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Decision, rationality, Lean methodology

Decisión, racionalidad, metodología Lean

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Abstract

Every day people are faced with countless decisions to make, some of them are trivial and even seem to be of automatic execution derived from the inertia of routines, while others can become significant w ith i mportant i mplications i n their future. The way in which people make decisions has always been a topic of great interest for professionals from different d isciplines, b oth m edical a nd i n s tudies o f people in their individual and social behaviors. Decision-making in organizations emerged as an object of study in the last century, with research aimed at characterizing the decision-making process, its components and decision-making in organizations. As the research was deepened, one of the lines of study was to determine whether the decision making of businessmen was only rational, and the role that emotions and intuitions had in that sense. The objective of this paper is to reflect various theoretical contributions regarding biases in organizational decision making. This paper is predominantly descriptive in nature, the research was based on a qualitative approach strategy, which included the review of primary and secondary sources, for which an exhaustive review of national and international scientific production was carried out.

Keywords: *Decision process; Cognitive biases; Decision making; Lean Thinking*

Resumen

Cada día las personas se enfrentan a un sinnúmero de decisiones a tomar, algunas de ellas son del tipo trivial y hasta parecieran de ejecución automáticas derivadas de la inercia de las rutinas, otras en cambio pueden convertirse en significativas con implicancias importantes en su futuro. La forma en que las personas deciden siempre ha sido un tema de gran interés para profesionales de distintas disciplinas tanto médicas como en estudios de las personas en sus comportamientos individuales y sociales. La toma de decisiones en el ámbito de las organizaciones surge como objeto de estudio en el siglo pasado, con investigaciones orientadas a caracterizar el proceso decisorio, sus componentes y la toma de decisiones en el ámbito de las organizaciones. A medida que se profundizaban las investigaciones, una de las líneas de estudio fue determinar si la toma de decisiones de los empresarios era solo de tipo racional, y el rol que en ese sentido tenían las emociones e intuiciones. El objetivo del presente trabajo es reflejar diversos aportes teóricos respecto de los sesgos en la toma de decisiones en el ámbito organizacional. El presente escrito es de índole predominantemente descriptivo, la investigación se basó en una estrategia de abordaje cualitativa, que incluyó la revisión de fuentes primarias y secundarias, para ello se realizó una exhaustiva revisión de producción científica nacional e internacional.

Palabras clave: *Proceso decisorio; Sesgos cognitivos; Toma de decisiones; Pensamiento Lean.*

Introduction

Sometimes the choice of the best alternative seems obvious and therefore easy to identify and choose, others - on the other hand - present complications linked to lack of information, uncertainty and even conflicts.

The way in which individuals perceive the context, the level of information they have, the ability to gather, analyze and process information, as well as the planning of the course of action, may constitute individual failures in the decision process, aspects analyzed under the theory of biases. The study and analysis of the decision-making process represents a multidisciplinary challenge; in particular for management it acquires a major peculiarity.

At the organizational level, the decision-making process involves the selection of a course of action from among several possible ones when facing a problem and solving it or determining how to carry out actions that will have an impact on the strategy. Decision-makers are oriented to seek the alternative that is most attractive in terms of effectiveness and efficiency.

Today's managers are well aware that customers are increasingly demanding; this puts pressure on companies to execute a permanent search for excellence at all levels in order to offer products and services of value that meet their expectations, while harmonizing internal processes in an agile manner.

Every day, people at all levels of an organization are faced with scenarios to analyze and decisions to make, and it is the combination of these decisions that determines the survival and/or success of a company. The Lean methodology is a management model focused on minimizing waste in systems and conversion processes, thus maximizing the creation of value for the customer.

Decision theory provides analytical tools that seek to provide an objective point of view aimed at improving the process, bearing in mind the context of uncertainty under which organizations operate.

Decision theory and Lean methodology complement each other to achieve superior decision making in terms of efficiency and effectiveness in organizational processes. Decision theory provides a framework for evaluating alternatives, while lean methodology provides a way to look at processes and use data to improve efficiency and effectiveness.

