

*Facing crisis periods: a proposal for an integrative model of environmental scanning
and strategic issue diagnosis*

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Abstract

The aim of this study is to examine the way top managers scan environmental conditions to diagnose and interpret issues during periods of crisis. Despite each of these processes being widely and individually represented in the research literature, there is a lack of integrative models that examine their internal dynamics in-depth. In this study, structural equation modeling methodology (EQS 6.3) was applied to a sample of 120 top managers to examine how the cognitive orientation of scanning (rational vs. intuitive analysis of environment) may influence final issue categorizations. Results confirm that not only is procedural rationality needed when scanning the environment, as traditional arguments have posited, but also that intuition plays a relevant role, complementing rational processes and configuring a mixed set of competencies to assess different issue dimensions, such as favorability, urgency, and influence.

JEL Code: M10

Keywords

Environmental scanning, strategic issue diagnosis, multidimensional interpretation, intuition, procedural rationality

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Abstract

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Introduction

Contexts such as the 2008 economic crisis and more recently the COVID-19 pandemic have dramatically changed conditions under which firms have competed. The current pandemic is contributing to a severe financial global crisis, the real economic effects of which remain unclear (Ebrig and Foss, *in press*). Accordingly, the World Trade Organization (WTO) has recently estimated that the gross domestic product (GDP) of most economies will decrease by approximately 2.4 to 3.0 percent during 2020 (Verma and Gustafsson, 2020). To address such as disturbing issues, companies have been pushed to change their business strategies, looking for new and resilient work philosophies (Ivanov, 2020). In this context, the organizational competencies of collecting, processing, and interpreting information from the external environment can be considered a source of competitive advantage (Miller and Lin, 2015; Sund, 2015), as they try to sense and shape potential opportunities and threats in order to survive (Teece, 2007).

The literature has traditionally defined a systematic process of issue management composed of three core steps (Daft and Weick, 1984), as follows: 1) the environmental scanning process by which firms identify the relevant information, 2) strategic issue interpretation, evaluating and giving a specific meaning to the collected data, and 3) strategic response, as the final stage, by which the firm formulates and implements strategic plans. The notion behind this process is that top managers have to deal with environmental developments that are still uncertain issues, and they have to ensure there is early identification to enable a quick response (Ansoff, 1980; Laamanen et al., 2018).

Despite the scanning-interpretation process being widely recognized in the literature, results on this topic are very dispersed and fragmented. Therefore, more research is needed to advance understanding of those dynamics and factors that condition appropriate

processes for the scanning and diagnosis of issues (Shepherd, McMullen and Ocasio, 2016; Laamanen et al., 2018; Joseph, and Gaba, 2020). In particular, this paper addresses two main aspects from the literature (Table 1):

- a) The need to propose integrative models of scanning-interpretation by highlighting the interdependence between the two, and the role of scanning processes and their function as the input for the interpretation phase (Joseph and Gaba, 2020).
- b) The lack of study on deepening the link between the scanning and interpretation stages from an alternative point of view by introducing managers' cognitive skills in scanning processes as determinants of final categorizations (Csaszar, 2018).

<Please insert Table 1 here>

Accordingly, this study utilizes issue management literature to examine how rational environmental scanning compares with intuitive environmental scanning in influencing subsequent issue diagnosis and interpretation. Although these phases are closely linked, they configure different realities in issue management processes, each affecting and conditioning the other (Heugens, 2006).

With this analysis, we contribute to the literature in two ways: 1) by proposing an integrative model of scanning-issue diagnosis from a theoretical point of view, and 2) by providing empirical evidence on the way the two strategic phases are connected. In particular, our results confirm that both procedural rationality and intuition are needed when scanning and interpreting information from the environment, shaping a dual set of competencies to evaluate different issue dimensions, such as favorability, urgency, and influence.

1 The paper is structured into three sections. Section 1 presents the theoretical framework
2 on issue management and the development of hypotheses. In Section 2, we present the
3 empirical test of the causal model derived from the theoretical discussion, using structural
4 equation modeling with EQS on a sample of 120 Spanish top managers. Section 3
5 presents the conclusions, limitations, and areas for future research.
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11 **Theoretical framework and hypotheses development**

12 *Environmental scanning: a dual process approach*

13 Crisis periods can be defined as “a moment of decisive intervention and not merely a
14 moment of fragmentation, dislocation or destruction” (Hay, 1999:317). In that contexts,
15 top managers need to be constantly alert to changes to adapt, maintain, or change their
16 current strategy (Floyd and Lane, 2000). In general, the literature has posited that the
17 broader the information scanning activities, the greater the organizational performance.
18 This has emphasized differences in the way companies look for strategic information
19 (Babbar and Rai, 1993; Ebrahimi, 2000). More recently, Danneels (2008) explained that
20 scanning is a strategic capability that enables the absorptive capacity of the firm to
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42 The main objective of this process is to enable firms to forecast and identify the
43 emergence of potential issues (Milliken, 1990) by extracting the predominant traits of
44 existing issues. Scanning is particularly relevant because it deals with vague and diffuse
45 developments that have not yet achieved the status of a decision event (Dutton et al.,
46 1983). This deliberative process entails different actions not only to obtain information
47 on relevant events, but also to protect the company from uncertainty (Thompson, 1967),
48 to detect environmental changes (Sutcliffe, 1994), and to align managers’ perceptions
49 with the real environment (Bourgeois, 1985).
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1 Although environmental scanning may be considered an easy task, the literature defines
2 diverse ways of performing this strategic process. For example, Gollner (1983)
3 distinguishes between two main actions: issue scanning and issue monitoring. The former
4 refers to a proactive behavior by which organizations identify events that may affect
5 current or futures strategies. The latter concerns updated information relating to a
6 previously identified issue. Others, such as Hough and White (2004), refer to external and
7 internal scanning, including the analysis of internal strengths and weaknesses of the
8 company. Another proposal describes scanning as an active process, characterized as
9 constant attention to the environment, rather than passive scanning, in which
10 organizations maintain a state of alertness for non-routine and core information (Huber,
11 1991).

12 In most cases, data collection activities precede issue interpretation (Daft and Weick,
13 1984), but do not necessarily result in organizational responses (Hough and White,
14 2004:782). In fact, environmental scanning is often difficult to interpret; however, it
15 provides the basis for better and deeper understanding of environments and guides
16 strategic planning steps (Lester and Parnell, 2008). In this vein, when scanning
17 environments, managers should not only identify and relate different relevant factors, but
18 also describe possible future developments to shape diverse potential scenarios (Ayres
19 and Axtell, 1991; Gausemeier et al., 1998; Jiang et al., 2017; Tiberius et al., 2020).

