

## DISCUSSING THE SUNK COST FALLACY: TOWARDS A HIERARCHICAL CONCEPT OF RATIONALITY IN MANAGERIAL DECISION-MAKING

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**Abstract:** An assertion widespread in economics, psychology, and management maintains that giving weight to sunk costs is irrational. However, there is a growing discussion which points to some aspects of such behaviour which may indicate that under certain circumstances giving weight to sunk costs is not irrational. In this article I suggest that the above mentioned discussion has wider implications for practical and theoretical management. When dealing with the rationality of management actions, assessment of their rationality is always connected with their value, organizational and cognitive context. I propose a concept of hierarchical rationality which respects the ambiguity of context and various goals and values both individual and organization may follow. Such a concept offers for management some practical impulses.

**Keywords:** Rationality, management decision-making, sunk costs, sunk costs fallacy

### 1 Introduction: Definition of the sunk cost fallacy

Imagine a major project in which your organization has already invested quite a significant amount of resources represented by finance, personnel, time, and knowledge. The project was already supposed to be finished but for any reason this is not true – the leadership of your organization is just having a meeting in order to discuss the next steps within the project. The main question is: "Shall we continue the project in order to finish it finally, or should we cancel it since it is obvious that to finish it we would need to use inadequate amount of additional resources?" Eventually the decision is to continue with the project because "so many resources have been already invested that we simply must finish the project".

What is described above is an illustration of what is usually called a "sunk cost fallacy" (hereinafter SCF) or "giving weight" (Kelly, 2004) to costs that have already been incurred in the past and cannot be recovered. A practical (yet insufficient as we will see later) definition describes this phenomenon as follows: "When large projects overrun their schedule and budgets, the original economic case no longer holds, but companies still keep investing to complete them." (Roxburgh, 2003, p. 34)

Such behaviour is often referred to as irrational. Whether to consider it irrational or not does have some practical implications as it may be related to some of the most significant projects or activities societies and organizations face such as foreign market entries, major infrastructure projects financed by both public and private capital, or even waging wars. In such projects the amount of resources spent is enormous (absolutely, as it is in the case of say building nuclear power plant or conducting a war, or relatively compared to the available resources of the respective organization or organizations responsible for such a project).

The definition of the sunk cost fallacy can be given in two different ways which, as we will see later, is quite important for the discussion of the correctness of the claim that SCF is irrational. There can be a wide and a narrow definition provided:

1. "Giving weight to sunk costs in decision making" (Kelly, 2004) or "a greater tendency to continue an endeavour once an investment in time, effort, or money has been made" (Arkes – Blummer, 1985) (wide definition).

2. Continuing the already started projects for the sake of the already invested resources (narrow definition). (Kelly, 2004)

The difference between these two approaches or definition lies in the fact that the wider definition leaves open space for various

reasons for continuing the already started projects (for instance keeping one's self-esteem thanks to kept promises to finish the project). These reasons allow us to challenge the claim of the irrationality of SCF. What's more the wider definition will allow us to draft the concept of hierarchical rationality.

### 2 Challenging the claim of irrationality of honouring sunk costs

The claim that honouring sunk costs is irrational has been already challenged by various authors. Their approach and the arguments they raise differ yet one can conclude that their main points is as follows: there are certain conditions under which the claim of irrationality of honouring sunk costs is or at least may be incorrect. This is in accord with the wider definition of SCF (see above).

Nozick (Nozick, 1993, p. 21-25), from his rather philosophical point of view, proposes that an individual giving weight to sunk costs may be better off because it helps him to overcome temptations. He even proposes using the tendency of honouring sunk cost intentionally in order to drive future behaviour: "If I think it would be good for me to see many plays or attend many concerts this year, and I know that when the evening of the performance arrives I frequently will not feel like rousing myself at the moment to go out, then I can buy tickets to many of these events in advance, even though I know that tickets still will be available at the box office on the evening of the performance. Since I will not want to waste the money I have already spent on the tickets, I will attend more performance than I would if I left the decisions about attendance to each evening. (...) Knowing all this, I purchase the tickets in advance in order to drive myself to attend." (Nozick, 1993, p. 22)

In more general fashion Nozick comments on the irrationality of SCF: "This may be a correct rule (not respecting sunk costs – my comment) for the maximization of monetary profits, but it is not an appropriate general principle of decision (...). We do not treat our past commitments to others as of no account except insofar as they affect our future returns, as when breaking a commitment may affect others' trust in us and hence our ability to achieve other future benefits; and we do not treat the past efforts we have devoted to ongoing projects of work or of life as of no account (...). Such projects help to define our sense of ourselves and of our lives." (Nozick, 1993, p. 22) Such a comment can be understood either as an opposite to purely economic interpretation of the sunk costs phenomena or its enhancement. Kelly (Kelly, 2004) also proposes some challenges to the assessment of SCF as purely irrational and concludes that under some conditions honouring sunk cost can be advantageous.

