REVISTA DE EMPREENDEDORISMO E GESTÃO
DE MICRO E PEQUENAS EMPRESAS

EDITORA ENTERPRISING

Review and analysis for synthesis in Decision Making Models

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ABSTRACT

Decision making for solving organizational problems is based on models validated in the routines and rules predefined by the organization, and on the personal analysis of decision makers regarding their understanding and application. Therefore, they have both analytical and subjective characteristics, with different principles and structures to determine decision making. This article aims to investigate, list and synthesize in a theoretical framework four of the main decision-making models: Rational, Procedural, Political and Anarchic. It is a descriptive qualitative approach of data collected in bibliographic research, where the models were listed and organized in a concise table with the following categories: concepts, summary, levels of organization, applications, profile and procedures.

Key words: Organizational environment; Organizational Ergonomics; Decision Making Models; Decision Process.

1. INTRODUCTION

The study of the decision-making process has been the object of investigation by several theorists and professionals from different areas over the years. This task is present in almost all day-to-day activities, both in simpler and less impactful issues, as well as in more complex issues that involve greater responsibility. Because of this and the impact that a given decision can generate, most of the studies were directed, and even carried out, taking into account the organizational environment. When in an organization, the result of a choice, regardless of whether it is assertive or not, can directly reflect not only on the life of the individual responsible for the decision, but also on the lives of all the people who participate in the organization, and may even, depending on the situation, it means its continuity or not.

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Silva, RAA, Mager, GB, Santo, CT; Review and analysis for synthesis in Decision Making Models.Journal of Entrepreneurship and Management of Micro and Small Enterprises V.6, Nº3, p.01-18, Sep/Dec. 2021.
Article received on 10/06/2021. Last version received on 12/18/2021. Approved on 12/25/2021.

Several studies related to this topic have contributed with research publications of great importance and relevance to the organizational area. In general, these researches cover issues that come from the beginning of this study within a more rational view, to issues involving the need and understanding of the cognitive aspects of the individual in the elaboration of more structured means on the possible reduction in the levels of error by account of decision-making mechanisms. Authors such as Simon (1947), Trueman (1998), Coutinho and Ferraz (1995), Kistmann (2002), Choo (2003) among others, state that the decision-making process involves mechanisms that guide the manager in terms of understanding the items needed to the development of good solutions to a problem,

For Choo (2003), in a decision-making process, in order to make a fully rational choice, the individual should be able to identify all existing alternatives, predict the consequences of each alternative and evaluate them according to objectives and preferences. That is, making a totally rational decision and having full control over everything that will happen after this is a practically impossible task, as the decision maker is not able to have knowledge about all the influencing variables, especially in highly complex issues. Some researchers on this topic defend the idea that the decision-making process, in complex systems, in a full and rational way is something impractical, because this process is limited. Among them,

Simon (1947) coined the term bounded rationality, which characterizes the aforementioned limitation of the organizational decision maker, as a limited human being, especially in being able to identify, collect and process information in large quantities, especially those with a certain degree of complexity, to make accurate and efficient decisions. aligned with the interests of the organization. Thus, the decision-making process took on a new dimension in the organizational environment, reinforced by the identification of subjective variables, of a more subtle nature, which exert an influence on the subject and can shape decisions. In this context, the organizational manager can be recognized as a normal and limited human being and, therefore, incapable of knowing and processing all the information related to the context in which the organization is inserted. (Schreiber and Bohnenberger, 2017). Corroborating this thought, Robbins (2005) defines “bounded rationality” as the “construction of simplified examples that attract the essential aspects of the problems, without capturing all their complexity”; this is because the individual does not have the cognitive conditions to appropriate all the

information that is offered to him and, in this circumstance, only what he deems important is assimilated (Lousada and Valentim, 2011).