20 Because there are different ways to develop scanning activities, top managers'
21 capabilities play a crucial role in this regard in the survival of their firms. On the one
22 hand, the *information-processing* approach posits that more information usually helps
23 managers to develop interpretations and label issues, which enables better performance
24 (Kuvaas, 2002). Thus, when managers face uncertain and complex environments, they
25 usually expend more effort on collecting data and seeking new information to clarify the

1 context in which they act (Dutton and Jackson, 1987). On the other hand, in certain
2 contexts, they reduce scanning activities and base their decisions on their own experience
3 and knowledge. This focus implies a direct and linear relationship between environment
4 and knowledge. This focus implies a direct and linear relationship between environment
5 complexity and data collection processes (Hough and White, 2004). However, these
6 arguments are limited in explaining the reality of scanning behaviors.
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12 To address these concerns, literature on *social cognitive processes* offers an alternative
13 explanation, proposing that managers who spend too much time on gathering information
14 tend to implement fewer changes relating to issue interpretation (Kuvaas, 2002). The
15 logic behind this argument suggests that “there is a strong tendency for subsequent
16 information gathering to be biased towards confirming its correctness, rather than finding
17 contradictory evidence [...]” (Anderson and Nichols, 2007:369). Therefore, as the
18 literature suggests, scanning usually decreases in situations where there are important
19 levels of certainty or uncertainty (March and Simon, 1958). This means that managers
20 would prefer to make decisions based on their “gut feelings” and experiences. In uncertain
21 contexts, it is possible that managers do not have access to information (May et al., 2000)
22 or there may be too much information to be analyzed, resulting in managers having to
23 cope with contradictory information (Hough and White, 2004). Accordingly, Álvarez and
24 Barney (2007) posit that creating opportunities is a better option to face uncertain
25 contexts or sectors than discovering new businesses. In essence, “creating” implies that
26 opportunities do not exist independent of entrepreneurs and they are not considered the
27 result of market discontinuities and imperfections. In fact, information to foresee potential
28 outcomes related to decision making may not yet exist in such a context.
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55 In environments of high certainty, familiar situations can be addressed by applying
56 managers’ experience. Nevertheless, as Hough and White (2004) propose, top managers
57 may extend greater effort to process information in a stable environment to seek new
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1 market or business opportunities, rather than to reduce information. Therefore, it can be
2 argued that efficient scanning, which requires a versatile and flexible set of actions and
3 abilities, needs to be developed. Hence, top managers need to be capable of adapting
4 scanning efforts to different situations and objectives to shape a flexible information
5 gathering process, which may then lead to different future scenarios (Gausemeier et al.,
6 1998; Jiang et al., 2017). As Durance and Godet (2010:1488) explain “a scenario is not a
7 future reality but rather a means to represent it with the aim of clarifying present action
8 in light of possible and desirable futures”.

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20 On the base of this definition, the paper proposes that scanning effort, understood as a
21 first step in the scenario management (Burmeister et al., 2004), should simultaneously
22 involve two types of processes—intuitive and rational/comprehensive (Hodkinson and
23 Clarke, 2007; Calabretta et al., 2016)—in a dual process model of searching and
24 reasoning (Basel and Brühl, 2013). In the literature, it is also known as System 1
25 (intuitive) and System 2 (rational) (Kahneman and Klein, 2009). The degree of deployed
26 rationality has frequently been linked to strategic decision-making processes. A number
27 of researchers have emphasized the effects of these processes on organizational
28 performance and decision-making quality (Elbanna and Child, 2007; Forbes, 2007).
29 Comprehensive analysis implies that managers emphasize search and research activities
30 and factors in the environment, evaluating relevant information on the basis of certain
31 criteria to identify and develop multiple alternative actions (Elbanna, 2006) and future
32 scenarios (Jing et al., 2017). Analytic processes are complex and slow, and also demand
33 higher cognitive time and effort. Furthermore, their dynamics enable managers to reduce
34 the complexity of strategic decisions, to minimize managers’ cognitive biases, and even
35 to increase agreement in the implementation of alternatives (Miller, 2008).
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1 Nevertheless, given the systematic approach and rigidity of such analytic processes, they
2 are not always efficient (Dane and Patt, 2007; Calabretta et al., 2016). This highlights the
3 importance of intuitive processes as a complementary mode of reasoning (Sadler-Smith,
4 2016). In essence, [...] “System 1 works in a domain-specific and contextualized manner
5 using associative parallel processing” (Salas et al., 2010:945). As with the comprehensive
6 mode, an intuitive focus on the environment also implies problem definition, analysis,
7 and integration, but from a less conscious perspective (Calabretta et al., 2016), solving
8 problems spontaneously and unconsciously without being affected by intellect or
9 alertness (Frederick, 2005). It also includes both affective and cognitive elements (Chassy
10 and Gobet, 2011) and allows a holistic association of elements (Dane and Patt, 2007).
11 Thus, the process should not be considered random or irrational. In fact, it is built upon
12 experiences and a coherent understanding of issues and problems (Khatri and Ng, 2000).
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30 This paper adopts Kahneman and Klein’s (2009) System 1 definition of “*intuition as*
31 *expertise*” (Kahneman and Klein, 2009; Salas et al., 2010). Intuition is understood as a
32 way of thinking and therefore as cognition that appears when decision makers have
33 reached a high level of knowledge in a certain field, derived from an extensive experience
34 (Salas et al., 2010). Hence, as Akinci and Sadler-Smith (2012:116) posited, “informed
35 intuition is the result of extensive and deliberate practice, reflection, feedback and
36 analysis” (Dreyfus and Dreyfus 1986; Ericsson et al. 2007). Kahneman and Frederick
37 (2002) explain that System 2 (rational) is implemented in a sequential, rule-based, and
38 abstract way to solve problems spontaneously and unconsciously without being affected
39 by intellect or alertness (Frederick, 2005). Thus, some degree of intuition may be
40 necessary in scanning environments to promote speed, agility, and the quality of decisions
41 (Burke and Miller, 1999). For instance, Grant (2003) argues that intuition will increase
42 creativity and flexibility in the decision-making process, especially in dynamic
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environments. Moreover, Khatri and Ng (2000) found intuitive processes to be positively related to organizational performance in unstable environments and negatively related in stable environments.

Although further research is needed on how these two complementary processes work (Basel and Brühl, 2013), some authors propose a dynamic connection between them (see Figure 1). On the one hand, heuristics arise spontaneously from intuitive processes, providing input into rational processes to generate deliberative strategies. On the other hand, fallacies and biases may appear when rational processes fail to amend mistakes derived from intuitive processes (Kahneman and Frederick, 2002).

Because decisions are neither based exclusively on rationality nor intuition, a combination of both strategies may be applied (Salas et al., 2010). In fact, different calls from the literature manifest a need for research on how these two processes work together (Gray, 2004; Salas et al., 2010; Calabretta et al., 2016). Therefore, the logic behind these arguments is that, in a way, complementarities and synergies are possible from both rationality and intuition (Calabretta et al., 2016), helping top managers to scan and understand their environment. In the next section of the paper, we explain in more depth how certain cognitive orientation in environmental scanning may condition the subsequent interpretation of issues.

<Please insert Figure 1 here>

Strategic issue interpretation: a multidimensional approach to interpretation

Scanning activities are a necessity but not a sufficient condition for issue management and strategic responses (Hambrick, 1982). The second stage of issue management refers

1 to giving meaning to the data collected through scanning (Heugens, 2006), and to
2 translating external issues into shared meanings for the complete organization (Sund,
3 2015). This part of the process is particularly relevant because it directly affects
4 organizational responses and the scope of subsequent decision-making processes (Dutton
5 et al., 1983).
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12 The categorization and labelling of events requires important cognitive efforts and the
13 application of mental maps (Dutton et al., 1983; Julian and Ofori-Dankwa, 2008). In fact,
14 a particular aspect detected in the environment can be considered a strategic issue for a
15 company while irrelevant to others because “no issue is inherently strategic” (Dutton and
16 Ashford, 1993:397). Therefore, it can be argued that these two strategic phases are closely
17 linked (Dutton et al., 1983; Sund, 2015). This connection implies that environmental
18 scanning provides the necessary input required to perform diagnosis of strategic issues.
19 Depending on the external information provided, the results of such interpretation may
20 vary. Therefore, we hypothesize the following:
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36 *H₁: The greater the managers' effort to scan the environment, the greater the*
37 *strategic issue interpretation process.*
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41 The most traditional model for the categorization of strategic issue diagnosis is the
42 opportunity–threat framework (Jackson and Dutton, 1988; Thomas, Clark and Gioia,
43 1993). On the basis of two main dimensions—valence (positive–negative) and agency
44 (controllable–uncontrollable)—situations can be perceived as negative or problematic
45 with the potential threat of loss or lack of organizational control. In such cases, these
46 situations become labeled as “threats.”
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57 By contrast, opportunities present positive events that may lead to gains, and they are, to
58 some extent, controllable (Thomas and McDaniel, 1990). Usually, this type of
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categorization involves more automatic/affective interpretation processes, leading to “categorical and relatively unreflective interpretations” (Dutton, 1997:87). In fact, such processes demand fewer cognitive resources and less effort, leading to interpretations based on “gut feelings” about the relative importance of the issue (Ginsberg and Venkatraman, 1995).

