**Navigating the Storm: How Managers' Decisions Shape Companies in Crisis**


## Abstract

This research aims to examine how managers responded and behaved in the highly chaotic environment generated by the COVID-19 crisis. Understanding their response is important because each decision made had a different yet significant on each company’s performance. The first part of the study uses topic modeling to interpret text from 113 interviews with executives published in the general media. The second part analyses responses from 518 managers across 15 countries using PLS-SEM. The survey was conducted during the most severe stage of the pandemic (2020), ensuring real-time opinions from managers rather than relying on recollections. The study's main finding reveals that managers made strategic/operational and financial decisions, which helped companies adapt and survive in this new environment. However, they had a negative effect on firm performance. These findings delineate significant theoretical implications for managerial decision-making amidst chaotic contexts, as well as guiding practitioners in facing future crises.



**Keywords:** business environment; COVID-19; decision making; poliheuristic theory; Cynefin framework; context perception; crisis management; firm performance.

## 1 Introduction

The pandemic that began in 2020 rapidly evolved to become not only a health crisis but an economic crisis as well, with a massive impact on companies internationally. For the first time in recent history, the entire world was simultaneously affected by a global pandemic (Vázquez-Martínez et al. 2021). This pandemic produced a crisis that met the characteristics described by Hermann (1963); i.e. it was unexpected by companies, threated their priorities, left no time for a response, and therefore limited the viability of organizations. In this context, companies had to both navigate unexpected dramatic changes and strategically manage the long-term repercussions of this crisis (Bouncken et al., 2022).

This entirely unprecedented situation of chaos created an uncertain and highly complex environment in which policy-makers and governments had to make decisions to balance the control of the pandemic and the impact on the economy (Sunstein 2021; Arroyo Barrigüete et al. 2022; Di Giulio 2023). These decisions caused business circumstances to vary greatly depending on the company sector or the particular measures applied in each country (e.g. Althaf and Babbitt 2021). The diversity of circumstances influenced managers' decisions (Seetharaman 2020; Meyer et al. 2022) and consequently their results.

A manager's decision is the selected course of action among a set of alternatives in response to a series of interconnected and intricate problems (Moxnes 2000; Wang et al. 2006). This complexity manifests within the decision-making process itself, wherein significant decisions often entail multiple components, interdependence among choices, and reliance on the contextual environment in which the decision is situated (Brehmer 1990; Hogarth 1981; Sterman 1989). Indeed, the environment in which a decision must be made—or more precisely, the leaders' perception of that environment—is where their capacity to act appropriately is determined. According to Snowden and Boone (2007), in their Cynefin framework for decision-making, a

chaotic context, which we also refer to as the environment in our study, is characterized by the presence of turbulence, the lack of a clear cause-and-effect relationship, and the inexistence of the 'right answers'. In such a setting, leaders are expected to act quickly, making decisions aiming at limiting the damage on the business, and later assessing whether these decisions worked (as no prior testing is possible). To do so, decision-makers need to employ several heuristic shortcuts in order to reduce the complexity of the decisions (Mintz 2004). Thus, the Poliheuristic Theory of decision-making posits that in these circumstances, leaders tend to choose suboptimal strategies rather than those that are more thoroughly considered and desirable (Mintz et al. 1997).

Inarguably, the COVID-19 pandemic provided an excellent opportunity to study the resultant chaotic environment, how managers perceived this chaos, the types of decisions they made, and how these decisions, assuming they were not optimal, impacted their companies.

Furthermore, despite the considerable volume of research on management decisions during the COVID-19 pandemic, studies have often been approached from disparate and isolated perspectives, thereby missing the opportunity to offer a comprehensive view of the topic. For instance, studies by Stan et al. (2020) and Ghobadian et al. (2022) have focused on the uncertainty and disruption induced by the pandemic, while those by Garretsen et al. (2022) and Foss (2020) have delved into leadership behaviors and decision-making. In addition, works by Al-Dabbagh (2020) and Chang et al. (2020) have concentrated on specific decision types, such as strategic or financial decisions. Conversely, the broader focus of our study has enabled us to conduct a more in-depth analysis, thereby making a notable contribution to decision-making theory.

Therefore, the overarching goal of this paper is to analyze the full decision-making process carried out by company leaders during the COVID-19 crisis. This full process includes the

leaders' perception of the environment, the type of decisions made, and the impact of these decisions. As part of this aim, we propose the following research questions (RQ):

**RQ1:** *How did managers perceive the pandemic in relation to their environment and companies?*

**RQ2:** *What types of managerial decisions were made during the crisis?*

**RQ3:** *How did the perceived environment during the pandemic affect managers' decisions?*

**RQ4:** *How did the decisions made by managers during the crisis affect overall firm performance, turnover evolution, and firm activity?*

In answering these questions and through our comprehensive approach to the study of management decisions during the COVID-19 pandemic, we expect to contribute to both the Cynefin framework (Snowden and Boone 2007) and the Poliheuristic Theory (Mintz et al. 1997). The former should benefit from a better understanding of what makes a chaotic context be perceived as such and how leaders make decisions within such contexts. Meanwhile, the applicability of the latter will be enhanced by clarifying the idea of suboptimal decisions and their impact on companies. Our contributions should help to further develop decision theory and practice within the environment of business management during the pandemic, which has not been sufficiently explored from a comprehensive perspective of the crisis (Alsalem et al. 2022). The structure of our article consists of an introduction as the first section. In this section, we provide the necessary context and theories that form the foundation of our research. This includes details about our data collection and methodology, as well as our research goals and questions. Our theoretical section addresses environmental theories related to dynamism, complexity, uncertainty, and digitalization, as well as their impact on managers' decisions, firm performance, and activity. Each point is supported by a hypothesis statement.

The empirical section of our article is based on two studies that we conducted to properly test our hypotheses. The first study involved the use of topic modeling to analyze 113 interviews with top executives from 14 different countries that were published in recognized newspapers and magazines during the early stages of the pandemic. This exploratory study served to elicit the overall perception of the crisis environment and identify the main decisions that management teams made during this time. Then, the second study applied PLS-SEM to interpret a survey of 518 managers. We developed a questionnaire comprising a set of constructs that shaped the proposed conceptual model under assessment in this study. To measure company performance, we used the scale developed by Powell and Dent-Micallef (1997). Along with company performance, the perceived environment of the pandemic crisis was a major influence on this paper. First, we explored theories about uncertainty (Gibbs 1994; Milliken 1987; Thomson 2017), complexity (Emery and Trist 1965), and dynamism (Gibbs 1994). We also created an ad hoc questionnaire centered on the digital and physical environment and its impact on managerial decisions around company strategy, financing, and organization. This questionnaire was based on our prior qualitative study. We made every effort to collect data in real time when the health crisis due to COVID-19 started to become an economic crisis, between March and May 2020. At the time we asked the 518 managers who participated in the questionnaire – and were experiencing the effects of the pandemic on their companies – about their decisions. The fact that our data pertains to managers' real-time experiences rather than their recollections gives significant value to our research and contributions.

Finally, our article concludes with a discussion of our findings, followed by the theoretical and managerial implications of our research. We also highlight the limitations of our study and provide avenues for future research.

## 2 Theoretical Framework

### 2.1 Perceived environment

As mentioned in the introduction, COVID-19 created one of the most chaotic environments in recent history. Many researchers have proposed different approaches to categorizing the COVID-19 environment in business and economic terms, but as yet there is no consensus. However, we found a series of chaotic environments, prior to the pandemic, addressed in many research papers, on which we drew for our own approach. Consequently, given the particular context of chaos that we concentrate on here, we opted to employ the dimensions of dynamism, complexity, and uncertainty—as mentioned in the introduction and explored in our review—to characterize this environment due to their relevance and suitability for the context. When a chaotic context unfolds, the new patterns that emerge are also a characteristic of the environment (Snowden and Boone 2007). Thus, in this case, we selected digitalization as the fourth dimension to characterize the chaotic environment and its impact in every company.

