IUL School of Business

Department of Marketing, Operation and Management

How Do Middle Managers Deal With Uncertainty in the Strategy Process?

Hasan Aktas

Thesis specially presented for the fulfillment of the degree of

Doctor in Management

Supervisor:

Henrique Duarte, Assistant Professor, ISCTE Business School

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ABSTRACT

Uncertainty is an unavoidable dimension of organizational life, and it is also challenging even for the most competent managers (Pich, Loch, & Meyer, 2002). This thesis examined middle managers' uncertainty responses during the formulation and implementation of the strategy process in three studies.

The first study was qualitative and intended to expose the sources of uncertainty, managerial responses, and variables, which are essential for middle managers to cope with uncertainty in the strategy process. Study 1, involving interviews with 22 middle managers in civilian and military organizations, resulted in six sources, including a new classification--International instability and disasters--and five different responses: Collaborative responses, Emotional responses, Cognitive responses, Value-based responses, and Bureaucratic responses.

In the second study, we conducted a Multidimensional scaling technique (N=70) to create a taxonomy of perception of managerial uncertainty responses in order to understand the nature of uncertainty in any organization and to help to build new theories. Results indicated six clusters: Protection by Support, Protection by Structure, Protection by Scapegoats, Certainty of Change, Development by Debate, and Development by Change.

In the third study, we examined the effects of individual responses to uncertainty and organizational factors on managerial responses using quantitative analysis (N=310). The results showed that organizational-level knowledge sharing has positive effects on managers' desire of change.

This study added a new source of uncertainty and five different managerial responses to uncertainty, and revealed that individual-level cognitive uncertainty and desire of change result in bureaucratic and collaborative responses. Additionally, we contend that managers respond to uncertainty

variously, from suppressing to collaboration, either to protect themselves or to act towards a constructive change in the organizations.

Keywords: Uncertainty, Sources of Uncertainty, Uncertainty Management, Middle Managers, Perception.
JEL Classification system: M10, M12 and M16

RESUMO

A incerteza é uma dimensão inevitável da vida organizacional, e também é um desafio até mesmo para os gerentes mais competentes (Pich, Loch & Meyer, 2002). Esta dissertação examinou as respostas de incerteza do gerente intermediário durante a formulação e implementação do processo de estratégia em três estudos.

O primeiro estudo foi qualitativo e pretendia expor as fontes de incerteza, respostas gerenciais e variáveis, que são essenciais para os gerentes de nível médio lidarem com a incerteza no processo de estratégia. O estudo 1, com entrevistas a 22 gerentes de nível médio em organizações civis e militares, resulta em seis fontes, incluindo uma nova classificação; Instabilidade internacional e desastres e cinco respostas diferentes; Respostas colaborativas, respostas emocionais, respostas cognitivas, respostas baseadas em valores e respostas burocráticas.

No segundo estudo, conduzimos uma técnica de dimensionamento multidimensional (N = 70) para criar uma taxonomia da percepção das respostas gerenciais de incerteza para entender a natureza da incerteza em qualquer organização e para ajudar a construir novas teorias. Os resultados indicaram cinco clusters; Proteção por Suporte, Proteção por Estrutura, Proteção por Bodes Expiatórios, Certeza de Mudança, Desenvolvimento por Debate e Desenvolvimento por Mudança.

No terceiro estudo, examinamos os efeitos das respostas individuais à incerteza e fatores organizacionais sobre respostas gerenciais por meio de análise quantitativa (N = 310). Os resultados mostraram que o compartilhamento do conhecimento no nível organizacional tem efeitos positivos no desejo de mudança dos gestores.

Este estudo adicionou uma nova fonte de incerteza e cinco respostas gerenciais diferentes à incerteza e revelou que a incerteza cognitiva de nível individual e o desejo de mudança resultam em respostas burocráticas e colaborativas. Além disso, afirmamos que os gerentes reagem à incerteza, desde a

supressão até a colaboração, seja para se protegerem ou para agir em prol de uma mudança construtiva nas organizações.

Palavras-Chave: Incerteza, fontes de incerteza, gerenciamento de incertezas, gerentes intermediários.

Sistema de Classificação JEL: M10, M12 e M16

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CHAPTER 1

1.1. General Introduction

Managers try to find ways to sustain competitive advantage and adapt their organizations to environmental conditions (Tamayo-Torres, Ruiz-Moreno, & Lloréns-Montes, 2011). Despite the absence of agreement on perceived uncertainty among the scholars, environmental uncertainty has definite effects on managerial perceptions in the strategy process, and the effect of uncertainty in strategy originates from the managers' perception (Santos Álvarez & García Merino, 2008). A separate feeling of uncertainty, observed in different people out of the same real-world situation (Lipshitz & Strauss, 1997b), makes comprehension of the managerial perception critical because perception leads to individual and particular opinions, and managers decide based on their perception even constructed by a single truth (Santos Álvarez & García Merino, 2008).

Moreover, different perceptions prevent managers from building a shared understating to find a solution under uncertainty. Thus, what is perceived environmental uncertainty for managers? In this thesis, we will define it as managerial perceived inadequacy to envisage something in the external organizational environment (Milliken, 1987). What makes managerial perception important is the strong relationship between managerial actions and perception (Priem, Love, & Shaffer, 2002), based on the indication that individuals have a tendency to "react on the bases of perceptions of reality, not reality per se" (Ferris & Judge, 1991, p. 45).

Since there is no one right way to lead an organization, managers develop a management style according to circumstances or environmental conditions (Nebeker, 1975). It is vital to analyze the responses to uncertainty from a manager's point of view, precisely that of middle managers, because managers can negatively or positively directly affect change in the organizations and other processes as well. For example, they can facilitate learning (Ellinger, Watkins, & Bostrom, 1999), innovation (Elenkov, Judge, & Wright, 2005), motivation and satisfaction (Parsons & Broadbridge, 2006), and performance (Anantatmula, 2010). So we cannot dispute their roles in overcoming barriers to success (Starr, 2004). Their ways of dealing with uncertainty affect overall management practices. Especially in the strategy process, managers continuously assess the external environment and try to comprehend its nature (Boulton, Lindsay, Franklin, & Rue, 1982). Managers develop uncertainty coping strategies: reducing uncertainty, acknowledging uncertainty, suppressing uncertainty (Lipshitz & Strauss, 1997b) and embracing uncertainty (Clampitt et al., 2001a). Otherwise, significant environmental change may generate organizational maladjustment (May, Stewart, & Sweo, 2000).

The importance of uncertainty to managerial sciences and other fields of knowledge has attracted researchers' desire to understand the concept and shed light on the phenomenon (Leung, Noble, Gunn, & Jaeger, 2015). Although the concept of uncertainty is widely used in many different disciplines, there is no agreement among scholars about the term uncertainty. Dequech (2011) asks some questions to show how controversial the subject is: How many different types of uncertainty? To what extent are those types similar or different? What are the degrees of uncertainty? Moreover, how do scholars use these different terms interchangeably?

Moreover, in some situations, how does the meaning of uncertainty change based on the context (Kwakkel & Cunningham, 2008)? All those questions underline the critical importance of defining and conceptualizing uncertainty. To define and conceptualize uncertainty, the researcher needs to develop taxonomy or typologies to articulate what the uncertainty is, what its characteristics are, and how individuals, managers, or organizations respond to the uncertainty (Kwakkel & Cunningham, 2008).

Furthermore, to develop a theory, besides defining uncertainty, scholars should describe the dimensions and components of the organizational environment (Duncan, 1972). When it comes to organization theory, uncertainty could be categorized into two types: environmental and internal uncertainty. Organizations do not operate isolated from their environment, and they have to handle problems created by environmental uncertainties in order to survive (Kreiser & Marino, 2002a). Thus, organizational theorists have been studying environmental uncertainty for more than half a century (Gerloff, Muir, & Bodensteiner, 1991) and types of uncertainties and methods to cope with them are the primary topic in organization theory (Grote, 2004).

The external environment refers to the environment beyond the borders of the organization, and internal environment refers to conditions inside the boundaries, including physical, social, and other psychological factors (Duncan, 1972). The internal environment also requires managers to allocate their time and engagement, as these conditions of organizations also help to generate complexity and uncertainty for the organizational tasks. Thus, task uncertainty is also another challenge related to the internal environment as well as the external environment, because the task environment shapes managerial actions and un certainty changes in task requirements (Karimi, Somers, & Gupta, 2004).

Successful organizations can balance their activities related to managing both the external environment and internal conditions (Dasgupta, 2015). Thanks to their unique position, middle managers can help these balancing activities. Strategic activities are the primary assets to manage and balance the internal and environmental circumstances (Dasgupta, 2015), and middle managers can contribute to the strategy formulation and implementation process significantly (see Balogun & Johnson, 2004; Currie & Procter, 2005; Floyd & Wooldridge, 1997). Middle managers face a significant number of uncertain situations both during their daily basic activities and during the strategy process. Their uncertainty management provides a substantial contribution in favour of the organization (Herzig & Jimmieson, 2006).

Middle managers are in a position where they both give and receive orders (Stoker, 2006). This position makes middle managers an interesting sample because they need to harmonize the actions of different stakeholders in order to keep the organization on track (Lowman, 2002). Their locus allows them to see daily business and tasks better than the senior officers but gives them enough distance to understand the big picture clearly (Huy, 2001). Since they are close to the frontline, it is possible for them to offer senior managers new ideas, opportunities, and innovations (Ahearne, Lam, & Kraus, 2014). Moreover, thanks to their nexus position, aligning middle managers' and senior managers' perspective is a must to prevent disruptions caused by environmental uncertainties (Dasgupta, 2015).

Accordingly, the main purpose of study 1 is to reveal the sources of uncertainty, individual strategies, and variables, which are critical for middle managers to deal with uncertainty in the strategy process. Put differently, the primary goals of this research, formulated in the first study, are:

1) *To identify how middle managers evaluate the sources of uncertainty*
2) *To identify how middle managers deal with uncertainty individually*
3) *To identify the variables that middle managers consider to influence the ways they deal with uncertainty.*

In the first study, we initially find how middle managers conceptualize the sources of uncertainty that they face in the organizational context. Then, we examine the primary behaviours, individual methods, and emotions caused by interactions while dealing with uncertainty or sources of uncertainty. Next, we will discuss the sources of uncertainty perceived by middle managers in the strategy process and compare them with findings of previous studies; we will articulate each managerial response to uncertainty thoroughly and present an uncertainty management model. Thirdly, we will inspect the effects of specific variables on managerial responses, such as organizational structure, team cohesion, and age.

In the second study, we will create an inductively developed taxonomy of managerial responses to uncertainty. Because top-level managers and first-line personnel have been a primary concern for researchers on coping with uncertainty so far, it remains to be considered how other actors manage and deal with uncertainty (Grote, 2009). On the other hand, constructing theories requires classifications on which to base the new theories (McKelvey, 1982); we will also inspect how middle managers deal with uncertainty, and classify their reactions in an organizational framework. Building on the results of this study, researchers will have the opportunity to promote new theories, and practitioners can understand the nature of actions based on the taxonomy that we developed. Consequently, our research will allow us to find the new and empirically grounded categories of managerial responses to uncertainty, then compare the results

with previous response patterns thanks to numerical taxonomy developed in this study. Also, building this taxonomy will shed light on the characteristics used by managers to group similar responses to uncertainty, and on the actual groupings. Creating taxonomy is to group objects based on their similarities or differences that assist us in organizing or building knowledge (Klein, 2010). In this study, we will establish a numerical taxonomy of perception of the managerial responses to uncertainty. In the discussion part, we will compare the taxonomy with managerial responses found in the first study to show the motives behind the responses.

