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DECISION SUPPORT SYSTEMS IN THE CONTEMPORARY SECURITY ENVIRONMENT

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Abstract: *The purpose of this study is decision support systems from a management perspective and their relationship to the modern security environment. The author believes that management as a process is a primary means of influence, and the successful decision-making process goes through several stages. This article expands the scope of the theoretical review and shows the relationship between information processes and decision-making systems through modern technologies for process optimization through decision-making systems. The study focuses on theoretical data on decision-making systems currently in use, without claiming to be complete. This may provide prerequisites for future research in the context of implementing new technologies and using artificial intelligence in the decision-making process in various sectors of the economy.*

Keywords: decision making; automatic information processing; decision making systems

INTRODUCTION

Every activity in the modern world requires development and achievement of increasingly better results. Achieving the expected good result in any activity can largely be viewed as a decision-making system. In practice, decisions are usually made to solve a specific problem. In cases where an individual lacks the necessary competence to solve a particular problem and/or does not know who could, a decision-making system is then applied.

What do decision-making and decision support systems represent in management decision-making?

Decision-making can be regarded as the essence of management and as its fundamental characteristic. Without managerial decisions, there is no true management. In the literature, numerous authors define management decision-making as the most important managerial function. Furthermore, in specialized literature, there even exists the so-called "decision-making school," whose adherents not only argue that decision-making is the most important act in management but also that the management process itself is reduced to the process of making managerial decisions.

Management as a process represents the primary means of influencing or a system of activities related to:

- changing the behavior of individuals and groups;
- changing the organizational structure of production and management;
- redistributing resources;
- changing the conditions for the functioning of the system and the relationships between its elements.

The successful decision-making process consists of three main stages: formulating the question, generating alternatives, and making the decision. (Mladenov, Yul., Terziev, V., 2011).

Until just a few years ago, methods based on individual creative thinking were primarily used. However, today, the use of large language models is becoming increasingly necessary, as they can assist at every step of the decision-making process. The development of information technologies helps to enhance the decision-making process.

"The Information Processes and Decision-Making Systems (IPDMS)" are the result of conducting scientific, applied scientific, and applied research in the field of modern information technologies aimed at optimizing processes and systems for decision-making (Institute of Information and Communication Technologies-Bulgarian Academy of Sciences, 2024).

A CONCEPT FOR DECISION-MAKING SYSTEM

Decision support systems are based on science management, research on operations, management theory, computer technologies, modeling technology, and information technologies as a means of semi-structured decision-making issues, i.e., activities of an intelligent person turned into systems. The system is capable of providing decision-makers with the necessary information, data, information and experience, in order to aid in decision-making and problem identification. (Vasilev, 2014). To create or modify the decision model, a variety of options as well as evaluation programs are offered.

A large portion of decision-making models, developed and evaluated through the consideration of numerous possible courses of action within one or another decision support system, are based on the examination of a large number of cases. It is evident that cases do not provide a solution in the form of an ideal answer for the specific decision-making situation. Instead, cases pose questions, provide frameworks for decision-making, and outline various options that can be used to train generative language models.

When discussing decisions in public organizations, it should not be forgotten that a number of requirements are presented, such as:

- Validity: Having complete and reliable information about the external and internal environment and acknowledging the fact that the decision will not be implemented in isolation but within a system with other previously made decisions.

- Timeliness: The timing of decision-making is crucial for overcoming any conflicts that arise within the public organization, but it is best when done early on.

- Cost-effectiveness: Objectives are achieved through various options, with costs varying in each option, necessitating the selection of the optimal one.

- Complexity: Decisions must consider not only changes in the economic aspect but also in the social, political, environmental, and other facets of the problem being addressed, continuously accounting for changes in any of these areas, which in turn affect the others. Therefore, when making decisions, these complex interrelationships must be considered, and the questions that arise must be addressed comprehensively.

- Specificity: Determining the exact composition and sequence of the planned activities, including deadlines for implementing decisions, methods for monitoring and evaluating the results of decision implementation.

There are also other fundamental requirements for decisions: timeliness, legality, flexibility, objectivity, and consistency (Mladenov & Terziev, 2011).

The dynamism and complexity of activities in various organizations necessitate making different decisions, which can be classified according to various criteria.

Decisions can be prospective, current, or operational depending on their duration of implementation.

Depending on the scope of the issues being addressed, decisions are categorized as general or specific.

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Based on the nature of the issues being addressed, decisions can be classified as economic, technical, technological, financial, administrative, organizational, and social. In management practice, there are no purely technical or purely economic decisions.

METHODS RELATED TO MANAGERIAL DECISION-MAKING

Decision-making typically involves choosing among multiple alternatives. Higher levels in the management hierarchy require making more decisions, and the higher the level, the more equally balanced the pros and cons between alternatives become. Making important decisions is accompanied by opinions, and the leader relies not only on facts because, in many cases, one fact or another may be misleading or essential facts may be lacking.

When making managerial decisions, heuristic methods, also known as "heuristics," are widely used. (Mladenov & Terziev, 2011). They are intended to generate options for solving a particular problem based on the inherent human ability for creative thinking and generally for creative activity. This method is characterized by heuristic reasoning, which allows for practical options for problem solving. The creative decision-making process using heuristic methods is one of the important resources of organizations, ensuring their competitiveness. Heuristic methods help in decision-making in conditions of increasing complexity, dynamics, and uncertainty of the external environment, especially when dealing with unstructured management problems.