Recent research has conceptualized environmental dynamism as the rate of change and the magnitude of unpredictability associated with that change (Tajeddini and Mueller 2019). If the degree of change is high, this dynamism makes it more difficult and challenging for managers to assimilate and anticipate environmental conditions (Akgün et al. 2008). As previously mentioned, one of the main characteristics of dynamism is unpredictability, but another is instability (Kovach et al. 2015). Thus, dynamism reflects the number of environmental changes that occur and the rate at which they occur (Rosenzweig 2009; Azadegan et al. 2013).

The importance of environmental complexity for managerial decision-making is well known (Carnes et al. 2019). Environmental complexity can be understood as the processing of information needed to make key strategic decisions (Bradley et al. 2011; Godoy-Bejarano et al. 2020). Thus, managers operating in complex environments such as COVID-19 must consider more information and variables than those within comparatively simple ones (Sharfman and

Dean 1991). Academics have identified complexity as one of the most important characteristics of the environment, with Emery and Trist (1965) being among the first to recognize the complexity versus simplicity dichotomy.

Dynamism and complexity are often determinants of environmental uncertainty (Gibbs 1994; Thomson 2017). Although there is a lack of consensus on what constitutes an uncertain environment (Sharma et al. 2020), most research uses the definition provided by Milliken (1987). Environmental uncertainty refers to the perception that an individual lacks the ability to accurately predict how an organization's environment will evolve in the near future. Therefore, the greater the uncertainty, the less predictable a situation will be. This uncertainty may arise due to a lack of information or an inability to discriminate between relevant and irrelevant data (Milliken 1987). COVID-19 pushed situations of uncertainty related to information and data to their limits for companies, as well as governments and society. As a result of the presence of many uncontrollable variables, this uncertainty in the perceived environment had significant effects on company decisions, with fatal consequences for many.

The latest and most novel topic that became relevant in the pandemic environment is digitalization. Wachal (1971) coined the term "digitalization" in his seminal research on the subject, describing it as the use and implementation of digital technology by a society or companies. Since then, digital implementation has been widely studied from various perspectives, such as inter-functional coordination (Ruiz-Alba et al. 2019), communications technologies (Crittenden et al. 2019), production processes (Buer et al. 2020), information systems (Legner et al. 2017), and data science applied to marketing (Saura 2021), among others. However, the COVID-19 crisis brought about several major disruptions to society and business, changing conceptions of digitalization. We interpret these changes in line with what Snowden and Boone (2007) described as an emerging pattern within chaotic environments. The lockdowns

imposed by many governments around the world forced companies to use technology like never before to keep their businesses operational (Rivera 2020). As a result, many companies were able to better manage the crisis by introducing remote work, virtualization of work, and connectivity in an entirely new digital environment that helped team members maintain their productivity (Longenecker and Wittmer 2024).

Amid chaotic environments, organizations are likely to experience unforeseeable disruptions. Crises increase the demands placed on leaders and cause their roles to become more complex, expansive, and time-sensitive (Jahagirdar et al. 2020). Under these conditions, leaders will focus on reopening or recovering business (Snowden and Boone 2007) and will enter crisis management mode. The adoption of appropriate decisions, particularly financial (Veerasamy et al. 2023) and strategic/organizational (Dirani et al. 2020), helped companies to navigate the context of the pandemic. In this vein, studies such as Ferrero-Ferrero et al. (2012) have demonstrated that board effectiveness is influenced by the prevailing economic period and tends to decrease levels of corporate risk-taking during economic crisis.

Based on the theories explained above, we present the following hypotheses:

**Hypothesis 1 (H1).** *Perceived environment is positively linked to financial decisions.*

**H2.** *Perceived environment is positively linked to strategic/organizational decisions.*

### 2.2 Managerial decisions

The pandemic emerged as a major test for business leaders across the world (Dirani et al. 2020). While some rose to the occasion and proved capable of creating a competitive advantage out of new opportunities (Longenecker and Wittmer 2024), others struggled to manage this crisis of unprecedented proportions (Dirani et al. 2020). During the COVID-19 crisis, we saw many examples of companies going bankrupt and many others of companies recording record profits, depending on the decisions taken by their managers but also their field of activity. Indeed, it is

during such moments of uncertainty and complexity that the vision and the decisions of company directors—provided they are true leaders—can represent a source of psychological comfort for their employees. Indeed, such leadership can reduce employees' levels of work-related stress and fear by showing how uncertainty can be turned into a vision of opportunity and success for the company (Bass 1985). These behaviors are part of the decision-making process, which is explained as the best option chosen among the different existing options at times of limited resource availability (Schoemaker and Russo, 2016).

### 2.2.1 Strategic and organizational decisions

During the COVID-19 crisis, the implementation of appropriate strategic and organizational decisions, alongside key leadership practices, facilitated organizations in preparing for, responding to, and mitigating the adverse impacts (Dirani et al. 2020). Extensive studies have underscored the significance of these decisions.

In order to chart a clear course through a crisis and effectively manage it, companies require a leadership approach that is adaptable and ready to adjust plans promptly if necessary (Gurr and Drysdale 2020). Managers must embrace uncertainty, anticipate issues before they arise, and be capable of executing contingency plans as needed (Marshall et al. 2020). Moreover, they are expected to capitalize on profitable business opportunities by expanding product lines, proactively adjusting offerings to meet evolving needs and safeguarding production capacity to meet customer demands in good time (Kang et al. 2021).

The pandemic prompted many boards to transition into crisis committees, fostering collaborative efforts to leverage the diverse strengths and expertise within their teams in the interests of effective decision-making (Marshall et al. 2020). In this context, enhancing internal communication to ensure clarity and transparency proved crucial for successful crisis management (Mizrak, 2024). Specifically, communication facilitated the delegation of responsibilities across various teams

within organizations, thereby improving the quality of decisions made in crisis resolution (Fernández and Shaw, 2020).

Furthermore, the COVID-19 crisis presented an opportunity for companies to capitalize on digital technologies (Klein and Todesco, 2021). In particular, extensive research has highlighted the role of digital technology adoption in crisis response efforts (Guo et al. 2020) and rapidly changing markets (Orero-Blat et al. 2024). The incorporation of cutting-edge technologies, such as data analytics or virtual communication tools, among others, was recognized as a key factor in enhancing crisis management capabilities (Mizrak 2024; Wendt 2022). Many businesses took proactive measures to bolster online shopping, web-based entertainment, and digital communication channels, leveraging these opportunities to increase sales and adapt to shifting consumer behaviors, market dynamics, and supply chain disruptions (Ceylan et al. 2020; Rababah et al. 2020).

In summary, we observe that company leaders took strategic initiatives (such as venturing into new lines of business or embracing digitalization) alongside organizational decisions (such as process adaptations) aimed at mitigating the impact of the crisis and, in turn, ensuring continuity and survival. Hence, we propose the following hypotheses:

**H3.** *Strategic and organizational decisions are positively linked to firm activity.*

**H4.** *Strategic and organizational decisions are positively linked to overall performance.*

### 2.2.2 Financial decisions

Access to sufficient and appropriate financial resources stands as one of the most critical determinants for firm growth and subsequent survival (Koropp et al. 2014), particularly amid crises such as the COVID-19 pandemic in which liquidity constraints became significant barriers for many companies (Sharma et al. 2024). The selection of suitable financial instruments by a company is a pivotal factor for its future development. However, the proliferation of available alternatives

in the market amplifies the complexity of financial decision-making. The level of complexity has surged in recent decades, compelling managers to devote extra effort to discerning which financial options best align with the company's requirements (Merigó and Gil-Lafuente 2010). This is because such decisions significantly impact a company's overall performance, so managers must meticulously evaluate each aspect of every financing option for their operations (Chang et al. 2020).