In the third study, we will investigate the relationship between individual responses (emotional uncertainty, cognitive uncertainty, the desire of change) and managerial responses (suppressing, bureaucratic, collaborative). Emotional uncertainty could cause maladaptive reactions (Greco & Roger, 2001), cognitive uncertainty lowers the tolerance of ambiguity (Carleton, Norton, & Asmundson, 2007), and desire of change supports and drives change in teams and companies (Derue, Nahrgang, Wellman, & Humphrey, 2011). On the other hand, suppressing responses encompass denial and ignoring uncertainty (Lipshitz & Strauss, 1997a), bureaucratic responses encompass following organizational rules and policies, and collaborative responses encompass including all interests of all stakeholders, and finding different perspectives and developing new opinions in challenging situations (Samarah, Paul, Mykytyn, & Seetharaman, 2003). After establishing the relationship between individual and managerial responses under uncertainty, we will examine the effects of organizational factors (internal uncertainty, environmental uncertainty, dissimilarity, cohesion, and knowledge sharing) on this relationship. In the discussions, we will review how organizational factors affect both managerial and individual responses to uncertainty. Moreover, we will then mention company-level factors' effects on managerial responses - specifically, the contribution of

organizational-level knowledge-sharing on managers' desire of change.

We expect the findings of this research to help managers to expand their responses to uncertainty, understand different coping methods, and develop appropriate actions under uncertainty in an organizational context. From an organizational point of view, we think that organizations could create the necessary climate for managers to cope with uncertainty, improve the managerial selection and promotion process, and develop advanced training programs for managers. From the researchers' perspective, we believe that scholars could find new insights to construct new theories based on the taxonomies in this study and find inspirations for future research.

CHAPTER 2

2. Literature Review of Uncertainty

2.1. Key concepts and the nature of uncertainty

Although physicists, mathematicians, philosophers, psychologists, communication researchers, and organizational theorists have been studying concepts of uncertainty for a long while (Clampitt, 2000) and have reached a consensus on the importance of uncertainty (Grote, 2004; Shenhav & Weitz, 2000), the terms 'uncertainty' and 'types of uncertainty' are still nuanced, which causes problematic approaches (Dequech, 2011; Wilson, 2009) such as preventing shared understanding (Wall, Cordery, & Clegg, 2002), producing inaccurate responses and misjudgment of its consequences. Wilson (2009,) touches on the reason for the problematic use of uncertainty; 'some authors use quite similar terms to mean fairly different things, and other authors use quite different terms to mean similar things.' In order to resolve this problem, Dequech (2011) proposes that researchers should use the term uncertainty with a qualifier in order to avoid communication failures or misunderstandings. Moreover, he refines existing concepts and establishes a typology by distinguishing between procedural and substantive uncertainty, strong and weak uncertainty, and fundamental uncertainty and ambiguity (Wilson, 2009).

We will present different conceptualizations of the uncertainty by several scholars since 1971 in Table 2.1 to show how the concept is discussed in the literature and also to prepare the reader both for the discussion of the term in the following paragraphs and

for the rest of the study. In this part, we will discuss the nature of the uncertainty and try to differentiate types of uncertainty by presenting typologies.

Based on the study of Dosi & Egidi (1991), Dequech (2011, p. 622) makes his first distinction between substantive and procedural uncertainty: "The lack of all the information which would be necessary to make decisions with certain outcomes" will result in substantive uncertainty. Therefore, uncertainty and information have an inverse correlation (Gifford, Bobbit, & Slocum, 1979). Information is the central point of the discussion. Absence of it creates uncertainty. However, an overabundance of information is also problematic. Because of the complexity of the environment, information overload (Johansson & Persson, 2009) causes cognitive difficulties for the decision maker with regards to limitations (Wilson, 2009). In this case, "limitations on the computational and cognitive capabilities of the agents to pursue unambiguously their objectives, given the available information" will result in procedural uncertainty (Dequech 2011, p. 622).

Dequech's (2011) second division is between strong and weak uncertainty. This distinction is about whether probability distribution exists or not (M. C. Wilson, 2009). Dequech (2011, p. 622) describes weak uncertainty as "an agent can form — or act as if she formed — a unique, additive and fully reliable probability distribution"; whereas "strong uncertainty is marked by the absence of such a distribution, used either explicitly or implicitly." Some other scholars use different qualifiers, e.g., Wilson (2009) uses the terms 'low weight' or 'high weight' instead of 'weak' and 'strong'. 'High' and 'low' are also two other qualifiers used similarly. However, to elaborate more, Dequech divides weak uncertainty into two subcategories: Knightian risk and Savage's uncertainty.

Differences between risk and true uncertainty were openly discussed for the first time in Frank Knight's essay *Risk, Uncertainty, and Profit*, published in 1921 (Van Praag, 1999). Since then, scholars have used the terms differently rather than interchangeably (Wennekers, Thurik, van Stel, & Noorderhaven, 2010). While risk and uncertainty can be considered as the same, the two terms have significantly distinct descriptions (Burnard & Bhamra, 2011). The definition of risk covers a kind of uncertainty *based on a well-grounded (quantitative) probability* (Ritchey, 2011). In a risk-based situation, one can calculate the relative probability of future events that may occur (Donald & Waters, 2007). Therefore, when risk is expressed based on a well-grounded probability, according to Knight, there is no existing uncertainty regarding effects (Ritchey, 2011). Dequech (2011, p. 624) explains the first subcategory of weak uncertainty as "individuals can act by a probability that is objective (in the sense that any reasonable person would agree on it) and known." According to this explanation, it can be said that an objective version of weak uncertainty is very similar to risk in terms of definitions.

Table 2.1. Uncertainty concepts in chronological order

Authors	Uncertainty Concepts	Definition
Duncan (1972)	Perceived environmental uncertainty (PEU)	(1) The lack of information regarding the environmental factors associated with a given decision-making situation (2) Not knowing the outcome of a specific decision in terms of how much the organization would lose if the decision were incorrect (3) Inability to assign probabilities with any degree of confidence with regard to how environmental factors are going to affect the success or failure of the decision unit in performing its function
Galbraith (1973, 1977)	Task uncertainty	A "misfit" or "mismatch" between decision-makers' information processing requirements and information processing capabilities
Nebeker (1975)	Perceived environmental uncertainty	The difficulty an individual has in deciding what is the most appropriate action—which choice will bring the overall best results
Milliken (1987)	State	Administrators experience "state" uncertainty when they perceive the organizational environment, or a particular component of that environment, to be

		unpredictable.
	Effect	Effect uncertainty is defined as an inability to predict what the nature of the impact of a future state of the environment or environmental change will be on the organization.
	Response	The third type of uncertainty is associated with attempts to understand what response options are available to the organization and what the value or utility of each might be.
Ghani (1992)	Task uncertainty	Difference between the amount of information required to perform the task and the amount of information already possessed by the organization
Dequech (1999) Dequech (2011)	Fundamental	Situations in which at least some essential information about future events cannot be known at the moment
	Ambiguity	Uncertainty about probability created by missing information that is relevant to decision making and could be known
	Substantive	Results from "the lack of all the information which would be necessary to make decisions with certain outcomes."
	Procedural	Limitations on the computational and cognitive capabilities of the agents to pursue unambiguously their objectives, given the available information
	Weak (Knightian Risk)	Individuals can, or behave as if they could, build unique, additive and fully reliable probability distributions.
	Weak (*Savage uncertainty*)	Probability as a property of the way one thinks about the world, a degree of belief
	Strong	Absence of such a unique, additive and fully reliable probability distribution
Tan & Litschert (1994)	Information	Uncertainty resulting from imperfect knowledge about the environment
Lipshitz & Strauss (1997)	Perceived uncertainty	Inadequate understanding Incomplete information Undifferentiated alternatives
Hogg, 2000	Subjective uncertainty	'challenge people's certainty about their cognitions, perceptions, feelings, and behaviours, and ultimately, certainty about and confidence in their sense of self.'
Van den Bos & Lind (2002)	Task uncertainty	Uncertainty arises whenever a person is unable to predict the future, or there is an inconsistency between different cognitions, and experiences, or cognition and behaviour
Priem et al. (2002)	Sources of the uncertainty	International competitive advantage
		Industry competition

		Production costs
		Human resources
		Government
		Societal change
Wall et al. (2002)	Task uncertainty	The amount and difficulty of problems, exceptions and key variances
Griffin, Neal, & Parker (2007)	Task uncertainty	When the inputs, processes, or outputs of work systems lack predictability
Wilson (2009)	Uncertainty	A person's faculty of logical intuition is weak. The evidence and arguments have low weight. The numerical probability is not meaningful, except as a metaphorical expression.
Johansson, & Persson (2009)	Uncertainty	Uncertainty grows from information load, contradictions, misunderstandings, and abundant or scarce communication.
Grow & Flache (2011)	Subjective uncertainty	Lack of experience and incomplete information about a new condition
Ben-Ner, Kong, & Lluis (2012)	Internal uncertainty	Originates at workplace level
	External uncertainty	Outside the control of managers
	Task uncertainty	Considers simple-complex, stable-variable, routine-nonroutine dimensions

Dequech (2011) defines the following subcategory of weak uncertainty as a subjective version of standard expected utility theory (EUT), which is developed by Leonard Savage. He explains the theory as follows: "the subjective is an example of an approach that treats probability as a property of the way one thinks about the world, a degree of belief." (Dequech, 2011, p. 625). This theory also shows how individuals dislike uncertainty and present aversive behaviours under risk and uncertainty (Rabin, 2013). After a few decades, questions were aroused as to whether EUT was insufficient to explain people's behaviours in these conditions (Harrison & Rutström, 2009). Then prospect theory (PT) was developed as an alternative to EUT. PT entails a correspondence between the options at hand and other options that the decision-maker could face and choose among risky prospects by balancing the value of the possible

outcomes (Gneezy, List, & Wu, 2006). However, when this is not possible, individuals face genuine uncertainty. Ritchey (2011) states that individuals are faced with genuine uncertainty in social, political, organizational, and ideological problems due to subjective problems. According to him, subjective behaviours are one of the inherited characteristics of genuine uncertainty, which we will cover under the name fundamental uncertainty in the next paragraph.

His third distinction is between ambiguity and fundamental uncertainty. Camerer & Weber (1992, p. 50) use the term ambiguity, instead of many other terms related to uncertainty such as ambiguous probability; vague probability; and epistemic reliability. They define ambiguity as 'information, which could be known, is missing and salient' or 'simply uncertainty about a probability, created by missing information that is relevant and could be known." Dequech (2011, p. 623), using this definition as a starting point, makes an additional refinement: "decision-maker under ambiguity does not know with full reliability the probability that each state or event will obtain; she usually knows all the possible events." He adds that even when not entirely known, the list of all possible events is already predetermined or knowable ex-ante, regardless of what people do.

On the other hand, the source of fundamental uncertainty is the lack of crucial information because future situations are unknown by the decision time (Dequech, 1999). He also states that innovation, structural changes, or creative human actions, intentional or not, are the causes of fundamental uncertainty. However, he underlines that fundamental uncertainty is not complete ignorance because decision makers have at least some incomplete information. Indeed, it is not possible to have complete certainty or knowledge in any enterprises or human undertakings; however, it is not possible to

have absolutely no knowledge either (Marcus, 1988). Some other scholars also examine fundamental uncertainty under different names. Ritchey (2011) uses the term genuine uncertainty, and O'Malley (2010) calls the term radical uncertainty instead of fundamental uncertainty, in a slightly different approach. He defines three characteristics to elaborate genuine uncertainty: inability to assign a well-grounded probability; lack of a well-defined or complete outcome space; and involving subjective, self-referential behaviours of meta-actors.

Any type of uncertainty can be found in a single organization, and members of the organization need to deal with uncertain problems. However, types of uncertainty may vary according to the organizational environment, types, and structure of the organization. Since information is a must for every organization and manager, substantive and procedural types of uncertainty are a prerequisite for all. On the other hand, small-scale businesses mostly deal with substantive uncertainty, and large-scale corporates are likely to have more procedural uncertainty because large-scale organizations confront more complex and dynamic problems, which require sophisticated computational capabilities. In a similar manner, technology firms probably struggle with fundamental uncertainty because innovation is at the core of the business. Moreover, innovation brings uncertainty both for the firm itself and for its competitors (Dequech, 2011). We will address organizational uncertainties more in the following section.