Thus, facilitating cognition on the part of the decision maker, regarding the understanding of subjective variables for solving problems within an organization, contributes positively to the decision-making process. This will be even more evident if applied in situations that are already recognized and of frequent occurrence, where information and data considered subjective can be collected and recorded in a coherent way, with easy access and agile processing in the use of these by the decision maker. The use of an organized model presupposes not only greater security regarding decision making, but also the possibility of reducing errors in this type of process, providing it with a more iterative and systemic character. In this context, an analysis of decision-making models is relevant,

2. MATERIAL AND METHOD

The methodological basis used for the work was the narrative literature review described by Elias et al. (2012) and Rother (2007) as a method that allows the development of articles in which the authors analyze and interpret in a more comprehensive and critical way the phenomena from a theoretical or contextual perspective. Rother (2007) also draws attention to the need to stick to quality sources that ensure a deep and reliable analysis of information.

Therefore, this article is part of a broader research and collection of an investigative study on Decision Making, as a structured record that will serve as a basis for the design of an initial reference model, with a view to its application, analysis and discussion of the results, and comprises the authors' object of study. In carrying out this article, authors who fit the proposed theme were used, based on research in books, and reference articles extracted from the Scielo and Google Scholar search platforms, listed and presented in the references of this article. Terms associated with decision making, management, cognitive and organizational ergonomics served as a guideline in the search and analysis of the content presented here. It is worth noting that there was no search restriction regarding the year of publication of the scientific materials, but rather, as to the relevance of its content to this article. Basically, authors of high recurrence were used in terms of

citation and use of research carried out, regarding considerable information for a consistent analysis of the aforementioned context proposed here.

The descriptive qualitative approach of the data collected in bibliographic research identified four of the main decision-making models, namely: rational, procedural, political and anarchic. The choice of these models was due to their importance and relevance in terms of their contribution to this area of study. And these are presented here in a summarized and structured way in a theoretical framework, considering the following categories: concept, summary, organization levels, applications, profile and procedures. These categories were identified and recorded during data collection of decision-making models and their action in the organizational context.

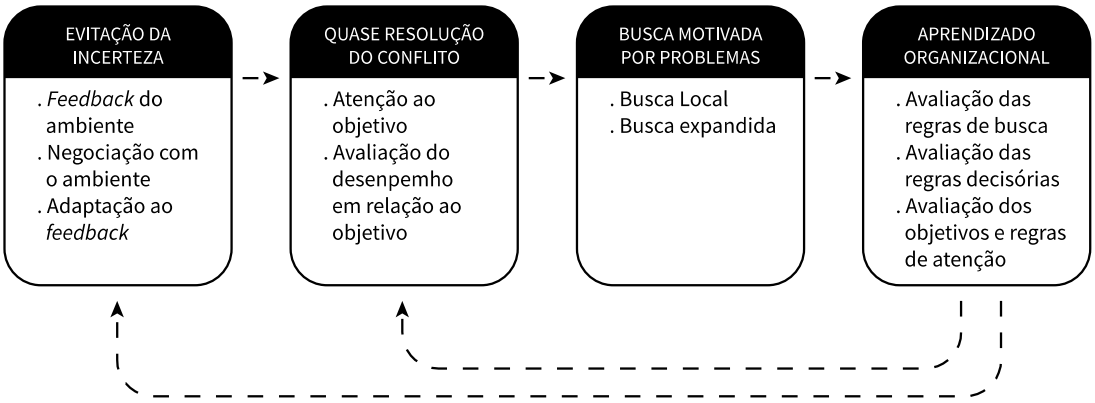
2.1. RATIONAL MODEL

The rational model, according to Simon and March (1958) and Cyert and March (1963), describes decision-making as a goal-oriented and problem-oriented act, where the decision maker works with the information at hand and were previously defined by the organization, as they relate to the intended objective. In this model, choice behavior is a behavior regulated by norms and routines, so that the organization can act in a procedural and intentionally rational way for decision making. Cyert and March (1963) distinguish four main procedures: (1) rules for performing tasks, (2) constant records and reports, (3) rules for handling information and plans, and (4) planning rules. In these procedures, the methods for performing the task must also be specified as to how it is carried out, whether for a specific member or group. Rules are invoked at different levels of the organization, guiding decisions from the operational to the strategic level, involving both daily routine decisions and decisions about price, inventory, sales, and even decisions that involve great uncertainty, in order to reduce it to a minimal problem with low uncertainty.