With regard to financial decisions, a multitude of options exists, including investment or divestment, reduction of non-critical expenses, or deferment of payments. All decisions must be made in consideration of the chaotic environmental conditions (Veerasamy et al. 2023) and with the objective of "stanching the bleeding" (Snowden and Boone, 2007, p. 5). Consequently, when uncertainties arise, managers tend to postpone investments, potentially foregoing profitable projects (Ming et al. 2016). In addition, managers may opt to augment cash reserves in anticipation of emergencies, albeit this action may curtail firms' momentum towards sustainable development (Shen et al. 2020).

In summary, general financial measures during a crisis entail cost reduction, production cutback, investment reduction, increased reliance on equity capital, enhanced efficiency, and debt restructuring (Beaver and Ross 1999; Köksal and Özgül 2007; Laitinen 2000). Most businesses undertake actions to economize, halt expansion, safeguard reserves, suspend hiring, and even downsize (Rababah et al. 2020). These measures typically exert a negative influence on company activity and performance. Thus, we propose the following hypotheses:

**H5.** *Financial decisions are negatively linked to firm activity.*

**H6.** *Financial decisions are negatively linked to overall performance.*

### 2.3 Firm performance and activity

Research on crisis management processes and their impact on firm performance has traditionally focused on navigating chaotic scenarios like outbreaks (Ritchie 2003), natural disasters (Bresciani et al. 2002; Fabeil et al. 2019; Flynn 2007), economic and financial crises (Devece et al. 2016), and inadvertent disasters and terrorism (Cook 2015).

The emergence of the COVID-19 pandemic led to the closure of numerous businesses, precipitating significant disruption in global commerce and resulting in losses across nearly all industrial sectors worldwide (Rababah et al. 2020). A comprehensive study conducted by Dimson et al. (2020) involving more than 2,200 SMEs operating in France, Germany, Italy, Spain, and the UK revealed that a majority of these businesses experienced revenue declines ranging from 23% to 33% amid the turbulent situation. Challenges faced by businesses included decreased demand, cashflow constraints, diminished sales revenues, workforce shortages, and marketing obstacles, while the continued viability of these businesses hinged upon their capacity to overcome such issues (Rababah et al. 2020). Meanwhile, some companies were compelled to implement layoffs and wage reductions, posing significant managerial challenges (Zehir and Savi 2004). These factors, compounded by the imposition of quarantine measures, contributed to a decline in firm productivity and revenue, which ultimately impacted corporate performance negatively (Shen et al. 2020).

Consequently, firm performance was affected in disparate ways during the COVID-19 crisis. While some companies were forced to shutter their operations, others experienced a reduction in production capacity due to subdued consumer demand. Consequently, numerous sectors witnessed revenue declines, although, according to Kubiczek and Derej (2021) and as we have mentioned here, certain companies managed to avoid negative figures, with some even reporting revenue increases. Thus, we propose the following hypotheses:

**H7.** *Firm activity is positively linked to overall performance.*

**H8.** *Overall performance is positively linked to turnover evolution in Q1 2020.*

Figure 1 shows the research model with the hypotheses proposed.

INSERT FIGURE 1 ABOUT HERE

## 3 Empirical Studies

In conducting our empirical investigations, we opted for a mixed-methods approach, given the exploratory and explanatory objectives of our study. As recommended by Kurtaliqi et al. (2024), qualitative and advanced quantitative methodologies should be integrated in a sequential manner, particularly when the variables to be measured in the quantitative study lack clarity or have not been adequately developed in prior literature. This dual approach enhanced the comprehensiveness and depth of our research findings, allowing for a more nuanced understanding of the phenomena under investigation. Therefore, to appropriately address the proposed research questions and test the hypotheses posited, we run two analyses: one qualitative based on text-mining techniques over a series of informative interviews to practitioners, and one quantitative based on self-administered questionnaires for business executives.

Text mining has gained notable traction as a research methodology since the start of the new millennium (Eickhoff and Neuss 2017). The mass availability of unstructured data (Schmidt 2010) has made the continued use of traditional qualitative text analysis unfeasible (George et al. 2016). Among the different automatic text analysis techniques available, topic modelling combined with other more descriptive-oriented exercises has been used extensively in many studies related to management (Eickhoff and Neuss 2017). According to Mohr and Bogdanov (2013), topic modelling consists of the codification of a corpus of text in different categories or topics. Besides, topic modelling has been proven to work adequately with texts from personal interviews published in informative journals (Pinto Gurdiel et al. 2021).

For the quantitative methodology in the second part of our study, this study relies on partial least squares structural equations modelling (PLS-SEM), which is a variance-based structural equation

modelling technique (Roldán and Sánchez-Franco 2012). We made this decision because the constructs analyzed in this study are modeled as composites. The use of PLS-SEM with composites has been supported by theoretical and empirical studies (Benitez-Amado et al. 2017; Felipe et al. 2017). An additional motive for using this technique lies in the prediction-oriented character of our study. Hence, this research is primarily focused on identifying how certain key constructs predict the dependent construct of overall performance (see Figure 1). A third reason is the use of higher order (multidimensional) constructs through the application of the two-stage approach (Hair et al. 2011).

### 3.1 Qualitative data analysis

To address our RQ1 and RQ2, we ran a text analysis over a series of interviews to business executives published in informational media. The results of this text analysis were then interpreted qualitatively. Text analyses are of proven use for the analysis of text data which whose volume renders manual and traditional analysis techniques unfeasible (Cifuentes and Olarte 2023). In addition, we opted for a secondary source of data (informational media) rather than ad hoc qualitative interviews conducted by academics for three reasons. First, because of our intention to run our research during the breakout of the pandemic, therefore prioritizing access to recently published information. Second, we wanted to ensure the neutrality of the study by utilizing secondary sources due to the exploratory nature of this first part of our research. And third, we wanted to analyze a significant volume of data in order to capture as many perspectives as possible.

#### 3.1.1 Sample

To create our corpus of text data we used an internet search engine to identify interviews that coincided with the purpose of our research. We used the following keywords: “interview”, “executive”, “covid” and “decision”, in either English, Spanish, French, or Italian (the languages

spoken fluently by the researchers). Then we filtered the results by type of source "news" and publication date (between March and May 2020). We obtained 147 results, from which we eliminated repeated results as well as unrecognized news and media sites. After this selection process we ended up with a total of 113 interviews with managers published or broadcast by recognized informational media outlets, such as CNN (USA), *Der Spiegel* (Germany), *El País* (Spain), or *El Comercio* (Peru), to name but a few. In the final sample, there were 14 countries and 15 different industries represented, which ensures the global scope of our study.

The next step was to translate those interviews that were not in English using an automatic online translator. Then, we uploaded all the interviews to R, a data analytics program used extensively in academic research (Welbers et al. 2017). This resulted in a dataset of text with more than 108,000 words to be analyzed.

3.1.2 Data analysis and results

Since the purpose of the text analysis was instrumental, we worked extensively to simplify the corpus to basic elements (tokens) that could eventually be used to extract the latent content (Mehl 2006). This latent content served to identify each interviewee's perception of the COVID-19 crisis. Therefore, guided by Anandarajan, Hill and Nolan (2019), we tokenized, standardized (removing special characters and stop words), and lemmatized the text. Then, we counted the words in order to identify outliers (words that were repeated too many or too few times) and eliminated them.

Once the corpus was simplified, we applied the latent Dirichlet allocation (LDA) model (Blei et al. 2003) in order to identify the main topics presented in the interviews. LDA is one of the most widely used methods of topic modelling (Lee et al. 2010). It consists of an unsupervised machine learning technique in which words are associated with a preselected number of topics according to their distribution. However, academics have not agreed on an adequate metric to define the

number of topics, as noted by Pinto et al. (2021). Provided this lack of agreement, we decided to use two metrics to select the number of topics: namely, perplexity and coherence (Newman et al. 2010), as suggested by Pinto and her co-authors. However, we used both metrics in sequence rather than in parallel, as Pinto's team did. Thus, we used perplexity to identify the range of topic numbers, and then we looked for the exact number of topics that provided the maximum level of coherence. This sequential process resulted in the identification of 35 as the optimal number of topics to apply the LDA model to our corpus.

