

Rational and Meta-Rational Decision Model for Organizational Management. Transdisciplinary Exploratory Approach to Problem Solving in Scientific Management

ADOLFO OSWALDO ACEVEDO BORREGO ¹
MARTHA CAROLINA LINARES BARRANTES ²

SUBMITTED: 10/04/2022 ACCEPTED: 12/10/2022 PUBLISHED: 31/12/2022

ABSTRACT

In academy, which includes scientific management or industrial engineering, decisions in organizations and the techniques used are fully based on rational criteria, including various techniques derived from learning from experience, called intuitive or heuristic. Academia does not consider approaches that are not framed within the rational criteria, since it considers that they do not exist or are irrelevant. The objective of the study is to develop a different approach to decision making under a transdisciplinary perspective and through the design of a conceptual model of decisions that considers the range of rational and meta-rational decisions in all organizational scenarios where problems are solved. It has been found that professionals define the decision criteria according to the perceived scenario: if it is simple and concrete, the technique is systematic and focused; if it is undefined or amorphous, the technique is soft with options; if the problem is complex, emotional criteria, beliefs and atavisms are considered, or creative and heuristic options are invented. The transdisciplinary perspective allows the inclusion of criteria and methods of problem solving not considered by academia, which enriches the praxis of the profession in the management of organizations.

Keywords: decision making; meta-rational decision making; problem solving; organizational management; scientific management.

INTRODUCTION

Background

Deciding is the process of choosing a course of action. It is a rational activity to diagnose a problem, generate alternative solutions, evaluate and choose solutions. In scientific management or industrial engineering, problem solving is applied systematically, using hard techniques such as operations research, decision theory, statistical analysis, decision models such as equilibrium point, preference matrix, decision trees, among others (Krajewski et al., 2013). Rational decisions can be iterative, concurrent, or permanent (Acevedo & Linares, 2013; Acevedo, 2012). They are also classified into programmed and non-programmed decisions, and individual and group decisions (Huber, 2012). Other academic knowledge domains build their proposals with descriptive, prescriptive and normative models (Rodriguez & Pinto, 2018), all of them focused on the rational logic of the choice of alternatives. Simon's behavioral economics approach defines rational decisions, bounded rationality and intuitive (Estrada, 2011). Kahneman (2003) differentiates intuition and reasoning of choice in contexts of uncertainty, risk aversion and frame effect in rational choice. Likewise, Kahneman and Sverky define heuristics and cognitive biases in the context of the expected utility model (Yáber, 2020). The empiricist current includes the managerial criterion whereby decisions must be of quality, by a capable manager and with decisions that affect the entire organization, with multiple goals and group decision techniques (Witzel, 2013).

The decisional process encompasses variables that go beyond the rationality of the scientific approach since human action, emotions, attitudes, and propensities entail different perceptions of the problems (Whetten & Cameron, 2016). These variables add diversity to the definition of the decisional process and di-

-
- 1 PhD in Industrial Engineering, Master's in Administration, industrial engineer, Degree in Economy. Currently working as professor at the Industrial Engineering School of Universidad Nacional Mayor de San Marcos (Lima, Peru).
Orcid: <https://orcid.org/0000-0002-9592-5107>
Corresponding author: aacevedob@unmsm.edu.pe
 - 2 Master's in Business Management, lawyer, industrial engineer. Currently working at Organismo Supervisor de la Inversión en Infraestructura de Transporte de Uso Público (Lima, Perú)
Orcid: <https://orcid.org/0000-0003-4977-6654>
E-mail: klinares.estudio@gmail.com

vergent solution proposals. Likewise, according to Simon, they may collide with a rationally optimal or satisfactory solution (Estrada, 2006). Two major elements are considered to identify decisional importance: 1) the dimension of the scientific management (industrial engineer) paradigm, which includes the productivity of the system in operation and the change and improvement of the system in disequilibrium, and 2) the dimension of the decisional process, which includes the rational and systematic decision variables and the variables that extend beyond rationality. The proper selection and balancing of the decisional variables must lead to the correct, feasible and desirable choice for the organization and the people (Acevedo, 2011). As roles of greater responsibility at managerial levels are assumed, the industrial engineer faces new scenarios with problems of increasing complexity that lead to the use of criteria such as emotions, beliefs, creativity, heuristics, empirical inquiry and mental experimentation, as well as the use of new tools, so that the ways of deciding have to be renewed, expanded and adapted to solve problems (Rocha & Silva, 2021; Badham, 2022; Savage et al., 2018).

The approach of the present study refers to the fact that the professional development of the industrial engineer is constantly enriched over time, so that systematic techniques and structured rational decisions to solve problems are insufficient and ineffective to face an organizational reality of increasing complexity. Thus, when making decisions, the perspective of the context must be broadened, considering criteria that go beyond the initial rationality learned in the academy.

Objective and Research Problem

The objective of the study is to propose taking into consideration the meta-rational elements of decision making in organizations through a conceptual model. This model frames the way in which problems are defined and solved within organizations and human groups based on the definition and understanding of the complexity of the context or problematic scenarios where problems initiate.

The research question of the study is: How does the problem setting or context where the problem is located influence the choice of rational or meta-rational decision criteria for the solution of the problem?

Investigation Hypothesis

The general hypothesis is: "The problem scenario influences the definition of decision criteria for

solving management problems in complex organizations and human groups."

Contribution and Impact

The direct contribution of the research is its contribution to the study of decision making in the Peruvian context, where there are no studies on profiles or decision theory that identify the forms and criteria of decision making in the different local environments. An additional contribution is the formulation of a conceptual model of decisions, which describes the rational and meta-rational elements to define a decision profile relative to the context and diverse scenarios where the industrial engineer performs in his decision-making or managerial role in complex organizations, human groups and other socio-technical business systems.

The indirect contribution is the identification of non-systematic elements that affect decision making and its effects.

METHODOLOGY

The research is exploratory, descriptive, and experimental, with a qualitative and a quantitative part. It is exploratory because it is intended to show and integrate the modes of decision-making that academic research and proposals do not contemplate. It is descriptive because it describes the way in which decision-making processes are developed according to the problematic and systemic context. It is experimental because a form of mental experiment is applied to immerse the participants in the problem situation and make them choose the correct option according to how the problem is perceived. Qualitative research refers to the design of an empirical conceptual model through the soft systems methodology that allows the holistic, interdisciplinary, and experimental study of problems in social systems (Kasser, 2011; Kotiadis & Robinson, 2008). It also comprises the phenomenological method to choose academic narratives using the format of case studies (Wehrich et al., 2017; Robbins et al., 2017) and literary narratives about complex situations showing decision problems (Acuña, 2002; Acevedo, 2016). The quantitative research comprises the logical design of the hypothesis, study variables and the elaboration of the data collection instrument based on a Likert-type questionnaire, with alternatives answered by the participants, and validated through in-depth interviews with academics. The hypotheses were corroborated by means of the comparison of means using ANOVA with SPSS statistical software. The participants are a homogeneous sample

of industrial engineers, first intact group of recent graduates or graduating seniors (gi1). The F-test of inferential statistics is used for small groups whose behavior tend to the normal distribution and whose standard deviation is not known. Analysis of the results and discussion of the findings has been conducted with the participants within an academic workshop.