Depending on the subject who conducts the decision-making process, heuristic methods are considered in two main groups: methods of individual and methods of group creative thinking.

Over the years, the process of decision-making has gone through various stages and evolved to incorporate the use of artificial intelligence today (Futurist.bg, 2023).

It is interesting to retrospectively analyze decision-making methods and note the progress in this area, alongside the development of information technologies.

An important method of individual creative thinking is the "scenario development" method, which find application primarily in determining overall economic policies in a given area. A drawback of this method is the lack of alternative solutions to the problem.

The following methods, these are the so-called methods of "morphological analysis", which are characterized by the use of sequential thought activities. The analysis enables the selection of a solution.

The "brainstorming" method is among the most widespread methods of creative participation in decision-making. This method is characterized by the mutual exchange of ideas during a collective brainstorming session on the problem at hand.

One of the most widely advocated heuristic methods in management activity are expert assessment methods. They are applied in determining the goals for solving a given problem by discussing options and choosing based on a conclusion about the choice.

Another method is the *Delphi* method and its modifications, the most widely used out of the group methods.

The *Ringi* method – a low-level manager prepares a document to solve a problem that is not within his competence. The document then goes to the next level of managers who do support or do not support the proposal to solve the problem. (Mladenov & Terziev, 2011).

AUTOMATIZED SYSTEMS FOR INFORMATION PROCESSING AND MANAGEMENT

Over the past two decades automated systems have been increasingly integrated into the lives of modern individuals. They even change people's daily routines, and it is impossible today to imagine success in any field without the use of such automation systems. Information systems are developing as rapidly as possible, and information technologies are prioritized in their development for countries as they form the

basis of organizing electronic government and international and national projects, including business, management, economics, administration, education, culture, healthcare, national security, and defense system.

Hence, decision-making support based on information systems is of crucial importance. These processes need to be mastered and controlled, especially when it comes to strategic management. It is important to note that the decision-making process is a systematic approach in making choices based on a set of criteria and selecting the best option based on evaluation.

The decision-making required in a given situation aims to assist the organization in better resource allocation, time efficiency, and other factors to achieve the best outcome. Decisions are most commonly categorized as operational, tactical, and strategic. Decision-making is usually associated with achieving goals, problem-solving, efficiency, improved results, risk management, or personal growth.

Business Intelligence (BI) (BI systems, 2022) is a system that encompasses processes, tools, and technologies necessary for transforming data into information and information into knowledge and plans that imply quick and effective business actions supporting the decision-making process.

It is through Business Intelligence (BI) systems that users obtain secure, consistent, understandable, easy-to-process, and timely information, which creates conditions for informed decision-making.

Business analysis systems can also help identify market trends and uncover problems that need to be addressed.

Large language models can also help identify goals and preferences, evaluate decision circumstances, and select a decision mechanism. And here again the dialogue is a key point. By asking the right questions, we can better understand the context of a decision. Another system is ChatGPT (How can we use ChatGPT to make more effective business decisions? 2023), with which we can quickly find suggestions of what typical goals other companies have pursued in a similar situation. This system gives different perspectives. The generative language model has a number of advantages – it is not self-interested and is much cheaper than external management consultants. It also means that ChatGPT can make preparation and decision support cheaper, especially for small and medium-sized companies giving them more chances in the market.

Systems are becoming more efficient because the economic incentive to make better business decisions is high and will drive the transition from today's ChatGPT to an even more powerful tool of the future, which we can tentatively call "DecisionGPT" (The future of business case solving, 2023).

The strength of ChatGPT and similar systems is in comparing and contrasting similar situations. This is perhaps the most important necessity in making many managerial decisions. Very few decisions that managers face to are unique. Thousands, sometimes millions, of managers before them have faced similar choices. The better it is described how the decision frameworks were formulated, the different options were evaluated and the corresponding decisions were made, the easier DecisionGPT will become a powerful tool for making more informed and correct decisions.

Another decision support system is DSS (Clinical Decision Support System, 2018), which is a computerized support system and is used to improve decision-making ability in a business organization as a significant part of its application is in the medical industry.

Of course, there are a number of other systems to support managerial decision-making, which we cannot consider here in substance.

All decision support systems must be protected, as well as the environment in which they operate. In the EU member states, a number of legal acts are applied, the main purpose of which is to guarantee the protection of consumers, not only EU consumers. In this sense, I will refer to one of the latest documents "Resolution of the European Parliament from 12 February 2020 on automated decision-making processes: ensuring the protection of consumers and the free movement of goods and services" (2019/2915(RSP) (European Parliament, 2020).

CONCLUSION

In the modern world, every person, especially in the role of decision-maker, is continuously faced with solving complex cases. It should not be overlooked how many factors influence decision-making. Making the right decision requires more practice and often help from outside. Then it comes the turn of decision support systems. In addition to learning from examples of decision-making, people need to improve on other leadership skills to make better choices, especially when faced with difficulties.

Responsible decision-making involves considering ethical, moral and long-term consequences when making choices, with examples including environmental awareness, ethical dilemmas, peer pressure and substance use, academic integrity, online behavior and cyberbullying, financial responsibility, health and well-being, social responsibility and civic engagement, conflict resolution and responsible use of technology.

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