2.2. Organizational Uncertainty

2.2.1. Theoretical Frameworks related to organizational uncertainty

The root of organizational uncertainty can be found in the years between 1879 and 1932, when US mechanical engineers transferred the notion of technical uncertainties into the organizational domain (Shenhav & Weitz, 2000). As a corollary to this transfer, scientific management scholars, with the help of Henry Ford's development of the production line, tried to reduce uncertainty by standardizing the workflows of employees and regulating organizations' rules (Wall et al., 2002). This approach is called the mechanical school, which emphases centralized authority with clear lines, specialization, and expertise (Perrow, 1973). After then, the human relation school drew attention to social aspects of uncertainties with regards to employees' group behaviour (Shenhav & Weitz, 2000) and underscored the importance of delegation of authority, employee autonomy, trust and openness (Perrow, 1973). However, the one who placed the notion of uncertainty as the focus of modern organization theory was James D. Thomson (Shenhav & Weitz, 2000).

According to Thompson (1967), organizations are open systems, surrounded by an environment in which organizations attain the necessary resources in order to survive and grow (Ford, 2015). Nevertheless, the organizational environment is by nature full of the uncertainty that may threaten the organization's existence (Pfeffer and Salancik, 1978). One of the theories constructed to cope with environmental uncertainty by scholars is the contingency theory. Contingency theory is dependent on the idea that there is no best way to lead and organize workgroups (Nebeker, 1975). Moreover, the environment in which the organization operates determines the suitable organizational

form or structure (Nebeker, 1975). Centralized organizational structures are more suitable under low uncertainty, and decentralized structures are more appropriate under high uncertainty (Kim & Burton, 2002b). On the other hand, contingency theory needs to clarify its theoretical statements and interaction effects; specify the form of the interaction; and reconsider analytic models used in contingency theory that tend to assume linear relationships between contingencies (Schoonhoven, 1981).

2.2.2. Types of Organizational Uncertainty

Organizations face uncertainties, both internal and external, (Burnard & Bhamra, 2011) due to their chaotic, complicated, confusing, and ambiguous environments (Clampitt et al., 2000) and future outcomes (King, 2009). Therefore, efficient organizations have to accept and manage uncertainty, because for some businesses even a single decision taken by managers may lead to organizational disaster thanks to stiff competition and changes within the uncertain environment (Karimi et al., 2004). Consequently, managers cannot close their eyes to uncertainty and act as if their organizations worked in steady environments (Clampitt et al., 2000).

Duncan (1972) categorizes environments into two as a) *internal*, in which physical and social factors can be found within the boundaries of the organization; and b) *external*, in which physical and social factors can be found outside the boundaries of the organization. He also identifies factors that determine the simple-complex and static-dynamic dimensions of the environment. These are the most critical factors of the perceived uncertainty of external environments (Andrews, 2008). Moreover, Duncan (1972) also states that a complex and dynamic environment has the most significant amount of uncertainty. Because organizations do not work in isolation, but should be

able to adapt themselves to the environment in order to survive (Duncan, 1972), a good deal of study has been conducted in order to understand the external environment and its function in management theories (Kreiser & Marino, 2002b).*Information uncertainty and resource dependence theory* are the essential viewpoints reflected in that literature (Tan & Litschert, 1994). With regards to the information uncertainty perspective, *imperfect knowledge about the environment* is the primary source of uncertainty for firms (Kreiser & Marino, 2002b). Based on this assumption, Lawrence & Lorch (1967) have developed three constituents of environmental uncertainty (Kreiser & Marino, 2002b). The first one is *lack of clear information about uncertainty*; the second one is a *long period*, necessary for feedback following a strategic move; and the last one is *general uncertainty of causal relationship* (Duncan, 1972; Priem, 2002). According to this perspective, shared understanding is that lack of complete information about the environment is the source of uncertainty, which forces managers to apply strategic actions built on their perception (Kreiser & Marino, 2002b). Resource dependence theory explains that the environment has limited resources, crucial for organizations in order to survive. Therefore lack of control over the resources results in an uncertain environment instead of incomplete information (Kreiser & Marino, 2002b).

Uncertainty is a powerful concept to explain relations between the organization and its environment within the organization theory framework (Duncan, 1972; Thompson, 1967). In this literature, Milliken (1987) defines that another typology consists of three types of perceived uncertainty in an environment surrounding a firm; state, effect, and response uncertainty (Kreiser & Marino, 2002b). This typology explains how administrators comprehend, make sense out of, and respond to situations in the external environment (Milliken, 1987). She describes uncertainty as ‘an individual's perceived inability to predict something accurately,’ and ‘environmental’ refers to the

environment, which is external or outside the organization, as the source of uncertainty (Milliken, 1987, p. 136). However, explaining only sources of environmental uncertainty is not sufficient. Thus, the type of uncertainty experienced by decision makers is also a central factor in apprehending the typology (Milliken, 1987).

The first type of Milliken's typology is State Uncertainty (or Perceived Environmental Uncertainty). Managers feel uncertain about the state of the organizational environment or specific constituent, which is unpredictable due to volatility, complexity, and heterogeneity (Milliken, 1987). Likewise, Kreiser (2008) explains that the perceptions of managers consist of complexity, instability, and unpredictability in the organizational environment. In this situation, managers need information about the nature of the uncertainty (Milliken, 1987). The second type of Milliken's typology is Effect Uncertainty, which is associated with the individual's ability or inability to foresee the nature, severity, and timing of the impact of environmental changes and events on his organization (Milliken, 1987). Unlike state uncertainty, in this case, managers need information about the effects of changes in the environment on their organization, instead of about the environmental conditions (Milliken, 1987). The third type of Milliken's typology is Response Uncertainty, which is connected to available response options and their utility and value to the organization (Milliken, 1987). In this type of uncertainty, managers lack information about the response options, value, or utility of these options regarding the desired outcome (Milliken, 1987). As a consequence, managers need to make careful assessments to calculate the impact of their actions and decisions *(*Kreiser, 2008).

Duncan (1972) showed that uncertainty surrounding organizations has effects on the perception on the members of the organization; since then, scholars have started to work

more and more on perceived uncertainty (Chawla, Mangaliso, Knipes, & Gauthier, 2012). However, few studies have addressed how different types of uncertainty or perceptions cause different behavioural responses among the members of the organizations, especially managers.

2.2.3. Uncertainty Management Responses in Organizations

Both individuals and organizations are uncomfortable with cognitively and psychologically challenging uncertainty because of the lack of predictability, complexity, and insecurity, which generates a feeling of vulnerability or anxiety that can result in distorting perceptions and information (Clampitt et al., 2000). Individuals tend to see uncertainty as a threat, and try to discover a way either to eradicate uncertainty or to discover some methods to make it tolerable and cognitively manageable (Van den Bos & Lind, 2002).

Lipshitz & Strauss (1997) define three different categories in order to conceptualize uncertainty coping strategies both at the individual and at the organizational level: suppressing uncertainty, reducing uncertainty, and acknowledging uncertainty; and furthermore, embracing uncertainty (P. Clampitt et al., 2001a) could be added as a fourth category to the coping strategies.

2.3. Responses to Uncertainty

2.3.1. Suppressing Responses to Uncertainty

The first managerial response to uncertainty is suppressing uncertainty. Suppressing uncertainty involves the denial of information and rationalization responses, which result in ignoring uncertainty (Lipshitz & Strauss, 1997a). Gneezy et al., (2006) show in their experimental study that people may value a risky prospect less than its worst possible realization, which is called the uncertainty effect. Besides individuals, Clampitt et al. (2001) list some hints to find out how organizations suppress uncertainty: a) over-emphasis on planning processes, b) over-use of research studies, c) over-reliance on computer modelling and forecasting, and d) inappropriate use of consultants.

2.3.2. Reducing Responses to Uncertainty

Another managerial response to uncertainty is reducing uncertainty. Reducing uncertainty, a clear strategy of coping with uncertainty, contains gathering/producing further information or postponing decisions until related information is found (Lipshitz & Strauss, 1997a). Therefore, the role of managers in organizations is to reduce that uncertainty and rapidly grow their knowledge relevant to the task or project by identifying knowledge gaps related to uncertainty (Harris & Woolley, 2009). Thus, broadly speaking, scholars have been studying uncertainty reduction theory (URT) in order to explain how persons respond to uncertainty and its possible outcomes since the theory's establishment in 1975 (Goldsmith, 2001). The theory explains why individuals display *certain interpersonal communication behaviours* during initial interactions (Kellermann & Reynolds, 1990). In this theory, Berger and Calabrese (1975) elucidated

the relationships between similarity, attraction, information seeking, nonverbal affiliative expressiveness, and uncertainty reduction by using the concept of uncertainty as a central construct (Gudykunst & Nishida, 1984). URT posits that the individual needs to reduce uncertainty to a certain level so that they can easily interact and gain control over their environment and outcomes (Goldsmith, 2001). URT also sees high uncertainty as *a stimulus for seeking information as well as an inhibitor of attraction* (Kellermann & Reynolds, 1990). Later, Berger (1979*)* detailed the theory by grouping uncertainty reduction strategies in three dimensions*: (1) passive strategies—reactivity search, social comparison, and disinhibition search; (2) active strategies—asking others about the target and environmental structuring; and (3) interactive strategies—interrogation, self-disclosure, and deception detection* (Gudykunst & Nishida, 1984).

On the other hand, another response to reduce uncertainty is that instead of making hasty decisions, which might be the most unfortunate possible decision, occasionally delaying a decision allows organizations to find new opportunities by providing more flexibility in facing challenges (Clampitt et al., 2001a). A *wait-and-see* approach allows managers to make a decision in better conditions and is likely to decrease uncertainty about the future (Sauner-Leroy, 2004) and buffer their organizations from environmental surprises (O'Toole Jr & Meier, 1999).

Rather than focusing on information, Thompson (1967) offers different strategies against internal and external uncertainties: instituting standard operating procedures for the internal and incorporating critical elements into the organization for the environmental uncertainty will constrain variability caused by uncertainty (Lipshitz & Strauss, 1997a). A good example can be found in the Taylorist organization, which seeks to minimize uncertainty by planning and monitoring and to give the least amount

of freedom to the practitioner in charge of implementing these plans (Grote, 2004). In the same vein, Allaire & Firsirotu (1989) list several techniques such as shaping and controlling external events, passing the risk on to others and disciplining competition to deal with the same problems (Lipshitz & Strauss, 1997a).

2.3.3. Acknowledging Responses to Uncertainty

The third managerial response to uncertainty is acknowledging uncertainty. Lipshitz & Strauss (1997) offer two different methods reflecting those responses. The first is to choose an available option, and the second is to form a method in order to bypass or repel possible risks. They present a rational choice model as an example of this response. Individuals using this model put uncertainty as a factor while assessing the available course of actions or apply minimum-maximum regret techniques. In a more complicated manner, they can create buffer zones or make contingency plans to confront potential risks. Lastly, Lipshitz & Strauss (1997) categorized four different types of acknowledgment responses, namely improving readiness, pre-empting, avoiding irreversible actions, and weighing pros and cons.

2.3.4. Embracing Responses to Uncertainty

The fourth managerial response to uncertainty is embracing uncertainty. Managers should find a way for their organizations to welcome, utilize and exploit uncertainty while embracing ambiguity, complexity, randomness, the unknown and the unknowable, because acceptance of uncertainty by the organization is more important than acceptance of uncertainty by employees (Clampitt et al., 2001a). Therefore, he offers three competencies: a) cultivating an awareness of uncertainty, b) communicating

about the uncertainty, c) catalyzing action in an uncertain environment (Clampitt, Williams, et al., 2000).

2.3.5 Comparison of Types and Responses of Uncertainty

After briefly explaining the responses, at this point, we want to compare the responses with the types of uncertainty. Suppressing responses include ignoring information and rationalization of responses (Lipshitz & Strauss, 1997b). Although Lipshitz & Strauss (1997b) stress the denial of information, we believe that this is, also, ignoring uncertainty because individuals who apprehend the uncertainty will respect the information related to it. They call this phenomenon the Pollyanna effect; in fact, we can take it back to Aristotle's saying, "Man is not a rational animal" (Lange, 1983) or John Maynard Keynes' concept of "animal spirits" (Raines, 1989). Nevertheless, we think that these responses may arise when faced with ambiguity, weak uncertainty, and substantive uncertainty. In ambiguity, the fully reliable probability distribution is missing, and in the other two cases information. A person who suppresses uncertainty will perform as if he is under certainty instead of seeking information and other possible responses (Lipshitz & Strauss, 1997b).