Choo (2003) mentions that performance rules are important because they contain the learning of the past, and when this information is stored, they can opportunely contribute to future use. Therefore, creating, maintaining, controlling and defining ways to communicate information from records is essential in this process, as well as knowing who communicates what to whom and which channels are the most appropriate for the flow of information. The decision-making model developed by Cyert and March (1963), presented in Figure 1 below, is composed of four concepts: (1) uncertainty avoidance, (2)

quasi-resolution of conflict, (3) motivated search for problems and (4) organizational learning.

Figure 1
Rational Model Diagram (Choo, 2003; Cyert, RM and March, 1992)

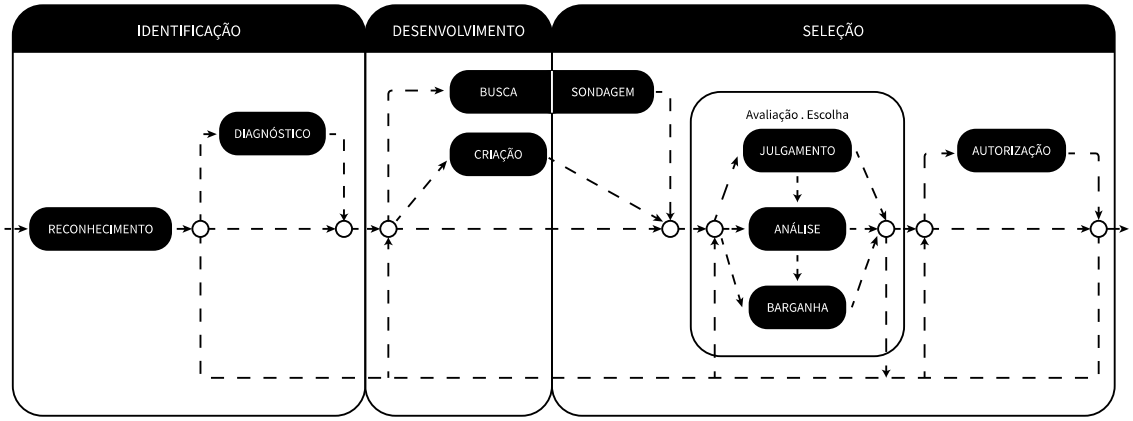


Choo (2003) states that the objectives of an organization function as independent limitations imposed by the members of the coalition, where the organization becomes a set of intersecting interests, in which various strategies are practiced to resolve the conflict. In Figure 1 above, it is possible to observe how the four concepts proposed by Cyert and March (1963) are interconnected in a decision-making model, applicable in an organizational environment. Starting from the left, the organization constantly analyzes the feedback coming from the environment. The intention of this action is to verify the degree of certainty in the processes that involve decision by the members of the organization. If uncertainty is high, the organization negotiates with the environment to reduce uncertainty (uncertainty avoidance). In this model, individuals or groups in the organization are considered to be meeting one objective at a time, and for this purpose they evaluate performance and the achievement of objectives using rules to reach an acceptable decision (almost conflict resolution). If an objective is not being met, members activate a problem-oriented search to solve organizational problems. At first, the search is carried out locally and, if it is not successful, then it is expanded, being able to include more remote sources and alternatives in this process (search motivated by problems). After the search is completed and alternatives are found to solve a given problem, the organization evaluates the search rules used, and the decision rules used (organizational learning). If the objective is considered achieved,

2.2. PROCEDURAL MODEL

The procedural model is exemplified in the work of Mintzberg, Raisinghani and Théorêt (1976), and seeks to elucidate the phases and cycles that give structure to complex and dynamic decision-making activities. In this model, the search for information must be broad and recurrent, and if necessary repeated in many cycles, especially during the development phase of the decision-making process, where in case of an unsatisfactory decision, the search for new information must be carried out until a solution is reached. During the development of this model, the authors analyzed 35 strategic decision-making processes in various commercial and governmental organizations, involving different situations, where phases and routines were observed that indicate an underlying structure to the decision-making processes. In accordance with the complexity and breadth of strategic decisions,

Figure 1
Procedural Model Diagram (Choo, 2003; Mintzberg et al., 1963)



The three main decision phases are identification, development and selection. The identification phase is where the need to make a decision is recognized and the understanding of issues implicit in the decision, such as recognition routines and diagnostic routines, begins. Within an organization, the recognition routine goes through a process of verifying the information regarding its pattern, differentiating the situation between something routine, which can be resolved through past experiences and pre-established solutions already used by the organization, or something new and /or unexpected. Mintzberg et al (1963) suggest that the decision maker's mind undergoes stimuli, which involve issues such as expected reward, workload, among others, and that

the accumulation of these stimuli influences the outcome of the decision. Therefore, in the diagnostic routine, the process involves the need to understand these stimuli and verify their causal relationships relevant to each decision-making situation. This information search process can happen in the channels already defined by the organization, or depending on it, start the opening of new channels for greater clarification and problem solving (Choo, 2003).

