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Understanding the decision-making from a cognitive and metacognitive perspective: A theoretical framework

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Abstract: Human decision-making depends on a complex system and several factors (interests, environment, motivation, emotions, etc.). This research examines human decision-making from a perspective outside the financial determinants that interfere with the decision. In fact, several factors are involved in decision making, both internal and external. In order to show the impact of these factors, using the documentary research method, we distinguish between cognitive and metacognitive factors. The findings of the literature review highlight the existence of certain cognitive factors, such as heuristics that are described as shortcuts, which can bias information and lead to errors of judgement. Apart from the mental processes which handle and analyse information in order to make a decision, we also notice that external factors are taken into account which are outside the scope of cognition, such as culture as a meta-cognitive factor.

Keywords: Decision-making; Cognition; Metacognition; heuristics; culture.

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Introduction

Decision-making, the process of choosing between options, is a fundamental human behaviour that has been studied intensively by disciplines ranging from cognitive psychology to economics (Fellows, 2004). Years of investigation into judgment and decision-making have unveiled that human decisions are consistently influenced by framing. Instead of assessing choice options in absolute terms, individuals often evaluate them relatively to prominent reference points (Kahneman, 2011).

We can see straight away that human decision-making depends on a complex system and several factors (interests, environment, motivation, emotions, etc.). This association between decision-making and bodily elements was also supported by Berthoz (2003), who considers that action and the body, which construct the perceived world according to our desires, goals and fears, are at the heart of decision-making mechanisms. For other authors (R.H. Thaler, C.R. Sunstein, 2008), the choice of a decision is associated with freedom, "More freedom implies more choice", and it is from this range of choices that people tend to make hasty decisions that are not always in their favour. These erroneous decisions are often due to heuristics or cognitive biases which, according to (Barney & Busenitz, 1997), are decision rules or cognitive mechanisms, and subjective opinions that people use to help them make acceptable decisions. These items mentioned (biases and heuristics) had no place in human mental activity, which has long been based on paradigms such as the rationality of the agent (homo oeconomicus), decision and game theory (probability calculations). However, this analysis could not be sustained in the face of reality, which shows that individuals can sometimes make rational choices. This challenge to the normative vision began with the early work of Simon (1955), who recognised that managerial decision-making often did not correspond to the purely rational model, and was followed by the introduction of psychology and cognitive science (Wason and Johnson-Laird, 1972; Tversky & Kahneman, 1974; Simon, 1979). On the other hand, to further illustrate that decisions are not always based on human rationality, we cite the case of the January effect, which suggests that markets remain optimistic in January, and as they anticipate earnings, the market rises.

The business environment is a perfect example of this multiplication of individual decisions and choices, making optimal resource management more complex (Van Hoorebeke, 2008). These decisions take on a decisive character when they are taken by the manager, for example in the case of an investment or financing choice, and overconfidence on his part, for example in the situation, can have harmful repercussions for the company's performance. As Barney and Busenitz (1997) point out, entrepreneurs are more likely to use decision-making biases and heuristics than managers in large organisations. Emphasised by ahmad & wu (2023), that investors often use heuristics, causing several heuristic-driven biases when trading on the stock market, specifically, reliance on recognition-based heuristics.

However, in addition to cognitive factors (biases and heuristics) which can influence human decisions and judgements, we also note the existence of metacognitive actors as The culture which in turn play