The design of the research is as follows:

1st part	gi1	X_1	O_1
2nd part	gi1	X_2	O_2

Where X_n are the immersion in the problematic environment and O_n are the response or decisions to each situation.

RESULTS

The conceptual model of rational and meta-rational decisions

1. Unstructured Situation

People make decisions in all circumstances of their lives. The different domains of knowledge have studied and elaborated their own decision models, all based on rational criteria, mainly in the utilitarian and pragmatic approach to decision making. Proposals for problem solving in organizations are studied in academia, standing out 1) the decision theory, which classifies problems into certainty, risk, and uncertainty, and 2) Simon's behavioral economics approach, which classifies them into rational, bounded rationality and intuitive. Recent proposals consider emotions, which are subordinate to decisional rationality.

On the other hand, in literature, philosophy, politics, and other fields, there are perspectives and forms of decision making that are applied by people for transcendental and day-to-day decisions, but do not exist for science, research or academia. Thus, the opportunity to contact, understand and develop new proposals that would enrich the existing methods, techniques and tools to make decisions and solve problems is wasted.

2. Structured Situation

To understand the common way of deciding for people, human groups and human organizations, which are not imbued with traditional academic and scientific knowledge, the complexity of the real world must be perceived and understood under a holistic *weltanschauung* (Heidegger, 2001), called "systemic

approach to problematic scenarios" (Acevedo et al., 2017). Within the continuum of scientific-narrative knowledge (Lyotard, 1991), and depending of the level of problem complexity, the problem scenario is located which, conceptually, grants common systemic characteristics to the problems and allows the development of how to present the problem, which forms a framework that delimits the boundaries in which the problem is to be solved and the various tools, methods and techniques accepted to understand it.

Figure 1 shows the way in which the complexity of the problem is perceived and understood, and how the approach, analysis, alternatives and resolution action are described and determined.

3. Basic Definition of the Relevant System or Transformation Process

In the root or basic definition, the transformation process is decision making.

Deciding is the process of choosing a course of action to solve a problem or to investigate and explain a new or unsolved problem. The decision is not a purely rational process, it may contemplate emotional, heuristic, atavistic criteria, or a combination of criteria. When the solution is not optimal (rationality), satisfactory (behavioral economics), or feasible and desirable (mss), it will be a correct, adequate or convenient solution, within the focus of choosing the solution or solutions that apply and work, from the perspective (reason and emotion) of the decision maker.

People possess two minds that are equivalent to their two kinds of intelligence: rational and emotional (Goleman, 2018; Ortega, n.d.). People's performance is determined by the balance between their two minds. Goleman states that emotion is relevant in decisions, so emotional education is required in organizations. Thus, for decisions, *ratio* and emotion are used in different proportions, depending on how the type of problem to be solved is perceived, from the perspective, criteria and beliefs of the decision-maker or decision-makers.

Ratio or reason is the conscious part of the choice. Rational intelligence is the awareness of our own knowledge; it is the knowledge and memory that are embodied in specific competencies and capabilities for the best performance of decision-makers. Faced with problematic situations, the rational mind adopts a unidisciplinary perspective (scientific knowledge domain) by applying specialized techniques known to the decision-maker. Each technique represents

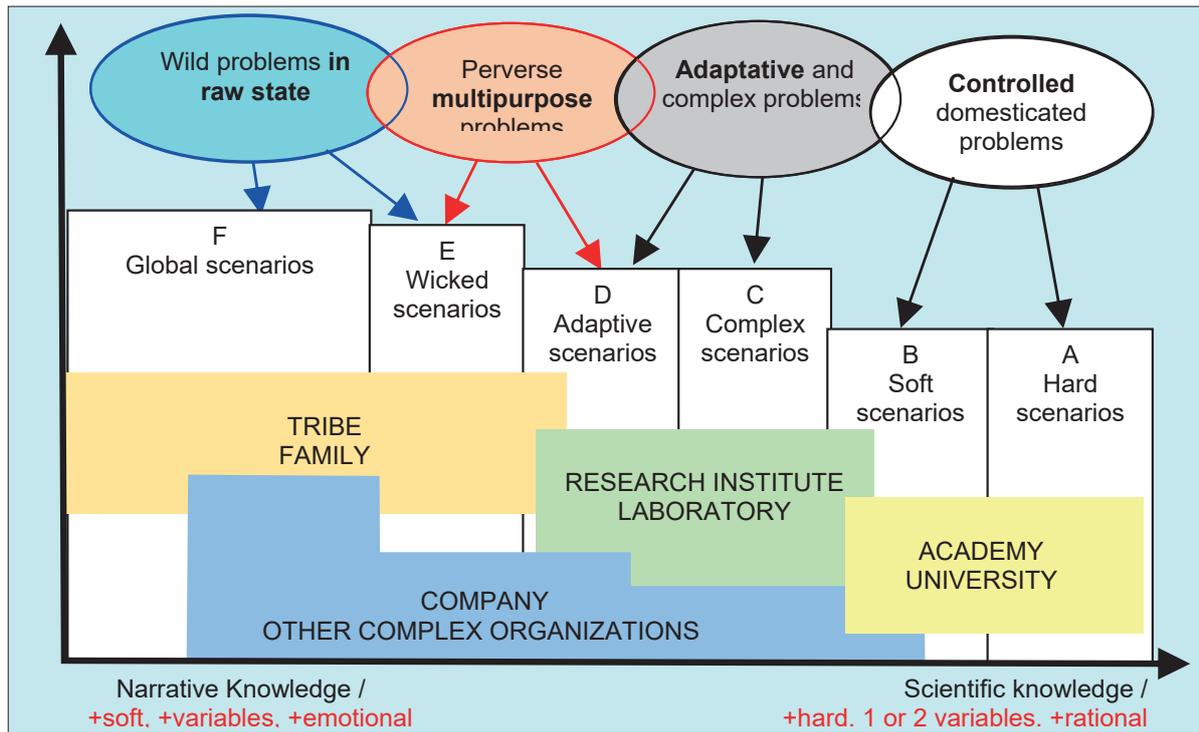


Figure 1. Continuum of narrative-scientific knowledge and the complexity of problems.