DEVELOPMENT

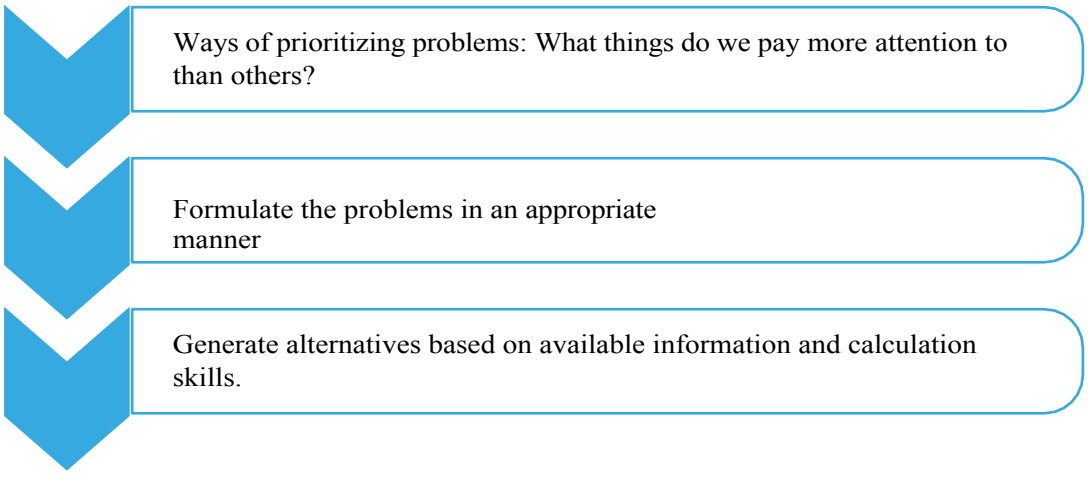
Approach to decision theory:

Decision-making is an organized cognitive process that, a priori can be conceptualized as a choice between different options by a decision-maker, who from an initial motive (meta decision) executes choices that can be rational or not (Bonatti, 2019; Chahin, 2016).

Most people's decisions are determined - in part - by self-interest, but the author recognizes the superior importance of the perception of the interests of the groups (whether families, organizations, etc.) with which they identify, and have a sense of belonging and loyalty (Simon, 2001; Estrada Gallego, 2007). The author also discusses the psychological process that is triggered in people at the moment of making a decision, since it is influenced by elements characteristic of human beings (attention, memory, habits, among others) and some from the surrounding context.

According to Bonome (2009), Simon provided a new perspective for analyzing the decision-making process by proposing the conceptual and empirical mode, understood as a consequence of the limited capacity to formulate problems and solve them in a rational and completely objective manner (bounded rationality). Figure 1 presents an approach to the decision process according to the aforementioned author.

Figure 1.
Three aspects of the decision process, according to Simons



Source: Own elaboration based on Bonome María (2009).

Based on the three aspects represented in Figure 1, the way in which the economic agent behaves during the process of selecting alternatives when solving a dilemma acquires new relevance. However, it lacks the analysis of the values of judgment that affect decisions and human reason as preponderantly instrumental, i.e., a priori it is of no interest whether the final decisions are good or bad.

Simon (2001) recognizes that organizational decision-making is influenced by a changing context, and that each organization may adopt different positions. Some take the initiative and execute strategies in advance or simply react to market variations. Likewise, decisions vary according to the type of organizations; in those with rigid, highly controlled structures, repetitive routines and preponderantly bureaucratic, programmed-type decisions are compatible, in which the cognitive process is based on past actions.