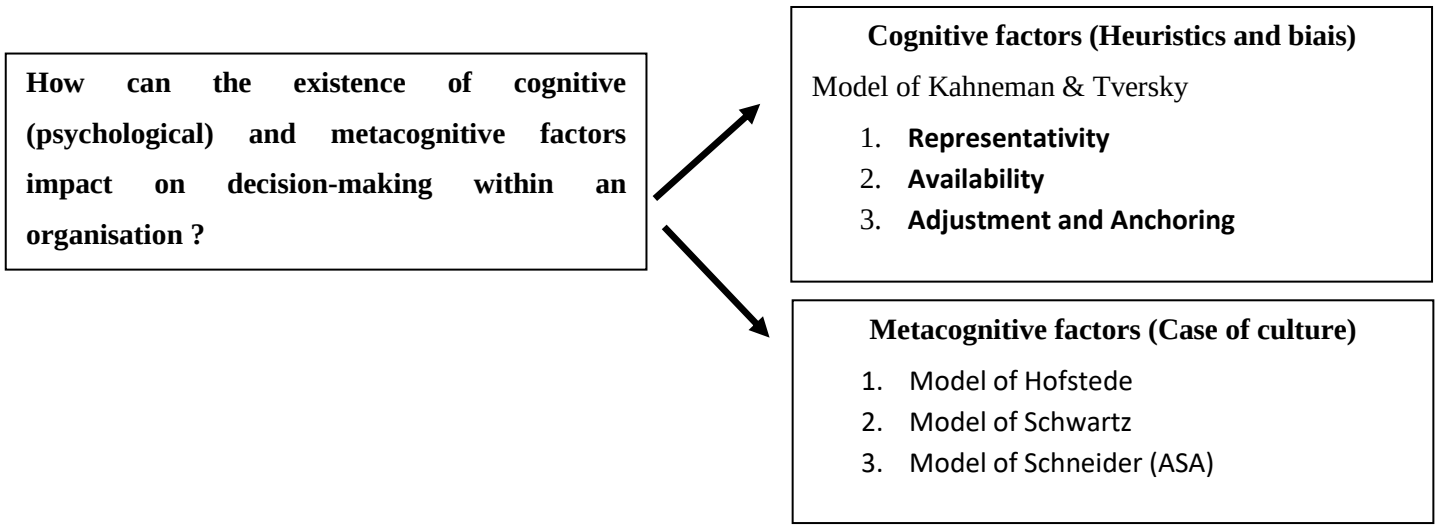
an important role in decision-making. By culture we refer to the character of a group of people who share a common history and perception of appropriate normative behaviour, values, and beliefs (Glazer & Karpati, 2014). This definition has been confirmed by Hofstede (2001), which claims that culture is the collective programming of thought that distinguishes members of one group or category of people from another. The notion of culture; borrowed loosely from anthropology, has been treated imprecisely in many organizational studies (Nutt, 1998).

The purpose of this paper is to answer the following question: **How can the existence of cognitive (psychological) and metacognitive factors impact the decision-making within an organisation?**

In order to respond to the above-mentioned problem, we are developing a conceptual model (Figure 1) in the form of a literature search. Our research will be structured in two main parts: the first represents a theoretical framework of the cognitive factors that can bias the decision, in this sense we have chosen to refer to the contributions of Kahneman & Tversky (Nobel Prize winners 2002) who deal with the different heuristics that can lead to errors of judgement.

In the second part, we deal with the metacognitive factors which can guide individual behaviour in the organization, in particular the case of culture. As an illustration, we have selected models such as **Hofstede, Schwartz** and **Schneider**.

Figure 1: Conceptual model



Source: Elaborate by the authors

Thus, our conceptual model attempts to explain human decision-making (**variable to be explained**) through a cognitive and metacognitive perspective (**explanatory variables).**

1. Heuristics and biais

1-1. Expected utility paradigm

Before dealing with the various heuristics that can be used in decision making, we first look at the concept of expected utility, which forms part of the rational choice paradigm. The paradigm of moral expectation is based on the idea that the rational choice between several risky situations (lotteries) should be based on maximising this moral expectation. should be based on maximising this moral expectation, now known as expected utility (Gerville-Réache, 2017).

The history of the axiom of expected utility represented by mathematical expectation dates back to 1738, with Daniel Bernoulli's attempt to solve the St Petersburg paradox.

St Petersburg Paradox is a game played between two people (a player and a bank). The principle of the game is to toss a coin into the air. If heads appear, the bank pays the player €2. If not, the coin is tossed again. If heads appear, the bank pays the player €4, and the game ends. Otherwise, the coin is tossed again. If heads appears, the bank pays the player 8 euros, and so on. So, if heads appears at the nth toss, the bank pays the player 2n euros. Add the probability tree.) The central question in this game is "What would be the initial stake to take part in this game? The answer to this paradox according to Bernoulli consists of substituting the mathematical expectation function (the result of earning an infinite number of euros) with a utility function (utility increases with decreasing intensity). This function will lay the foundations for the microeconomics we know today, such as marginal utility and the law of diminishing marginal utility. The concept of marginal utility makes it possible to answer various questions: (i) what happens if the consumer buys an additional unit of the same good? (ii) by how much does the consumer's utility increase for each additional unit purchased? (Alvino et al, 2018). Marginal utility can be broadly defined as the change in utility associated with a small change in one of the goods consumed, with the quantity of the other good remaining unchanged (Levin & Milgrom, 2004). It can also be described as "the additional utility received by consuming an additional unit of the good per unit of time while keeping constant the quantity consumed of all other goods" (Salvatore, 2008). While the law of diminishing marginal utility, as opposed to total utility, is a diminishing function which, according to Hermann Gossen (1983) in "The Laws of Human Relations", is "a psychological concept which states that the more a good is consumed, the less additional satisfaction each unit brings" (Dittmer, 2005; Frijtersa & Leighb, 2008; Kishtainy et al., 2012). These key concepts have also been used in the development of decision theory and game theory. The first one, seeks firstly to describe the behaviour of economic agents (Kast, 1993) and secondly to justify choices by means of a mathematical description and evaluation.