Source: Prepared by the authors.

a piece within a decisional puzzle that solves a portion but not the whole problem. Within rational intelligence, there are two criteria for perceiving, understanding, analyzing, and solving problems in organizations:

- The analytical approach that employs the reductionist paradigm that segments the situation and poses controllable variables to solve specific issues.
- The empirical or intuitive-a-posteriori criterion, which employs utilitarian-pragmatic techniques derived from experience, which work and serve correctly, but are not based on scientific evidence or academic theories.

Emotion is the impulsive part of the choice. Emotional intelligence is the awareness of one's own emotions, it is to perceive and understand the feelings of others, to tolerate the pressures and frustrations of the task, to increase the capacity for empathy and to raise the possibilities of personal and professional development. Emotions are impulses to act, they allow us to face unexpected situations. Within emotional intelligence there are two criteria to understand people in their purpose of solving individual, group or organizational problems:

- The transcendent criterion based on the paradigm of the human condition of feeling and understanding the causes of the failures in the solution of the problems in order to prevent them.
- The intrinsic criterion based on the paradigm of the supreme end to sense and understand the sources of human motivation in their search for well-being and achievement.

4. Conceptual Model of Rational and Meta-Rational Decisions

Decisions can be rational or emotional, they are classified according to the following scheme:

- Rational decision:
 - Rational per se (solving problems).
 - Post-rational (investigating problems), mainly embedded with the previous one.
- Meta-rational decision: emotional, impulsive, paused and memetic (solving problems).

There are three types of decisions: rational, post-rational and meta-rational (Figure 2).

Rational Decisions. Decision refers to choosing a course of action or solving problems (Huber, 2012). Rational decisions seek the best choice to meet a planned and defined criterion as a goal. Rational decisions to solve problems can be:

- **Rational per se**, when they are based on perfect or complete information where the analysis allows for optimal or maximizing choices.
- **Bounded rationality**, when information is partial and insufficient and appropriate choices can be approximate, satisfactory, or negotiated.
- **Empirical intuitive**, when the information is null or contradictory, so that the choice derives from a rationality not supported by proven or verifiable information. It is based on a posteriori judgments or experience in the field.

These decisions comprise tools from specialized domains such as industrial engineering (Heizer &

Render, 2009), operations research, decision theory, behavioral economics, organizational psychology, systems, and other empirical models (Hammond et al., 1999).

Post-rational decisions. These overlap with rational decisions when faced with situations where knowledge is incomplete or insufficient. The decision contemplates inquiry through research and empirical experimentation. According to their purpose, decisions can be:

- **Heuristic decisions**, when empirical criteria are used to facilitate and accelerate the choice for resolution, action, or innovation. Heuristics are academic when they employ empirical rules such as analogy, managerial judgment, design thinking, strategic thinking, creative thinking, algorithms, and metaheuristics (Krogerus & Tschäppeler, 2017; Flogler & LeBlanc, 2009; Farson, 1997) or pseudoscience. Heuristics is vulgar or popular when it employs timing, serendipity, procrastination, chindogu, fortune, luck, coin flipping, chance, improvisation, fortune telling, tarot, astrology, lying, cheating. It

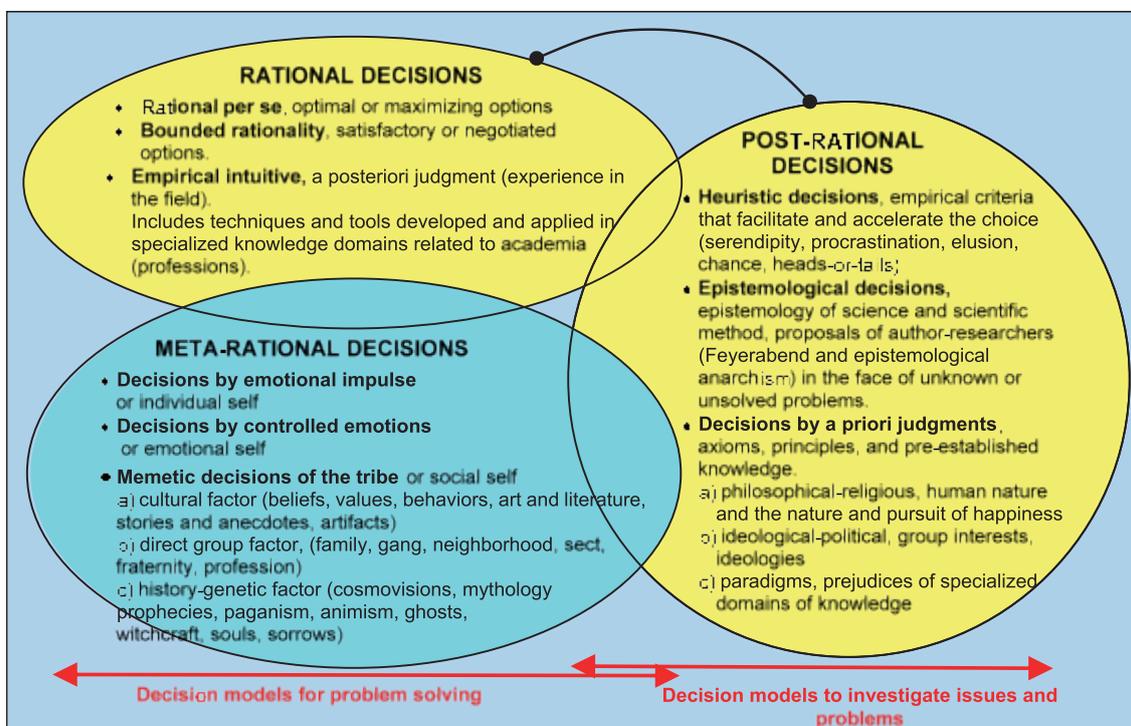


Figure 2. Map of the conceptual model of decisions to investigate and solve problems in organizations and human groups.

Source: Prepared by the authors.

is confusing and mimics irrational decision criteria when it refers to chance, luck, astrology, pseudoscience, among others (Sterman, 2017).