The first example is derived from the game theory. If a party is in conflict with much a stronger opponent it may try to inflict as much damage (or costs which the stronger party must expend) as possible. This way the weaker player may hope that continuing the struggle may become too costly for the stronger one so he gives up. Now think of what the stronger may do: by honouring the costs already expended ("we cannot give up after so many resources have been spent") it may make clear to the weaker player that inflicting more damage will not help him. In contrary, inflicting more and more damage to the stronger side will only increase its motivation for continuation of the conflict. Kelly (Kelly, 2004, p. 66) illustrates it by an example of the War in Vietnam: "The Communists succeeded in making it clear to the United States that continued pursuit of its objectives would result in significant costs, costs that were ultimately judged to be not worth bearing." He concludes that in such situation (conflict between a stronger and much weaker side which may try to inflict as much damage as possible in the hope of the stronger side gives up due to too large cost) the stronger player is better off if he is a "pure honorer of sunk costs" (Kelly, 2004, p. 66). Kelly describes then the way such an agent may possibly argue:

“The more resources he has invested in pursuing a given course of action in the past, the stronger the reasons he takes himself to have to continue that course of action now and in the future (so long as there is any hope of achieving the relevant goals at all)” (ibid). Obviously “while the typical terrorist tactic of maximizing inflicted costs is an effective strategy against the expected utility maximizer, it is utterly counterproductive against the pure honorer of sunk costs” (ibid)

One could of course argue against such a conclusion by pointing out to the goals of such hypothetical terrorist: As long as their goal is clearly defined and tied to a decision of the terrorized subject (e.g. leaving certain region or giving up in a war) the pure sunk-costs is better off. But when the goal of the terrorists is just to cause as much pain as possible (e.g. in order to “punish” the nation for any reason) such a strategy is pointless and even suicidal. What we can learn from this discussion is that any potential challenge to the irrationality of SCF should be thoroughly analyzed before accepted. We will discuss this point later.

The second Kelly’s challenge to the irrationality of SCF is concerned with the role knowledge of the past plays in the current decision making. An inseparable part of SCF is the agent’s respect to past – what he did in the past influences the way he is deciding now and thus what he will or will not do in the future. Common description of SCF claims that one should not take into account what has happened in the past and just take into account what is going to happen from now on. Kelly (Kelly, 2004, p. 71) shows that there are circumstances under which taking the past into account is advantageous for the agent: “In cases in which past investments in a given course of action influence the probability that that course of action will be successful if continued, a decision-maker deliberating behind a veil of ignorance will be at a disadvantage.” I find this comment rather subtle because it refers to agent’s knowledge of past rather than to his respect to the investments he did. It may be difficult to draw a clear demarcation line between knowledge of and respect to, nevertheless it is clear that there is difference between these two concepts.

The third challenge given by Kelly I would like to mention is the one concerned with giving sense to one’s past deeds: “...present actions can affect the significance of past events in ways that matter deeply to us (...) that is, knowledge of sunk costs is essential to the fulfilment of certain preferences. (...) One might prefer that, if others have made significant sacrifices in attempting to realize some valuable state of affairs S, then their sacrifices not be in vain. (...) if I do have such a preference for redemptive actions, then being ignorant of sunk costs will effectively frustrate my ability to satisfy it.” (Kelly, 2004, p. 73-4). This notion challenges the concept of SCF by emphasizing that an agent may have preferences which (1) take the past into account, (2) content of such preference is not purely economic (compare with Nozick’s point about the rationality assessment in terms of economic and more general criteria).

It is not the task of this paper to provide a complete review of the challenges to the irrationality of SCF, yet we can conclude now on the challenges discussed above:

1. When discussing the challenges to the assessment of SCF as irrational one observation becomes clear: these challenges may work with the wide definition of SCF. In other words it does not seem to me that any of the challenges mentioned would question the narrow definition.