As already mentioned, categorizations significantly condition strategic actions in diverse ways, deploying either proactive or reactive behaviors. Studies suggest that organizations usually increase control over their actions and reduce information flows and participation in decision making when responding to perceived threats (Staw, Sandelands, and Dutton, 1981). Researchers have posited that when interpreting opportunities, companies tend to be more proactive, seeking new products, innovation, or diversification (Schneider and De Meyer, 1991). For example, Parida, George, Lahti, and Wincent (2016) posit that entrepreneurs who perceive the environment to be controllable increase the likelihood of initial sales from low-to-medium levels. More recently, Seetharaman (2020) defend that, in the context of COVID-19 pandemic, organizations find environmental variability to be a source of opportunities that can be turned into “temporary adhocracies” with the objective of innovating constantly to adapt their business models. As stated by Wenzel et al. (2020), innovating is one of the most predominant strategies to manage a period of crisis.

However, this method of categorization may entail an oversimplification of reality in some cases. Although correct simplification of the circumstances may help to stabilize the situation, in very specific and complex cases (such as the COVID-19 pandemic) oversimplification may produce inefficient decision-making processes (Ehrig and Jost, in press). To address this limitation, another stream of research proposed the feasibility–urgency framework (Dutton et al., 1990). Based on social construction theory (Daft and

1 Weick, 1984; Dutton et al., 1983), this more complex approach explains that
2 organizations build their strategic responses by paying attention to two different criteria:
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4 1) feasibility, understood as the organizational capacity to respond because of the
5 importance of the strategic issue, and 2) urgency, which describes the time pressure and
6 the visibility of the strategic issue (Dutton and Duncan, 1987; Dutton et al., 1990). In
7 practice, this approach requires more active/deliberative focus than the opportunity–
8 threat model. Thus, interpretations require deeper and wider information searches and
9 analyses (Dutton, 1997; Julian and Ofori-Dankwa, 2008), which lead to more conscious
10 and intended processes.
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22 Although strategic issue diagnosis models have been widely discussed in the literature,
23 they lack descriptive accuracy. Consequently, they do not offer a detailed explanation of
24 how managers interpret strategic issues in practice (Julian and Ofori-Dankwa, 2008). To
25 address the limitations of previous models, an integrative model combining the two
26 approaches described—the opportunity-threat and feasibility-urgency models—is
27 proposed in the literature (Julian and Ofori-Dankwa, 2008). In such an approach, the
28 perceived relevance of the issue would be reflected through three dimensions. First, the
29 “favorability” dimension indicates the degree to which the response to a strategic issue
30 will result in a positive gain. Second, “urgency” relates to an assessment of the perceived
31 importance in responding to a strategic issue. Third, “influence” refers to the perceived
32 capacity of the organization to respond to a relevant event (Julian and Ofori-Dankwa,
33 2008).
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52 Empirical evidence shows that this integrative model explains the interpretation process
53 better than previous models, confirming the empirical relevance of the three dimensions.
54 The high complexity around strategic issues makes their interpretation especially
55 difficult. Interpretations based only on a single dimension may lead to biased meanings
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1 and erroneous manager behavior (Julian and Ofori-Dankwa, 2008: 110). In fact, the
2 nature of issues, usually ill-defined and broad, may also produce ambivalent
3 interpretations that simultaneously imply both positive and negative evaluations
4 associated with an issue (Plambeck and Webber, 2010; Yuan et al., 2017). Ambivalence,
5 despite increasing the complexity of the interpretation processes, provides a more
6 complete and accurate diagnosis of the issue, allowing the proposal of further actions
7 (Jonas et al., 1997).

17 The generation of multiple futures based on interpretations of environmental factors is
18 influenced by different aspects, such as managers' bounded rationality, cognitive biases,
19 beliefs about the future, and communication processes implemented that also transmit
20 scenarios (Tiberius, 2019), leading to a particular set of biases that, as Schoemaker
21 (1993) posited. To minimize biased and imprecise interpretations, the base on which
22 managers shape future scenarios needs to be particularly clear for all participants,
23 including labels, meanings, and their implications. Accordingly, we followed Julian and
24 Ofori-Dankwa's (2008) arguments to explain issue interpretation as an integrated process
25 through which favorability, urgency, and influence are jointly assessed. Thus, managers
26 implement better diagnostic processes when they are able to detect the degree to which
27 an issue may be favorable, urgent, or influential for the firm. This interpretation model
28 provides a more complete and systematic framework with which to assess the strategic
29 issues because of its greater applicability, which is more far-reaching than the traditional
30 opportunity–threat and feasibility–urgency models (Figure 2).

52 <Please insert Figure 2 here>

53 *An integrative model of interpretation*

54 Research on strategic issue management has traditionally focused on studying either the
55 identification/scanning phase (Liao et al., 2008; Grégoire and Shepherd, 2012; Shepherd
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et al., 2016), or the interpretation stage (Dutton et al., 1983; Julian and Ofori-Dankwa, 2008; Miller and Lin, 2015). However, the link between the two stages has been less frequently examined and tested (Shepherd et al., 2016).

As discussed, scanning and issue diagnosis are two of the most relevant managerial tools because they not only increase the chance of seizing opportunities, but also provide the means by which threats and potential problems may be faced. In practice, the complexity and importance of threats and problems mean that top managers constantly face the challenges of interpreting diverse environmental signals and searching for the potential implications (and results) for their companies (Miller et al., 2015).

With these two processes, the capacity of perception is crucial and logically it is different across managers. In fact, it is possible that managers suffer “inattentional blindness,” which is “the failure to attend to an event that occurs during the performance of another task” (Helfat and Peteraf, 2018: 839). In practice, managers do not pay exclusive attention to the environment, and even if they did, their focus may be biased in terms of how the issue is understood (Haast et al., 2015). Experts in certain areas may perceive information and issues more acutely and rapidly than those managers not considered to be experts. In such an intricate landscape, linking managers’ cognitive skills—rational and intuitive—to issue interpretation helps us to put the two strategic phases together in an attempt to better understand how they function. Different issues require different levels of time, effort, number, and type of information sources to provide a clear idea of what they are about. Hence, the proposed model is based on the assumption that the way scanning is performed may influence perceptions across multiple dimensions in strategic diagnosis.