- **Epistemological decisions**, refers to the inquiry of new problems where theoretical or applied, laboratory or field, theoretical or experimental research hypotheses are raised. It considers various epistemological approaches, such as critical rationalism, positivism, phenomenology-hermeneutics, systems approach, dialectical materialism (Manrique & De Castro, 2019), among other schools of scientific method. It includes the so-called “epistemological anarchism” before the profusion of the methodological proposals from authors.
- **Decisions by a priori judgments**, are based on pre-established principles and knowledge. They could be a) philosophical-religious, when they emphasize scholastic visions and criteria for choices that seek to govern human nature, the human condition or the supreme end; b) ideological-political, when they are based on dogmas that prioritize the interests of groups, whether political, economic, social or religious; c) domains of specialized knowledge, when they emphasize the methods, axioms and dogmas of specialized academic fields, without considering other options for reasoning (Hammond et al. 2002, 1999; Bento et al., 2022).

Meta-rational Decisions. The ideal rational decision paradigm considers reason free from emotion for the choice between options; on the contrary, the emotional intelligence paradigm contemplates the harmonization between mind and heart (Goleman, 2017; Raza-Ullah et al., 2022), that is, integrating visible reason and invisible emotion in the decisions that influence groups and organizations. It is claimed that emotional or aesthetic aspects redefine the meaning of information (Saifer & Dacin, 2022).

Decisions are meta-rational when they comprise a high portion of emotionality. There are three types: emotional impulse, controlled emotionality, tribal memetics.

- **Decisions by emotional impulse or individual self.** Decisions of the individual self-correspond to first impulse emotional decision making, where emotions drive action without prior reflection. Pure emotional decisions focus on speed and are directed directly to action. The emotional mind

assimilates things as a whole by making intuitive judgments that may be true or false; it is faster than the rational mind. The emphasis on action provides a sense of strong certainty derived from the simple and simplified way of seeing things (Goleman, 2017), where accuracy is sacrificed for speed. They can be due to pure emotion and the human element.

- **Decisions by controlled emotions or emotional self.** When a controlled emotional decision is taken, conceptual paradigms are applied and they add rationality to emotions, so that the choice takes into account the consequences or effects of the decision, in addition to the pragmatism or utilitarianism prevailing in organizations. Emotional decisions are impulse decisions; rational decisions are delayed reaction decisions. The scheme of emotions, with the human condition and its purpose is shown in Table 1.
- **Memetic decisions of the tribe or social self.** The choice of the individual self and the emotional self is always affected by the circumstance and its evolution, which involve the decision maker. Decisions are socially constructed from social information transmission units or memes (equivalent to genes) (Fomin, 2019; Espinosa, 2016). They are the decisions of the tribe or social self (Goleman, 2006), atavisms and beliefs that shape the historical space-time or influence of the tribe (direct group context, family, gang, neighborhood, sect, fraternity, profession, nation) to guide and reorient the choice. Decisions can be by cultural factor, by direct group factor, and by history-memetic factor. They involve the transmission of atavistic paradigms and cosmovisions such as animism, paganism, polytheism, witchcraft, ghosts, prophecies, mythology.

5. The meta-rational decision process. The meta-rational decision comprises three blocks: the first is directed to action; the second, oriented to emotions; and the third, to integration with the social side. This process has to be embedded with rationality for complex decisions (see Figure 3).

- **Subprocess of pure emotional decision.** It is the first reaction, without thinking, which is called first impulse. The first impulse is a direct and immediate emotional reaction, the decision is instantaneous and emphasizes action; it is useful in dangerous and unexpected situations. The emotional impulse leads to unreasoned actions that often collide

Table 1. Meta-Rational Decisions, Purpose, and Emotions.

Dimensions of Human Nature (Hobbes)		Emotion Families (Goleman)		Human Condition (Hobbes)	Influence on Decisions in Organizations	Emotions in Decisions in Human Groups and Organizations.
		Basics	The Family			
Of the natural condition of men: equality	DOMINION Desire for power	Shame	Humiliation Contrition	Desire for power Vanity	Pride Humility	<u>Leading and managing:</u> personal aptitude, self-control, motivation, empathy, social skills. <u>Negotiation:</u> position, role, appreciation, affiliation, autonomy. <u>Emotional learning:</u> by operant behavior. <u>Group work:</u> loyalty, trust. <u>Values-based management:</u> - - A posteriori values (perseverance, achievement, success, competitiveness). - A priori values (respect, charity, honesty, truthfulness, honesty).
		Surprise	Astonishment Bewilderment	Curiosity Wisdom	Doubt Science	
	DISCORD Dissension	Fear	Concern Phobia	Distrust Antagonism	Envy Empathy	
		Annoyance	Abhorrence Disdain	Competition Desire for glory	Ambition Collaboration	
Of the supreme goal: happiness	WILL Voluntary actions	Anger	Animosity Violence	Will Prudence	Decision Dignity	
		Sadness	Pessimism Depression	Experience Laziness	Demotivation Hope	
	PREDISPOSITIONS Inclinations	Pleasure	Amusement Gratification	Appetite Aversion	Delight, irrational Flow-Happiness	
		Love	Trust Devotion	Loyalty Sympathy Good, fair	Passion, whimsy Fraternity-Ethic	

Source: Prepared by the authors, adapted and based on studies by Goleman (2018) and Hobbes (2004).

with what is socially accepted, ethical or legal. This first impulse leads to the question “Why did I act this way?”, which has no answer. Control of one’s own impulses must be maintained. In this process, education or knowledge suspends the action until verifying that it is moving towards a beneficial objective (it is useful, it serves, it works, it is profitable).

- **Subprocess of controlled emotional decision.** It is the slow emotional decision employing emotional intelligence, reaction control and high associative logic. Emotional intelligence is a social competence. This **second impulse** is a moderate emotional reaction where more complex emotions are applied, subsequent to the emotional impulse (or parallel if it is controlled) and prior to rational reflective thinking. It represents the emotionally reflective, thoughtful, slow, and prudent meta-rational decision, with systematic criteria to choose the feelings and emotions to be highlighted. It is characterized by its high associative logic and use of emotional intelligence. It precedes the rational decision and is related to it since it facilitates the achievement of our own purpose, fits with personal interests and predispositions, does not collide with paradigms and avoids the emergence of cognitive dissonance.
- **Subprocess of the meta-rational choice.** In this step, a rational decision integrated with

emotionality is attempted. The sequence of the rational process is: 1) Perceiving the problematic situation, 2) Understanding and giving meaning to the problem, 3) Defining the intentions of decision-makers, 4) Prioritizing the elements of the problematic situation, 5) Proposing solutions in the field of action, 6) Applying solution techniques to the problematic situation, 7) Verifying expected results and emerging failures, 8) Evaluating compliance.

Research Findings

About Null and Alternate Hypotheses:

Null hypothesis H₀: “Problem scenarios have no influence on the definition of decision criteria for solving management problems in complex organizations and human groups”.