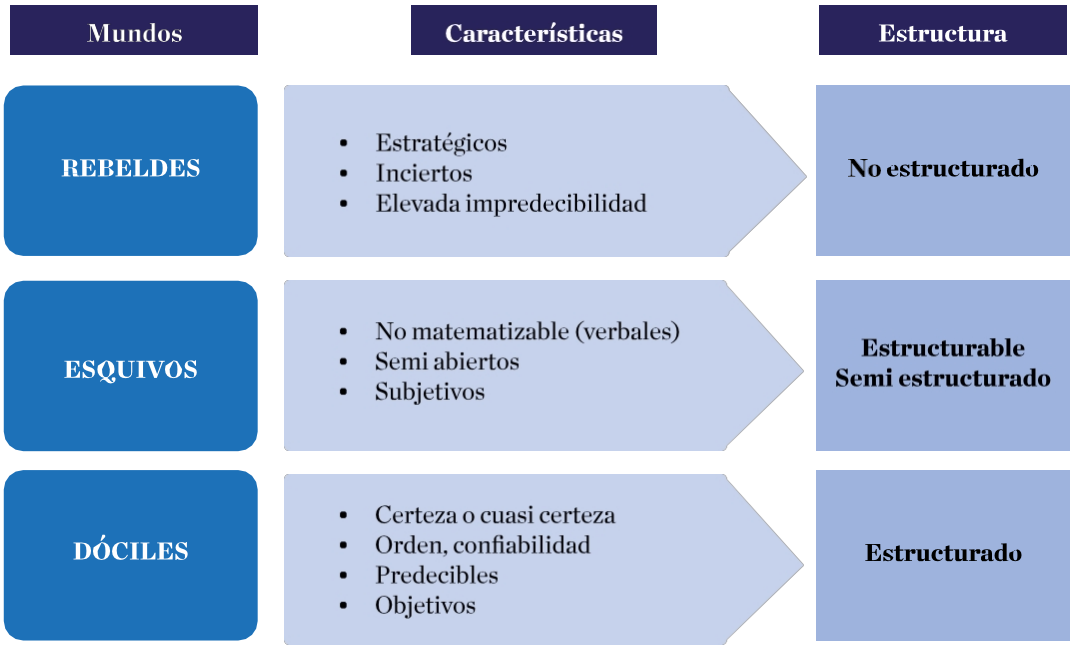
On the other hand, and in contrast to what was expressed in the previous paragraph, there are non-programmed decisions. They arise when the decision-making agent does not have the resource to resort to corporate memory to ensure the effectiveness of the decision-making process; this situation does not mean a lack of information, but rather that the agents are permanently faced with unknown situations. In order to provide a solution to these situations, simulation and operational research, among others, have emerged.

For his part, Pavesi (2000) affirms that there is the possibility of learning to think about the decision, to the extent that it can be recognized in the decision process, that there is a correct interpretation of the variables; then it is possible to find a method that guarantees that the best possible was done at the moment of deciding, unfortunately it is not susceptible to guarantee the success of the decision.

Another important contribution of the author is the recognition of different situations that have a direct impact on the decision-making process, which Pavesi calls the world. By world is understood all the elements and variables that influence and influence the decision. In turn, the decision-making agent is immersed, as opposed to postulates that divide the thinking subject (cognitive subject) from the object, both are in permanent interaction, feedback and interdependence.

Figure 2 presents the worlds in Pavesi's terms. It is important to note that a variable, according to the author, is any element that is perceived and selected by the decision-making agent and that can adopt both levels and values over time. The more knowledge and experience the cognitive subject has, the greater the ability to select variables. The behavior of variables is represented by the succession of levels, degrees and values.

Figure 2
Types of worlds according to Pavesi



Source: own elaboration based on Pavesi (2000).

According to Baron & Zapata Rotundo (2018, as cited in Simons, 1947) human beings have a particular way of perceiving the world around them, in order to process the complexity of variables, they perform an abstraction to convert it into a simplified model, which helps them to dispel the great confusion of the real world. This mechanism causes people to make decisions within the limits of their own knowledge (bounded rationality).

For Simon (2001), the classical economic man is the one who develops the decision-making process in a known and defined environment. The administrative man, on the other hand, can only consider partial aspects of reality. Cognitive biases are mental filters that occur in the fractioned vision.

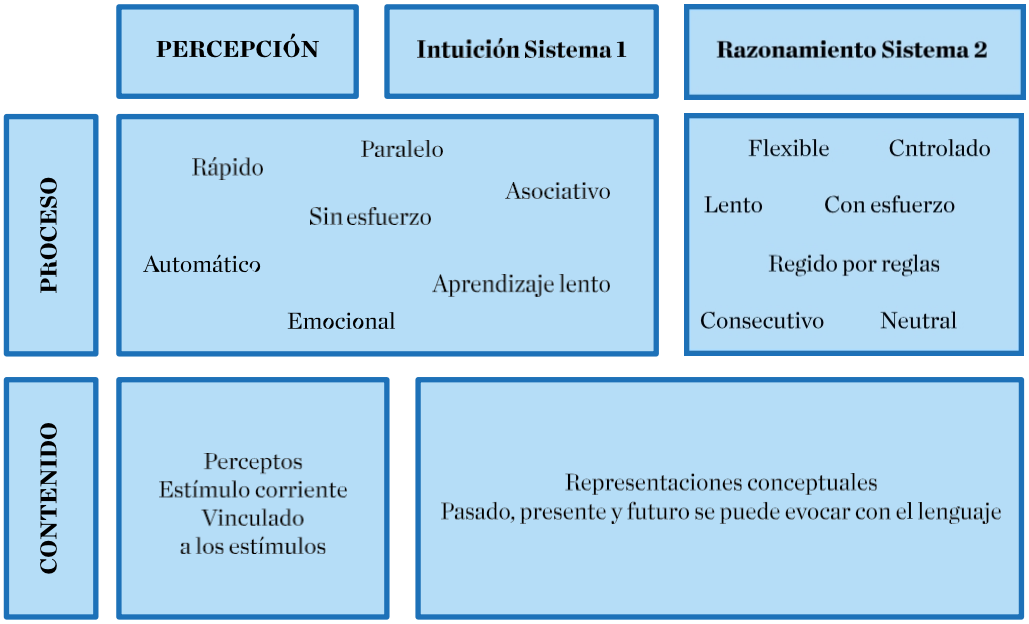
According to Kahneman (2003), two modes of thinking and deciding are identified that, in general, are correlated with the concepts of reasoning and intuition. Reasoning is what people do when, for example, they solve a basic mathematical operation; people reason deliberately and with a lot of effort.