1-2. Heuristics

Heuristics are often defined as mental shortcuts that people often use to make quick decisions, but which can also lead to systematic errors. The term "heuristic" is defined by Grether (1992) as being a general decision-making rule by which individuals form probability judgements. In particular, they can be used to simplify problems (Yachanin & Tweney, 1982). These heuristics are quite useful, but they sometimes lead to serious and systematic errors. As Kahneman & Tversky (1974 p. 23) point out: "***in practice, people rely on a small number of heuristic principles that reduce the task of assigning probabilities to simpler judgmental activities. These heuristics are often indispensable, although they can also lead to serious and systematic errors".*** Although merit is given to the work of Kahneman & Tversky for the identification of different heuristics, the idea of heuristics was first raised by Simon (1955), who proposed a behavioural model of rational choice, which argues for a "bounded" rationality, in which decisions are derived from processes of dynamic adjustment both external (environmental) and internal (human characteristics) (Furnham & Boo, 2011).

Thus, a mode of reasoning based on heuristics is an empirical approach which leads to the establishment of provisional hypotheses when faced with a problem situation. Kahneman & Tversky (1974) state that the aim of heuristics is to reduce the complex tasks of evaluating probabilities and predicting values to simpler judgement operations. These judgements can sometimes lead to errors that are due to data of limited validity.

In their article "Judgment under Uncertainty: Heuristics and Biases", Kahneman & Tversky identify the main heuristics that impede rational decision making:

Representativity: this heuristic is often used to answer questions such as: what is the probability that object A belongs to class B? or what is the probability that process B will generate event A? To answer this type of question, people generally rely on the representativeness heuristic, in which probabilities are evaluated according to the degree of representativeness of A in relation to B, i.e. the degree to which A resembles B. In other words, this bias leads individuals to judge that an event is more likely if it resembles a stereotype or model they already have in mind. This can lead to errors of judgement when the apparent resemblance does not actually reflect the statistical probability of the event in question.

As an illustration of the representativeness heuristic, we cite the example given by (Kahneman & Tversky, 1974): "Let's take the example of a person described by a former "Steve is very shy and withdrawn, invariably helpful, but with little interest in people or the world of reality. me gentle and orderly, he has a need for order and structure and a passion for detail". How do people assess the likelihood of Steve working in a particular profession from a list of possibilities (for example, farmer, salesman, airline pilot, librarian or doctor)? In the representativenes heuristic, the probability of Steve being a librarian, for example, is assessed according to the extent to which he is representative of, or

similar to, the librarian stereotype. Tversky & Kahneman (1972) also point out that individuals subject to this heuristic often believe in a law known as "the law of small numbers". According to this law, individuals tend to extrapolate and draw hasty conclusions from small samples. For example, if a person meets three people from the same country and they are all nice, that person, subject to the representativeness bias, will hastily deduce that all the people from that country are nice.

Availability: This refers to the tendency of individuals to estimate the probability of an event based on the ease with which examples or instances of the event come to mind. In other words, when people assess the probability of an event, they tend to rely on the amount of information available in their immediate memory. Is also one of the heuristics affecting asset pricing (Xie et al, 2023). Indeed, several areas of management science use the foundations of psychology, in particular marketing and, more specifically: **neuromarketing.** In this regard, we cite a study (Nazlan et al, 2023) that discusses how restaurants can engage and attract social media users by presenting their dishes or services via influencer marketing campaigns. The underlying mechanism in this study is the use of the availability heuristic. Consumers increasingly tend to make their purchasing decisions based exclusively on information available on social networks (influencer posts).