Alternate hypothesis H₁: “Problem scenarios have influence on the definition of decision criteria for solving management problems in complex organizations and human groups”.

Hypothesis Testing

1°) Null hypothesis:

$$H_0: \mu_1 = \mu_2 = \mu_3 = \mu_4 = \mu_5 = \mu_i$$

All μ_i are equal; where $i = 1, 2, \dots, k$, $k = 5$

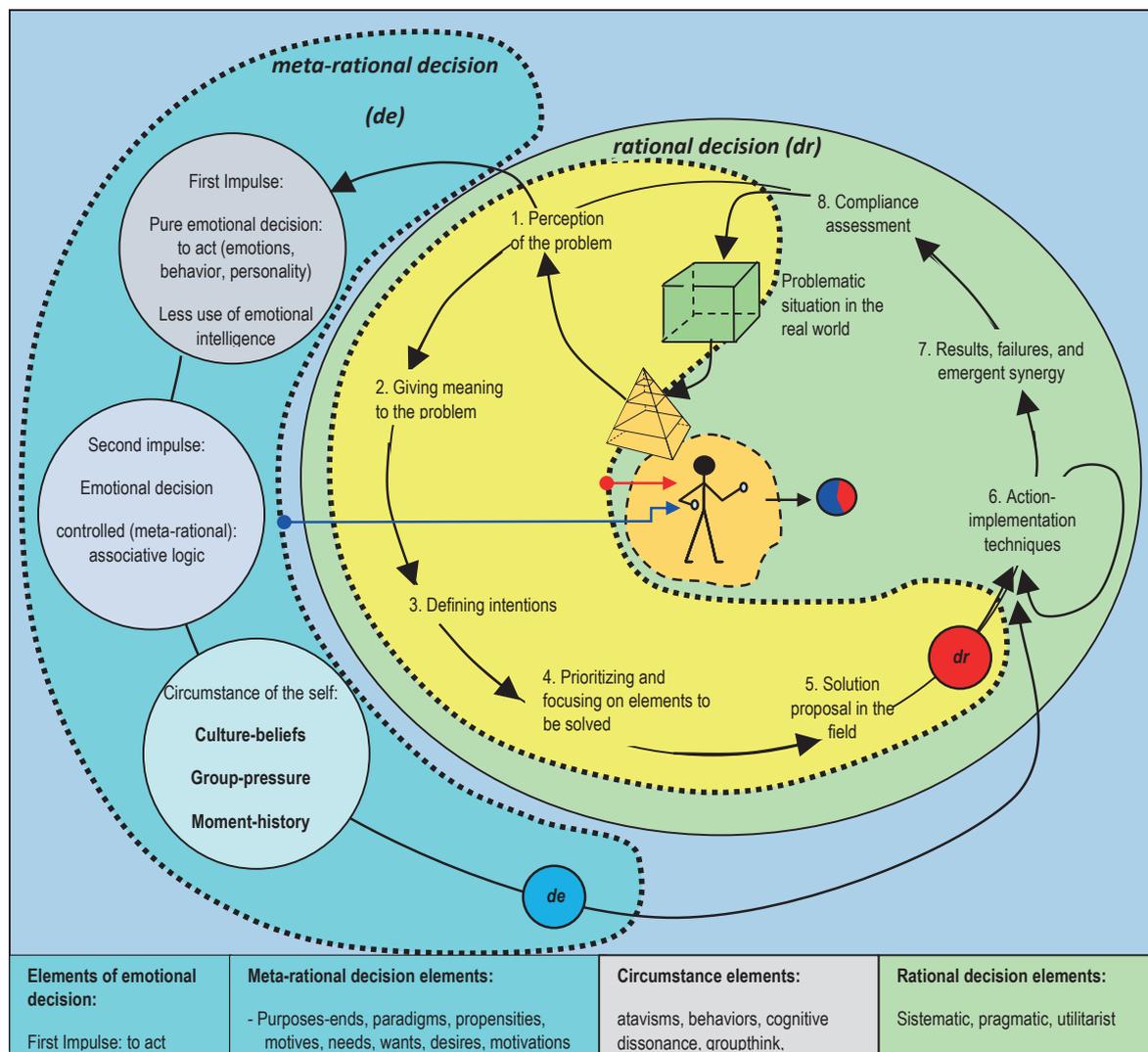


Figure 3. Meta-rational decision process in problem solving and rational adjustment.

Source: Prepared by the authors.

or: every mean of the preferences are equal

2º) Significance level and confidence level

or: Alternate hypothesis:

Significance level $\alpha = 0.05$

H_1 : Not all μ_i are equal

Confidence level $1 - \alpha = 0.95$

or: $\exists i / \mu_i \neq \mu$

$$\mu_i = \sum_{j=1}^k \sum_{i=1}^n d_{j,i}$$

3º) F-test: Table 2 presents the decision descriptives according to the problem scenarios (academic in part a, complex narrative in part b). The table indicates the orientation towards rational decisions or meta-rational (emotional) decisions. Table 3 indicates the null hypothesis corroboration for part b, where the F-test is in the rejection region.

where:

μ_i = Mean of type of decision-maker j 's decision in problem scenario i ; where $j = 1, 2, \dots, n$, $n=25$

With high certainty (significance 0.00) the F test of hypothesis corroboration rejects the null hypothesis for both studies.

Table 2. Descriptives of Decisions in Problematic Scenarios.

a) DECISIONS IN ACADEMIC PROBLEM SCENARIOS. Descriptives O ₁								
SCENARIO	N	Mean	St. Dev.	Standard error	95 % confidence interval for mean		Minimum	Maximum
					Lower limit	Upper Limit		
1 HARD	25	32.60	2.398	.480	31.61	33.59	29	39
2 SOFT	25	26.72	3.759	.752	25.17	28.27	21	34
3 COMPLEX	25	23.72	4.267	.853	21.96	25.48	15	31
4 WICKED	25	7.00	3.028	.606	5.75	8.25	3	15
5 COMPLEX GLOBAL	25	9.96	3.422	.684	8.55	11.37	3	16
Total	125	20.00	10.474	.937	18.15	21.85	3	39

b) DECISIONS IN COMPLEX-NARRATIVE PROBLEM SCENARIOS. Descriptives O ₂								
SCENARIO	N	Mean	St. Dev.	Standard error	95 % confidence interval for mean		Minimum	Maximum
					Lower limit	Upper Limit		
1 HARD	25	8.72	4.623	.925	6.81	10.63	1	20
2 SOFT	25	11.84	3.350	.670	10.46	13.22	8	20
3 COMPLEX	25	24.32	5.566	1.113	22.02	26.62	11	34
4 WICKED	25	26.44	5.308	1.062	24.25	28.63	15	38
5 COMPLEX GLOBAL	25	28.68	3.614	.723	27.19	30.17	21	35
Total	125	20.00	9.310	.833	18.35	21.65	1	38

Source: Prepared by the authors, based on SPSS.