Intuition, on the other hand, is immediate knowledge, without calculation or effort. While thinking is immediate, there is also some control over the quality of mental processes and the way they manifest themselves in behavior. Individuals do not tend to express every thought that occurs to them or act on every impulse. However, control is usually lax, and enables the expression of intuitive appraisals (Kahneman, 2003).

Conventionally, intuition was linked to poor results, but intuitive thinking, according to the author, can also be powerful and accurate. Kahneman presents a model made up of three cognitive systems, as shown in Figure 3: Perception and stimuli in direct linkage. Intuition associated with perception and reasoning with social representations.

Figure 3 also represents the basic idea that guided Kahneman and Tversky's research that intuitive judgments hold a position between the automatic operations of perception and the planned operations of reasoning. All the characteristics that have been attributed to the so-called System 1 are properties of perceptual operations. However, the operations of System 1 are not limited to the processing of current stimuli. Both systems operate with accumulated concepts as well as with rules. This view of intuition also indicates an accumulation of scientific knowledge about the phenomena of perception that can serve as a basis for a new paradigm regarding the functioning of intuition.

Figura 3
Tres sistemas cognitivos



Source: Kahneman (2023).

Cognitive psychology is the branch of psychology that studies the structures, representations and the way people perceive the context that surrounds them, as well as the way they reason, learn and remember information. In the evolution of theories, they have sought to explain human heuristic reasoning in a general way, typically identifying its processes with strategies or guidelines for making a decision. Experiments

on human reasoning, carried out by experts in the field, have sparked debates about the best way to characterize heuristic reasoning, but, above all, they have generated a discussion on how to understand human rationality, i.e., how to characterize normative reasoning. This debate that arises centrally in cognitive psychology has potential repercussions in the different fields in which the notion of heu- ristics is used (Barón & Zapata Rotundo, 2018).

According to Bonatti (2019), psychology offers a new approach to the decision-making process, based on the studies of Kahneman, the author recognizes that this process is composed of two systems of thought: an intuitive one characterized by speed, association and relationship. The other is reasoning characterized by conscious calculations, which requires prior preparation and effort. This offers a better perspective for analyzing how human beings decide. Bonatti also points out that Kahneman's findings complement normative theories.

At the end of the 1960s, at the Hebrew University of Jerusalem, the most important psychological studies began with the Israeli researchers Daniel Kahneman and Amos Tversky. These researchers started from the premise that losses and disadvantages have a greater impact on the preferences of individuals, compared to gains and disadvantages; in this way, research begins to judge from a new perspective the precepts of rational choice theory and normative theories (Bonatti, 2019; Barón & Zapata Ro- tundo, 2018).

Over the years, Daniel Kahneman has studied the conditions under which decision-making processes occur in organizations. His interest in people's behavior is evident from his work. Based on (Chahin, 2016), Table 1 summarizes Kahneman's contributions over time.

The organizational decision-maker is an administrative man who operates within the limits of rationality, since he has a fractioned and subjective vision of the world. In turn, he is conditioned by cognitive biases, which influence the execution of the decision.

Over the years, Daniel Kahneman has studied the conditions under which decision-making processes take place in organizations. From his work, his interest in people's behavior can be appreciated. Based on (Chahin, 2016), Table 1 summarizes Kahneman's contributions over time.