Next, we used the LDAvis topic visualization tool (Sievert and Shirley 2014) to view how the topics differ from each other and to study in detail the most important terms for each topic. As to the difference between topics, a total of 26 topics presented some similarities but only four pairs of topics significantly overlapped (see Figure 2).

INSERT FIGURE 2 ABOUT HERE

Finally, two researchers from our team looked separately at the list of topics (and their most representative words) and interpreted them in order to identify those that were related to our goals for this part of the research (understanding managers' perceptions about the COVID19 crisis and identifying their decisions). The interpretation took into consideration not only the list of these top terms but also, in cases of similar topics, the most significant terms shared between the two similar topics. These interpretations resulted in a list of ten topics, which we presented to an external academic who also interpreted and commented on the topics. The entire process yielded the results shown in Table 1:

INSERT TABLE 1 ABOUT HERE

To summarize the results, we observed that managers' perceptions focused on the changes that occurred overall and in certain industries. These changes affected not only companies but also society. Thus, responses to the pandemic had to do with inclusivity and sustainability.

Meanwhile, the practical aspects of the managerial decisions were mainly oriented to ensuring business continuity in operational and financial terms.

### 3.2 Quantitative data analysis

To address RQ3 and RQ4, we designed a questionnaire to conduct a quantitative analysis. This analysis was based on the outcomes of our qualitative study and some of the findings regarding the actions taken by managers. Since these questions were intended to grasp managers' perceptions about how the perceived environment affected their decision-making and how these decisions affected overall firm performance and turnover, it was necessary to rely on perceptual scales. Therefore, this questionnaire was constructed on the basis of both the findings from the qualitative study as well as the theories of recognized previous studies.

*Sample and data collection*

First, we launched the questionnaire using LinkedIn, the foremost online global professional network. We obtained 234 responses. To target 500 managers but also gain a balanced sample in terms of gender, level of responsibility, and company type, among other characteristics, we used the following LinkedIn networks: an alumni association pertaining to the university where one of the authors is employed, an entrepreneurship organization (so that we could factor entrepreneurs into our study), and a women in business organization (so that we could boost female participation). In total, we collected 579 questionnaires. We decided to use only the questionnaires that were fully completed, leaving a total of 518. Tables 2 and 3 provides the characteristics of the sample.

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3.2.1 Measurement model

We used different measurements for the constructs of our model. For the *perceived environment* and *overall performance* constructs, we used the scales from Emery and Trist (1965), Milliken (1987), Gibbs (1994), Powell and Dent-Micallef (1997), and Thomson (2017). We included the on-site vs. digital item in *perceived environment* due to the new digital context that managers recognized during the crisis. On the other hand, the scales for *financial decisions*, *strategic/organizational decisions*, *firm activity*, and *turnover evolution* were based exclusively on our qualitative study. The proposed financial decisions scale included the five actions that most managers were applying at that time: 1) cancellation of investments, 2) reduction of non-critical expenses, 3) policies on postponement of payments and on 4) retaining liquidity, and 5) requests for credit financing to overcome the crisis. The second scale we formulated concerned strategic and organizational decisions. We included six items extracted from manager interviews. The main measures were those related to 1) the creation of a crisis committee, 2) activation of contingency plans, 3) enhancement of internal communications, 4) protection of productive capacity to attend to markets, 5) enforcement of firm digitalization, and 6) the pursuit of profitable business opportunities. Given the lockdown measures to which most businesses were subjected worldwide, we proposed a scale called "firm activity" composed of two items: 1) The firm's openness level, understood as the degree of openness that firm could have, and 2) The firm's activity level, as the degree of action a firm could take. Finally, the turnover evolution scale had a single item about how current turnover had evolved with respect to Q1 2020.

3.2.2 Model assessment and results

The appraisal of PLS-SEM models traditionally comprises two stages: (i) the evaluation of the measurement model and (ii) the analysis of structural model results.

The first step in assessing the measurement model is to explain the two kinds of estimation applied to the composites that shape the research model. Following Rigdon (2016), we applied

Mode A, using correlation weights, to estimate the composites with correlated items, and Mode B, based on regression weights, to estimate the rest of the composites. Table 4 shows the estimation mode applied to estimate each of the constructs shaping the research model, both at first and higher order levels.

We evaluated the composites estimated in Mode A following traditional measurements of individual item reliability (outer loadings > 0.7), construct reliability (composite reliability, Cronbach's Alpha and rho_A > 0.7), convergent validity (average variance extracted AVE > 0.5) and discriminant validity, using the well-established Fornell-Larcker criterion and heterotrait-monotrait ratio (HTMT) (Henseler et al. 2016; Roldán and Sánchez-Franco 2012). Conversely, we first evaluated the composites estimated in Mode B on the basis of a test for potential collinearity through the examination of the variance inflation factor (VIF) of the indicators or dimensions (Sarstedt et al. 2022). According to Roberts and Thatcher (2009), a variance inflation factor (VIF) greater than 3.3 indicates a high multicollinearity. However, Ringle, Wende and Becker (2015) specified that multicollinearity should only be a concern when VIF levels surpass the critical level of 5. In our case (Table 4), the VIF values for the indicators are well below the most restrictive threshold proposed by Roberts and Thatcher (2009). Subsequently, we assessed the magnitude and significance of the weights. The outer weights reveal how each indicator or dimension contributes to its respective composite and the relative importance in the formation of the component (Chin 1998; 2010). Accordingly, we were able to rank each indicator/dimension based on its contribution, and also by applying both the Fornell-Larcker standard and the narrowest HTMT approach (Henseler et al. 2015). Table 5 shows that all constructs attained discriminant validity.

INSERT TABLE 4 ABOUT HERE

INSERT TABLE 5 ABOUT HERE

The next step involved assessing the magnitude and significance of path coefficients, along with the coefficient of determination ($R^2$) of endogenous constructs. To this end, we used a bootstrapping (5,000 resamples) approach to obtain t-values, p-values, and 95% bias-corrected confidence intervals (95% BCCI), which enabled the assessment of the relationships' statistical significance. Table 6 outlines the direct effects under the research model and shows whether each of these relationships is statistically significant or not. Moreover, the coefficients of determination ($R^2$) for the main dependent or endogenous constructs are higher than the moderate level (0.330) set by Chin (1998), which means that the model has an adequate predictive power (in-sample prediction). Specifically, Table 6 reveals that all the direct effects hypothesized are statistically significant.

INSERT TABLE 6 ABOUT HERE

3.2.3 Predictive ability of the model

As noted above, this research is oriented towards prediction. According to Shmueli and Koppius (2011) a model's predictive performance refers to its ability to generate accurate predictions of new interpretable observations, whether temporal or cross-sectional. Consequently, in this study we assessed the predictive ability (out-of-sample prediction) of our model using cross-validation with holdout samples (Evermann and Tate 2016), focusing on the final key dependent construct (outcome success). In particular, we used the PLS-predict algorithm (Shmueli et al. 2016) in the SmartPLS software package version 3.2.9. (Ringle et al 2015). To this end, we focused on the $Q^2$ value. These values reveal that the prediction error of the PLS-SEM results is smaller than the prediction error of simply using the mean values, and the model offers an appropriate predictive ability. Our model meets this criterion in all of its constructs and most of its indicators (Table 7).