As previously mentioned, the literature has traditionally presented two competing frameworks to explain the effect of gathering information in the context of issue

1 management. These are the *information process approach*, in which more information is
2 understood to be positive because it usually implies a more complex understanding of the
3 issue and provides support for initial interpretations, and the *social cognitive process*, in
4 which further information is not always needed because there is a tendency to look for
5 “biased” information that only confirms the preliminary interpretation rather than
6 contradicting or reconsidering it (Anderson and Nichols, 2007). In addition to these
7 arguments, different works have considered that the interpretation of the issue (as either
8 an opportunity or a threat) will affect subsequent actions, with opportunities demanding
9 fewer actions than threats (Chattopadhyay et al., 2001; Anderson and Nichols, 2007).
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22 Considering these arguments and the dimensions included in the model, “favorability”
23 was defined in terms of the potential positive gain a firm may obtain, similar to the
24 concept of opportunity (Julian and Ofori-Dankwa, 2008). If we apply the argument
25 concerning the interpretation of automatic and analogical reasoning, top managers will
26 detect and interpret environmental data based on their prior experiences, making
27 inferences from past analogous situations (Miller and Lin, 2015; Vechiatto, 2020). This
28 means more automatic/affective processes that require less cognitive effort would be
29 implemented. In these situations, top managers would not need much information from
30 the environment because they would perform ‘relatively unreflective’ interpretations
31 based on previous experiences (Dutton, 1997). Therefore, we may expect that managers
32 will not need extra information because they do not aim to take action regarding the
33 perceived opportunity, and accordingly they do not need to confront information to clarify
34 or change their vision concerning the strategic issue in question.
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54 Thus, the perception of issue favorability will be more precise when top managers
55 implement intuitive processes during environmental scanning and subsequently interpret
56 issues through automatic analogical reasoning. By contrast, cases of urgency and
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influence (because of their very nature and essence) are initially perceived to be negative and/or disturbing for the firm. In these cases, more information and data are needed to enable a clearer understanding of what is being analyzed, which may even change the managers' minds from their preliminary perception (Anderson and Nichols, 2007). Based on these arguments, we propose the following sub-hypotheses (see Figure 3).

- *H_{2a}: Intuitive scanning processes lead to better interpretations of issue favorability than rational processes.*
- *H_{2b}: Intuitive scanning processes lead to worse interpretations of issue urgency than rational processes.*
- *H_{2c}: Intuitive scanning processes lead to worse interpretations of issue influence than rational processes.*

To complete the integrative model, we focus on the information-processing approach to explain that top managers need to scan the environment comprehensively to understand strategic issues (Hough and White, 2004). This focus posits that exhaustive scanning processes will provide top managers with necessary and sufficient information to reduce any uncertainty around an event (Sund, 2015). More information may help top managers to better understand and perceive the extent to which a certain event needs to be addressed within a short period; in short, to determine urgency.

Something similar happens with the "influence" dimension. Data and specific information about the way a certain issue should be addressed may facilitate top managers' perceptions about how an issue can be controlled by the firm. Comprehensive scanning processes imply a "*much greater degree of information search and analysis*" (Dutton, 1997:87), and contrary to intuitive processes, may elicit more active and

deliberative interpretations. Interpretations of the degree of urgency and the influence of an issue—both of which are intrinsically linked to threats (Julian and Ofori-Dankwa, 2008)—will be more conscious and intentional. Therefore, as Gilbert (2006) posited, threats usually demand greater cognitive effort, being more cognitively taxing. Hence, we propose that top managers need to extract relevant information from the environment to offer objective and precise perceptions of the way an issue may influence a company and the level of urgency required in their response. Implicitly, and based on the arguments included in the previous hypothesis (H_{2a}), events that seem favorable for the firm tend not to require much information to be understood and interpreted. In general (although opportunities are of interest to companies), they neither imply a crucial concern for managers in terms of potential losses nor require quick and reactive actions to be managed (Anderson and Nichols, 2007). Thus, to some extent, exhaustive analysis of environmental information could be ineffective. Therefore, we propose the following hypotheses (see Figure 3).

- H_{3a}: Rational scanning processes lead to better perceptions of issue urgency than intuitive processes.
- H_{3b}: Rational scanning processes lead to better perceptions of issue influence than intuitive processes.
- H_{3c}: Rational scanning processes lead to worse perceptions of issue favorability than intuitive processes.

<Please insert figure 3 here>

Empirical analysis

Sample, measures, and methods

To explain the link between the scanning and interpretation stages by introducing managers' cognitive skills in scanning processes as determinants of final categorizations, data were collected using an online, self-administered questionnaire delivered to 290 Spanish top executives. To identify and contact potential respondents, we used the membership database of the Spanish Association for People Management and Development (AEDIPE).

Strategic managers were considered more direct and important agents deeply involved in strategic processes, such as environmental scanning and issue diagnosis (Hambrick, 2007; Carmeli et al., 2009; Miller and Lin, 2018). This is because their personal characteristics (cognitive processes, beliefs, personality traits, and ethical norms) definitively condition a firm's success. Therefore, higher responsibility is devolved to top managers (Abatecola and Cristofaro, 2018). Although other managers may participate in such strategic processes (Raes et al., 2011), not always attending to other managers' inferences about strategic issues may lead to better results (Miller and Jin, 2018).

The model was tested using structural equation modeling (SEM), specifically the EQS program (6.3 version), applying ordinary least squares-elliptical distribution (Bentler, 2006). We paid special attention to missing values, asymmetry, and kurtosis, confirming that our sample followed a non-normal distribution pattern, from both multivariate and univariate perspectives.

To assess the variables involved in the proposed model of study (degree of procedural rationality/comprehensiveness, degree of intuitive analysis, and capacity to interpret strategic issues) 7-point Likert-type scales were used, with response options ranging from 1 = *strongly disagree* to 7 = *strongly agree*. The questionnaire was designed according to suggestions by Fowler (2002) and Johnson and Harris (2002) concerning how items and scales should be defined to maximize validity and reliability. A pretest was conducted

using an initial sample of respondents who provided feedback about the comprehensibility of the questions and the problems experienced while responding. Incomplete questionnaires were excluded, leaving 120 satisfactory responses (one respondent per firm). The final sample comprised a majority of large firms (48.5% of the sample) in the following proportion: 3.4% building sector, 8,6% trade sector, 25% industry sector, and 62.9% remaining services.

We used validated scales from the literature to measure involved constructs (Appendix I), as follows:

1) *Degree of procedural rationality/comprehensiveness in environmental scanning.*

This was measured using Dean and Sharfman's (1996) scale. The Cronbach's alpha coefficient suggested that the new variable is internally consistent and reliable ($\alpha = 0.853$).

2) *Degree of intuitive analysis.* Khatri and Ng's (2000) scale was applied to measure the degree to which top managers monitor the environment based on their own experiences and "gut feelings." The Cronbach's alpha presented acceptable levels of internal consistency ($\alpha = 0.711$).

3) *Capacity to interpret strategic issues.* The last construct introduced in the model was measured using Julian and Ofori-Dankwa's (2008) model to assess the three main dimensions in strategic issue diagnosis: favorability, urgency, and influence. The Cronbach's alpha confirmed its internal consistency ($\alpha = 0.909$).

Before testing the model, we conducted preliminary analysis with Q-Q plots and histograms, as well as the Kolmogorov-Smirnov's test to confirm the non-normality character of the dataset. In addition, we conducted specific analysis of variance

(ANOVA) to control for sector and size differences. The results confirmed that mean differences were not statistically significant (see Table 2).