Adjustment and Anchoring: Among the strategies of making a judgement in a context of uncertainty is to use the information that comes to mind and adjust it until we arrive at a plausible estimate (Epley & Gilovich, 2006). The adjustment heuristic is a common mental strategy used by individuals to estimate unknown values or quantities based on initial information called an "anchor" (the starting information). When individuals are faced with situations that require them to estimate some value, they tend to be influenced by the initial anchor presented to them. The next step is to adjust from the initial anchor to obtain the final estimate.
For example, if you ask someone to estimate the number of years it would take to double the population of a city, and you suggest 10 years as the initial anchor (which is unlikely for most cities), the person might adjust their answer based on this anchor, perhaps suggesting an estimate such as 20 or 25.

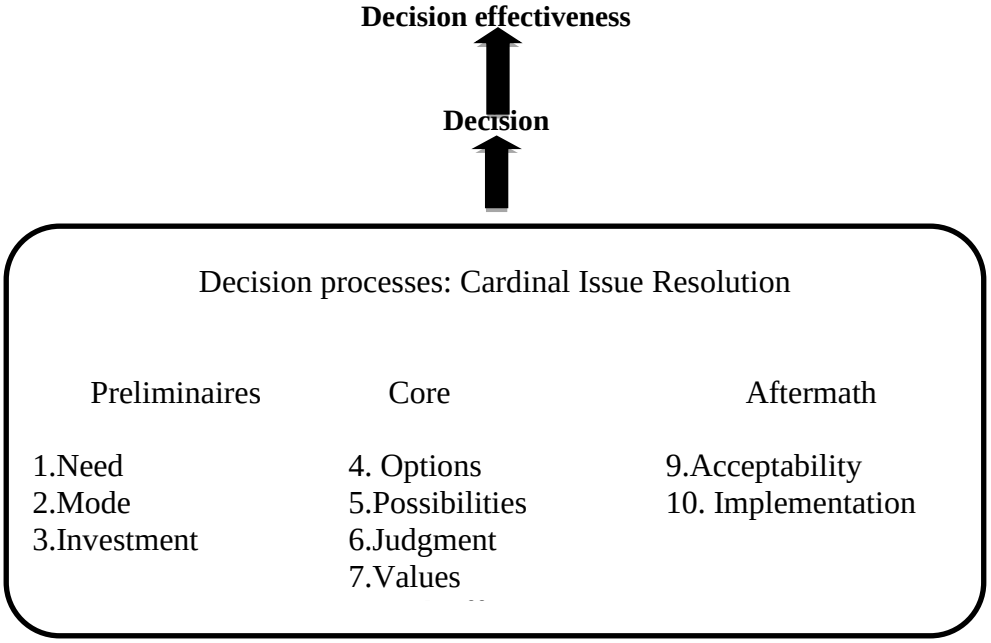
2- Metacognitive factors (Case of culture)

In this section, we first recall that in psychology, cognition covers all mental states and all psychic processes, in other words the study of mental activities which provide man with an internal representation of data external to him, for the purposes of decision-making and action. The 8 basic psychological processes are: (a) perception, (b) learning, (c) language, (d) thought, (e) attention, (f) memory, (g) motivation and (h) emotion. Amongt the branches that

study the functioning of the brain and its link with behaviour, we can cite Neuropsychology, which is a branch of psychology that studies the behaviour of the brain. Indeed, neuroscience has developed to incorporate and integrate other fields of research such as management and strategic management as Vannet (2024) points out that the proposal to marry strategic management with neuroscience has been long made, however, the affianced couple awaits the blessing of strategic management scholarly community to eventuate this marriage.

Concerning metacognition, it involves both knowledge and the regulation of cognitive activity (Le Gall et al, 2009). We can also describe it as the ability to examine one's own cognitive processes, enabling us to identify our mistakes and successes, to understand their origins and to make informed decisions, as Doudin & Martin (1992) point out, it also helps to guide learning and cognitive functioning during problem-solving tasks (Doudin & Martin, 1992). In daily life, the decision-making process is not as straightforward as it might seem, particularly in situations of uncertainty, in particular, with the presence of several decision-making perspectives such as: the rational perspective, the organisational perspective or the behavioural perspective. And it is in this vein that the (CIP) Cardinal Issue Perspective model (as shown in figure 2) on decision-making characterizes decision-making behaviour in terms of several categories of standard issues (Alattar et al, 2016).