Table 3. Corroboration of Hypothesis through ANOVA.

a) DECISION IN ACADEMIC PROBLEM SCENARIOS. ANOVA O ₁					
	Sum of Squares	df	Mean Square	F	Sig.
Between groups	12188.960	4	3047.240	258.416	.000
Within groups	1415.040	120	11.792		
Total	13604.000	124			

b) DECISION IN COMPLEX-NARRATIVE PROBLEM SCENARIOS. ANOVA O ₂					
	Sum of Squares	df	Mean Square	F	Sig.
Between groups	8232.560	4	2058.140	98.184	.000
Within groups	2515.440	120	20.962		
Total	10748.000	124			

Source: Prepared by the authors based on SPSS.

4^o) Figure 4 shows the F-test for one-factor analysis of variance (ANOVA), which graphically shows the corroboration of hypotheses in both studies.

Analysis of Results

For a significance level of 0.05, using the SPSS, the F is within the rejection region, with respect to the theoretical F (2.70 < 98.184). Therefore, it is not possible to accept the null hypothesis that states that, in complex problem scenarios, meta-rational elements do not influence problem-solving decisions.

Alternatively, the alternate hypothesis, which states that, in complex problem scenarios, meta-rational elements significantly influence problem-solving decisions, is corroborated.

- The null hypothesis is rejected at a significance level of 0.05.
- The alternate hypothesis is accepted at a significance level of 0.05.

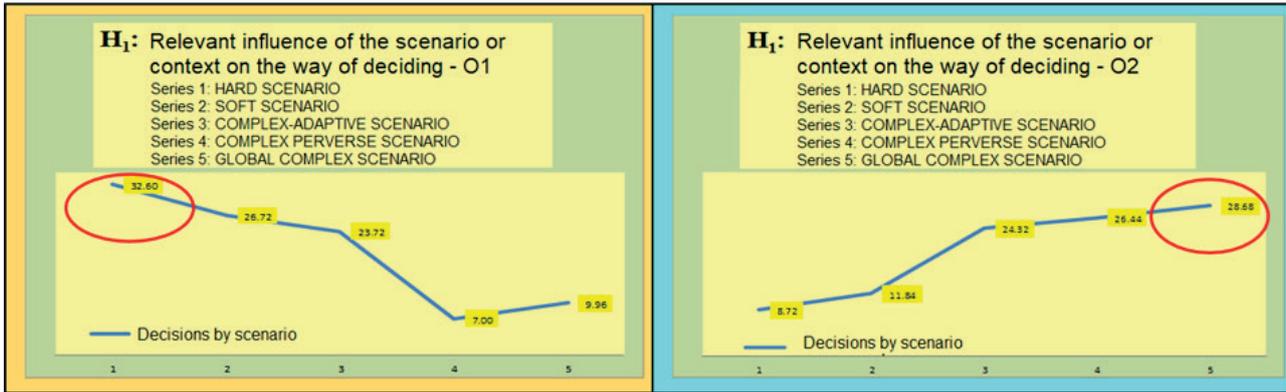


Figure 5. Hypothesis corroboration: rational decision (O₁), meta-rational decision (O₂).

Source: Prepared by the author.

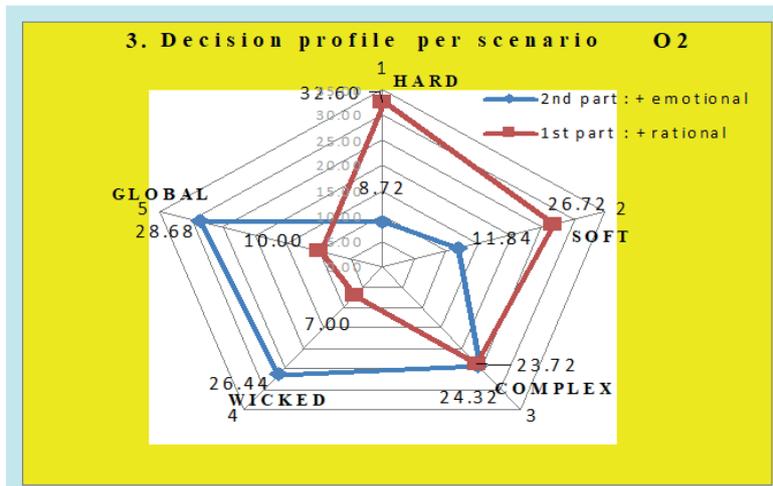
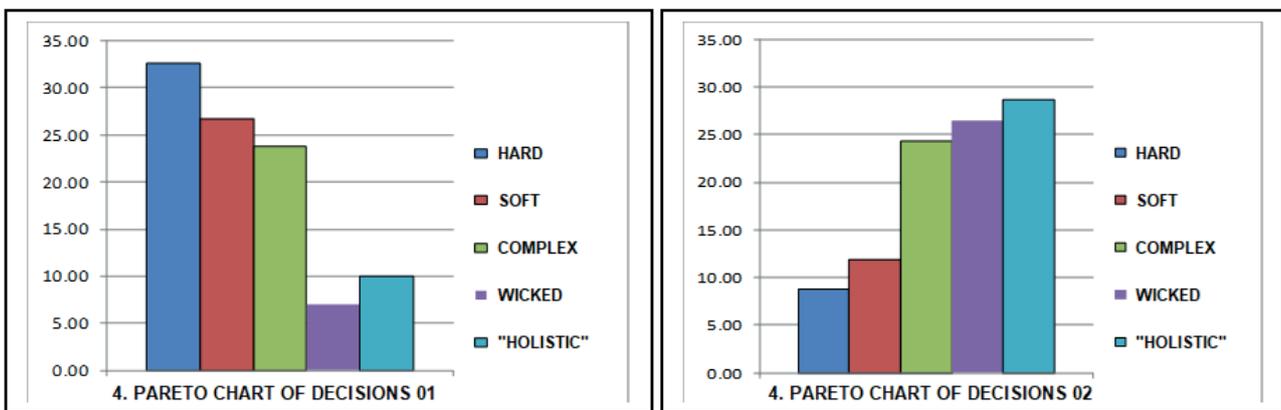


Figure 6. Decision profile according to the problem scenario.

Source: Prepared by the author.