Reducing responses include removing or decreasing uncertainty (Lipshitz & Strauss, 1997b). These responses are also valid for ambiguity, weak uncertainty, and substantive uncertainty. Under these types of uncertainty, instead of suppressing, individuals first try to lessen their imperfect knowledge by getting as much information as possible and by broadening their understanding (Smithson, 1989). The most common reducing responses are collecting more information, following organizational procedures or postponing actions (Lipshitz & Strauss, 1997b). Also, one can also reduce procedural

uncertainty by expanding one's computational capacity to understand environmental complexity (Dequech, 2011).

Acknowledging responses include actions evading or confronting possible risks besides seeking or collecting information (Lipshitz & Strauss, 1997b). These responses are preferred to confront weak uncertainty based on an assessment of the options in the context of EUT and PT. Individuals select an option among the conceivable courses of action by calculating gains and losses (Lipshitz & Strauss, 1997b). Acknowledging responses can be efficient under fundamental uncertainty. Although fundamental uncertainty prevents us from envisaging future events (Dequech, 2011), we can create specific responses to avoid undesirable consequences, produce general capability to confront unforeseen incidents, or evade irrevocable activities (Lipshitz & Strauss, 1997b).

Embracing responses include fostering awareness of uncertainty, creating opportunities, and propelling the action (Clampitt et al., 2001b). These responses may exploit all types of uncertainty because we change our point of view from confronting to leveraging uncertainty. However, reducing and acknowledging responses are not complete enough for embracing. After delaying action or searching for information, additional measures are needed to exploit the uncertain state, such as flexible routines, and acknowledging responses will only lessen the negative consequences, rather than prevent them. Embracing responses are more critical and efficient under fundamental and strong uncertainty. Because non-predetermined structural change, complexity, and incomplete knowledge are the essential characteristics of fundamental uncertainty, and strong uncertainty is the combination of one or more other types of uncertainty (Dequech, 2011), other responses would be insufficient, incomplete, and inefficient. In this case,

responses require complicated measures such as adaptation, innovation, creativity (Dequech, 2011) and leveraging technology (Clampitt et al., 2001a).

2.4. Social aspects (group dynamics/behaviours/external variables) of coping with uncertainty

We will now present some examples related to responses to uncertainty and, when possible, elaborate on social and behavioural aspects of the concepts based on the typology we have covered earlier. Because examining cognitive capabilities may present fruitful information about people's ways of thinking, only when researchers study social interactions in the organization will they be able to understand work characteristics (Johansson & Persson, 2009). Since contemporary civilization consists of organizations (Czarniawska, 2007) and humans cannot be separated from the social context of organizations because we are embedded in, rather than being independent of, the organization (Perrow, 2000), studying social aspects is a must. Moreover, the social dimension of organizational activities is also essential to cope with uncertainty for managers who work with real people (J. C. Spender, 2003). Thus, we will first discuss what can be considered as suppressing responses.

2.4.1. Variables related to suppressing responses

Since the suppressing responses include denial of uncertainty or related information, a distinctive approach, which may shed light on suppressing strategies, is uncertainty avoidance theory. This theory explains how individuals respond to the uncertainty based on their cultural background (Wennekers et al., 2010). According to this theory, an uncertain or unfamiliar condition threatens members of a culture regarded as high

uncertainty avoidance when they face uncertainty or ambiguity (Wennekers et al., 2010). Therefore, people who live in a culture avoiding uncertainty are more likely reluctant to accept new job opportunities and prefer a steady work environment (Wennekers et al., 2010).

On the other hand, the findings of Sorrentino & Hewitt (1984) explain the denial or acceptance of the related information in a different way. They suggest that their findings support the theory "one's cognitive uncertainty orientation determines information seeking behaviour." According to them,

> *...uncertainty-oriented persons are likely to choose achievement situations that provide the greatest information about their ability, whereas certainty-oriented persons are less likely to find such information relevant (Sorrentino & Hewitt, 1984, p. 894).*

These individual distinctions are also critical factors that can be found in social psychological approaches to understand uncertainty reduction, e.g., as stated before, individuals' reactions to uncertainty may vary according to their tolerance level to uncertainty (Hogg, 2000). Thus, investigating individual distinctions may also help to understand their different types of responses under uncertainty (Hodson & Sorrentino, 2001). Uncertain situations inspire uncertainty-oriented individuals, and uncertainty resolutions stimulate their behaviours (Hodson & Sorrentino, 2001). Therefore, uncertainty-oriented persons pursue information to resolve uncertain situations, whereas certainty-oriented persons postpone or resolve uncertainty with heuristic methods in a quick manner in order to avoid uncertainty (Hogg, 2000). Thus, the first one will yield reducing or even embracing responses, and the second one will rehearse suppressing

behaviours, because uncertainty resolution does not motivate certainty-oriented persons, and they refrain from discovering the possible consequences of uncertainty (Hodson & Sorrentino, 2001). Also, uncertainty avoidant individuals are inclined to focus on planning and create a steady environment to cope with uncertainties in their social life (Hogg, 2000).

Moreover, Crawford (1974) investigates the influence of combining uncertainty and importance on search behaviour. When a decision maker is uncertain and cannot determine response alternatives, he delays the ultimate decision and pursues information from others (Crawford, 1974).

Similarly, fear of negative evaluation (FNE) triggers suppressing responses. Trautmann, Vieider, & Wakker (2008) argues that FNE is a crucial determinant to explain ambiguity aversion. The results of their experiment prove that aversive behaviour vanishes entirely in the absence of FNE. According to their explanation, the choice of an ambiguous option, with unwanted consequences, contains the fear of others' criticism. Because people make their decision in a social context, it is not possible to eradicate aversive behaviour, which contributes to the significance of FNE (Trautmann et al., 2008).

We will also assess dysfunctional behaviour under the umbrella of suppression responses. Hirst (1981) explained the relationship between dysfunctional behaviour and uncertainty in one of his studies. He states that a medium to high (medium to low) reliance on accounting performance measures lessens the occurrence of dysfunctional behaviour under low (high) task uncertainty. In this study, he defines uncertainty as:

> *Tasks about which beliefs concerning cause-effect knowledge are reasonably incomplete are referred to as tasks in which "task*

> *uncertainty" is high. Tasks about which beliefs are reasonably complete are referred to as tasks in which "task uncertainty" is low* (Hirst, 1983b, p. 599).

According to Hirst (1983), reliance on a performance tool and its association with tension is related to the task uncertainty; therefore, the question is why and how individuals display dysfunctional behaviours to seek relief from tension. Dysfunctional behaviour will probably manifest itself more frequently because of a high reliance on an incomplete performance measure than a high reliance on a comprehensive measure (Hirst, 1983).

Hirst connects the incentives behind engaging in dysfunctional behaviour with the performance measures and the level of task uncertainty (Hayes & Cron, 1988). He puts open units, subject to environmental uncertainty and the effects of interdependency, and insulated units, protected from external effects, at the epicenter of his model (Hayes & Cron, 1988). If the manager, working in an open unit, cannot distinguish the cause-effect relations related to his actions because dynamics beyond the manager's control lead to the accomplishment of a task, it will be a source of task uncertainty (Hayes & Cron, 1988). The escalation in task uncertainty may cause, to some extent, dysfunctional behaviours (Hayes & Cron, 1988).

Later, Hirst (1987) described task uncertainty as a moderator variable on the relationship between goal setting and performance, because, to him, the completeness of task knowledge is influenced negatively by task uncertainty and the positive effect of goal setting depends on the completeness of task knowledge. In order to clarify the moderator role of task uncertainty, he posits that, based on Hirst (1981), repetitiveness and openness are two constructs that explain task uncertainty (Hirst, 1987).

Repetitiveness is defined in terms of the frequency of the performed task, and openness is defined as:

> *...in organizational settings, the extent to which a task is affected by events or stimuli external to the focal organization and to tasks performed by others in the focal organization. Tasks that are both non-repetitive (repetitive) and open (closed) to "significant" outside influence are referred to as high (low) uncertainty tasks* (Hirst, 1987, p. 777).

Positive effects of goal setting can be seen only when task knowledge is complete; therefore, if knowledge is not complete, people probably will not show essential behaviours, which result in better performance due to determined goal setting (Hirst, 1987). So, when task uncertainty is low, goal setting can attain better performance; but when the task uncertainty is high, then we will face three options: a smaller increase, no increase, or a reduction in performance (Hirst, 1987). Under high task uncertainty, referring to Hirst (1981), goal setting on performance will probably cause dysfunctional behaviour (Hirst, 1987). To sum up, according to Hirst (1987), the affiliation between goal setting and task performance will be moderated by task uncertainty based on given arguments.

2.4.2. Variables related to reducing responses

Uncertainty reduction is also an essential motivational concept in theories of communication and organizational socialization; individuals seek information to decrease uncertainty using communication with managers and colleagues (Hogg, 2000). One of the most prominent studies in communication researches is the Uncertainty Reduction Theory (URT). URT attracted researchers' attention to the role of uncertainty in communication and how individuals cope with uncertainty under challenging

conditions (Goldsmith, 2001). The first proposal of the URT is that individuals communicate to reduce uncertainty (Berger & Calabrese, 1975). In any organization, managers use communication primarily to achieve daily business. We think that managers may practice communication as a means to reduce uncertainty in an organizational context. Individuals also use interpersonal communication as a vehicle to reduce uncertainty (Perse & Rubin, 1989). Thus, uncertainty reduction is also an essential motivational concept in theories of organizational socialization; newcomers seek information to decrease uncertainty using communication channels and social interactions with managers and colleagues (Hogg, 2000). The motivation behind the reduction process for newcomers is to predict, understand, and control the task environment, similar to other organization members (Saks & Ashforth, 1997a).

Not only in organizational settings but also in a sociocultural framework, uncertainty reduction is a goal in communication. Accordingly, Goldsmith (2001) accepts, similar to URT, that uncertainty is an essential practice for human activities, and that uncertainty management is one of the principal human endeavors. He also proposes that the importance of uncertainty *varies* with *the sociocultural context*. Based on case studies *from ethnographic research conducted in various sociocultural groups*, unlike URT Goldsmith (2001, p. 5151) proposes *normative questions:* '(a) how people should behave if they wish to achieve desired outcomes and why, or (b) when people behave in a particular way, how will they be evaluated?' Conducting researches in different sociocultural contexts and asking normative questions in order to collect appropriate data will help us to understand both what people do in response to uncertainty regarding *meanings attributed to uncertainty and to different communicative responses to uncertainty,* and how effectively they do it (Goldsmith, 2001). Furthermore, he adds

that the normative approach will shed light on how to manage uncertainty and practical applications.

On the other hand, predicted outcome value theories *(POV) (Sunnafrank, 1986a, 1989)* propose conflicting explanations of URT (M. Sunnafrank, 1990). Sunnafrank (1990) states that individuals aim to reach *positive relational outcomes* with regards to communication behaviour and uncertainty reduction efforts in initial interactions.

Reducing responses include removing or decreasing uncertainty (Lipshitz & Strauss, 1997b). These responses mostly deal with substantive and procedural uncertainty in the typology presented above, because the nature of those two types is information-centric uncertainty. Under these types of uncertainty, individuals first try to lessen their imperfect knowledge by getting as much information as possible and by broadening their understanding (Smithson, 1989).

Different varieties of sources feed uncertainty in social systems embedded in the organization (Johansson & Persson, 2009). Grow & Flache (2011) state that a lack of experience and incomplete information about a new condition will lead to high subjective uncertainty. In this state of mind, individuals will tend to seek information to lessen the uncertainty, which results in reducing responses, and experiencing uncertainty makes individuals susceptible to the influence of different information. If they can get additional arguments for their attitude from similar colleagues in the organization (Grow & Flache, 2011) or share the same cognition with the colleagues with whom they identify themselves, their level of uncertainty will reduce (Holtz, 1997). On the other hand, the more similar members of a team disagree, or dissimilar members agree, the more a team member's current level of uncertainty rises (Grow & Flache, 2011). In this condition, both the salience of interpersonal similarity and

dissimilarities may stimulate individuals' response to uncertainty by increasing their level of uncertainty. Put differently, if an individual tends to develop reducing responses under uncertainty, they will verify the correctness of their responses due to disagreement with similar team members or agreement with dissimilar team members. Consequently, similarity and dissimilarity may influence individuals' behaviours under uncertainty.