Figure. 2. The cardinal decision issue perspective



Source: by Alattar, Yates, Eby, LeBlanc, & Molnar, 2016

In the following, in order to show the impact and effect of culture at the level of organisations, we refer to the models of: Model of Hofstede, Model of Schwartz and the Model of Schneider (ASA).

2-1. Model of Hofstede

One of the difficulties in conducting cultural research is to understand what 'culture' is, given the many definitions, conceptualisations and dimensions used to describe this concept (Stroh et al., 2002). For anthropologists, culture can be defined as a set of beliefs (values or ideas) which are not innate, but which have a particular meaning and significance. This adds to the definition proposed by Hofstede (2001), which asserts that culture is the collective programming of thought that distinguishes members of one group or category of people from another (ethnic groups). The first observation we can draw from Hofstede's definition is that culture has a collective character, but it can be connected to different collectives. Within each collective there is a variety of individuals (Hofstede, 2011). Let's recall first that Geert Hofstede examined a substantial dataset of employee values scores gathered by IBM from 1967 to 1973, encompassing over 70 countries. Initially, he focused on the 40 most extensive datasets, subsequently expanding his analysis to encompass 50 countries and three regions.

Hofstede's work has revealed 6 cultural dimensions in an organisation, such as:

1. Power Distance, related to the different solutions to the basic problem of human inequality;
2. Uncertainty Avoidance, related to the level of stress in a society in the face of an unknown future;
3. Individualism versus Collectivism, related to the integration of individuals into primary groups;
4. Masculinity versus Femininity, related to the division of emotional roles between women and men;
5. Long Term versus Short Term Orientation, related to the choice of focus for people's efforts: the future or the present and past;
6. Indulgence versus Restraint, related to the gratification versus control of basic human desires related to enjoying life.