<Please insert Table 2 here>

Common method bias

The nature of our model and dataset made it necessary to control for common method bias (CMB) problems. Following Podsakoff, MacKenzie, Lee and Podsakoff (2003) and Podsakoff, MacKenzie, and Podsakoff's (2012) recommendations, we performed two different sets of analyses: (1) procedural remedies or *ex-ante* remedies, and (2) specific statistical method or *ex-post* actions. For the first approach, we paid particular attention to the design of the study and the survey, protecting respondent anonymity and reducing evaluation apprehension. In doing so, an introductory paragraph specifying the objective of the study and its academic purposes was included in the survey. In addition, we provided some reverse coded items in the questionnaire, looking for a certain balance between positive and negative items to reduce socially desirable, lenient, or acquiescent opinions (Podsakoff et al. 2003: 888). Moreover, we used validated scales from the literature as Tourangeau et al. (1991) recommend, to minimize vague concepts and complex wording.

Regarding the second issue, Harman's one-factor test was conducted. Several factors emerged from the analysis in which the variance for the first factor was 41.47%. Although Harman's single factor test has been widely used, it has been also rigorously criticized because of its limitations in controlling CMB. Therefore, additional and more complex statistical analyses were conducted.

Accordingly, we applied the unmeasured latent method construct (ULMC) technique, which introduces a first-order method factor whereby the measures are single indicators. Results showed that the majority of the method factor loadings were not statistically

significant (15/17). Moreover, the indicators' substantive variances were higher than their method variances, also suggesting a relatively low level of CMB (Vance et al., 2008).

In addition, we assessed discriminant validity by comparing variable correlations with the squared root of average variance extracted (AVE) values for each of the constructs and calculating heterotrait–monotrait (HTMT) ratio scores, confirming that each construct represents a singular dimension of the model. Correlations exceeded the commonly accepted cut-off value of 0.90 (Table 3a), while for the HTMT ratio, only two of the obtained values exceed 0.95 (Table 3b). As Pavlou, Liang, and Xue (2007) posited, this evidence also suggests that CMB does not significantly condition our analyses.

Results and discussion

As previously stated, data in this study did not follow either univariate or multivariate normality, which led us to avoid the application of maximum likelihood estimation methods (Bentler, 2006). Mardia's coefficient (42.222) and the analysis of asymmetry and kurtosis suggested the need to use ordinary least squares methods in the specific case of elliptical distributions (Bentler, 2006).

Convergent validity for each construct of the measurement model was confirmed, showing most significant loadings at 5%, with values generally over 0.5. In addition, standard errors showed acceptable levels. As Table 3a demonstrates, discriminant validity was also confirmed with each AVE measure exceeding the 0.50 level (Bagozzi and Yi, 1988) and levels above the squared correlations between constructs (Hulland, 1999). As stated, HTMT analyses were conducted to complete the previous analyses of discriminant validity (Table 3b). More specifically, only two cases demonstrated levels over the liberal criterion $HTMT = 0.90$ (Henseler et al., 2015). Finally, internal reliability was assessed

through composite reliabilities, ranging from 0.848 to 0.909 (Nunnally and Bernstein, 1994).

<Please insert Tables 3a and 3b here>

A set of equation analyses was conducted to examine the effects of comprehensiveness and intuition on different dimensions of strategic issue diagnosis in the structural model. The chi-square statistic is usually used to evaluate the fit of the model tested. In our case, the test provided a significant result at a 0.05 threshold ($\chi^2 = 189.561$; $N = 120$; $df = 113$; $sig. = 0.00001$). However, the chi-square is usually influenced by data non-normality, model complexity, and sample size, leading us to consider that there is a lack of fit between the sample and the covariance matrices (Byrne, 1998). Different indices were therefore provided to address these problems and to obtain a broader and more precise view of the model fit (Kline, 2005).

In fact, the rest of the indices obtained in our model showed an acceptable level of fit to the data. For *absolute fit indices* (to determine how well the a priori model fits the sample data) the results were as follows: GFI 0.97; AGFI 0.96; RMSEA 0.07; SRMR 0.08. As observed, the indices ranged within appropriate levels, providing interesting evidence about how our data fits the theory. For *incremental fit indices* (comparing the fit of a substantive model to a null model) the results were as follows: NFI 0.91; NNFI 0.95; CFI 0.96 (Table 4). These levels were also acceptable, suggesting that the relationships included in the proposed model make sense and explain the reality.

<Please insert Table 4 here>

These results partially support the proposed hypotheses and also offer additional interesting information. Regarding the first hypothesis, we found that having a greater ability to scan the environment improved the way top managers interpreted strategic issues. There was a positive and significant effect between different methods of scanning

the environment and the dimensions included in the strategic issue interpretation. Specifically, H_{2a} was supported ($\beta = 0.776$; $p < 0.1$), indicating that intuitive processes help managers to better identify the degree of favorability of a certain issue. However, results indicated that exhaustive processes also improve favorability identification (H_{3c}), showing less intensity than intuition ($\beta = 0.631$; $p < 0.1$). A similar result occurred for H_{3a} ($\beta = 0.572$; $p < 0.1$) and H_{3b} ($\beta = 0.506$; $p < 0.1$). In these cases, the hypotheses were supported, suggesting that comprehensiveness is significant and positively linked to urgency and influence identification. Unexpectedly, we also found that intuition plays a positive role in detecting the dimensions of strategic issues—urgency (H_{2b}: $\beta = 0.745$; $p < 0.1$) and influence (H_{2c}: $\beta = 0.673$; $p < 0.1$)—showing even higher intensity than comprehensive processes (Figure 4).

<Please insert Figure 4 here>

These findings support the notion that a combination of the two strategies may lead to more complete and efficient strategic issue diagnosis processes (Hodgkinson and Clarke, 2007; Calabretta et al., 2016). The synergies arising from the interaction of the two processes and their interdependence generate a complementary process of strategic issue diagnosis (Basel and Brühl, 2013). In addition, the relative predominance of intuition in strategic issue diagnosis processes is especially interesting, considering the period when top managers were questioned. As mentioned, when the data collection process was conducted in 2013, Spain was still in economic crisis. Managers were asked about their decision-making processes, specifically the way that they scanned unstable environments and identified and interpreted crucial strategic issues to enable them to face the crisis. Different authors have already noted the relevance of intuition in decision-making during crisis (Sayegh et al., 2004; Calabretta et al., 2016; Li et al., 2016). However, some

researchers dispute that intuitive decisions may be the most efficient form of decision making when facing time pressures and ambiguity in crisis situations (Lerner et al., 2015).

Conclusions, limitations, and future research

This paper explores the dynamics behind environmental issue management processes, detailing the way in which environmental scanning and strategic issue diagnosis are connected. Despite a number of researchers having examined these processes in the literature on strategic contexts, there is a lack of studies analyzing both constructs simultaneously and the specific interactions between their dimensions (Shepherd et al., 2017).

One of the contributions of this research from a theoretical point of view is the proposal of an integrative model of interpretation in which both strategic stages are conceptually redefined from a multidimensional perspective. Traditionally, procedural rationality or comprehensiveness has been closely linked to efficient strategic decision-making processes (Cabantous and Gond, 2011). However, processes of this kind should not be generalized to every situation, and can be combined with intuitive processes to generate internal synergies and gain efficiency (Calabretta et al., 2016). Environmental scanning is described in terms of the degree of rationality and intuition applied when managers examine the environment, assuming it as a dual process. This implies a broader process of scanning where more issues can be detected because of the synergies derived from the interplay between intuition and rationality (Calabretta et al., 2016). In this regard, Karhu and Ritala (2020:513) explain that “Managers should therefore pay close attention to situations that evoke mixed feelings; depending on the situation, they may decide to pursue their “gut feeling” where they are comfortable with the duality, or seek rational facts to back up decision-making in case of doubt.”

