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The relationship between time and decision

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Abstract

The study of human decision-making can be traced back to the great thinkers of antiquity, and many disciplines have been working on this fundamental question ever since. As a result, there have been many theories and studies on the decision-making process. The classical mathematical models of economics represent the normative tendency. However, the classical concept cannot fully describe most events in our everyday life and systems (e.g., from economic behavior to social sciences, project management models, Etc.). In this paper, we present a descriptive trend dealing with subjective decisions, and we also examine one of the significant factors in decision-making: time. Following a review of the literature, the paper shows that time influences decision-making, and, by its very nature, it is worth describing, even using soft computational models.
Keywords: decision, behavior, economics, time, Fuzzy, theory of decision-making.

1 History of decision theory

There are different approaches to decision theory. Philosophical approaches date back to the 4th century BC. Voluntary action is attributed to Lao Tzu, who believed in letting events happen independently [1]. At the same time, Confucius says that decisions require benevolence, ritual, reciprocity, and love for one's neighbor [2].

According to the psychological approach, the impact of a decision, its probability, and the way it is aggregated are subjective. The result is subjective expected values based on perceived rather than absolute probabilities.

According to the classical economic approach, human decision-making is focused on quantitative aspects. The starting point is that products and services on the market can be counted, so studying the laws of supply and demand in this way makes sense. In describing the behavior of the decision-maker, Smith [3] and Taylor [4] first examined the motivations and purposes with which producers and consumers engage in the interactions created by goods. In their view, the individual's aim in each case is to maximize utility, i.e., to achieve total utility.

Nevertheless, according to the Nobel Prize-winning researchers in decision theory in modern economics, it is also necessary to consider the subjective factors that influence the decision. Kenneth Arrow believes that there cannot be rules for social decision-making that satisfy all the needs of society [5]. According to Herbert Simon, human information processing capacity is limited when making decisions. The theory of bounded rationality allows and accepts the sequential enumeration of alternatives to a problem, which can be a suitable method instead of optimization [6]. The Allais paradox indicates that individuals prefer an inevitable consequence to an uncertainty of the same expected value [7]. Kahneman and Tversky used the tools of psychology to develop a theory of

prospect theory to deal with uncertainty, according to which people tend to commit cognitive biases when the outcomes of choices are uncertain [8]. Most recently, Richard Thaler combined behavioral science with decision theory. His work shows that the "homo oeconomicus" (the economic man who seeks the most significant possible gain at the minor sacrifice and by economic principles), as we know from classical economics, is found in only a tiny percentage of decision situations [9].

2 The decision under uncertainty - descriptive orientation

As discussed in the previous chapter, there are two primary schools of decision-theoretic approaches: normative and descriptive.

While quantitative decision methods represent the normative trend, which aims at optimal decision-making, the descriptive trend deals with uncertainty.

According to Knight Frank, the essential elements of subjective decision-making are uncertainty and the measurable part of the risk that comes from it. Moreover, in decision-making, risk and uncertainty are the same because action depends on the extent to which the decision-maker believes in his or her estimates [10]. According to J. Savage, probability is simply the degree of belief [11].

The descriptive approach focuses on the decision-making process. It considers the decision-maker's behavior in the specific decision situation. In many cases, this contrasts the decision models of the normative orientation.

3 The relationship between time and decision

The most important task of a manager is to make decisions in critical situations, whether they concern short-, medium- and long-term strategic issues or routine daily tasks [12]. The relationship between time and decision plays an essential role in the life of organizations, a relationship that is being explored in several disciplines.

Neurobiological research analyzes the time it takes to respond to a stimulus. According to Carpenter's studies, the distribution of reaction times generally follows a relatively simple law, which the LATER model can explain [13]. In addition, injuries to the cerebellum are associated with increased temporal variability [14]. In another study, Carpenter and Reddi also considered the supply of information or the individual's expectations as an influencing factor, in addition to the time needed to decide. They further demonstrated that the degree of urgency influences the criterion level at which the decision signal triggers a response [15].

Market changes require a rapid response in the financial world, so managers usually need more time before deciding. In many cases, this forces the person concerned to make subjective decisions, even on essential issues that may have a long-term impact on the operation and future of the organization [16][17].

In addition to identifying different approaches to the study of decision-making, the potential of time constraints in understanding their effects on judgment and decision-making was also developed. In doing so, it puts into perspective the different studies on judgment and decision-making [18].

Leaders make decisions as individuals, and time is an important dimension. The time taken to achieve a positive outcome can be seen as a cost and must be weighed against the benefits of the outcome. Impulsive individuals perceive time as a higher cost. Impulsive subjects, therefore, overestimate the duration of time intervals and consequently discount the value of delayed rewards more heavily than self-controlled individuals [19].

The survey of K Szűcsné Markovics 2012 shows that the organization's size influences the time

of investment decisions [20].

Making managers and other stakeholders aware of the different interpretations of time can help organizations be time and future-aware [21].

As discussed in the previous chapters, the relationship between time and decision-making should be investigated using neurobiology-based mathematical models. Neural networks and fuzzy systems are proving effective methods [22]. In 1979, Kacprzyk, J. studied the multi-step control of a deterministic and a stochastic system in a fuzzy environment. He analyzed the intersection of fuzzy constraints and objectives for maximizing decisions [23]. KY Lu introduces a fuzzy logic approach to maintenance decision-making, based on which a manager can easily make the right production management decisions to meet the rapid response requirement [24].

4 Conclusion

The study of the descriptive tendency has helped to identify the issues that underlie uncertainty. For example, one such uncertainty factor is time.

Time is an influential factor in the life of organizations. It is a determining factor in the formulation of strategies and in reacting to market changes, and thus in decision-making.

The availability of time influences decision-making, which is supported by both neurobiological and economic research.

Awareness of time interpretations facilitates the future conscious functioning of the organization. Furthermore, the time a decision-maker has to spend on a particular strategy directly impacts the organization's future.

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5 References

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