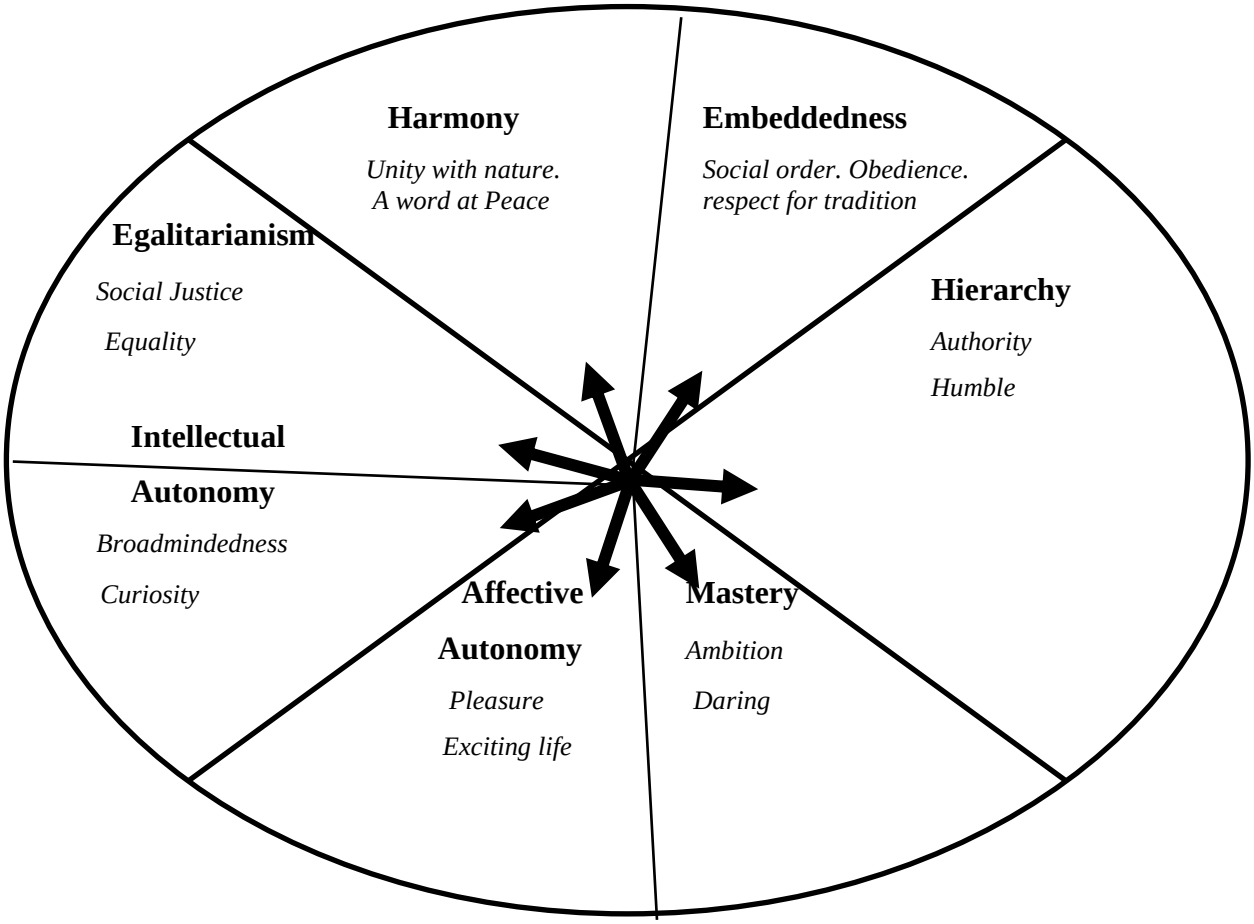
2-2. Model of Schwartz

The concept of culture examined by Hofstede on the basis of his experiences can be described as a national culture which offers a framework for understanding, specific to each nation, which is a function of factors such as languages, culture and the environment. specific to each nation (Angué & Mayrhofer, 2010). However, the Hofstede model has been criticised, leading several researchers to propose alternatives for measuring the effect of culture particularly the Schwartz model. Indeed, the Schwartz model is a model based on values (theory of the value dimensions) as fundamental elements for understanding culture (Knafo et al, 2011). At the national level, values are the goals and objectives that members of a society are encouraged to view as worthy and serve to justify actions taken in the

pursuit of these goals (Schwartz, 1999). The author also perceives values as conceptions of the desirable that guide the way social actors (e.g. organisational leaders, policy-makers, individual persons) select actions, evaluate people and events, and explain their action. Otherwise, values do not only influence individuals in their aspirations and beliefs but shape whole societies in their policies, norms, and practices (Vauclair et al, 2011).

Through data from 49 countries worldwide (teachers and students), seven categories of were identified and divided into three bipolar dimensions: Conservatism opposed to Intellectual and emotional autonomy, Hierarchy versus Egalitarianism, Domination versus Harmony. Respondents scored the importance of each value ***"as a guiding principle in my life"*** (Hofstede, 2011).

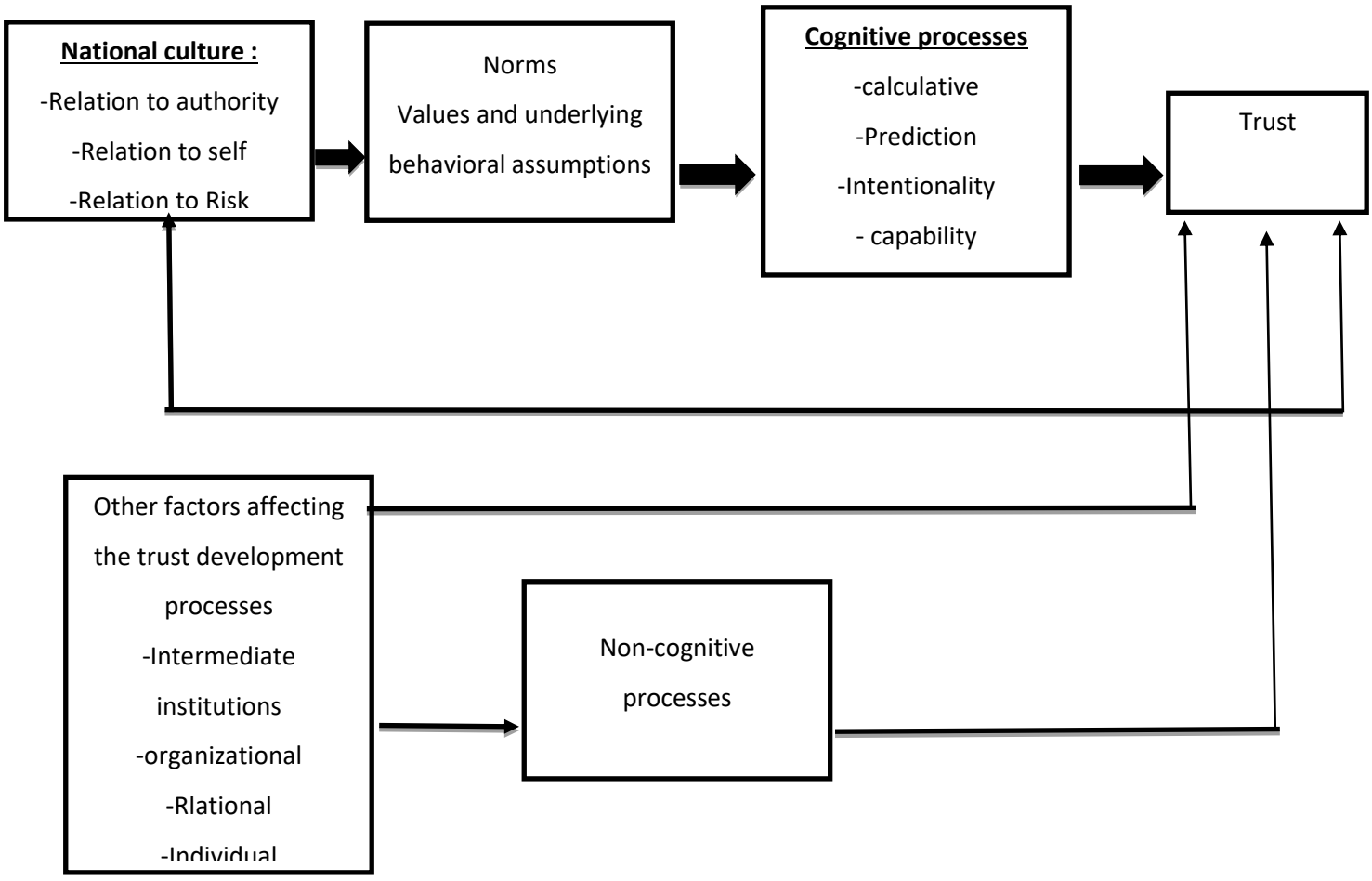
Figure 3: Prototypical Model of Schwartz's Culture-Level Value Structure