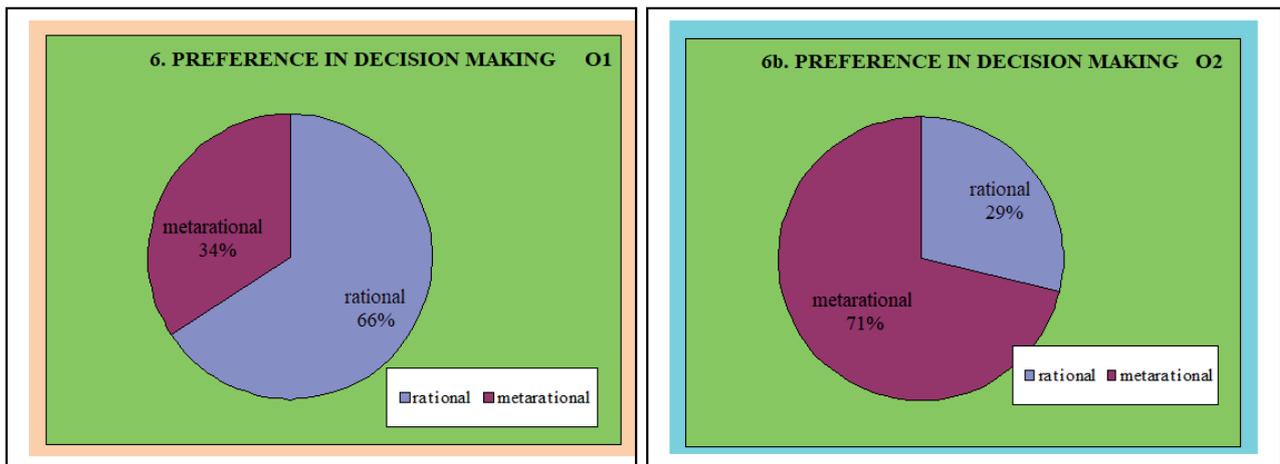


a) Decisions more rational (O₁)

b) Decisions more emotional (O₂)

Figure 7. Pareto Chart of Decisions according to the problem scenario.

Source: Prepared by the author.



a) Academic Structured Scenarios (O₁)

b) Complex Scenarios (O₂)

Figure 8. Composition of decisions in tamed problems and in wild problems.

Source: Prepared by the authors.

CONCLUSION

Within the discussions of results and interviews with academics, it has been found that:

- People’s performance is determined by the balance between their two minds or intelligences, rational and emotional, where emotion is relevant in decisions when the scenario is more complex.
- The ways of deciding are different according to the ratio-emotion combination of the decision-maker.
- The ideal paradigm of rational decision making, which considers that reason must be freed from emotion in order to choose the best option, is hardly feasible; in reality, decisions comprise visible reason and invisible emotion. There is no such thing as an emotionally neutral or pure decision-maker, in other words, there is no leader or manager who does not include an emotional part in his decisions.
- Faced with the growing complexity of the problems of a changing world in permanent conflict, the unidiscipline perspectives of modern scientific knowledge do not have the tools and techniques to perceive, understand and solve the problems of reality. Thus, new integrative and transdisciplinary approaches have emerged in management with integral, systemic and relative options for approaching

and solving problems in organizations, thus enriching management and decision-making tools.

- In summary, this study provides concepts and a new way of understanding decisions in organizations, which contribute to the theory and praxis of decision making to solve problems. Therefore, it contributes to the development of tools for the management of organizations.

RECOMMENDATIONS

In the professional training of the industrial engineer, the range of analysis and problem-solving methodologies must be broadened, where, in addition to the management of operational productive and service processes with decision-making tools with quantitative emphasis, it must be oriented towards the management of directive processes (strategic process, leadership process, cultural process, learning process) where decisions take on a more intangible and conceptual aspect.

For these reasons, the following is recommended:

- To elaborate studies of wide scope, where narrative knowledge is integrated with scientific knowledge to develop novel study models that allow understanding and solving complex and wicked problems that arise in the organizational development and that are only presented as literary fiction scenarios

and not as scenarios of systematic scientific study, possible to analyze and be solved.

- To propose studies for the design of meta-rational decision processes in order to add elements of scientific systematization in the management of people and the socio-technical system of organizations, so that they complement the management of human activity systems.
- To elaborate studies on decisions in different contexts and in different academic, business, and public administration populations, in order to verify the universality of the decision model and to corroborate the validity of the formulated hypotheses.
- Complementarily, the development of research using different domains and theories, with an interdisciplinary, multidisciplinary and transdisciplinary perspective, is recommended for the study of the intangible processes and the invisible processes that exist in organizations.

REFERENCES

- [1] Acevedo, A., Linares, M., y Cachay, O. (2017). *Perspectiva transdisciplinaria del ingeniero industrial para conceptualizar y resolver problemas en contextos sistémicos complejos*. X Congreso Argentino de Ingeniería Industrial COINI 2017. Universidad de Buenos Aires, Argentina. <https://www.eumed.net/libros/1740/index.html>
- [2] Acevedo, A. (2011). Perspectiva y circunstancia en la toma de decisiones: el modelo de las 4D en el mundo de la empresa. *Industrial Data Revista de Investigación*, 14(2), 93-105. <https://doi.org/10.15381/idata.v14i2.6230>
- [3] Acevedo, A. (2012). El enfoque y rol del ingeniero industrial para la gestión y decisión en el mundo de las organizaciones. *Industrial Data Revista de Investigación*, 15(1), 9-24. <https://doi.org/10.15381/idata.v15i1.6236>
- [4] Acevedo, A. (2016). *Lecturas para la dirección científica en las organizaciones*. Lima, Perú: Editor Adolfo Acevedo.
- [5] Acevedo, A., y Linares, M. (2013). Eficacia y eficiencia de las decisiones en entornos sistémicos complejos. *Industrial Data Revista de Investigación*, 16(1), 118-128. <https://doi.org/10.15381/idata.v16i1.6426>
- [6] Acuña, E. (2002). *Cuentos del trabajo en Chile. Aportes de la literatura para aprender sobre empresas y organizaciones chilenas*. Santiago de Chile, Chile: Editorial Universitaria.
- [7] Badham, R. (2022), James March and the poetry of leadership. *Journal of Management History*, 28(1), 46-65. <https://doi.org/10.1108/JMH-02-2021-0015>
- [8] Bento, J., Quattrone, P., y Llewellyn, N. (2022). Turning to Mystery in Institutional Theory: The Jesuit Spiritual Exercises. *Organization Studies*, 43(9), 1-22. <https://doi.org/10.1177/01708406221081622>
- [9] Espinosa, C. (2016). ¿Cómo se toman las decisiones organizacionales? Una revisión clásica. *Sociológica* 31(87), 43-78. <https://www.redalyc.org/articulo.oa?id=305043762002>
- [10] Estrada, F. (2006). Herbert A. Simon y la economía organizacional. *Revista Sociedad y Economía*, 11(2) 146-174. <https://bibliotecadigital.univalle.edu.co/bitstream/handle/10893/644/Herbert%20Simon.pdf?sequence=1>
- [11] Estrada, F. (2011). Herbert A. Simon y la economía organizacional. *Sociedad y Economía*, (11), 146-174. https://societyeconomia.univalle.edu.co/index.php/sociedad_y_economia/article/view/4132
- [12] Farson, R., (1997). *Administración de lo absurdo: Las paradojas del liderazgo*. México D. F., México: Prentice-Hall Hispanoamericana.
- [13] Flogler, H. S., y LeBlanc, S. E. (2009). *Strategies for creative problem solving* (2ª ed.). Stoughton, MA, EE. UU.: Pearson Education Inc.
- [14] Fomin, I. (2019). Memes, genes, and signs: Semiotics in the conceptual interface of evolutionary biology and memetics. *Semiotica*, 2019(230), 327-340. <https://doi.org/10.1515/sem-2018-0016>
- [15] Goleman, D. (2006). *Inteligencia social*. México D. F., México: Planeta.
- [16] Goleman, D. (2017). *La inteligencia emocional en la empresa*. Madrid, España: Penguin Random House, Grupo Editorial.
- [17] Goleman, D. (2018). *La inteligencia emocional*. Madrid, España: Penguin Random House, Grupo Editorial.
- [18] Hammond, J., Keeney, R., y Raiffa, H. (1999). *Decisiones inteligentes. Guía práctica para tomar mejores decisiones*. Bogotá, Colombia: Editorial Norma.