2. The challenges made often include criteria which may not be perceived as purely economic. Or in other words – the criteria used for challenging irrationality of SCF or only related to profit or similar criteria which are usually used when illustrating SCF’s irrationality.

### 3 Hierarchical approach to rationality

#### 3.1 Assessing rationality of agents in the world of complex contexts

Economic subjects – as defined by classic economics – are supposed to maximize their utility. In other words they are supposed to pursue their goals in the most efficient and effective way. If they do so they are to be evaluated as behaving rationally. Yet there are quite many aspects of agent’s behaviour which make this basic reasoning quite complex. Consider the following examples: What perfectly meets the goals of an organization’s sub-unit may be in contrary to the whole organization’s goals (e.g. decreasing the number of people responsible for recruitment may help meet the recruitment manager his cost saving goals but undermine the whole organization’s goal to have quality human resources at its disposal), what is quite rational in the short term may be irrational in the long term (e.g. saving on machinery maintenance) or what is rational for a company may not be rational for the whole society (e.g. saving on safety which may result in leakage of poisonous substances).

The extent to which certain activity may be assessed as rational or irrational based on its goal and value concept can be illustrated by some of the challenges to the irrationality of SCF provided by Nozick and Kelly in chapter 2. Their challenges include values an agent may respect, knowledge agent has and may need for successful decision making as well as the “game” (as used by game theory) the agent is involved in.

#### 3.2 Proposal of hierarchical rationality

The natural question now is as follows: How could we assess rationality of an agent given such a complex environment (not mentioning that the description of this environment in this paper is far from being complete)? In order to answer this question I propose the term hierarchical rationality. The term encompasses two findings related especially to assessing rationality in organizations and within managerial decision making:

1. Rationality of certain activity can only be completely assessed within a well defined context of goals and values.
2. Within practical management there are various such contexts represented for instance by various levels of organizations or timeframes.

Resulting is the concept of hierarchical rationality i.e. not one rationality as a universal measure by which agent’s decision-making and activities are evaluated but a set of layers of rationality which enable to move from one level to another one. At every level agent can be evaluated. Agent is evaluated within one level, and the rationality of one such a level is evaluated by the superior level and so on.

#### 3.3 Illustrating hierarchical rationality

In the following text I would like to illustrate the complexity of context which in my opinion implies the need for hierarchical rationality or similar concept.

When discussing Kelly’s challenge to the irrationality of SCF in the context of game theory (and the example of the War in Vietnam or fighting terrorism) I stated that the potential success of the pure sunk-costs honorer is quite dependent on the goals which the weaker side in the conflict pursue. As long as the goals is bound to the decision of the stronger party the pure sunk costs honorer is better off – and vice versa. We can conclude that without knowing the exact context (the relation between the goals of the weaker part and the decision of the stronger one) we cannot decide whether the agent’s behaviour is rational or not. But even without that we can assess at least agent’s process rationality (one level below): To which extent is the agent trying to understand its context, the motivation of the stronger party etc. I.e. we can assess agent’s rationality on lower level without being able to assess it on the upper one. The productivity of the concept of hierarchical rationality is clear here as it enables us to

decrease our entropy when assessing agent's behaviour (without being stuck in endless discussions about the upper level rationality).

Some of the implications/aspects of the SCF phenomenon may be revealed when we discuss it in a context which is rich in values which may be perceived in a significantly different way by different evaluators/agents. Kelly (Kelly, 2004) quite often refers to the discussion which took place in the United States about the appropriate strategy for the Vietnam War. The decision in question was whether to continue the war or to withdraw. The part of this discussion were arguments mentioned by Kelly: "The United States has invested much in attempting to achieve its objectives. In addition to the many millions of dollars that have been spent, many thousands of lives have been lost, and an even greater number of lives have been irreparably damaged. If the United States withdraws from Vietnam without achieving its objectives, then all of these undeniably significant sacrifices would be wasted." (Kelly, 2004, p. 62) The counterargument may of course be that every other human lost in the conflict represents a value which cannot be counterbalanced by the previous sacrifices. However, it is difficult to agree with Kelly's conclusion that "(...) the fact that many lives have been lost in the past cannot provide a reason for favouring one course of action (continuing the war – author's comment) over another (withdrawing – author's comment)" (Kelly, 2004, p. 63). We could propose a hierarchy (or even hierarchies) of rationalities according to which withdrawal or non-withdrawal from Vietnam could be assessed. We could for instance start with short-term military goals, then go on to long-term military goals, continue to long-term political goals (as defined by valid foreign policy) and end up with deep values ingrained in the US policies. Obviously, it is quite unlikely that a common agreement would be reached even if such a hierarchy would be employed – but certainly the discussion would be much structured than the one represented by Kelly.