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Table 1
Kahneman's research

Título	Autores- Año	Aporte
The Framing of Decisions and the Evaluation of Prospects	Amos Tversky and Daniel Kahneman (1986)	Existen cambios aparentemente intrascendentes en la formulación de problemas que producen cambios significativos en las preferencias. La manipulación tiene un impacto considerable al momento de decidir.
Loss Aversion in Riskless Choice: A Reference-Dependent Model	Amos Tversky and Daniel Kahneman (1991)	Las personas al momento de decidir están influenciadas por el nivel de statu quo. Cualquier cambio del punto de referencia repercute en la decisión. La hipótesis en la que basaron el estudio postula que las pérdidas y las desventajas tienen una mayor significancia en las preferencias personales, en comparación con las ganancias y las ventajas
Making Low Probabilities Useful	Kunreuther, Novemsky y Kahneman (2001)	Parte de la premisa que las personas procesan la información sobre eventos negativos con alta probabilidad de ocurrencia. Expresan la necesidad información del contexto del proceso decisorio. Cada persona tiene su propia escala de percepción del riesgo
Before You Make That Big Decision	Kahneman, Lovallo y Sibony (2011)	Impacto y decisiones estratégicas. Errores de los individuos al momento de tomar decisiones. Fallas en la percepción
Pensar rápido, pensar despacio	Kahneman (2012)	Define dos vías de pensamiento: el Sistema 1, rápido, intuitivo y emocional; y el Sistema 2, más lento, esforzado y racional (psicología cognitiva y social).

Source: own elaboration based on Chachin (2016).

According to Kahneman (2003), disagreements arise between economists and psychologists over research on biases. For economists, from the psychological point of view, there is a marked tendency to generate lists of errors and biases, but they are empty of content, since they do not offer a better model of decision making. For the author, this criticism is only partially justified since the psychology of intuitive thinking is unable to compete with the elegance and precision of normative models and lacks validity from a psychological perspective.

Throughout their lives, people incorporate information and carry out learning processes through socialization. In the interaction with their peers they acquire rules, guidelines, etc. that try to give meaning to the set of stimuli and objects that surround them. At the same time, in order to enable

understanding of so many variables naturally activate filters. The set of mental operations that is activated when processing information about the world is vital to determine whether the individual's perception is an objective reflection of his or her context or whether distortions exist. The latter are sources of cognitive biases.

Cognitive biases

The importance of the analysis of cognitive biases has extended beyond people management to encompass many organizational decisions. Thinking of companies as living and dynamic organisms, which are constant producers of decisions, leads us to think that many functions can be affected by biases, for example, the quality requirements with which the organization works. Due to what has been expressed in these lines, efforts to design strategies, prevent and address the undesired effects of cognitive biases are becoming more and more frequent in the business environment. Organizational decisions involve aspects that can translate into competitive advantages or disadvantages, and therefore have characteristics of vital importance for an organization. Thus, making decisions in the organizational sphere involves analyzing situations under a context of uncertainty, with the limitations of the information available and subject to the cognitive biases of the decision-maker.

Bonatti (2010) discusses failures in the decision-making process that come from the level of analysis and planning, as well as from the decision-maker's own mind. The author points out that among the deficiencies detected at the time of decision making is perception; it is certainly necessary to emphasize that we are not talking about failures in the mind of the decision maker only at the time of making the final decision; they can also occur at the time of analysis and planning.

For Zapata & Canet (2009), biases are judgment rules that have an impact on decision-makers (executives and managers), helping them to simplify complex situations to facilitate the definition of decision models and the most convenient courses of action.

For Pérez (2000), economics and psychology converge as disciplines in the area of decision making studies. When the decision-making process takes place under uncertainty, psychology recognizes a set of distorted neurological activities that are part of the neuropsychological substrate, which have a great impact on the formulation of cognitive biases. The author identifies three categories of cognitive distortions. In managerial activity, the decision situation is linked to the perception of reality as a source of biases on the part of managers:

– At the level of perception of information (perception bias), at the moment of acquiring information, selective perception processes can be triggered through prejudices or by not registering at the mental level information that contradicts a previous idea of the matter in question. It is also possible to incur in other types of bias such as representativeness bias, which occurs when conclusions are drawn from a few events and there is a tendency to generalize. Bias by analogy is also typified, where, based on past experience, the aim is to make the following compatible

events (current and historical) to offer the same solution. Impression bias consists of perceiving events with emotional commitment.