Hogg (2000) proposes that the reduction of subjective uncertainty - in addition to self-enhancement - is a formidable human motive in social identity theory. The notion, at the epicenter of social identity theory, is that after describing and assessing themselves according to groups' values, individuals compare themselves in order to differentiate the in-group from the outgroup (Hogg, 2000). At this point, he posits that self-categorization, focused on social influence, is a very formidable method to reduce subjective uncertainty, because

> *Uncertainty arises when we discover that we disagree in our beliefs, attitudes, feelings, and behaviours with 'similar" others, where similar others can be defined as people whom we categorize as members of the same group as ourselves* (Hogg, 2000, p.232).

2.4.3. Variables related to Acknowledging Responses

Arguably, individuals always face uncertainty, but how they respond to different types and levels of uncertainty may vary considerably (Van den Bos, 2001). Individuals practising acknowledging responses either assess the possible courses of action or find a way to repel uncertainty and minimize the potential risks. In the social context, they try to compensate for undesirable consequences by increasing the importance of the values. To elaborate on this kind of responses, Van den Bos (2001) has revealed in his study

that when individuals are faced with uncertainty, they respond more intensely to perceived fairness. He also posits that since the individual in an uncertain situation presents a strong reaction to perceived fairness, uncertainty (salience) may be an essential factor for the psychology of social justice. Therefore, uncertainty is likely to play an essential role in any other human behaviours. Van den Bos & Lind (2002, p. 4) argue in their uncertainty management theory:

> *Uncertainty occurs either when a person confronts an inability to predict the future or when a person confronts an incompatibility between different cognitions, between cognition and experiences, or between cognition and behaviour.*

Since fairness allows individuals to cope with their feelings of uncertainty, Van den Bos & Lind (2002) suggest a model of uncertainty management using fairness judgments. This model asserts that uncertainty makes fairness more critical and that fairness is a means through which individuals manage uncertainty (Diekmann, Barsness, & Sondak, 2004). Diekmann et al. (2004) support the uncertainty management model that people care more about fairness when they are uncertain about things that are important to them, as when they are uncertain about performance standards and appropriate behaviours.

2.4.4. Variables related to embracing responses

Embracing responses requires accepting, taking advantage of, and exploiting uncertainty. In this perspective, Grote (2004) presents one of the embracing responses to uncertainty. According to him, there are two sources of uncertainty: the process of transformation in the organization and its environment. One way of dealing with those uncertainties for organizations is to have flexible routines and rules, which can create a

proper balance between a stable organization and a flexible one (Grote, Weichbrodt, Günter, Zala-Mezö, & Künzle, 2009a). He defines two different cases in which routines are used in two different ways. In the first case, he explains that central planning helps decision makers to control subordinates by giving them the least room to manoeuvre in any given situation to minimize the uncertainty. Additionally, Grote et al. (2009) state that the significant role of routines in the first case is to reduce complexity and uncertainty, and increase stability, managerial control, and legitimacy. Any disruption in that situation is regarded as a system error and fixed by central authorities (Grote et al., 2009). In this case, the routine is the standard means to decrease complexity and uncertainty (Grote et al., 2009).

In the second case, instead of reducing uncertainty, the focus is on coping with uncertainty (Grote, 2004). This time sufficient and flexible local autonomy is given to subordinates to handle uncertainty by deciding or modifying goals and rules for the sake of effectiveness (Grote, 2004). Any disruption inherent in a situation is regarded as an opportunity to develop a new capability for the system (Grote et al., 2009). However, two different cases generate a dilemma between standardization and flexibility in the organization, which can be resolved by loose coupling (Grote et al., 2009). Grote (2004) presents some loose coupling examples, such as: motivation through task orientation, higher order autonomy, flexible changes between organizational modes, and culture as a basis for coordination/integration.

The structure of the organization also has effects on coping with uncertainty. Uncertainty creates a linkage between performance and organizational structure (Wall et al., 2002). Wall et al. (2002) state that mechanistic and organic approaches to the structure of organizations are two different views that can be found in organizational theory to cope with different levels of uncertainty. We think that these two structural

types also encounter different types of responses and uncertainty. A mechanical approach is more suitable for substantial or weak uncertainty and is likely to produce reducing responses, because routinized tasks are carried on in a mechanical structure based on formal relationships with the help of centralized decision-making processes (Wall et al., 2002).

On the other hand, organic structures are more suitable for fundamental uncertainty and embracing responses. As Wall et al. (2002) suggest, organic structures are more flexible and decentralized with regards to decision-making while practicing informal routines. At this point, to them, empowerment arguments come to the surface. Thus, they propose that empowerment methods are more efficient in organic structures under strong uncertainties than in formalized and routinized designs under low uncertainties. According to our typology, the first case applies to fundamental uncertainty, and the latter is a weak one.

Moreover, they propose that high empowerment should be realized when operational uncertainty is high for the sake of fostering employees' performance. Also, we believe that empowerment will foster embracing responses both for employees and the managers, increasing their performance. To elaborate on the relationship between high uncertainty and performance, researchers expressed operational uncertainty as a reference to the amount and difficulty of problems, exceptions and key variances that can be found in tasks (Wall et al., 2002). Consequently, to them, when those problems are high in number, then performance will decrease because handling operational troubles will take longer time and overwhelming effort. To overcome that problem with empowerment will result not only in better performance but also in higher productivity (Wall et al., 2002).

One another factor affecting responses to uncertainty is whether an organization is centralized or decentralized. Based on the contingency theory suggestion, the performance of an organization will be more efficient under high uncertainty when the organizational structure is decentralized; contrary to that, the organization will perform better under low uncertainty with a centralized structure (Kim & Burton, 2002b). This will also affect response types. Managers and employees in a decentralized structure will embrace the uncertainty, and under a centralized structure will be more likely to behave reductionally. Kim & Burton (2002) examine the relationship between task uncertainty, level of centralization, and project team performance, measured in three dimensions: cost, time, and quality. Their finding clarifies contingency theory with regards to better performance. Differentiating the teams as centralized and decentralized under low uncertainty has no effects on performance with regards to time and cost variables; on the other hand, medium and high task uncertainty make a positive contribution to the performance of decentralized teams with regards to time and cost (Kim & Burton, 2002b). When it comes to a quality variable, centralized teams perform better under both kinds of uncertainties (Kim & Burton, 2002b).

Another form of embracing response is an adaptation. Adaptation is a must for the organization to cope with uncertainty (Griffin, Neal, & Parker, 2007). Griffin et al. (2007) classify three different behaviours at three different levels, namely individual, team and organizational, as sub-dimensions of role performance in an organizational context, in which roles can manifest themselves in terms of emergent and formalized roles depending on the uncertainty level. These dimensions are proficiency, adaptivity, and proactivity. Then, with the help of a role theory perspective, he assigns behavioural predictors to define the relationship between dimensions and predictors for his hypothesis. He finds the relationship between role clarity and individual task

proficiency; role breadth self-efficacy and role productivity (for all three levels); openness to change and adaptivity (for all three levels); perceptions of team supportiveness and team member behaviours (for three sub-dimensions); and perceptions of organizational commitment and organization member behaviours (for three sub-dimensions).

This is one of the delayed action methods in response to uncertainty based on missing information. However, a real option is also a way to mitigate the effects of late responses to uncertainty by splitting the decision into *at least two parts in which the initial decision creates the opportunity, but not the obligation, to make a subsequent, beneficial decision, built upon the first* (Janney & Dess, 2004). Janney & Dess (2004) explains that managers can create *a wait and see* an option with the initial decision until the collection of new information, which will reduce uncertainty. However, deferring any option for a while will probably result in profit losses (Collis, 1992).

So far, we have classified possible variables affecting different types of responses under uncertainty (Table 2.2). On the other hand, one should keep in mind that transition among classes is possible, and one variable could affect more than one type of responses. However, we think that this classification helps us to understand and evaluate different variables based on given responses.

Dill (1958) split the organizational environment between the task and the general environment. Similarly, Duncan (1972) used the terms internal and external environment to distinguish the sources.

Table 2.2. Variables related to managerial responses to uncertainty.

Responses	Variables
Suppressing Responses	Uncertainty avoidance (Hofstede, 1984). Certainty-orientation (Sorrentino & Hewitt, 1984). Tolerance level to uncertainty (Hogg, 2000). Decision delay (Crawford, 1974). Fear of negative evaluation (Trautmann et al., 2008). Dysfunctional behaviour (Hirst, 1983).
Reducing Responses	Standard operating procedures (Thompson, 1967) Uncertainty reduction theory (Berger & Calabrese, 1975) Shaping and controlling external events, passing the risk on to others and disciplining competition (Allaire & Firsirotu, 1989) Gathering/producing further information, postponing decisions until finding related information (Lipshitz & Strauss, 1997a). Buffer zone (O'Toole Jr & Meier, 1999). A wait-and-see (Sauner-Leroy, 2004). Minimum freedom to the practitioners (Grote, 2004).
Acknowledging Responses	Choose an available option, bypass, or repel possible risks (Lipshitz & Strauss, 1997a). Perceived fairness (Van den Bos, 2001). Flexible routines and rules (Grote et al., 2009a).
Embracing Responses	The mechanistic or organic structure of the organization, empowerment (Wall et al., 2002). Centralized of decentralized organization (Kim & Burton, 2002b). Adaptation (Griffin et al., 2007). Real option (Janney & Dess, 2004).

However, later, environmental uncertainty referred only to the external environment of the organization. (see Andrews, 2008; Vecchiato, 2012; Ford, 2015). Thus, the literature presents two primary sources of uncertainty: external and internal uncertainty.

After Duncan (1972), most researchers focused primarily on external sources (Priem et al., 2002), because controlling external sources is demanding, and their effects on the company are more destructive than those of the internal ones. Thus, companies diverted their efforts towards building strategies to mitigate the destructive effects of external sources of uncertainty. On the other hand, internal sources can also cause many uncertainty-related problems. Priem et al., (2002) and Voges, Priem, Shook, & Shaffer (2003) showed that managers perceive both internal and external sources as foundations for uncertainties in the organizations.

Nevertheless, Priem et al., (2002) dedicate six clusters for the external sources, and two out of six also include internal sources. Voges et al., (2003) comprise five clusters for external sources and one cluster for internal sources. These findings relatively reflect the degree of importance of the internal sources perceived by managers. Managers place greater emphasis on external variables. Since it has been more than 15 years since those two studies, we intend to see how contemporary managers evaluate the sources of uncertainty. We also try to validate typologies still in use and compare them with our findings. This is one of the goals of the first study.

Another goal in study 3 is to see how managers deal with uncertainty. One of the most eminent theories of uncertainty is the uncertainty reduction theory of Berger and Calabrese (1975). According to the theory, individuals need to reduce uncertainty. Thus, they try to reach information using communication. Searching for data, information, or

knowledge are primary individual responses to uncertainty, but the main motive in this search is not limited to reducing uncertainty. In addition to reducing uncertainty, acknowledging uncertainty and suppressing uncertainty are two other strategies to cope with uncertainty (Lipshitz & Strauss, 1997b). Instead of the use of buzz terms such as strategy, tactics, and methods, we prefer to use 'responses to uncertainty' because some coping mechanisms comprise emotions, delaying or avoiding actions, and ignoring, including non-cognitive reactions. The study of Lipshitz & Strauss (1997) was restricted to the decision making context, and they used military students as their sample. We want to explore managerial responses to uncertainty in the organizational context but not limited to decision making. Also, in study 2, we want to create a taxonomy of responses to uncertainty to compare them with classifications in the literature so that researchers can endorse new theories, and practitioners can comprehend the nature of responses based on newly developed taxonomy.

We also intend to broaden our sample by using both military and civilian samples. One other response to uncertainty is embracing uncertainty (Clampitt et al., 2001a). Embracing was a new approach to uncertainty coping mechanisms and reflected the evolution of the responses to uncertainty over the years. Many researchers' focus shifted from avoiding to managing (van den Bos & Lind, 2002), and exploiting uncertainty (Clampitt et al., 2001a). However, they also used only employees as a sample. They showed that employees were ready to embrace uncertainty, and executives needed to build the necessary climate by encouraging employees and the organization to embrace uncertainty. To embrace uncertainty, organizations need to cultivate awareness, communicate about uncertainty, and catalyze action (Clampitt et al., 2001a). Our focus is not organizations but how managers - not employees - respond to uncertainty while they are working in an organizational environment.