Source: Adapted From Schwartz, 2006

From the same values perspective, we refer to the study by Doney (1998) which suggests that the existence of values and norms in organisation can create an environment conducive to trust and subsequently (as shown in Figure 4) in an organisation can reduce transaction costs. Modern businesses should give entrepreneurial leaders, learning cultures, and organizational learning processes serious consideration if they want to maintain their competitive advantage over other business institutions, meet the needs of the community and the market, attract enthusiastic and high-achieving open-minded leaders, and help solve problems (Abbasi & Zamani-Miandashti, 2013).

Figure 4: Influencing of national culture on the development of trust



Source: Doney, P. M., Cannon, J. P., & Mullen, M. R. (1998). Understanding the influence of national culture on the development of trust

2-3. Attraction-selection-attrition (ASA) model (Schneider)

We have chosen the ASA model to demonstrate the importance of culture within an organisation. Indeed, the effect of culture can orient and influence (positively or negatively) the behaviour of the

organisation depending on the people who make it up. As Schneider & Bowen (2010) point out; an organization looks and feels the way it does because of the dominant personality of its people.

The ASA cycle is proposed as an alternative model for understanding organizations and the causes of the structures, processes, and technology of organizations (Schneider, 1987). In fact, the understanding of organisational behaviour could be seen in two perspectives: the first, macro-organisational, which states that understanding organisational behaviour implies first understanding the attributes of the organisation and the markets. The second perspective supports the hypothesis that understanding organisational behaviour begins with studying the attributes of people in organisations (micro-organisational). The model is based on the theory of interactional psychology, which suggests that environments and people are inseparable, in other words: situations cause behaviour (Schneider, 1987). The behaviour of individuals in the organisation is not due to personal attributes but to non-personal attributes, they behave this way because they have been attracted by this environment, selected by it and stayed with it. In fact, each organisation attracts, selects and retains its individuals through its own values and culture, which explains why each organisation is different and distinguished (is the result of the ASA cycle).

Attraction, its basis comes from vocational psychology, which suggests that people are attracted to careers on the basis of their own interests. Holland (1976) emphasises that: "Vocational choice is assumed to be the result of a person's type, or patterning of types and the environment». In short, this stage focuses on the idea that individuals are attracted to organisations that match their own values, attitudes and preferences. People tend to be more attracted to organisations that share their cultural, social and psychological characteristics.