– At the level of attribution of a cause to events (attribution bias) occurs when the reason is not presented in a clear and evident way and there is an underestimation of chance or environmental factors and an underestimation of the role of people. On the other hand, it may happen that in certain situations people acquire an egocentric role, such that if the results are good, it was thanks to their personal intervention, and when they are bad, they are due to external and unpredictable factors. Also when the analysis of the causes fails and is attributed to the first alternative that appears.

– At the level of formal representation of reality (formalization biases) occur with the activation of filters of perception of the real complexity of the situation, thus anchoring and the simplification bias that consists in perceiving reality as a simple model that allows structuring and understanding the problems. The model is imposed on reality.

Bonatti (2010), for his part, mentions the authors Kahneman and Tversky in the framework of the three legitimate heuristic methods that are used in decision processes under uncertainty and lead to systematic errors. The rules that are detected are:

- Representativeness, the error is manifested at the moment of determining probabilities of occurrence of objects or events, when misinterpreting or misdetermining the degree of representativeness of the samples under analysis.

- Availability of circumstances or scenarios, also known as "recall capacity trap", "memory trap" occurs at the moment of estimating the class frequency or the feasibility of a particular event. In this case, the filters act in such a way that one tends to remember only some events, either by order of occurrence (primacy effect) or by impre- sion caused to the detriment of the facts.

-Anchoring is a cognitive bias derived from the tendency of people to give greater weight to the first alternative or evidence they know about an event when making a decision. Thus, first impressions, estimates, and estimations hold the subsequent thoughts and judgments.

Table 2
Main biases

Comportamientos	Efectos documentados
Efecto "marco" o "El principio de invariación" o "La trampa de la expresión"	Un cambio del contexto; una situación problemática erróneamente expresada puede influir en el proceso decisorio. Las personas tienen una actitud de evitar el riesgo ante escenarios de ganancias y tienden a asumirlo en un escenario de pérdidas.
Axioma de Independencia	Es el más vulnerado, ocurre cuando no se contemplan eventos de baja probabilidad pero aún posibles o de alta probabilidad pero no ciertos.
Efecto de la situación creada	"Efecto de ser conformista", permanecer bajo las condiciones de statu quo implica conservar las condiciones de menor riesgo psicológico (a salvo de exposición y críticas)
Efecto de comprobación	Afecta tanto a la elección fuente de información como a la interpretación de la misma. Sucede cuando se busca información que ratifique las presunciones iniciales.
Efecto de los "costos irrecuperables" (costos hundidos)	Persistencia en el tiempo de ideas y decisiones aunque ya no resulten válidas. Reticencia a abandonar proyectos que ya no resultan útiles.
Efecto "Exceso de confianza"	Subestimar el factor "suerte" atribuyendo resultados a destrezas extraordinarias.
Efecto del Criterio Pesimista (Lo mejor de lo peor)	Alta aversión al riesgo, también llamada trampa de la prudencia.
Hábito de la obediencia	Inercia a obedecer sin cuestionarse.
Efectos de pertenencia e interacciones entre grupos	Las actitudes grupales resultan mas fuertes que las individuales. Puede ocurrir también que el líder tienda a rodearse de asesores que avalan sus ideas desestimado a los que disientan. La exacerbación de poder y la influencia de señales afectan la conducta del grupo.
Sesgo de dominancia fáctica	Muy perjudicial ya que anula todo el proceso de decisión posterior.
Existencia de estereotipos	Los positivos pueden promover efectos de halo. Los negativos son poderosos y difíciles de erradicar.
Falta de coherencia	Sobrevaloración de la opción elegida.
Emociones	Las emociones conllevan la pérdida de objetividad para evaluar la situación en el contexto
Analogías con el pasado	No se debe perder de vista el contexto actual, si bien el pasado pude ayudar a predecir el futuro, no es absoluto.

Source: own elaboration based on Bonatti (2010).

Likewise, Bonatti (2010), based on (Hammond, Keeney and Raiffa, 1998; Sutherland, 1992), presents the most relevant biases and/or effects analyzed and documented in her research. Table 2 offers a summary of the author's statements in this regard.

Lean methodology, a different look.

The Lean methodology was promoted in the 1950s at the Toyota factory, with Taiichi Ohno being one of the most prominent referents. In a first approach to this methodology, we can mention that it is an improvement system that analyzes the entire production chain, with a view to minimizing costs and increasing productivity, eliminating from the processes everything that does not add value to the final product (Uriarte, 2019).