1 Our model provides empirical confirmation of a relevant interaction between the two
2 dimensions leading to different implications. On the one hand, procedural rationality
3 contributes to the detection of crucial issues by gathering explicit and implicit
4 information, applying explicit knowledge, calculating observations, and proposing
5 alternative actions once managers implement logical information analysis (Ford and
6 Gioia, 2000). Because it is demanding of time and cognitive skills, the rational process is
7 not always efficient by itself and needs to be complemented with intuitive orientation.
8 Usually, in unstable environments, decisions should be made quickly to adapt to highly
9 uncertain contexts, and the use of rational processes may hinder the decision-making
10 process. In such environments, managers may also increase their efforts when looking for
11 additional information to clarify the situation (Ehrig and Jost, in press). Therefore,
12 ambivalence justifies the need to introduce intuition in the scanning process (Vecchiato,
13 2020).

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Conversely, intuitive processes should not always be understood as erratic or based on
personal emotions (Khatri and Ng, 2000). Although “imperfect intuition” exists
(Kahneman and Klein, 2009: 521) leading individuals to have “subjectively compelling
intuitions,” professional intuitions are built on tacit knowledge grounded in past
experiences (Kleinmuntz, 1990).

In this sense, intuition provides the scanning process with quick and coherent professional
judgments, completing the rational analysis, which is especially interesting in the context
of crisis. Consequently, our model describes and confirms the connection between
intuition and rationality as the combination of the two dimensions where either one,
depending on the situation (uncertainty, instability), can gain predominance. However,
intuition usually provides the basis on which rationality is built (Sayegh et al., 2004). In

1 practice, rational processes help to verify (with updated information) what managers
2 already know from their experiences and tacit knowledge.
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5 This internal functioning of environmental scanning also conditions the second stage of
6 the process: strategic issue interpretation. We proposed an integrative model of issue
7 interpretation following Julian and Ofori-Dankwa (2008). This allowed the model of
8 interpretation to become more complete and precise, offering a broader perspective to
9 categorize environmental issues. In contrast to our theoretical assumption, neither of the
10 dimensions (intuition or rationality) was the best option alone for detecting urgency,
11 favorability, or influence of an issue during periods of crisis.
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23 As our empirical results show, both approaches to scanning the environment improved
24 issue interpretation with a relative predominance of intuition. In other words, the
25 combination of rationality and intuition appears to better explain the strategic issue
26 dimensions, shaping relevant issues for the company (Hodgkinson, and Clarke, 2007;
27 Calabretta et al., 2016).
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36 In addition, the predominance of intuition may be explained in this case by considering
37 specifically that managers responded during a period of crisis. In this vein, some authors
38 have defended the importance of tacit knowledge and experiences in crisis decision
39 making (Sayegh et al., 2004; Elbanna et al., 2013; Lerner et al., 2015; Li et al., 2016).
40 Specifically, this tacit knowledge can be used through intuitive thought processes,
41 providing speed, agility, and efficiency when interpreting issues. In other words, the use
42 of tacit knowledge to complete the available information will improve the accuracy of
43 perceptions and interpretations in crisis contexts (Brockman and Anthony, 1998). Thus,
44 interpreting issues will depend not only on tacit knowledge, but also on explicit
45 knowledge from rational processes. In a crisis, deep rational decision making may require
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1 too much time and too many resources. However, part of the rational process can be
2 performed, and it can be complemented with knowledge based on professional
3 experiences (Sayegh et al., 2004).
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8 Conclusions derived from the theoretical development and empirical analysis lead us to
9 propose different managerial implications.
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13 Because issue interpretation in reality implies a number of complexities, such as different
14 opinions between top managers, lack of clarity on what is interpreted, and turbulent and
15 dynamic conditions, the first step before starting issue identification is that managers must
16 have a clear idea of what they are assessing when addressing an issue. In periods of crisis,
17 this becomes even more important because of environmental instability and complexity.
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21 Therefore, based on the theoretical development of the paper, managers should extract
22 relevant tools, such as Julian and Ofori-Dankwa's model, to ensure the application of
23 complete and holistic models in practice. This model offers a clear framework to interpret
24 strategic issues, considering three main dimensions, such as influence, favorability, and
25 urgency. However, it is necessary that top managers work collectively on these
26 definitions, agreeing their meanings in different contexts and sectors. Clarity of concepts
27 in practice is extremely relevant to avoid ambiguity and vague categorizations. Thus,
28 categorizations will be more precise, which is crucial for decision-making processes.
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47 With regard to the empirical results, the influence and even the predominance of intuition
48 over rationality shows that managers need to really understand the potential of intuition,
49 and gain trust and knowledge about how and when it should be used (Elbanna et al.,
50 2013). As part of their management education curriculum, they should receive training to
51 implement better intuitive decisions, while the intrinsic preference for rational processes
52 should be mitigated to allow better integration of rationality and intuition. Managers need
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1 an in-depth understanding of the contribution of each process and the ability to use them
2 properly. Thus, organizations would foster the appearance of ambivalent cognitive skills
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4 at individual levels. In addition, from a group perspective, organizations may consider
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6 the need to integrate different and complementary cognitive profiles in their top teams,
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8 ensuring that not only individual managers but also top teams have the capability to
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10 implement complete strategic issue interpretation. Hence, recruitment and selection
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12 practices, as well as team building actions, should be oriented to this purpose.
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18 As stated, the coexistence between rationality and intuition is not always easy. Usually,
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20 tensions arise between them demanding attention from managers. Specific practices for
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22 managing such tensions should be designed and implemented. For example, formal or
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24 informal meetings, presentations, simulations or workshops could foster openness and
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26 reduce resistance to this paradoxical thinking (Calabretta et al., 2016).
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31 Such strategic processes (environmental scanning and issue interpretation) and the
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33 cognitive activity behind them, lead to different strategic responses to face dramatic crisis
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35 periods, such as the COVID-19 pandemic. In this respect, Krauss et al. (2020), in line to
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37 previous studies such as Krauss et al. (2013), recently posited that in most cases
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39 companies have adapted their strategies in a short period of time, using a combination of
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41 different strategies. In particular, Krauss et al. (2020) provided evidence confirming that
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43 companies tend to combine three types of strategies: innovation, retrenchment (reducing
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45 costs), and persevering (maintaining firms' operations). The results of this study show
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47 not only companies' capacity for resilience, but also the increasing complexity of
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49 strategies to be implemented coherently to the COVID-19 situation. One of the most
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51 recent strategies used in complex contexts is the "coopetition" strategy, because it
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53 contributes to different types of innovation due to the synergies derived from sharing
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55 resources, R&D activities or access to knowledge (Roig-Tierno et al., 2018).
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Some limitations should be considered when interpreting the results of the present research. First, we suggest the need to include an antecedent variable (decision motive), moderating variables (environment attributes such as complexity, uncertainty, and dynamism) or decision outcomes in future studies. The inclusion of such variables may enrich the conclusions of the research and provide a more detailed explanation of environmental issue management in current companies. In this vein, scenario management method may be a relevant framework to explain how managers deal with uncertainty in decision-making processes, shaping future success potentials (Tiberius et al., 2020). Furthermore, we find it particularly useful to focus on opportunities. These are the issues with the potential to impact companies positively, depending on how they are discovered or created, the nature of the opportunity, the nature of decision-makers, and the characteristic of the environment (degree of uncertainty). Second, the generalization of our results should be carefully limited for two reasons. First, all our data were obtained from large companies in the service sector, which implies a particular dynamic and approach to decision making. Second, potential cultural bias derived from the Spanish context may affect not only issue interpretation but also final decisions to be implemented. To address these limitations, future research could also focus on comparative analysis including international samples and consider the possible effects of different sectors. Finally, we find particularly interesting to deepen how these processes—environmental scanning and issue interpretation—are developed in dramatic situations, such as the COVID-19 pandemic, and how they may condition strategic responses.