- [19] Hammond, J., Keeney, R., y Raiffa, H. (2002). Las trampas ocultas en la adopción de decisiones. En *Harvard Business Review HBR, La toma de decisiones*. Colombia: Ediciones Deusto.
- [20] Heidegger, M. (2001). *Introducción a la Filosofía* (2ª ed.). Madrid, España: Ediciones Cátedra.
- [21] Heizer, J., y Render, B. (2009). *Principios de Administración de Operaciones*. México D. F., México: Prentice Hall.
- [22] Hobbes, T. (2004). *Leviatán: O la Materia, Forma y Poder de un Estado Eclesiástico y Civil*. Madrid, España: Alianza Editorial.
- [23] Huber, G. (2012). *Toma de decisiones en la gerencia*. Caracas, Venezuela: Trillas.
- [24] Kahneman, D. (2003). Mapas de racionalidad limitada: Psicología para una economía conductual. *RAE: Revista Asturiana de Economía*, (28), 181-225. <https://dialnet.unirioja.es/servlet/articulo?codigo=2304896>
- [25] Kasser, J. (2011, 19-21 de octubre). *An application of Checkland's soft systems methodology in the context of systems thinking*. 5th Asia-Pacific Conference on Systems Engineering. Seúl, Corea del Sur.
- [26] Kotiadis, K., y Robinson, S. (2008, 7-10 de diciembre). *Conceptual modelling: knowledge acquisition and model abstraction*. 2008 Winter Simulation Conference. Miami, FL, EE. UU.
- [27] Krajewski, L., Ritzman, L., y Malhotra, M. (2013). *Administración de operaciones. Procesos y cadena de suministro* (10ª ed.). Naucalpan de Juárez, México: Pearson.
- [28] Krogerus, M., y Tschäppeler, R., (2017). *The Decision Book: 50 Models for Strategic Thinking*. Nueva York, NY, EE. UU.: W.W. Norton et Company Ltd.
- [29] Lyotard, J. (1991). *La condición postmoderna. Informe sobre el saber* (2ª ed.). Buenos Aires, Argentina: Red Editorial Iberoamericana.
- [30] Manrique, H., y De Castro, A. (2019). Toma de decisiones: intuición y deliberación en la experiencia de los decisores. *Innovar*, 29(73), 149-164. <https://doi.org/10.15446/innovar.v29n73.78028>
- [31] Ortega, C. (s.f.). *Vinculación entre la inteligencia emocional y la toma de decisiones en la empresa*. (Tesis de grado). Universitat Internacional de Catalunya, Barcelona.
- [32] Raza-Ullah, T., Bengtsson, M., y Gnyawali, D. (2022). The nature, consequences, and management of emotions in interfirm paradoxical relationships – A conceptual framework. *Scandinavian Journal of Management* 36(4). <https://doi.org/10.1016/j.scaman.2020.101127>
- [33] Rocha, A., y Silva, L. (2021). Literatura e estudos organizacionais em prosa, verso, drama e ficção. *Revista Eletrônica de Ciência Administrativa*, 20(4), 602-620. <http://dx.doi.org/10.21529/RECADM.2021esp>
- [34] Robbins, S., Coulter, M., y Decenzo, D. (2017). *Fundamentos de administración*. México D. F., México: Pearson.
- [35] Rodríguez, Y., y Pinto, M. (2018). Modelo de uso de información para la toma de decisiones estratégicas en organizaciones de información. *Transinformação*, 30(1), 51-64. <https://doi.org/10.1590/2318-08892018000100005>
- [36] Savage, P., Cornelissen, J., y Franck, H. (2018). Fiction and Organization Studies. *Organization Studies*, 39(7), 975-994. <https://doi.org/10.1177/0170840617709309>
- [37] Serman, D. (2017). *Historias de fracasos y fracasados que cambiaron el mundo*. Buenos Aires, Argentina: Paidós.
- [38] Saifer, A., y Dacin, M. (2022). Data and Organization Studies: Aesthetics, emotions, discourse and our everyday encounters with data. *Organization Studies*, 43(4) 623-636. <https://doi.org/10.1177/01708406211006250>
- [39] Weihrich, H., Cannice, M., y Koontz, H. (2017). *Administración. Una perspectiva global, empresarial y de innovación* (15ª ed.). México D. F., México: MCGraw Hill Education.
- [40] Whetten, D., y Cameron, K. (2016). *Desarrollo de habilidades directivas*. Naucalpan de Juárez, México: Pearson.
- [41] Witzel, M. (2013). *Historia de pensamiento administrativo*. México D. F., México: Grupo Editorial Patria.
- [42] Yáber, G. (2020). Economía Conductual (Desde la racionalidad limitada hasta el «Nudge»). En F. Spiritto (Coordinador), *Economía. Temas fundamentales*. Caracas, Venezuela: Publicaciones UCAB.