In the development phase, the search for one or more solutions to solve a problem or crisis begins, or even to create a new opportunity. These search routines and creation routines also undergo a systematized process, where, in the search routines, Mintzberg et al (1963) identified four types: "memory search, which consists of probing the organization's existing memory; passive search, which consists of waiting for unsearched alternatives; trap search, which consists of activating search generators (such as letting suppliers know what the company is planning to buy); and active search, which consists of actively seeking information about alternatives" (Choo 2003).

As Cyert and March (1963) suggest, searching appears to progress from local to remote searching, from memory and passive searching to the less accessible sources of trap and active searching. Creation routines involve developing a custom solution or tasks that may involve modifying an existing conventional alternative. According to Choo (2003), in this type of search, organizations that create and develop customized solutions sometimes go through a complex and interactive process, where initially vague ideas gradually converge to a specific solution. It is worth noting that the author also highlights the differences between the use of a customized or conventional solution. In the first condition, organizations pursue, create and develop a single alternative, in the second, the choice usually starts with the selection of one among multiple alternatives, without the need for creation. Regardless of the choice, the selection phase involves first evaluating the alternatives and then choosing a solution for a commitment to action. In this process, selection involves probing routines, evaluation-choice routines and authorization routines. Polling routines eliminate what is not feasible, reducing the number of alternatives to consider. Evaluation-choice routines use judgment, bargaining, or analysis to arrive at a choice. In judgment, the individual makes the choice according to rules defined in his own mind. In bargaining, the choice is made through agreements with a

group of people with conflicting goals and interests, in which each participant exercises judgment. In the analysis, alternatives and their consequences are evaluated against a set of criteria in order to determine the best performance option, and the final choice is made by bargaining or judgment. Authorization routines define a path through the organizational hierarchy for the decision to obtain internal and external support and to guarantee resources for its implementation (Choo, 2003).

2.3. POLITICAL MODEL

The political model, developed by Allison (1971), emerged after the author applied the rational and procedural models, in his analysis of Decision Making during the 1962 Cuban Missile Crisis, and realized that neither of the two models fully explained what happened. . The author defines this model as political, as he realized that during the decision-making process, in a moment of bargaining, the influence that the participants have in favor of their interests can interfere with the outcome of this process. Thus, decisions result less from a rational choice than from the ups and downs of politics. According to Allison (1971), actions and decisions can then be analyzed based on the answers to a sequence of four questions: 1. Who are the players? 2. What are the players' positions? 3. What is the influence of each player? 4. How do each player's position, influence, and moves combine to generate decisions and actions? (Choo, 2003) In the first question, it is understood that the players are individuals who have a prominent position in the decision-making process, and they can interfere in the choice and determine actions to be performed based on it. But it also warns that this position of “advantage” imposes certain obligations on this individual. In the second, the position of each player is verified, which can be determined by several factors, such as: the way he sees an issue; their goals, interests and points of view; and reactions to deadlines and events. It is worth noting that this player's perceptions are inevitably limited, as each person sees a different facet of the issue, depending not only on their goals and interests, but which are also influenced by situational and organizational elements. The overlapping of the interests of the people, the group and the organization constitutes the position in favor of which the individual plays the decision game. In the third, the issue verified is power, which Allison believes is the result of bargained advantages, and the ability and willingness to use these advantages in favor of the decision, as well as the way other players interpret the actions

resulting from these two elements. These sources of advantages range from position and occupation, such as access and control of certain information, and even the use of persuasion, resulting from personal relationships. In the fourth and final question, it is verified whether the players occupy positions linked to the channels that lead to action, as this is a formal means of interfering in a specific issue. Issues are usually contained in established channels, and sometimes it is these channels that then structure the decision-making game. From them, it is determined which players can play, and their advantages and disadvantages in that game.