Studies like van den Bos & Lind (2002) focused on managing uncertainty using compensation via a norm or value - in this case, fairness - because uncertainty enhances the importance of the norms or values perceived by the individual, and when the uncertainty is higher, fairness provides protection against the threat of uncertainty and helps individuals to manage their feeling of uncertainty (Van den Bos & Lind, 2002). Although their arguments are persuasive, as they stated, their study lacks empirical validation. Similarly, Hirst (1983) suggests that individuals try to relieve the tension of uncertainty via dysfunctional behaviour. However, this type of compensation is harmful both for the organization and for individuals. Later, Hirst (1987) showed the unproductive moderating effect of uncertainty on performance and goal settings. Although we are not interested in the moderating role of uncertainty, we will look for the possible deviant role of uncertainty.

We presented possible variables affecting managerial responses to uncertainty. These variables are mostly at an individual level, such as uncertainty avoidance, intolerance of uncertainty, and uncertainty reduction. All these variables consider uncertainty as a threat. We intend to focus on organizational-level variables, not only those affecting avoiding responses, but also variables affecting embracing responses. Organizations try to embrace uncertainty using flexible routines and rules (Grote, Weichbrodt, Günter, Zala-Mezö, & Künzle, 2009b), organic structure and decentralized decision-making processes (Wall et al., 2002), adjusting the structure as centralized or decentralized (Kim & Burton, 2002b) or increasing adaptation (Griffin, Neal, & Parker, 2007). As we keep in mind those variables, we also look for variables related to managerial responses to uncertainty in study 1. Then, in study 3, we will examine and discuss organizational-level variables affecting responses to uncertainty, in addition to individual-level variables.

CHAPTER 3

3. Study 1: Sources of uncertainty and middle managers' responses to uncertainty in the strategy process

3.1. Introduction

Uncertainty is a key topic of management in organizations. Organizations face uncertainties, both internal and external (Burnard & Bhamra, 2011), due to their chaotic, complicated, confusing, and ambiguous environments (Clampitt & Williams, 2000), and future outcomes (King, 2009). Therefore, efficient organizations have to accept and manage uncertainty because for some businesses even a single decision taken by managers may lead to organizational disaster owing to severe competition and changes within the uncertain environment (Karimi et al., 2004). Managers must face uncertainty in their daily business to be more successful, and they must also find efficient methods of dealing with uncertainty in their organizational environment, either in business environments or in public and military organisms, by discussing strategies and implementing operational plans in case of unpredictable events.

The concept of strategy dates to more than 2000 years ago, and it was associated with military settings. Although the use of strategy in military framework has a long history, its adjustment to corporate business was around 60 years ago (Segal-Horn, 2004). Since then, the concept of strategy has followed different paths in military and business contexts. Ozleblebici, Pinto, & Antonio (2015) observed that military and business managers have different understandings of strategy. Therefore, we believe that the study of uncertainty will be enriched by the comparison between business and military

environments, since the purposes of these organizations are distinct but the need to design strategies and operational plans is similar. More specifically, similar to all other organizations, military organizations attempt to cope with uncertainty (albeit of a harder kind) in order to fulfill their purposes (Posen, 2016). Military organizations exist both to assure security in a stable environment and to deal with the uncertainty that rises from unpredictable events that challenge stability. On the other hand, military organizations have developed high hierarchical and formalized systems that tend to be considered highly rigid, and that might hinder the necessary responses to unpredictable events. This paradoxical aspect of organizations that face changing environments, and high levels of uncertainty co-existing with formalized structures and procedures, could be a counterpoint to the flexible structures detected in business organizations (Grote et al., 2009).

Military organizations have unique aspects such as attitudes towards hierarchy, obedience and discipline, the readiness to serve, authoritarianism (Gregersen, Morrison, & Black, 1998), competence, and loyalty to an impersonal legitimate power (Nuciari, 2018). Although military organizations spend most of the time in peace, their ultimate purpose lies in war (Posen, 2016). Military organizations direct their activities to the management of organized violence (Nuciari, 2018). Their effort is to annihilate adversaries (Posen, 2016). That gives the military a peculiar nature alongside these unique aspects.

On the other hand, one can also see conventional social processes in military organizations (Segal & Segal, 1983). In contrast to many other civilian organizations, military organizations have a comparatively extremely centralized and unified organizational context (Kemeny, 1983). Military organizations also consist of two main

pillars - a combat-oriented subsystem and a technical/administrative subsystem - and the interaction between those pillars and systems in the outside environment creates inconsistencies because of the complexity and uncertainty in the international arena (Nuciari, 2018).

Especially in wartime, due to the uncertainty, perplexity, necessity, and stress, soldiers take initiatives at lower levels, practice lateral communication, and emphasize teamwork (CHANGE, 1999). In peacetime, it is different. One of the most significant disadvantages of military organizations in comparison with corporate ones is that they cannot engage in their primary activities and cannot appraise real-world experience on a daily basis (CHANGE, 1999). Those activities involve a high degree of uncertainty because it is not easy to comprehend the situation in the battlefield, and perform even a simple action with irreplaceable high-value assets and interdependence with other services (Posen, 2016). Simulating war activities in peacetime is costly and almost impossible. Whether in war or peace, mistakes in the military may have excessive costs for the individual himself/herself, his/her colleagues, or his/her country (Posen, 2016). Peacetime activities also involve uncertainties. Domestic politics, the relationship between the land, navy, and air forces, and the recruiting and training of the personnel, especially officers' training, are among the causes of the uncertainties in peace.

On the contrary, the military performs many duties other than war, such as peace operations, resolving conflicts, and supporting disaster relief operations. Moreover, distinguishing between war or peace is getting increasingly vague, and *blurring* is becoming a fundamental description of modern warfare (Kaldor, 2013). However, hybrid activities create more confusion and challenge the modern military. Hybrid warfare and these peace operations need different structures (Change, 1999),

capabilities and mindset as opposed to conventional warfare.

Uncertainty surrounding the military is one of the most critical themes to deal with. Since von Clausewitz's (von Clausewitz, 1989) masterpiece 'On War,' the *fog of war* is used interchangeably with the term *uncertainty*. Fog of war is understood as the unreliability of information amongst the military academics (King, 2009). Accordingly, one shared tactic among military managers or leaders to cope with uncertainty is to gather and process more information about the environment with the help of technology (Johansson & Persson, 2009).

Defining uncertainty as lack of knowledge is not sufficient (Walker et al., 2003), as we face an uncertain strategic environment (King, 2009), which forces us to govern by contingency, and also has devastating effects on how we make or rule warfare (O'Malley, 2010). This new kind of warfare, including asymmetric, hybrid, and cyber warfare, presents distinct types of threats and opportunities. Moreover, it also compels leaders to find flexible and adaptive military management strategies, because we are leaving behind tasks that we know how to perform, process and find solutions to in that particular situation (O'Malley, 2010).

Apart from uncertainty, new military operations are too complex to be governed by one leader on top, so decentralized structures seem more useful to cope with a challenging environment (Krabberød, 2014). However, now, the question of what commonalities exist between the military organization and commercial organizations comes to the surface. Unquestionably, there are similarities, e.g., bureaucracy, professionalism, and management (Segal & Segal, 1983), basic structures and dynamics, but also there are differences, e.g., enforcement, employment contract, and mission, between military and

corporate organizations (Weber & Gerde, 2011). There were significant differences between military and civilian organizations before World War II, but then commonalities were increased, especially when it comes to technology and organizational forms (Segal & Segal, 1983). According to Janowitz & Moskos (1979), three thematic distinctions can be found between military and civilian organizations: the military organization and military profession; the relationships between armed forces and society; and the conflicts and war in particular.

On the other hand, Moskos Jr (1973) suggests three trends in order to describe the relationship between military and civilian organizations in a sociological context. The convergent model implies a trend toward civilianization, unlike the divergent model, which carries more traditional aspects of the military. The third model is segmented, suggesting a plural military which holds both convergent and divergent aspects.

Moreover, the divergence trend, nowadays, paves the way to the lack of comparative organizational and military studies and investigation of the development of military organizations (Augier, Knudsen, & McNab, 2014). Also, the current challenges that the military faces require different tasks in the several kinds of international conflicts in which different problems arise for the military organizations to understand (Nuciari, 2018). So, these developments create immense potential in studying and cross-fertilization between the organizational studies and military organizations (Augier et al., 2014).

In 1977, Moskos presented his famous model, the Institution/Occupation model (Moskos Jr, 1977). On the one side, military organizations keep traditional legitimated norms and values; on the other side, they show a trend towards the marketplace. Despite

the convergence of some parts, including the clerical, technical and administrative areas, some other elements of military organizations, especially related to combat, have remained distinct (Moskos Jr, 1973). For instance, intangible factors such as morale, esprit de corps and unity still play a more significant role in military organizations, especially in warfare (Segal & Segal, 1983). Alongside this warfare feature, they name other factors. Institutional culture, the role of women, that organization's responsibility for families, and connections with citizenship and military service are other elements that contribute to the differentiation of military from civilian organizations (Segal & Segal, 1983).

Augier et al. (2014) suggest several dissimilarities between military and private organizations from an organizational perspective. They think that competition can be placed at the epicenter of both organizational behaviours. Private business cannot use organized legal violence to get a competitive advantage, unlike the military. Instead, it focuses on a measure of effectiveness and profit, which are not necessarily priorities in the military. Also, military success could result in a Pyrrhic victory involving post-conflict stabilization and reconstruction problems. This outcome could be considered as an opportunity for a businessperson to increase profitability. Business has a negative impact on society by producing externalities such as pollution and corruption. On the other hand, the impact of the military on society could be devastating by demolishing public and private infrastructure and creating grounds for future conflict and instability.

The past thirty years have seen many types of research in many different fields focused on middle managers, showing that middle managers are key to clarifying critical organizational outcomes (Wooldridge, Schmid, & Floyd, 2008). Since management in contemporary organizational environments requires empowering middle managers in

activities connected to the operational and tactical planning (Darkow, 2015) and recent changes in organizational forms highlight the strategic importance of middle managers (Floyd & Wooldridge, 1997; Huy, 2001, 2002), we believe that middle managers' roles will continue to increase (Balogun & Johnson, 2004). Moreover, middle management is useful as a preparation locus for future higher-level positions as well as offering leadership to subordinates and fulfilling several specific functions (CHANGE, 1999). Thus, it is necessary for a better understanding of how middle managers deal with uncertainty because, in particular, there is genuinely little published research on how middle managers cope with uncertainty in the strategy process.

The scope and purpose of this research is to unveil the sources of uncertainty, individual strategies, and variables, which are critical for middle managers to deal with uncertainty in the formulation and implementation of the strategy process. Primary goals of this research, formulated in Chapter One, are:

- To identify how middle managers evaluate the sources of uncertainty in civilian and military organizations

- To identify how middle managers deal with uncertainty individually in civilian and military organizations

- To identify the variables that middle managers consider as influencing the ways they deal with uncertainty in civilian and military organizations

In the first study, we initially find how middle managers conceptualize uncertainty in their organization; then, we define the sources of uncertainty that managers face in the

organizational context. Additionally, we reveal the individual methods used to deal with sources of uncertainty or uncertainty itself. Moreover, we try to understand the primary behaviours and emotions caused by interactions while dealing with uncertainty.

3.2. Theoretical Background

3.2.1. Managerial and individual responses to uncertainty in organizations

Both individuals and organizations are often uncomfortable with cognitively and psychologically challenging uncertainty because of the lack of predictability, complexity, and insecurity, which generates a feeling of vulnerability or anxiety that can result in distorting perceptions and information (Clampitt et al., 2000). Individuals tend to see uncertainty as a threat, and try to discover a way either to eradicate uncertainty or to discover some methods to make it tolerable and cognitively manageable (Van den Bos & Lind, 2002). Thus, managers and individuals present specific behavioural patterns to deal with uncertainty.

