1,194	3370	5
3865	2,088	3012	26	6041	1,170	3865	5
3931	2,056	1511	24	2496	1,164	3956	5
3435	1,983	4452	24	3242	1,143	3980	5
1513	1,980	8531	20	1631	1,130	8051	5
3377	1,945	3376	19	1561	1,091	9062	5
3916	1,945	3377	18	9831	1,081	0312	4
3312	1,933	1823	17	1554	1,080	1882	4
3913	1,932	1822	16	0321	1,071	3234	4
5011	1,926	1844	16	1555	1,060	4500	4
3374	1,845	4411	16	3316	1,059	4530	4
3951	1,837	7982	15	3910	1,053	4540	4
1587	1,815	3435	14	4461	1,046	5000	4
7982	1,805	3951	14	3152	1,028	5032	4
4451	1,798	3319	13	4431	1,019	6010	4
3914	1,762	3512	13	7163	1,014	7135	4
2430	1,684	1800	12	6040	1,012	7731	4
1589	1,621	4448	12	4483	1,010	7980	4
2400	1,603	7033	12	3412	1,000		

Source: Own processing based on EKS and RoSE database