We are also aware of the limitations of a single respondent questionnaire. Although we have considered study design recommendations for future research to avoid this problem, obtaining data from top management teams would also help mitigate possible response bias. In addition, the use of longitudinal data would help to reduce the problems

associated with having single respondents and would enrich knowledge about the complete environmental issue management process. Furthermore, we would minimize

Main contributions of the extant literature	Limitations to be addressed in the study
Especial attention to environments is needed to anticipate and deal with changes, creating strategic responses	Mostly admit the existence of both stages: scanning and interpretation, however, the focus is usually on the final categorizations, leading to certain strategic responses
Environmental scanning and issue interpretation as main stages in the process	Mostly assume the connection between both stages but they do not put much emphasis on explaining it explicitly
Traditional categorizations: Opportunity/Threat framework	Mostly assume the importance of managers' cognitive skills but they do not examine them explicitly
Update works extend the perspective of categorization included the Feasibility/Urgency framework	
Integration of ways of categorizations: Favorability-Influence-Urgency model (Julian and Ofori-Dankwa, 2008)	

the limitations from single respondents by obtaining responses from other managers and configuring a multiple-agent model (Miller and Lin, 2018).

Table 1: Contributions and limitations on Strategic Issue Management

Source: Own elaboration

Table 2: ANOVA analysis

ANOVA				
Factors/Variables	Sector		Size	
	F	Sig.	F	Sig.
rationality	.370	.775	.432	.651
intuition	1.515	.217	2.079	.131
influence	.486	.693	.598	.552
urgency	1.138	.339	1.619	.204
favourability	.670	.573	.458	.634

Table 3a: Constructs, squared correlations, AVE and composite reliability

	rat	int	inf	urg	fav	p_c
rat	.700					.867
int	.000	.781				.848
inf	.336	.001	.583			.851
urg	.249	.008	.634	.854		.909
fav	.215	.001	.521	.412	.830	.890

*AVE values appear in the diagonal for comparison with squared correlations under the diagonal to assess discriminant validity

Table 3b: HMTM results

	rat	int	inf	urg	fav
rat	-				
int	.298	-			

inf	.647	.071	-		
urg	.740	.235	.927	-	
fav	.594	.122	.740	.901	-

Table 4: Goodness fit indices

	Fit indices	Value
Absolute fit indices	χ^2	189.561; sig. = 0.00001
	χ^2/df	1.67
	GFI	0.97
	AGFI	0.96
	RMR	0.1
	SRMR	0.08
	RMSEA	0.07
Incremental fit indices	NFI	0.91
	NNFI	0.95
	CFI	0.96

Appendix I: Items and constructs information

Constructs		Labels	Item writing In period of crisis...	Loadings	AVE	αCronbach	
Degree of procedural rationality/comprehensiveness in environmental scanning		Rat01	I always look for information exhaustively before making strategic decisions	.774	.700	.853	
		Rat02	I always extensively analyze relevant information before making decisions	.850			
		Rat03	I consider the use of quantitative techniques to be especially important in decision making	.537			
		Rat04	I'm effective at focusing my attention on crucial information and ignoring relevant information.	.860			
Degree of intuitive analysis of environment		Int01	I usually rely on pure judgement in making important decisions	.003	.781	.711	
		Int02	I depend on my past experiences when making important decisions	.281			
Capacity to interpret strategic issues	Influence	Infl01	I'm capable of addressing strategic issues	.815	.583	.923	.909
		Infl02	I'm able to deal successfully with strategic issues that are out of our firm's control	.812			
		Infl03	I'm able to manage strategic issues with current resources	.695			
		Infl04	I'm able to control the effect of strategic issues on our organization	.712			
		Infl05	It is difficult to decide which action likely to be most effective (reverse)	.118			
	Urgency	Urg01	I'm capable of identifying those strategic issues that demand attention	.889	.854	.913	
		Urg02	I'm capable of identifying those strategic issues that are urgent issues for our firm	.791			
		Urg03	I'm capable of identifying those strategic issues that have negative implications for our firm's future.	.739			
		Urg04	I'm capable of identifying those strategic issues that will lead to a loss for our firm	.831			
	Favorability	Fav01	I'm capable of identifying those strategic issues that could be a great deal	.875	.830	.814	
Fav02		I'm capable of identifying those strategic issues that represent something positive for our firm	.739				