INSERT TABLE 7 ABOUT HERE

3.2.4 Importance-performance map analysis

We complemented the PLS results reported above by applying the 'importance-performance map analysis' (IPMA) technique, also known as priority map analysis (Ringle and Sarstedt 2016)**.** Specifically, this technique supplements the information intrinsic to the standard results of path coefficient estimates by adding a dimension that takes into account the average values of the latent variable scores. Synthetically, the IPMA technique compares the total effects, representing the relevance of the antecedent constructs in the determination of a certain construct (target construct) with its average values from the latent variables scores, which in turn indicate their performance (Ringle and Sarstedt 2016). The objective was to identify those antecedents that are relatively important in determining the target construct (i.e. those with a strong total effect), but which also reveal a low performance (i.e. low average latent variable scores). Thus, this technique allows the identification of determinants with relatively high importance and relatively low performance, which thus become major areas to prioritize or improve. We carried out the IPMA technique for the main target construct assessed (overall performance). As can be observed in Figure 3, the constructs *strategic and organizational decisions* and *firm activity* are the most important in determining the target construct under assessment. These constructs are followed in terms of importance by *perceived environment*. Finally, *financial decisions* was revealed to be the least important construct when it comes to determining overall performance.

INSERT FIGURE 3 ABOUT HERE

## 4 Discussion

As presented above, the mixed methods approach we used allowed us to exploit the advantages of both numerical quantitative and text-based qualitative methods (Creswell 2009). Through this combination we were able to construct a solid discourse around the impact of the COVID-19 crisis on managers. We first explored managers' perceptions and decisions, then the relationship between both, to find an explanation for the consequences of their decisions.

As mentioned in the introduction section, numerous related studies were conducted during the COVID-19 pandemic. Some were based on circumstances and the environment (Seetharaman 2020; Meyer et al. 2022; Stan et al. 2020; and Ghobadian et al. 2022), while others focused on managerial behavior and decision-making (Al-Dabbagh 2020; Chang et al. 2020; Foss 2020; Garretsen et al. 2022). Although the results of many of these studies were interesting, they were often limited by their specificity, sample size, sector, or geographic scope, even if these dimensions were aligned with this study. To address these limitations, for this study we adopted a comprehensive perspective, encompassing the perception of a chaotic environment as described by Snowden and Boone (2007) and interpreted through the dimensions of uncertainty (Gibbs 1994; Milliken 1987; Thomson 2017), complexity (Emery and Trist 1965), dynamism (Gibbs 1994), and digitalization (Wachal 1971; Rivera 2020; Klein and Todesco, 2021; Guo et al. 2020). Managerial decision-making (Mintz et al. 1997), whether strategic in nature (Dirani et al. 2020; Gurr and Drysdale, 2020; Marshall et al. 2020; Kang et al. 2021) or financial (Chang et al. 2020; Veerasamy et al. 2023; Shen et al. 2020; Rababah et al. 2020), is examined. Finally, we address the impact on company performance (Dimson et al. 2020;  Kubiczek and Derej 2021; Powell and Dent-Micallef 1997; Rababah et al. 2020; Shen et al. 2020). Subsequently, we describe the results for each of the research questions in detail.

When it comes to our first research question—How did managers perceive the pandemic in relation to their environment and companies? —we discerned groups of general and particular perceptions of the COVID-19 crisis. By “general perceptions” we refer to those regarding the overall context. In this group we observed the perception that the whole context has changed and that these changes are here to stay. This has direct implications on managerial decisions, because if changes do not revert in the future, managerial decisions and responses should also stay to accompany the new context. Another general perception was related to the involvement of

everyone: family and society. This reflects the widespread impact of this crisis, unlike previous crises in which some parts of society were more affected than others. The final general perception concerned the decisions that had to be taken, their cost, and their impact. Particular perceptions, i.e. those referring to the business environment, were about ensuring the continuity of business. According to our interviewees, this continuity should be founded on the use of technology and company experience. Another key issue perceived by top executives was related to the impact of the COVID-19 crisis on business activity and employment. Two industries stood out above all others as being particularly affected: air transportation and healthcare systems.

In general, such characteristics of the context have already been explored in the literature. Seetharaman (2020) and Brinca et al. (2021) used inflation expectancy and ratios through econometric methods, while Stan et al. (2020) used national statistics to define some of the characteristics of the context. Unfortunately, the aim of these authors was solely to characterize the environment and its impact on business activity and not to delve into how it affected managers' decisions. Therefore, because we wanted to elucidate the relationship between the context and the response, we had to move from an objective to a subjective study of the phenomenon. The list of perceived characteristics we have presented not only fulfills the purpose of our first RQ but also supports the justification of our second inquiry.

For our second research question—What types of managerial decisions were made during the crisis? —our analysis of the interviews elicited three main decision areas: operational continuity, managerial responsibility, and financial measures. As regards operations, managers took decisions oriented toward ensuring the continuity or survival of their companies. This involved serving their customers adequately and finishing their on-going projects. Interviewees also referred to responsible business, expressing their concerns about the inclusivity, sustainability, and transparency of any solution that might be implemented during the crisis. When it came to

the third decision area, managers expressed the need for support from banks and governments in the form of loans and credits. In large part, the first two decisions had to be financed externally, particularly at a time in which recurrent revenue sources were at stake, which led to the need for the third decision. Specifically, identifying and grouping decisions in two comprehensive groups (strategic/operational and financial) allowed us to study the impact of these decisions on the general performance of companies. Otherwise, focusing on specific company functions like human resources (Dirani et al. 2020) or marketing (Kang et al. 2021) limited the scope of these previous studies and justified the utility of our third RQ.

For the third research question—How did the perceived environment during the pandemic affect managers' decisions? —we proposed two hypotheses. The first was related to financial decisions and the second was related to strategic and organizational decisions. Both hypotheses were confirmed by our analysis. In particular, those perceptions related to the dynamic and digital environment showed significantly more importance in the perception of the environment and had a positive impact on both types of decisions. On the one hand, a dynamic environment limits the capacity of companies to predict how their circumstances may change in the short-term. Confronted with this situation, companies decided to implement restrictive financial measures, and to change their strategy and organization accordingly. On the other hand, if the environment is perceived as involving a shift from a largely offline situation into a digital arena, managers will ultimately make decisions aimed at reducing their investment in physical assets and reorganizing their companies to adapt to this new digital context.

In summary, managers' decisions in response to a chaotic context extend beyond those aimed solely at mitigating impact and downsizing operations, as previously explored in the literature (Beaver and Ross, 1999; Köksal and Özgül 2007; Laitinen 2000; Snowden and Boone 2007). This approach provides a limited perspective on the range of decisions made by managers, which

does not align with the realities observed during the pandemic. Consequently, alternative measures aimed at growth, new businesses exploration, and commitment to digitalization (as an emerging pattern) constitute part of a more comprehensive array of decisions. Thus, the presence of multiple options justifies an exploration of their consequences, as we did with our latest research question.

The fourth research question—How did the decisions made by managers during the crisis affect overall firm performance, turnover evolution, and firm activity?—was addressed through Hypotheses 3 to 8, all these which were confirmed. First, we defined "firm activity" as the degree of openness and level of activity of a business. Because the financial decisions made were highly restrictive, involving measures like reducing cost or canceling investments, among others, the resulting level of business activity was limited. But conversely, strategic decisions, such as contingency plans or digitalization, were made to react to and overcome the crisis. These decisions helped to sustain firm activity. Meanwhile, overall performance was affected in a similar way to firm activity. Restricted financial decisions limited overall performance, while strategic decisions boosted it. In turn, and intuitively, this sustained a high level of activity and overall performance. Finally, in those cases in which overall performance was positive, the relative turnover was better than in the previous period. This was true of COVID-19-related activities like health services and online shopping.

To summarize, although the chaotic environment affected all companies, different decisions yielded different outcomes. While many resulted in negative performance, as previously evidenced (Dimson et al. 2020; Rababah et al. 2020; Shen et al. 2020; Zehir and Savi 2004), consideration of companies' activity levels (influenced by policymakers' decisions) and specific sector of operations allowed us to discern why certain companies achieved positive outcomes even amid this chaotic context.