According to Yang (2011), the fundamental basis of the Lean Management system is to channel all internal efforts to provide customers with a solution. To achieve this, it focuses on adding value to all the productive and operational processes of an organization and identifying and eliminating all those activities that do not generate value. This gives rise to the term mudas (waste), which refers to all those processes in which resources are poorly used, to the detriment of organizational efficiency.

A conventional way of representing the Lean thinking model is through the To- yota house. The graphical representation allows simplifying a complex system as it unfolds in several dimensions and at the same time preserves the coherence of the explanation of its elements. To achieve a state of permanent continuous improvement over time, executives must lead the company to make a critical leap from management-driven to employee-driven improvements.

When an organization adopts the Lean methodology as a management model for value creation, it is also adopting a particular form of decision making in the organization, based on Lean thinking. In the following, the salient features of Lean thinking will be presented in the light of decision theory and in particular on biases:

a) Decision-making: much of the theory of decision making in the organizational sphere seems to be developed under the assumption that the managerial decision maker develops his intellectual activity as an incumbency of his high hierarchical position. Although, in day-to-day organizational life, each person is faced with countless decisions to be made in order to solve their work routines, there is a tendency to consult with their superiors as the degree of impact of the decision increases.

On the other hand, a particularity that stands out in organizations with Lean thinking is the sustained tendency to provide people in the lower lines with the tools, empowerment and autonomy they need to make decisive decisions. Of course, it is necessary to create an environment of trust so that people do not hide problems, mistakes, etc., in the face of fear.

b) In relation to what was stated in the previous paragraph, the Lean methodology promotes large actions tending to a correct definition of the problems, promoting participative, agile and orderly techniques. For example, the gemba walk (walks through the area where the processes being decided upon are carried out) is aimed at obtaining real information, and in context, it is a clear way of reducing perception bias and verification bias. Other tools that can be mentioned are those aimed at promoting visual management, through their implementation, it is sought that the work area is able to simplify communication. Thanks to this technique, separation and recycling are easily achieved through an orderly work environment.

c) They also seek to order the problem-solving processes, e.g., through the Five Why's, they seek to determine the root cause of the problem in an orderly fashion, having a positive effect in attempting to control the effects of attribution biases. With the participation of cross-functional teams, made up of those with the appropriate expertise at that point in the process. To the extent that a team is made up of people with different profiles, it has a positive effect in trying to control the effects of attribution biases.

The results are better solutions because each problem is seen from a different point of view, providing a great diversity.

d) A very interesting and characteristic activity of the Lean methodology is to do the so-called Hansei, which a priori means "to reflect" on what has been decided. In the development of Hansei, a deep recognition of one's own mistakes is sought as a fundamental starting point for improvement. Hansei is also performed for the recognition of success, promoting humility as an essential value. The more problems can be solved effectively and eliminating the root cause, the greater the learning derived from them.

One of the main premises of the Lean methodology encourages to create a production level with continuous flows so that, if problems arise, they become visible by themselves, with level loads (heijunka) according to customer requirements. This premise is based on the idea of creating a harmonious organizational environment, where the surprise factor is the exception, in Pavesi's (2000) term, the Lean methodology aims to create a docile world in the organization.

Conclusions

Decision-making in organizations is an activity considered critical for the survival of the entity. Through this paper, an approach to the complexity of the decision-making process was made by the agents, highlighting that, despite being a logical and sequential process, it is influenced by the capacity of analysis, perception of information and emotions of the people involved in it, without forgetting the uncertainty factor of the context.

The study and analysis of the decision making process represents a multidisciplinary challenge, particularly for the Administration it acquires a major peculiarity. It is possible to find a method that guarantees that the best possible decision was made at the time of making the decision, which unfortunately is not a guarantee of the success of the decision.

Lean thinking demonstrates great efficiency when proposing tools for decision making, as expressed in the development of this work, several of these methodologies mentioned help to order the analysis of information seeking a correct definition of the problems and subsequently an organized resolution. Among the techniques of Lean thinking, which have the characteristic of being participative, agile and organizing, they aim at obtaining real information, and in context, it is a clear way of decreasing perception bias and verification bias. However, there is a clear tendency to focus almost exclusively on problem solving, leaving aside the analysis of the decision process as a critical organizational tool.

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