These rules define how the game will be played, establishing positions, power and channels for action. At the same time, according to Choo (2003), they limit decisions and actions, prohibiting certain behaviors, legitimizing certain movements, such as bargaining, persuasion or the formation of coalitions, and disapprove of others. In the political model, actions and decisions are understood as political effects. Political because they emerge from the bargaining of individuals through regular channels, and effects because they are consequences of the concession, conflict and confusion of players who have divergent interests and unequal influences. Organizational goals can be negotiated between groups, but the divergence of personal goals, especially in situations that involve resource allocation, and containment of scarce resources, it is normal not to have everyone's support,

2.4. ANARCHIC MODEL

The rational and procedural models are defined through structured sequences for solving problems, but studies indicate that decision behavior can sometimes happen randomly, being determined by available solutions, participants' interests and existing situations. Based on the ordered models of organizations, Cohen, March and Olsen (1972) suggest another view of organizations, which defines them as organized anarchies characterized by problematic preferences, obscure technology and fluid participation in decision-making processes. According to the authors, the criteria used in decision making are generally limited and incoherent, and they can be better defined as a collection of ideas than an organized structure for the search for solutions. It will not always be possible to have full control of the criteria beforehand, the organization's technology is obscure, not all processes and procedures are well understood by its members, which jeopardizes

the means of achieving the objectives desired by the organization. Participation is fluid, individuals dedicate themselves to different activities, making different use of time and effort (Choo, 2003).

In organized anarchy, decisions result from four relatively independent streams, namely: problems, solutions, participants, and choice opportunities. Choo (2003), refers to the studies of Cohen et al (1972), defining that a decision situation is like a garbage can into which various types of problems and solutions are thrown by the participants as they are generated, where the Decision occurs when problems, solutions, participants and choice opportunities coincide. When this happens, solutions are glued to problems, and problems to choices. The opportunity will define which solutions will be glued to which problems, where this may vary depending on who the participants are and their goals.

The garbage can model predicts that timing is an important element in choosing a project, but it is not always possible to understand the factors surrounding opportunity. Studies on the subject show that projects, apparently well resolved, do not succeed, and that the opposite of this situation can present good results. Or even projects where weak results are expected, but which can be seen as important and essential to the organization as a project. Dubious decisions are made based on arbitrary judgments such as these, and almost always play a significant role within the organizational context, and positive reports of results are not uncommon.

Cohen et al (1972) suggest that, in the garbage can model, decisions are made in three different ways: by resolution, by inadvertence and by escape. Resolution is decision making that occurs after thinking about the problem for a certain amount of time. In inadvertence, a choice is adopted quickly and incidentally for other choices to be made. The escape decision occurs when problems abandon choice - the original problem disappears, leaving a choice that can now be made, but the decision does not solve any problems. In organized anarchies, choices by inadvertent or flight are more common than decisions by resolution.

3. RESULTS

For a better understanding and analysis of the content researched here, in accordance with the objectives of this article, the results will be presented below, where it will be possible to review the theoretical part, as well as the decoupage of these and their elements, in a summarized way, according to each model researched. This narrative review discusses and helps to understand decision-making models and their influence on the organizational environment.