## 5 Conclusions

The results obtained in this research offer important theoretical and managerial implications that enable a better understanding of managers´ decisions in a chaotic context as well as their reactions to a crisis and the impact of their decisions on the companies they run.

### 5.1 Theoretical implications

There are three primary theoretical implications arising from this research, all closely interrelated with the research questions and supported by the results obtained in the qualitative and quantitative studies.

Our initial theoretical implication highlights the significance of contextual perception. While recognizing the importance of context (Snowden and Boone 2007), we emphasize that managers' ability to interpret and comprehend that context holds even greater significance. This is clearly in line with one of the three principal tendencies in management identified by Calderon-Monge and Ribeiro-Soriano (2024), which involves designing flexible organizations to adapt to the business environment. Hence, it is imperative to accurately delineate the scales for measuring context. In this vein we propose the scale to measure the perceived environment. This new scale is based on previous scales on complexity, uncertainty, and dynamism (Emery and Trist 1965; Gibbs 1994; Milliken 1987; Thomson 2017), with the addition of the digital perspective as an emerging new pattern (Snowden and Boone 2007). These variables contribute to the Cynefin framework (Snowden and Boone 2007), facilitating its application in future investigations into the interrelation between business context and managerial decision-making.

The second theoretical implication pertains to decision-making. In chaotic contexts, managers are compelled to make a myriad of decisions, each with multiple objectives. It is crucial to approach these decisions from a comprehensive perspective. Our study delineates two categories of decisions: financial decisions and strategic/organizational decisions. The former are

predominantly short-term focused, aimed at ensuring the company's survival, whereas the latter, particularly strategic decisions, possess a longer-term outlook. In short, identifying pivotal decisions and determining the appropriate timing for their execution is paramount in navigating chaotic environments. To do so, we proposed two corresponding scales: one related to financial decisions made by managers with the aim of securing sufficient financial resources to face the crisis, and another one concerning the strategic and organizational measures implemented to overcome the problems stemming from COVID-19 and to ensure companies' present and future viability. In our view, specifying the type of decisions made and measuring them should aid further development of the Poliheuristic Theory (Mintz et al. 1997) within the realm of managerial decision-making.

Our last, but not least, theoretical implication explores the significance of how specific protocols implemented by policy-makers, such as the extent of the activity resulting from operating and legal restrictions, impact managerial decisions and company performance. These restrictive measures often emerge in chaotic contexts. Given that it is crucial for managers to understand how these measures influence their decisions and company performance, future theoretical developments could benefit from this implication as they might consider the measurement of performance (Powell and Dent-Micallef 1997)) together with the impact of extraordinary conditions on the particular case of certain companies or industries.

**5.2 Managerial implications**

Digitalization is probably one of the top implications of the COVID-19 pandemic for managers, with the crisis having accelerated the process around the world (Amankwah-Amoah et al. 2021). Nearly all businesses were forced to digitalize at least some of their activities, pushing managers to test and analyze different technologies in real time to keep their companies afloat (Kamal 2020). Those companies that could not adapt to this new situation—by using technologies and

digitalizing their business model or their operations—suffered enormous losses or even bankruptcy (Priyono et al. 2020).

The second managerial implication is related to the quick and appropriate adaptation to new market patterns. To be sure, consumers changed their behavior during the crisis (Verma and Gustafsson 2020). For instance, they reduced their expenditure on non-essential categories, such as fashion or durable goods, and increased it heavily on other categories like non-perishable foods, personal care, and cleaning products (Vázquez-Mártinez et al. 2021). The stock-up mentality and online ordering were also among the new habits exhibited by consumers all over the world (Zwanka and Buff 2021). These changes, among many others, prompted managers to rethink and adapt their portfolios, sales and distribution channels, and communications to these new consumer patterns.

Third, it is important to stress the importance of revenue, organization, and strategy. Most of the industries suffered enormous losses because of the lockdowns. With markets closing and nearly no freedom of movement for lengthy periods, revenue fell dramatically. Many companies requested financial aid in the form of credits and loans, as shown in the qualitative part of the study. This situation pushed managers into making complex decisions related to efficient and cost-effective processes, supply chain efficiency (Shen et al. 2020; Verma and Gustafsson 2020), minimization of costs and inventories, and increased asset utilization (Kumar et al. 2020) to ensure their companies' survival.

Finally, our study can inform certain guidelines that might help managers to confront future chaotic contexts. As a first suggestion we would emphasize the critical importance of accurately interpreting chaotic situations characterized by uncertainty, complexity, and dynamism. It has been evidenced that interpretation plays a central role in understanding the situation and initiating the decision-making process effectively. A second recommendation would be understanding how

policymakers' decisions, such as implementing lockdowns, can impact company activity. Assessing whether a company can operate, and the extent of activity permitted, are crucial for its survival and performance. To close our recommendations, it is worth stressing the importance of developing the capability to rapidly pivot towards profitable business opportunities during chaotic contexts. Numerous successful examples, such as sportswear producers transitioning to manufacturing medical garments during the COVID-19 pandemic, prove the virtue of this agility.

### 5.3 Limitations and directions for future research

This was a cross-sectional study that drew on a combination of a qualitative analysis applied to a sample of 113 interviews in 14 countries and 15 different industries, with a quantitative analysis applied to a sample of 518 managers who were facing the effects of the pandemic in their companies and participated in the questionnaire.

First, the limitations of the cross-sectional design in the verification of causal relationships are recognized. One of the limitations of cross-sectional studies is that, by their nature, they provide data from a specific moment in time; this means that if the same population is analyzed at another moment in time, the findings could be different and could therefore compromise the internal validity of the study (Bowen and Wiersema 1999; Sedgwick 2014).

Second, the first part of our research was based on secondary data: interviews with managers published or broadcast in informative media. There is an intrinsic limitation to this, which is the lack of control over the interview structure. However, as Harris (2001) highlighted, in circumstances in which managerial perceptions are collected the use of primary data is not recommended as it can be biased. As regards the text analysis, we used several techniques in order to ensure a robust analysis of the text, as expressed in the empirical studies section. As posited by Ramage et al. (2009), only the use of adequate analytical and visualization tools can ensure topic modelling with the required level of reliability.

Finally, because of resource and time constraints, we relied on convenience sampling. This method allows for selection of those accessible cases suitable for inclusion based on convenient accessibility and proximity of the subjects (Otzen and Manterola 2017). This type of sampling is not exempt from criticism since the resulting sample may not be representative of the entire population. This creates a limitation in the generalization of the findings and the possible inferences that may arise over an entire population, restricting the external validity of the study (Bencardino 2012; Córdova and Soledad 2016). However, convenience sampling is widely used in the literature (Karim et al. 2013; Neupane 2015; Uddin and Arif 2016), and we pursued and achieved a well-balanced sample, as shown in Tables 2 and 3.

In the light of the abovementioned implications and limitations of this research, we suggest three future research avenues. One line is related to management leadership at moments of crisis. Since the COVID-19 pandemic, companies around the world are facing new and complex situations: supply chain problems, semiconductor and chip shortages, high energy prices, and others. These crises put managers to the test, forcing them to prove their worth at the helm of their businesses. It would be interesting to explore the idea of managers' improvisational decision-making in crisis, in line with Tabesh and Vera (2020) and the crisis-preparedness theory proposed by Carmeli and Schaubroeck (2008).

The second prospective avenue for research pertains to the advancement of managerial decision theories. Our contribution to characterizing the context, measuring managerial perceptions, defining decisions made, and contextualizing performance opens up a promising path for theoretical development. We eagerly anticipate the utilization of our constructs and scales across a broader spectrum of environments, both chaotic and non-chaotic, which could yield valuable additional insights.