Figure 1: A dual process model of environmental scanning

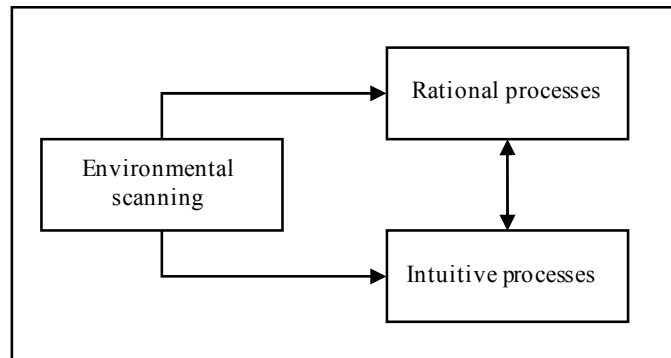


Figure 2: A multidimensional process of issue diagnosis

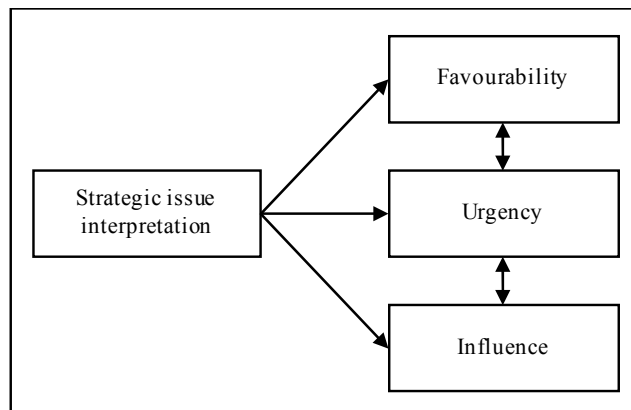


Figure 3: Integrative model of interpretation: hypotheses

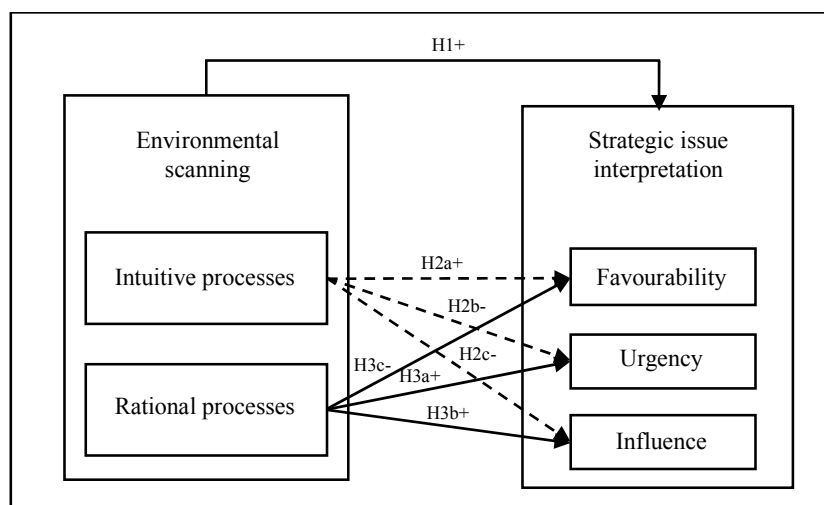
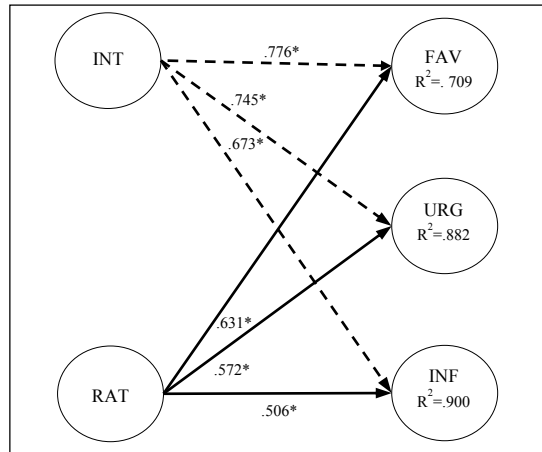


Figure 4: Empirical analysis



Level of significance $p < 0.1$

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Figure 1: A dual process model of environmental scanning

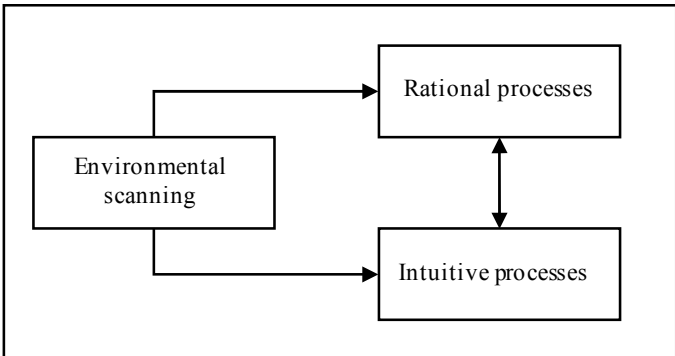


Figure 2: A multidimensional process of issue diagnosis

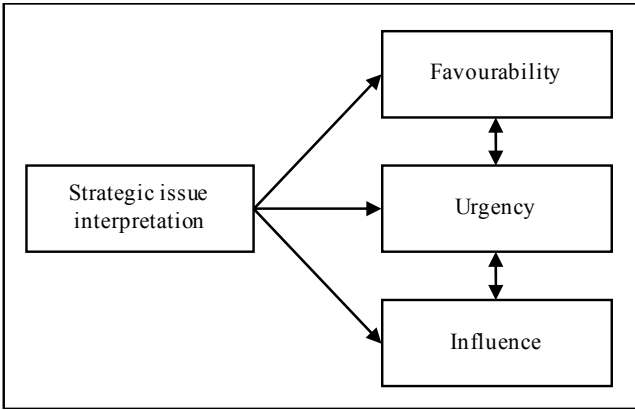


Figure 3: Integrative model of interpretation: hypotheses

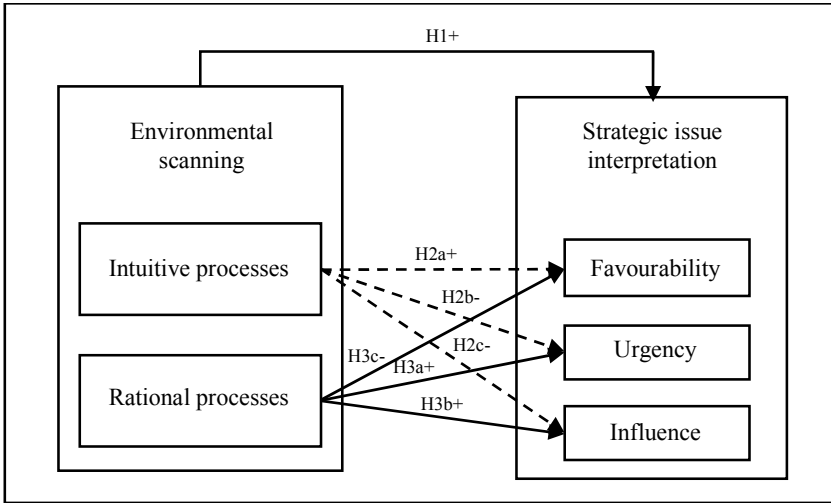
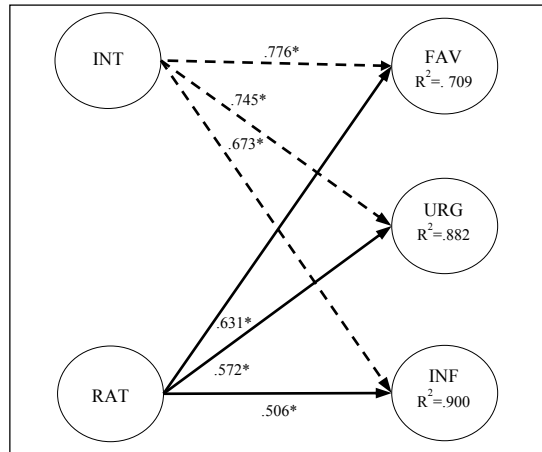


Figure 4: Empirical analysis



Level of significance $p < 0.1$

Table 1: Contributions and limitations on Strategic Issue Management

Main contributions of the extant literature	Limitations to be addressed in the study
Especial attention to environments is needed to anticipate and deal with changes, creating strategic responses	Mostly admit the existence of both stages: scanning and interpretation, however, the focus is usually on the final categorizations, leading to certain strategic responses
Environmental scanning and issue interpretation as main stages in the process	Mostly assume the connection between both stages but they do not put much emphasis on explaining it explicitly
Traditional categorizations: Opportunity/Threat framework	Mostly assume the importance of managers' cognitive skills but they do not examine them explicitly
Update works extend the perspective of categorization included the Feasibility/Urgency framework	
Integration of ways of categorizations: Favorability-Influence-Urgency model (Julian and Ofori-Dankwa, 2008)	

Source: Own elaboration

Table 2: ANOVA analysis

ANOVA				
Factors/Variables	Sector		Size	
	F	Sig.	F	Sig.
rationality	.370	.775	.432	.651
intuition	1.515	.217	2.079	.131
influence	.486	.693	.598	.552
urgency	1.138	.339	1.619	.204
favourability	.670	.573	.458	.634

Table 3a: Constructs, squared correlations, AVE and composite reliability

	rat	int	inf	urg	fav	p_c
rat	.700					.867
int	.000	.781				.848
inf	.336	.001	.583			.851
urg	.249	.008	.634	.854		.909
fav	.215	.001	.521	.412	.830	.890

*AVE values appear in the diagonal for comparison with squared correlations under the diagonal to assess discriminant validity

Table 3b: HMTM results

	rat	int	inf	urg	fav
rat	-				
int	.298	-			
inf	.647	.071	-		
urg	.740	.235	.927	-	
fav	.594	.122	.740	.901	-

Table 4: Goodness fit indices

	Fit indices	Value
Absolute fit indices	χ^2	189.561; sig. = 0.00001
	χ^2/df	1.67
	GFI	0.97
	AGFI	0.96
	RMR	0.1
	SRMR	0.08
	RMSEA	0.07
Incremental fit indices	NFI	0.91
	NNFI	0.95
	CFI	0.96