Selection: The selection stage involves organisations choosing individuals who match their culture and needs. During the recruitment process, organisations tend to favour candidates with qualities and attributes that are congruent with their existing values and culture.in other words, selection involves organizations and applicants choosing one another on the basis of how well they meet each other's needs (Ployhar et al, 2006).

Attrition: as highlighted by Schneider (1987), the attrition is the opposite side of attraction and refers to the process by which individuals voluntarily or involuntarily leave an organisation. People who do not fit in with the culture or who feel uncomfortable in the organisation are more likely to leave.

From another perspective, culture can be a source of learning. In fact, to remain competitive and sustainable, the organisation must constantly improve and update its learning process in line with new environmental challenges. To obtain and sustain competitive advantage, organizations must enhance their learning capability and must be able to learn better and faster from their successes and failures, from within and from outside (Marquardt, 1996).

In a study by Singh (2010), the cultural dimensions that can impact organisational learning are: Openness, Confrontation, Trust, Authenticity, Proaction, Autonomy, Collaboration, Experimentation.

Conclusion:

This research, in the form of documentary research, has attempted to shed light on and view decision making from a psychological and social angle. Human choice is described as rational according to the expected utility paradigm, which stipulates that human decision making is the result of probabilistic calculation and reasoning that attempts to maximise and optimise utility under constraint, i.e. the integration of the objective costs of seeking information (Stigler, 1961). The work of Simon (1955, 1947) challenged this postulate of rational choice, in particular by introducing the concept of the individual's bounded rationality, which refers to the limits of the decision-maker's mental capacity in relation to the complexity of the decision-making environment. This observation was later supported by Kahneman & Tversky, who stressed the need to replace the notion of maximisation by that of satisfaction. Indeed, the authors point out that in situations of uncertainty, individuals tend to make their assessments and choices on the basis of cognitive tools known as heuristics**.** As we developed in the first section, we based ourselves on Kahneman & Tversky 's model, which distinguish between three types of heuristics: Representativity, Availability, Adjustment and Anchoring.

Among the factors that can have an impact on the decision and which are outside the cognitive process, we find metacognitive factors such as culture. In order to study culture as an external factor, we have chosen in the second section three models (Model of Hofstede, Model of Schwartz, Model of Schneider) that deal with national culture within the organisation.

The results of this documentary research highlight that the decision-making process is complex and depends on several factors. In our study, we treated heuristics as a cognitive factor and culture as a metacognitive factor. Those factors that are strongly linked to the decision and cannot under any circumstances be excluded in the sense that individuals constantly use the standard mental process (processing and analysis of information) which requires the use of cognitive biases. And on the other hand, we note that the environment shapes and acts on the behaviour of individuals. This environment which brings together people who share the same values and beliefs (culture).

Managerial and theoretical implications:

As for the managerial implications, this research attempts to explain that decision-making is a process that combines several elements. Indeed, when a manager makes a decision, he or she is constrained by a number of cognitive biases that can lead to errors in the decision, with consequences (positive or negative) for profitability. As a result, taking these factors into account is becoming an obligation for all decision-makers. Similarly, for stakeholders, investors are often confronted with rigged decision-making, leading them, for example, to undervalue or overvalue an investment through the use of heuristics.

Without forgetting that the nature of the present paper, which is a literature review, has above all theoretical implications. These implications are represented by the main vocation of the research, which is to present conceptual model in the form of a combination between cognitive (heuristic) and metacognitive (cultural) factors in order to find an understanding of human decision-making.

Limitations of the research:

As limitations of our research, as previously noted, human behaviour depends on several factors that we have not treated, such as emotions or the effect of experience. Among the difficulties also found the scarcity of articles, which treat the impact of the culture of the entrepreneur on the decision, in the sense where the models that we have approached treat culture as a national concept.

Research perspectives:

The constant evolution of knowledge, technologies and conceptual approaches has considerably enriched the complex field of decision-making. In this context, it would be wise to place this research in a perspective that incorporates the technological dimension, notably artificial intelligence. Indeed, Big Data and Predictive Analysis make the collection and processing of massive data provide valuable information to inform decision-making. The same thing for Artificial Intelligence and Machine Learning, which help to automate decision-making processes, identify patterns and predict outcomes. However, it is worth noting that the lack of a legal and ethical framework within which AI can operate correctly and prudently also poses a potential risk to the protection of human rights and dignity, and could provide an ethical compass and a global normative foundation for establishing respect for the rule of law in the digital world.

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