Third of Kelly's comments (the concept of redemptive action) is quite interesting as it inevitably leads to the need for hierarchical rationality: If one has a preference of the actions of others not be in vain, it may result in respecting SC. But is such a preference rational? It is impossible to answer this question unless you know the goals or values to which such a preference can be compared. If the agent's ultimate goal is to have good relationships with his companions such a preference is probably rational. If agent's ultimate goal is to increase his short-term profit such a preference is probably irrational. We can further ask which of these two goals are rational: and again we would need to know the other levels of goals/values etc.

In order to get the discussion closer to a practical managerial topic consider a situation in which a manager of a large multinational company has to decide about continuing or not continuing an underperforming research project which is significant for his sub-unit but rather insignificant for the whole company. While it may be rational for him to stop the project as he may be evaluated based on the return on investment calculated based on the current data, his superior may be less prone to closing the project as he can see the links of the project to other projects he is responsible for (which may be expressed e.g. in the share of fixed costs). And the way the company's CEO evaluates the project can be even more different: his criteria may be more focused on cultural impacts the project may have on the research and development staff. Quite similar situation is mentioned in the interview with Jeffrey Immelt: "Do you mean that CEO's point of view on a project like this would be different from, say, a business unit head's point of view? Why would that be true? – I have the biggest risk profile and the broadest time horizon in the company. So looking at the evolution of the hybrid locomotive, we're talking about tens of millions of dollars. For the program manager, it's huge, the most massive thing he's ever managed. For John Dineen, who runs the rail business, it's pretty big. For me, you know, it's OK. We can do it." (Immelt, 2006, p. 9)

### 3.4 The aspects of hierarchy

In order to elaborate more on the concept of hierarchical rationality let us discuss some of the aspects which may be used for constituting its levels.

These aspects are such which, within the realm of practical management, can alter assessment of particular behaviour. Here we can propose at least the following four:

1. Time frame – obviously an action which seems to be rational in terms of profit increase in a short term (say a quarter) may be found irrational in the long term (more than several years). A good example is to stop of investments in renewal of production capacities.
2. Organization levels / units – this aspect is represented especially by vertical dimension of an organization even though horizontal dimension may also play a significant role. Quite often subordinate employees or units complain of irrationality of orders of the superior unit. But when they get familiar with the motivation (i.e. goals and values) of the superior unit they eventually find it rational (even though they still consider it a burden for them).
3. Levels of values – one could, based on generally accepted value context, design a hierarchy of values. He may then conclude that what may seem rational from the lower level point of view (e.g. represented by short-term economic profit) may be found irrational from the higher level point of view (e.g. represented by quite abstract general justice).
4. Extent of possessed knowledge – the more knowledge one possesses the more aspects of a certain action one can (we can assume) assess. Therefore we can conclude that the assessment of rationality will differ among evaluators possessing different level of knowledge.

### 3.5 Some concluding comments concerning the concept of hierarchical rationality

There are several noteworthy comments to the hierarchical rationality concept:

1. The above stated list of aspect is not complete. The main motivation for this list was to show that the levels of rationality (assessment) are not abstract but rather something that we meet in everyday life. The list also shows that, to quote Kelly: "(...) we are unlikely to be spared the far messier and more difficult task of arguing about the value of competing ends, or about the worth of different goals." (Kelly, 2004, p. 81) Yet it also seems clear that the concept of hierarchy can help us to make this task a little bit less "messy".
2. The concept turns attention from logical or formal aspect of rationality (i.e. we judge rationality of certain decision making by checking logicity of reasoning) towards its value aspect which Spohn mentions in an interesting example: "In planning a holiday trip, to use a trivial example, we evaluate the alternative destinations with respect to their probable satisfaction of the basic values for holidays, and this evaluation of destinations enters itself into the evaluation of specific alternative holiday plans." (Spohn, 2002, p. 250).
3. The concept interestingly connects the notion of reference rationality and external rationality as defined by Morell (Morell, 2006): "Every decision takes place in an environment of certain rationality, which is a set of judgments and beliefs shared by a community of persons which take part in the decision making and follow it. This is what I call reference rationality (...). By outer rationality I call every different rationality which is external to such a community, for instance rationality of an observer who is governed by a different set of judgments and beliefs. (...) Decision is thus irrational only within the rationality

which has been used for making such a decision (reference rationality)." (ibid, p. 39).