A last future research avenue might address the changes that were implemented within companies. We wonder whether these changes observed are actually being consolidated by companies' management and within their structures. In all likelihood, digitalization will be one of the greatest changes in the near future for managers and companies all over the world, and we consider it important to explore its implications and repercussions. This line of research could contribute to the post-crisis recovery framework proposed by Sharma et al. (2022), but not only to the SME context but also to that of bigger corporations.

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**Table 1** Selected topics, main terms and interpretation

| Topic | Top terms for topic picked | Managers' perception | Managers' decisions |
|---|---|---|---|
| 2 | Measure, context, continue, implement, remain, change. | The context has changed, changes arrived to stay. | Implementing measures that may assure continuity of operations. |
| 4 | Technology, tools, experience, thank, today, security, continue. | Nowadays, business can continue operating thanks to technology and experience. | N/A |
| 5 | Moment, consider, family, continue, care, measure, sense, everyone. | This is a moment to consider the family and everyone. | The response to the pandemic has to be inclusive. |
| 10 | Bank, credit, help, line, loan. | N/A | Looking for help from banks in the form of credits and loans. |
| 11 | Production, sustainability, part, continue, turn. | N/A | Continuing or turning to a sustainable production. |
| 15 | Employee, activity, face, mask, manufacture. | The activity and employment have been affected. | Facing and not masking the situation regarding business activities. |
| 18 | Sector, information, generate, face, decision, society, survey, cost | In every sector, companies took costly decisions affecting society. | N/A |
| 29 | Project, construction, client, today, group, finish. | N/A | Finishing ongoing projects for their customers. |
| 31 | Airline, industry, travel, flight, cancellation. | Cancellation of flights and travel affected the airline industry. | N/A |
| 34 | Hospital, system, virus, case, charge. | The pandemic changed the healthcare system. | N/A |

**Table 2** Participant profile

| Age | n | |
|---|---|---|
| Less than 30 years old | 45 | 8.7% |
| Between 31 and 40 years old | 153 | 29.5% |
| Between 41 and 50 years old | 177 | 34.2% |
| Between 51 and 60 years old | 111 | 21.4% |
| Over 60 years old | 32 | 6.2% |
| Gender | | |
| Female | 272 | 52.5% |
| Male | 246 | 47.5% |
| Employment situation | | |
| Employed | 371 | 71.6% |
| Self-employed | 123 | 23.7% |
| Others | 24 | 4.6% |
| Working experience | | |
| Fewer than 10 years | 86 | 16.6% |
| Between 10 and 19 years | 193 | 37.3% |
| Between 20 and 29 years | 156 | 30.1% |
| 30 or more years | 83 | 16.0% |
| Executive level | | |
| Manager/Team supervisor | 170 | 32.8% |
| Director/Area manager/Senior manager | 162 | 31.3% |
| Managing director/CEO/Chairman/Owner | 133 | 25.7% |
| Others | 53 | 10.2% |

**Table 3** Participant's company profile

| Ownership | n | |
|---|---|---|
| Private | 457 | 88.2% |
| State-owned | 61 | 11.8% |
| Company sector | | |
| Financial services | 64 | 12.4% |
| Education | 41 | 7.9% |
| Professional services | 57 | 11.0% |
| Trade and transportation | 56 | 10.8% |
| Industry and construction | 52 | 10.0% |
| Hospitality | 27 | 5.2% |
| Utilities and telecommunications | 34 | 6.6% |
| Other services | 99 | 19.1% |
| Other sectors | 88 | 17.0% |
| Number of employees | | |
| Less than 10 employees | 95 | 18.3% |
| Between 10 and 50 employees | 109 | 21.0% |
| Between 51 and 250 employees | 97 | 18.7% |
| Over 250 employees | 217 | 41.9% |
| Revenues | | |
| Less than $2 million | 152 | 29.3% |
| Between $2 and $10 million | 115 | 22.2% |
| Between $11 and $50 million | 87 | 16.8% |
| Over $50 million | 164 | 31.7% |

**Table 4** Measurement model results

| CONSTRUCTS. Dimensions. items | Outer Loadings | Outer Weights | VIF | Cronbach's Alpha | rho_A | Composite Reliability | AVE |
|---|---|---|---|---|---|---|---|
| PERCEIVED ENVIRONMENT | | | | | | | |
| 1A_Simple-Complex_Environment | | -0.006 | 1.275 | | | | |
| 1B_Certain-Uncertain_Environment | | -0.098 | 1.258 | | | | |
| 1C_Static-Dynamic_Environment | | 0.653 | 1.017 | | | | |
| 1D_On-site-Digital_Environment | | 0.694 | 1.025 | | | | |
| FIRM ACTIVITY | | | | 0.705 | 0.720 | 0.871 | 0.771 |
| 8_Firm_OpennessLevel_Covid-19 | 0.855 | | | | | | |
| 9_Firm_ActivityLevel_Covid-19 | 0.900 | | | | | | |
| FINANCIAL DECISIONS | | | | 0.780 | 0.787 | 0.851 | 0.534 |
| 10D_Cancellation_Investments | 0.654 | | | | | | |
| 10E_Expenses_Reduction | 0.762 | | | | | | |
| 10F_Postponing_Payments | 0.776 | | | | | | |
| 10H_Liquidity_Retention | 0.790 | | | | | | |
| 10I_Request_For_Credit_Financing | 0.662 | | | | | | |
| STRATEGIC AND ORGANIZATIONAL DECISIONS | | | | 0.832 | 0.838 | 0.878 | 0.549 |
| 10A_Creation_Crisis_Committee | 0.752 | | | | | | |
| 10B_Contingency_Plans | 0.851 | | | | | | |
| 10C_Increased_Internal_Communication | 0.816 | | | | | | |
| 10L_Protection_Productive_Capacity | 0.624 | | | | | | |
| 10M_Firm_Digitalization | 0.714 | | | | | | |
| 10N_Profiting_Business_Opportunities | 0.664 | | | | | | |
| OVERALL PERFORMANCE | | | | 0.869 | 0.871 | 0.905 | 0.656 |
| 17A_Our_financial_situation_is_not_excessively_threatened | 0.759 | | | | | | |
| 17B_Our_financial_situation_is_still_better_than_competitors | 0.827 | | | | | | |
| 17C_Our_sales_volume_has_not_been_excessively_reduced | 0.774 | | | | | | |
| 17D_Our_sales_volume_is_still_higher_than_competitors | 0.864 | | | | | | |
| 17E_We_are_still_more_profitable_than_competitors | 0.822 | | | | | | |
| TURNOVER EVOLUTION | | | | | | | |
| 18_Turnover_evolution_compared_Q1_due_to_COVID19 | 1.000 | | | 1.000 | 1.000 | 1.000 | 1.000 |

**Table 5** Discriminant validity

| Fornell-Larcker Criterion | | | | | | |
|---|---|---|---|---|---|---|
| | Financial Decisions | Firm Activity | Overall Performance | Perceived Environment | Strategic and Organizational Decisions | Turnover Evolution Q1 |
| Financial Decisions | 0.731 | | | | | |
| Firm Activity | -0.122 | 0.878 | | | | |
| Overall Performance | -0.285 | 0.445 | 0.810 | | | |
| Perceived Environment | 0.138 | 0.250 | 0.177 | 0.525 | | |
| Strategic and Organizational Decisions | 0.223 | 0.406 | 0.271 | 0.380 | 0.741 | |
| Turnover Evolution Q1 | -0.293 | 0.345 | 0.487 | 0.103 | 0.066 | 1.000 |
| Heterotrait-Monotrait Ratio (HTMT) | | | | | | |
| | Financial Decisions | Firm Activity | Overall Performance | Perceived Environment | Strategic and Organizational Decisions | Turnover Evolution Q1 |
| Financial Decisions | | | | | | |
| Firm Activity | 0.153 | | | | | |
| Overall Performance | 0.344 | 0.560 | | | | |
| Perceived Environment | 0.326 | 0.392 | 0.346 | | | |
| Strategic and Organizational Decisions | 0.316 | 0.526 | 0.322 | 0.469 | | |
| Turnover Evolution Q1 | 0.328 | 0.405 | 0.517 | 0.239 | 0.070 | |