Two main theories in uncertainty literature are uncertainty reduction and uncertainty avoidance. According to Berger and Calabrese (1975), individuals are in search of information to reduce uncertainty. Besides, uncertainty avoidance theory explains to what extent individuals in a particular culture feel uncomfortable with uncertainty (Hofstede, 1984). However, we preferred to classify responses to uncertainty in the literature as reducing, suppressing and embracing responses to conceptualize uncertainty coping activities based on Lipshitz & Strauss (1997) and Clampitt et al. (2001).

Reducing uncertainty is an understandable response to cope with uncertainty, which contains gathering/producing further information or postponing decisions until finding related information (Lipshitz & Strauss, 1997b). In this process, managers are either searching for data, information, or knowledge. In this response, managers try to grow their knowledge relevant to the task or project promptly by naming knowledge, information, or data gaps to reduce the uncertainty (Harris & Woolley, 2009), because the conceptions of data, information, and knowledge shape managers' way of thinking about a phenomenon (Liew, 2007). In fact, uncertainty acts as a stimulus for seeking information (Kellermann & Reynolds, 1990) so that they can easily interact and gain control over their environment and outcomes (Goldsmith, 2001); reach positive relational outcomes (Sunnafrank, 1990); and predict, understand, and control the task environment similar to other members of the institution (Saks & Ashforth, 1997a). So managers wait until lessening uncertainty before taking decisions (Sauner-Leroy, 2004). Apart from information seeking, setting up standard operating procedures (Lipshitz & Strauss, 1997a); planning and monitoring (Grote, 2004); and shaping and controlling external events could be considered other methods of reducing uncertainty.

Suppressing uncertainty involves denial and rationalization responses, which result in ignoring uncertainty (Lipshitz & Strauss, 1997a). A distinctive approach, which may shed light on suppressing strategies, is uncertainty avoidance theory. This theory explains how individuals respond to the uncertainty based on their cultural background (Wennekers et al., 2010). This cultural background may result in Hofstede's (1980) uncertainty avoidance, a measure of intolerance for risk (Money & Crotts, 2003). According to this theory, an uncertain or unfamiliar condition threatens members of a culture regarded as high uncertainty avoidance when they face uncertainty or ambiguity (Wennekers et al., 2010). Therefore, people who live in a culture avoiding uncertainty

are more likely reluctant to accept new job opportunities and prefer a steady work environment (Wennekers et al., 2010). Also, the inappropriate use of consultants, planning processes, and research studies may lead to suppressing uncertainty (P. Clampitt et al., 2001a).

Embracing uncertainty requires finding a way for their organizations to welcome, utilize, and exploit the uncertainties (Clampitt et al., 2001a). One way of meeting those requirements is to have flexible routines and rules, which can create the right balance between a stable organization and a flexible one (Grote et al., 2009a). Thus, adequate and flexible local autonomy is given to subordinates to handle uncertainty by deciding or modifying goals and rules for the sake of effectiveness (Grote, 2004). To achieve this, managers should enhance subordinates' awareness of uncertainty, communicate about the uncertain situation, and take synergic actions in the uncertain environment (Clampitt et al., 2000) and adapt themselves to uncertainty (Griffin et al., 2007).

Besides this taxonomy, managers may also use values such as fairness and trust as leverage under uncertainty. According to Van den Bos (2001), when individuals face uncertainty, they respond more intensely to perceived fairness. Because fairness allows individuals to cope with their feelings of uncertainty Van den Bos & Lind (2001) suggest a model of uncertainty management using fairness judgments. In the same vein, Lewis & Weigert (1985) suggest that trust can be used to reduce uncertainty. Thus, both fairness and trust play a significant role in managing uncertainty. From this point of view, when managers are fair and trusted members of the organizations, it creates a feeling of comfort that lessens uncertainty in a much more general sense (Colquitt, LePine, Piccolo, Zapata, & Rich, 2012).

Military managers' responses to uncertainty may somehow differ from those of civilian counterparts, because the environment is naturally volatile, uncertain, complex, and ambiguous (Shambach, 2004). Paparone, Anderson, & McDaniel, Jr. (2008) emphasize several leadership tasks for a military setting. The first one is relationship building, which requires crafting long-term relations instead of concentrating on roles and responsibilities to enhance efficiency. The second one is loose coupling, which involves providing a degree of freedom at the local level and searching for solutions in parallel rather than micromanagement. The third one is sense-making, which includes developing a shared understanding and meaning throughout activities, initiating interaction and elaboration of a collective mind. The fourth one is emergent thinking, which embraces creating new ways, skills, and abilities with what is at hand instead of formal planning and forecasting. Apart from those tasks, improvising, learning, complicating, and making use of diversity are other methods to help managers in the military context under complexity and uncertainty. These methods stimulate innovative strategic thinking instead of the hierarchically oriented, linear strategic thinking that has governed the traditional military (Franke, 2011).

3.2.2. Middle managers in the strategy process

Middle managers work between the top and lowest levels of the organizations, and their job is primarily implementing the upper-level strategy and controlling the subordinates (Harding, Lee, & Ford, 2014). Most scholars somehow define middle managers in a similar way by stressing their position (see Mintzberg, 1989; Uyterhoeven, 1972; Dopson & Stewart, 1990). In fact, the characteristic value of the middle managers lay not in their position but mainly in their ability to affect both the top-level management and the operational personnel of the organization (Wooldridge, Schmid, & Floyd, 2008)

because what is occurring in the middle of organizations severely affects organizational performance (Dopson & Stewart, 1990, 1993; Dutton & Ashford, 1993; Floyd & Lane, 2000; Huy, 2002). Thanks to those abilities they can play a crucial role in the strategy process (Currie & Procter, 2005) and overestimation or removal of these roles and abilities from the organizations may lead to substantial problematic results (Shi, Markoczy, & Dess, 2009).

Although middle managers can contribute both strategy formulation and implementation through upward and downward influences (Wooldridge & Floyd, 1990), their bottom-up leverage is possible via championing alternatives and synthesizing information (Floyd & Wooldridge, 1992. p154). Formulating or implementing a comprehensive strategy is barely possible because of the uncertainty salient in and outside the organization due to the complex and dynamic environment. According to Thompson (1967), organizations are open systems surrounded by an environment, in which organizations attain the necessary resources in order to survive and grow (Ford, 2015). Thus, middle managers face many uncertain situations and problems; uncertainty is a powerful concept to explain relations between the organization and its environment within the organization theory framework (Duncan, 1972; Thompson, 1967). In this respect, middle managers mainly try to help alignment of their organization with the uncertain environment by converting conflicting ideas and changing behaviours in the strategy process (Floyd & Wooldridge, 1997). The requirements of the external environment force them to align their organizational tasks, processes, and outputs (Mangaliso, 1995). However, managers feel uncertain about the state of the organizational environment or specific constituent, which is unpredictable due to volatility, complexity, and heterogeneity (Milliken, 1987). On the other hand, thanks to their inter- and intraorganizational network centrality (Floyd & Wooldridge,

1997), they can understand uncertainty and take actions to cope with those uncertainties. We think that it is critical for middle managers who are exposed to uncertainty to develop certain managerial behaviours.

On the other hand, top-down leverage is achievable via facilitating adaptability and implementing deliberate strategy. (Floyd & Wooldridge, 1992. p. 154). Involvement in the implementation of strategy is one of the most typical roles of middle managers in the strategy context (Mantere, 2008). Literature suggests that strategic change and strategy have nearly the same meaning (Burnes, 2004) and middle managers may present a vital role in this strategic change (Van Cauwenbergh and Cool, 1982; Nonaka, 1988). According to Herzig & Jimmieson (2006), middle managers face uncertainty in both the pre-implementation and implementation phases of strategic change. They also suggest that middle managers try to reduce uncertainty in order to conceptualize change and find the necessary procedure to implement it.

Recently, researchers have shown an increased interest in micro-organizational social processes (Jarzabkowski 2004; Johnson et al., 2003). The activities and interactions of practitioners of strategy constitute strategy as a social practice. (Whittington, 2003). The strategizing perspective concentrates on daily activities and practices and their strategic outcomes (Johnson, Melin, and Whittington, 2003) and it 'is conceptualized as a situated, socially accomplished activity (Jarzabkowski, Balogun, & Seidl, 2007, p. 4). This perspective urges a broader definition and places middle managers in the core of influencing strategy (e.g., Balogun and Johnson, 2004, 2005; Mantere, 2005; Rouleau, 2005). Since contemporary civilizations consist of organizations (Czarniawska, 2007) and humans cannot be separated from the social context of organizations because we are embedded in, rather than being independent of, the organization (Perrow, 2000), it is

essential to study the social mechanisms in order to clarify the liaisons between the strategy process and content (Sminia and de Rond, 2012); we suggest uncertainty as one such mechanism.

Moreover, the social dimension of organizational activities is also important to cope with uncertainty for managers who work with real people (J. C. Spender, 2003). Because different varieties of source produce uncertainty in the social system embedded in the organization (Johansson & Persson, 2009), Lê & Jarzabkowski (2015) imply that some considerable scholars underline the significance of social dynamics during strategizing. Hence, this will help us understand the potential implications of responses to uncertainty on strategizing. Although a broader strategic role for middle managers is agreed by scholars (Van Rensburg, Davis, & Venter, 2014) and studies over the past two decades have provided valuable information on strategic roles of middle managers,, researchers' interest in this topic has somewhat reduced over the years (Shi et al., 2009). Little is known about how middle managers deal with uncertainty. In this article, thus, we want to explore middle managers' behaviours to deal with that uncertainty and identify the variables that middle managers consider as influencing the ways they deal with uncertainty. Also, we want to show what could be the sources of those uncertainties. Some scholars have tried to understand the interaction between organizations and their environment based on the uncertainty concept (Dill, 1958; Duncan, 1972; Lawrence & Lorsch, 1967; Thompson, 1967).

This chapter presents a description of the methods used for the first study, including the research design and rationale, participants, data collection, coding, and analysis procedures.

3.3. Research Approach and Methods

3.3.1. Background

We used in this study a qualitative research methodology in order to sufficiently investigate the complexity and meanings that people ascribe to human experiences (Morrow, 2007). In this case, the various forms and expressions are to unveil the sources of uncertainty, individual strategies, and variables, which are critical for middle managers to deal with uncertainty in the development and formulation of the strategy process. Qualitative researchers try "to make sense of or interpret phenomena regarding the meanings people bring to them" (Ellis et al., 2008, p. 4). Qualitative inquiry is often used to answer questions of "What" or "How" versus "Why," and typically focuses on experiences as a whole rather than on their constituents (Morrow, 2007; Moustakas, 1994). Additionally, Creswell & Clark (2005) propose that qualitative research is suitable when the researcher investigates the processes, or how things develop, and the theory needs to be established or elaborated.

Abductive analysis was warranted for this study because we were expecting to find new theoretical insights based on new evidence by moving back and forth between old theories and new facts (Timmermans & Tavory, 2012). Current theories and research on dimensions and types of uncertainty (e.g., Clampitt et al., 2000; Grote, 2004; Shenhav & Weitz, 2000) could benefit from further description and analysis. Abductive analysis is a research method for making replicable and valid inferences from data to their context, to provide knowledge, new insights, and representation of facts (Reichertz, 2007). Thus, a review of existing responses to uncertainty, types of uncertainty, and research on environmental and task uncertainty in uncertainty management assisted in

the coding process, and elements of inductive analysis were used to allow themes to emerge naturally from the non-coded parts of the interviews.

In order to identify differences among uncertainty sources and managerial responses to uncertainty that are noticed and perceived to be valuable by present-day middle managers, during the semi-structured interview we asked middle managers to self-identify sources of uncertainty and how they respond to uncertainty based on their perception during the formulation and implementation phases of the strategy (see interview questions in Appendix B). Also, semi-structured interviews allowed us to show the interaction of environmental and task (including procedural) uncertainty, and this interaction evokes different managerial responses. Managers iterate back and forth between the strategy process and strategy content issues, as they experience and respond to both environmental and task uncertainty. This iteration is critical, as actors cannot define all strategy content and process in advance and must follow an incremental, process-based feedback loop, identifying and resolving problems as these emerge during implementation.

3.3.2. Sample

The scope and purpose of this research is to unveil the sources of uncertainty, individual responses, and variables, which are critical for middle managers to deal with uncertainty in the strategy process. So we searched for middle managers who were in a position of either strategy making or implementing a process or both in order to adequately capture their perception of the responses to uncertainty. The sample consists of two separate groups; military and civilian middle managers (see Table 3.1). All military participants were working at strategic and operational headquarters at NATO at the time of research.