4. No matter how we define the various levels of rationality, we should keep in mind that it only makes sense to assess rationality of certain action if and only if it has been based on certain conscious activity. Etzioni (Etzioni, 1988, p. 153) maintains that rationality is connected with cognitive work, development of personality, organizational, and social foundations, and combining maintenance of the appropriate resources, procedures, and institutions with adaptation. What hierarchical rationality brings to this view (which I agree with) is that evaluating certain activity as rational compared to the superior level is rather not enough but that the qualities of rationality as stated by Etzioni above should be also assessed on various levels. In other words the conscious activity should take place on all levels of particular rationality hierarchy. This quality of consciousness will be applied in the following chapter.

#### 4 Implications for practical management

Understanding and using the concept of hierarchical rationality may bring several impulses for the development of both theoretical and practical management.

1. Consciousness of higher levels of goals. Organizations (and especially companies, i.e. organizations focused on profit creation) are usually good in pursuing its primary goals. Where they may fail is better understanding of what is behind (or above) these goals. In other words they may lack awareness of to which goals they should turn when the primary goals endanger their further existence.

2. Conscious understanding of development of goals. One of the dangers encountered when dealing with goals setting and changing environment is rationalization of changes to our goals – an observation made by Gilbert Harman and described by Kelly: "Harman observes that, so strong is our desire to see our own past efforts play a role in bringing about valuable ends, we will often adopt new ends, carefully tailored, so that our past efforts can be seen as instrumentally valuable means to the achievement of these end." (Kelly, 2004, p. 75) Hierarchical rationalization, used as an analytical tool pointing to various aspects based on which it can be established, can help to better understand why goals are changing. When the hierarchy of goals and related rationalities is established one can easily decide whether changing a goal is still in line with the superior rationality or it is just an attempt to rationalize our past failures. This way hierarchical rationality introduces more rigour in evaluation of changing goals.

3. Improved (especially strategic) management. Unclear or insufficient understanding of one's goals may result in being prone to imperfect pursuing of one goal when partially pursuing a conflicting one. Better understanding of one's superior goals and rationality may decrease this risk. To illustrate this issue consider the following example: "Often, individuals and nations, being neither pure expected utility maximizers nor pure honorer of sunk costs, suffer greatly from giving some weight to both in their decision-making. Again, the Vietnam example is instructive. Because we as Americans give some weight to sunk costs in deciding upon a policy (...), we stay in considerably longer than we would have otherwise and thus incur much greater costs than if we were pure expected utility maximizers. On the other hand, because we give a great deal of weight to expected utility (...), and the Communists know this, we receive none of the benefits which we might enjoy from the reputation-effects of being sunk costs honorers. Thus, the particular mixture of weight given to considerations of expected utility and to sunk costs might result in peculiarly bad policies)." (Kelly, 2004, p. 69)

4. Improved performance management. Once the hierarchical rationality – as an explicit, complex set of goals, values, and meanings – is established it is easier to design a functional performance management system. What sometimes represent a

problem with performance management within an organization are clashes between various parts of organization, both in the horizontal and vertical dimension. Where hierarchical rationality can play a significant role is thorough analysis of its aspect - time frame, extent of possessed knowledge etc.

#### 5 Open questions and possible research

Only some aspect of the hierarchical rationality concept has been proposed in this paper. Quite many questions remain open, let me name just a few:

1. The set of aspects based on which a hierarchy of rationality can be designed is definitely not exhaustive. It is needed to analyse this set in more detail. The goal to be pursued is to find a collectively exhaustive and mutually exclusive set of aspect, or such a set for certain context or situation (e.g. a publicly listed company).

2. It is unclear where the formal or procedural rationality should be placed within a hierarchy of rationality: is it on top, in the bottom or is it a general quality which runs (or should run) through all layers of such a hierarchy? I believe we will not be able to provide a final answer to this question yet it should be possible to answer it within a defined context.

3. In reference to Morel's reference and external rationality it is unclear whether within a certain hierarchy of rationalities the external rationality is included too or it constitutes a parallel hierarchy. Answering this question could help us understand the concept of totally different rationalities as defined by the conflict between the rationality of Western civilization and some primitive tribe (see for example (Wilson, 1970)).

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