Table 1
Summary of Decision Making Models

MODELS	CONCEPTS	ABSTRACT	ORGANIZATIONAL LEVELS	APPLICATIONS	PROFILE	PROCEDURES	AUTHORS
RATIONAL	- avoidance of uncertainty - near conflict resolution - motivated search for problems - organizational learning	- decisions as a goal-oriented and problem-driven act - the decision maker works with the information he has at hand and that has been previously defined by the organization - decision maker behavior regulated by rules and routines - actions of the procedural and intentionally rational decision maker	- strategic - tactical - operational	- common daily activities - decisions involving great uncertainty	- individual - group	- rules and routines for the performance of tasks; - constant records and reports; - rules for handling information and plans; - planning rules.	- Simon and March (1958) and Cyert - March (1963)
PROCEDURAL	- identification - development (from organizational memory, passive waiting, traps, or active form) - selection of alternatives	- the search for information must be broad and recurrent - if necessary repeated in many cycles - in case of unsatisfactory decision, the search for new information must be carried out until a solution is reached	- strategic	- complex and dynamic decision-making activities - especially during the development phase of the decision-making process	- individual - group	- recognition and diagnosis routines - search and/or creation routines polling routines - evaluation-choice routines - authorization routines	Mintzberg, Raisinghani and Théorêt (1976)
POLITICAL	- bargaining moment - influence that participants in favor of their interests - persuasion - formation of coalitions - less rational choice and more political	- identification of players (decision makers) -establishment of positions - ability and willingness to use the advantages given by the position - influence of power issues and channels for action	- strategic	- activities with conflicting goals and interests - resource allocation activities - political activities	- group	- questions: 1. Who are the players? 2. What are the players' positions? 3. What is the influence of each player? 4. How do each player's position, influence, and moves combine to generate decisions and actions?	Allison (1971)
ANARCHIC	- randomness in the use of solutions - determined by available solutions - sense of opportunity on the part of the decision maker - determined by the interests of the participants - changes according to existing situations	- organizations such as organized anarchies - characterized by problematic preferences - obscure technology - fluid participation of individuals	- strategic - tactical - operational	- activities with conflicting goals - decisions involving great uncertainty - decision by resolution - inadvertent decision - decision to escape	- individual - group	- problems - solutions - participants - choice opportunities	Cohen, Marche Olsen (1972)

In his book, Choo (2003) presents the traditional decision-making models, which contributes to the understanding of this action within the organizational environment,

which in addition to presenting decision-making processes, their forms, already researched and recognized ways of acting, also brings between the lines a series of principles common to this action.

It is also understood, now through structured processes, that the decision-making process passes through a series of routines and rules, even when the rule is not to have well-defined rules, which is more easily perceived in the anarchic process. Another point to be noted is the commonalities and differences between the decision-making models researched here. Table 2 below presents a compilation of this point in attention, which contributes to the segregation of what is typical of the decision-maker's context, and what is more evident within the organizational context.

Table 2
Common points and differences in Decision Making Models

	RATIONAL	PROCEDURAL	POLITICAL	ANARCHIC
POINTS GENERAL IN COMMON	- presence of conflict or problem - solution search			
POINTS SPECIFIC BY MODEL	- use of rules and routines as a solution - learning of the applied process as new rules and routines	- amplified solution search - repetition of the cycles defined in the decision-making process	- attention to situations of a personal nature such as: bargaining, influence, persuasion and coalition	- does not have defined rules and routines - randomness in the use of solution

In Table 2, the general points in common bring elements that are typical of all decision-making models, but it is important to remember that they do not necessarily occur in the same way, especially when looking for a solution to resolve a conflict or problem. The specific points by model present the characteristic elements of each model, in order to register striking differences, and that help in the understanding of each one of them as an approach and action. The study and understanding of these models helps in understanding the decision-making process and facilitates analysis in everyday situations, as well as the use and application of this knowledge in diverse and broad ways within the organizational environment. Therefore, the grouping and organization of these elements can be a way to be explored.

4. CONCLUSIONS AND FINAL CONSIDERATIONS

The systemic organization, which involved the search, registration and analysis of knowledge, using the narrative literature review methodology, contributes to the evolution of knowledge on the subject, and encourages the search and observation of other contexts for the expansion of learning, which possibly will elucidate the use and possible creation of new decision-making models, applicable within the organizational environment, where the individual can be understood and helped in the resolution of conflicts or problems. In this context, it is also worth mentioning the importance of good communication, which allows for a greater understanding of each part of the action, and which enables an adequate collection and recording of data, serving the definition and dissemination of decision-making models,

The study also suggests the expansion and search for new knowledge, as an example, involving the cognitive aspects and their influence on the decision maker, for a better understanding of the actions performed in the presented models. Cognitive and language processes correlated, especially, with personal search situations can open new horizons. There are several possibilities for studies that contribute to the development of this area. These studies present different methods, techniques and procedures, revealing that an adequate superposition of facts, with an interdisciplinary character, will be of great value to studies that approach the decision-making process.

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