**Table 6** Summary of direct effects

| Summary of direct effects | Path coefficient | T Statistic | P-Value | 2.5% | 97.5% | Support |
|---|---|---|---|---|---|---|
| Perceived Environment -> Financial Decisions | 0.109 | 1.968 | 0.049 | -0.004 | 0.215 | Yes |
| Perceived Environment -> Strategic and Organizational Decisions | 0.292 | 7.694 | 0.000 | 0.213 | 0.363 | Yes |
| Financial Decisions -> Firm Activity | -0.226 | 5.604 | 0.000 | -0.300 | -0.144 | Yes |
| Financial decisions -> Overall Performance | -0.290 | 6.950 | 0.000 | -0.366 | -0.203 | Yes |
| Strategic and Organizational Decisions -> Firm Activity | 0.451 | 9.811 | 0.000 | 0.359 | 0.539 | Yes |
| Strategic and Organizational Decisions -> Overall Performance | 0.203 | 4.336 | 0.000 | 0.110 | 0.293 | Yes |
| Firm Activity -> Overall Performance | 0.328 | 7.264 | 0.000 | 0.239 | 0.414 | Yes |
| Overall Performance -> Turnover Evolution Q1 | 0.487 | 12.230 | 0.000 | 0.404 | 0.559 | Yes |

| Coefficient of determination ($R^2$) | Firm activity | Financial decisions | Strategic and org. decisions | Overall performance | Turnover evolution Q1 |
|---|---|---|---|---|---|
| | 0.233 | 0.036 | 0.307 | 0.283 | 0.237 |

**Table 7** Predictive performance summary

| Constructs level prediction summary | | | |
|---|---|---|---|
| | RMSE | MAE | $Q^2$ |
| Financial Decisions | 0.998 | 0.815 | 0.013 |
| Firm Activity | 0.976 | 0.825 | 0.055 |
| Overall Performance | 0.990 | 0.810 | 0.026 |
| Strategic and Organizational Decisions | 0.936 | 0.740 | 0.132 |
| Turnover Evolution Q1 | 1.002 | 0.789 | 0.008 |
| Indicators level prediction summary | | | |
| | RMSE | MAE | $Q^2$ |
| 10D_Cancellation_Investments | 1.747 | 1.442 | 0.010 |
| 10H_Liquidity_Retention | 1.815 | 1.502 | 0.014 |
| 10I_Request_For_Credit_Financing | 2.059 | 1.732 | 0.003 |
| 10E_Expenses_Reduction | 1.708 | 1.407 | 0.017 |
| 10F_Postponing_Payments | 2.118 | 1.829 | -0.009 |
| 8_Firm_OpennessLevel_Covid-19 | 2.031 | 1.747 | 0.047 |
| 9_Firm_ActivityLevel_Covid-19 | 2.134 | 1.851 | 0.039 |
| 17D_Our_sales_volume_is_still_higher_than_competitors | 1.665 | 1.397 | 0.026 |
| 17B_Our_financial_situation_is_still_better_than_competitors | 1.681 | 1.356 | 0.023 |
| 17A_Our_financial_situation_is_not_excessively_threatened | 1.918 | 1.664 | 0.012 |
| 17E_We_are_still_more_profitable_than_competitors | 1.696 | 1.392 | 0.012 |
| 17C_Our_sales_volume_has_not_been_excessively_reduced | 1.890 | 1.594 | 0.013 |
| 10M_Firm_Digitalization | 1.566 | 1.253 | 0.090 |
| 10L_Protection_Productive_Capacity | 1.724 | 1.403 | 0.029 |
| 10B_Contingency_Plans | 1.626 | 1.279 | 0.084 |
| 10A_Creation_Crisis_Committee | 1.800 | 1.471 | 0.076 |
| 10N_Profiting_Business_Opportunities | 1.796 | 1.491 | 0.057 |
| 10C_Increased_Internal_Communication | 1.544 | 1.220 | 0.095 |
| 18_Turnover_evolution_compared_Q1_due_COVID19 | 1.478 | 1.166 | 0.008 |

**Figure 1** Research model

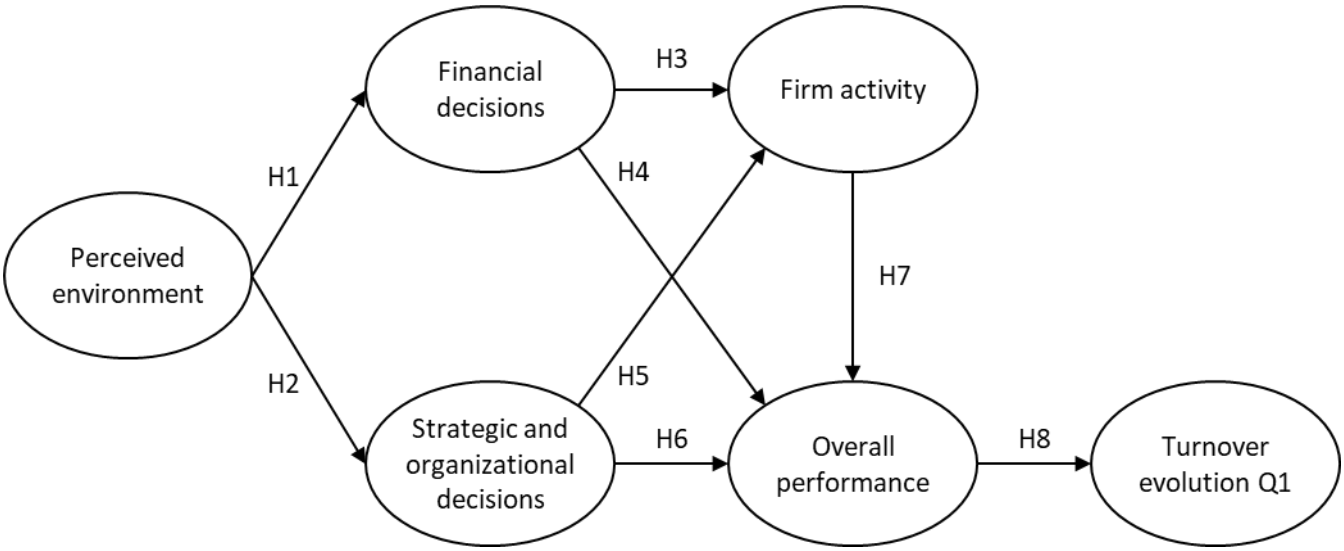

**Figure 2** Intertopic distance map using LDAvis (Sievert and Shirley, 2014)

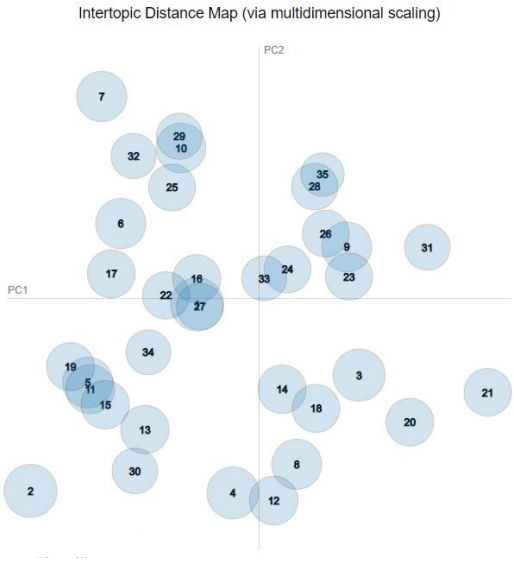

**Figure 3** IPMA results for the target construct *overall performance*