Middle managers at these headquarters are confronted with uncertainty regularly at a strategic level and can comprehend the several types of uncertainty facing their organization, so that they can present general attitudes in response to uncertainty. Their nationalities are Turkish, Belgian, Italian, Spanish, Dutch, and American. All participants are at least bilingual, and all hold master's degrees previously gained from universities in Turkey, Europe, and the USA. All hold managerial positions in headquarters with titles such as Branch Head and Section Head. All civilian participants are full-time, working managers in different public and corporate sectors. They also work in positions which require active participation to either strategy development or implementation or both. Their nationalities are Belgian, French, Italian, American, Dutch, Canadian and Kosovan. All are at least bilingual, and all hold MBA degrees previously obtained from universities in the USA and Europe (See Table 3.1). Their positions have titles such as Strategy Implementation Manager Europe, Middle East, and Africa; Director General; Senior Global Executive; Area Sales Development Manager, South Europe, Middle East & Africa, and Product Marketing Director Europe & Middle East. They were working for firms and sectors that include, for example: (1) a recruitment agency; (2) global manufacturing and distribution of advanced plastic piping systems; (3) the crop protection industry in Europe; (4) global supplier of complete wine closure solutions; (5) elevators and escalators; (6) an integration agency; (7) flat glass for various sectors.

This sample was mainly suitable for our research goal for several reasons. Primarily, data needed to be gathered from middle managers who face uncertainties. The military sample consisted of the participants from NATO posts. As stated in the Warsaw Summit declaration, NATO has faced multiple security problems and threats that are emanating from different regions, actors, and sources such as Russia's belligerent

engagements in Ukraine, non-state actors in the Middle East, and other hybrid confrontations[1]. The Alliance decided to apply a new strategy, namely the Readiness Action Plan, to confront those challenges[2]. Our sample managers took part in this strategy formulation or implementation process between Wales in 2014 and Warsaw Summit 2016 while working at NATO headquarters. Thus, they faced and dealt with many uncertainties during that time. Civilian managers also faced uncertainties due to BREXIT, migration to the EU, ISIL, and economic sanctions imposed on Russia[3]. Those environmental uncertainties, alongside internal ones, created many threats and opportunities for managers and organizations to deal with.

Second, the military middle managers' knowledge was also incredibly significant, because they were all selected for those duties by their national armed forces thanks to their achievements in their professions. Therefore, it is most likely that they represented the best human resources in their countries. Most of them also hold master's degrees. Likewise, the civilian managers in this study hold MBA or master's degrees. They had different nationalities, and at the time of research, they were working for multinational firms or public organizations. Moreover, they were members of firms that have different scales in different sectors. Finally, the middle managers were all well-educated, multicultural, multilingual, and global managers.

Third, it is crucial for this research that the sample middle managers actively participated in the strategy process. Therefore, all middle managers with a military

[1] http://www.mfa.gov.pl/resource/283018e4-2eb2-414f-b69f-de85afa1ac08:JCR

[2] http://www.nato.int/cps/en/natohq/official_texts_112964.htm

[3] https://www.weforum.org/agenda/2016/01/what-are-europes-big-challenges-in-2016/

background (between major and colonel) were working either at strategic-level headquarters, or at other headquarters but from strategic divisions or branches. Likewise, we searched for civilian managers who were active participants in the strategy process. Middle managers in the strategy process confront uncertainties regularly and present potentially meaningful behaviours to deal with them thanks to their long job tenure and diverse capabilities.

Table 3.1. Participants' Details.

Nu.:	Age	Gender	Nationality	Job tenure	Type of Organization
1	40-45	Male	Turkish	20-25 years	Military
2	45-50	Male	Italian	20-25 years	Military
3	35-40	Male	Spanish	15-20 years	Military
4	35-40	Male	Turkish	15-20 years	Military
5	40-45	Male	Turkish	15-20 years	Military
6	45-50	Male	Belgian	20-25 years	Military
7	35-40	Male	Turkish	15-20 years	Military
8	40-45	Male	Turkish	15-20 years	Military
9	35-40	Male	Turkish	15-20 years	Military
10	40-45	Female	Dutch	15-20 years	Military
11	45-50	Male	American	20-25 years	Military
12	55-60	Male	American	25-30 years	Civil
13	30-35	Female	Belgian	1-5 years	Civil
14	30-35	Male	Italian	5-10 years	Civil
15	50-55	Male	Spanish	20-25 years	Civil
16	50-60	Male	Belgian	25-30 years	Civil
17	55-60	Male	Belgian	25-30 years	Civil
18	30-35	Male	Kosovan	5-10 years	Civil
19	35-40	Male	Belgian	10-15 years	Civil
20	30-35	Male	French	10-15 years	Civil
21	55-60	Male	Dutch	15-20 years	Civil
22	55-60	Male	Canadian	20-25 years	Civil

3.3.3. Data Collection

Empirical data for this study were collected using semi-structured interviews. We held a

series of interviews between 2016 and 2017 for two years in Belgium. Most interviews were conducted face to face, with three exceptions. Two of them were video calls, and the other was a phone call. Duration of the interviews was between twenty-five and ninety minutes and was (with a few exceptions in military samples) taped and transcribed. When recording was not possible, we used hand notes. We conducted the semi-structured interviews in two different languages, Turkish and English. All 22 interviewees answered the same questions in order to be sure that the themes that surfaced were common across our sample and not just random incidents (Locke, 2001). We also asked complementary questions to assure this.

A story-telling manner allowed interviewees to elaborate their experiences without too much interference by answering questions such as, “When you are given a task that you do not know what to do, what actions do you take?” (Czarniawska, 2004). This question provoked informants to give examples of their responses to uncertain situations. Moreover, our questionnaire also covered a group of questions dealing with uncertainty in the strategy process, because interviewees need time to talk and tell their stories, which will generate narratives (Riessman, 2008). Particular questions designed to stimulate stories about uncertainty management included the following: "What are the sources of uncertainty that you face in your activities in this organization?" and "Could you give me an example of your meaningful contributions to organizational strategy making/implementation?” From these initial points, we investigated further information related to middle managers’ responses to uncertainty in the organizations. We also asked participants, “What kind of problems and uncertainty issues have you faced?" (see Appendix B). All interviews also involved other questions related to how informants define uncertainty and feel in an ambiguous situation. Beside the pre-arranged part, for standardized assessments across interviewees, we also directed

additional questions to elaborate remarkable comments in more detail. For example, whenever an informant mentioned actions involving uncertainty management, we probed with general follow-up questions (e.g., can you tell me more about these interactions?"). All these questions paved the way to an in-depth analysis of middle managers' actions in response to uncertainty in the strategy process.

3.3.4. Data Analysis

Our initial data collection was concentrated first on understanding differences among uncertainty definitions, sources, and emotions that are perceived by present-day middle managers. Especially, some classifications of environmental uncertainty sources that are still in practice were established more than 15 years ago (e.g., Voges et al., 2003; Priem et al., 2002; Miles & Snow, 1978; Duncan, 1972). So, we intended to identify sources of uncertainty, definitions, and emotions related to uncertainty and then compare them with extant literature. To complement this inquiry, we explored data to detect managerial responses to uncertainty.

Since our analytic method was abductive and abductions cannot be constrained by certain procedural techniques (Reichertz, 2007), in this research we also took advantage of general qualitative analysis practices (Boje, 2001; Strauss & Corbin, 1994; Riessman, 2008; A. L. Strauss, 1967). The analysis was completed by following several stages. Firstly, we defined initial codes based on the literature review, such as "sources of uncertainty," "definition of uncertainty," "emotional responses to uncertainty," and "behavioural responses to uncertainty." Secondly, after finalizing transcripts of interviews, they were uploaded into Atlas.ti version 1.6.0 (Friese, 2014). Thirdly, each interview's content was read numerous times to grasp the comprehensive sense of the

whole. Then data were selected into meaning units by using the quotation function. Concurrently, meaning units (quotations) were assigned with initial codes, when necessary with a new code such as “understand,” “cognitive procedures,” “communication” and “information” based on individual thoughts (Wester, 2005). The entire content was considered when assigned with a code. Each code represented a distinctive notion that related to uncertainty management or sources, and each was applied when subsequent similar thoughts were identified (Treviño et al., 2014). Finally, two different researchers with a managerial background analyzed the meaning units independently and developed themes and sub-themes that sufficiently explained the content of each meaning unit. Six themes and 23 sub-themes were established. The themes agreed upon by both analysts were as follows: (1) Collaborative responses, (2) Emotional responses, (3) Cognitive responses, (4) Value-based responses, (5) Bureaucratic responses, (6) Sources of uncertainty.

Aragón-Correa, Martín-Tapia, & Hurtado-Torres (2013) showed that information sharing and promoting collaboration is essential for the organization in an uncertain environment and helps to implement more proactive strategies. We believe that collaborative responses help the manager to deal with uncertainty. Also, collaboration increases the possible implementation of distributed cognitive responses, which are beneficial in the uncertain environment (Michel, 2007). On the other hand, emotional responses may decrease the competency of managers; as Greco & Roger (2001) suggest, uncertainty may lead to counterproductive coping responses. However, value-based responses can counterbalance such downsides. Comparably, despite its problematic inefficiency, bureaucracy could be used to reduce uncertainty in organizations - especially public ones (Gajduschek, 2003).

3.4. Findings

Our primary goal in running this qualitative study was to prompt our interviewees to reciprocally unveil the content factors that contribute to deal with uncertainty. Our inquiry, based on answers to the questions asked of the informants, resulted in the themes and sub-themes that comprise Table 3.2. Six themes and two or more sub-themes for each theme were identified. Table 3.2 also presents an overview of the amounts of meaning units categorized into each sub-theme. Each meaning unit was used in only one sub-theme.

Nonetheless, each of the 22 informants could have revealed more than one sub-theme. We display the findings of our analysis and elucidate association among the themes and sub-themes. Table 3.5 demonstrates representative meaning units from each sub-theme to show the rationale behind the naming those themes and sub-themes. The phrases in bold print were used as a commencing point in naming the sub-themes. These meaning units also funneled our integration of middle managers' responses to uncertainty and related theories to describe our findings. Each quotation has numbers in parentheses that indicate the respondent's Atlas.ti assigned code and the meaning units extracted from the transcribed interviews.

Table 3.2. Themes, subthemes, number of comments and number of respondents

N=22		
Theme/sub-theme	Number of comments	Number of respondents
Collaborative responses	**60**	
Advice seeking	19	14
Common platform	13	8
Discussing	12	7
Buy-in Process	11	9
Awareness Making	5	4
Emotional responses	**24**	
Unconfident	9	7
Insecure	9	5
Stressed	3	3
Positive	3	2
Cognitive responses	**58**	
Clear direction	13	9
Cognitive process	15	11
Information exchange	14	9
Assumption	10	7
Planning	6	4
Value-based responses	**23**	
Trust	9	6
Honesty	6	4
Unproductive behaviours	8	6
Bureaucratic responses	**27**	
Leader's responsibility	13	9
Power	6	5
Roles and responsibilities	8	4
Sources of uncertainty	**41**	19
Internal	20	11
External	21	8

3.4.1. Sources of uncertainty

The organizational environment is by nature full of uncertainty that may threaten the existence of the organization (Salancik & Pfeffer, 1978) and managers' perceptions of this environmental uncertainty are connected to their managerial activities (Voges et al., 2003). Our findings in this study exposed the sources of uncertainty as a distinct theme with two sub-themes, namely, internal and external (environmental), similar to previous studies (see Priem et al., 2002 and Voges et al., 2003). Table 3.3 shows six distinctive sources of uncertainty in detail. Our first source of uncertainties under the internal theme is *internal organizational conditions*. According to our respondents, internal structural changes related to strategic decision or reorganization; change of leadership/management and shareholders; and lack of clear direction, policies/procedures or decision from top management create uncertainties within the organization. Middle managers are not only dependent on superiors, but also, they are reliant on their colleagues. Moreover, most tasks, specifically non-routine tasks, require including cross-functional departments, which generates complexity.

Table 3.3. Sources of uncertainties

Sub-theme 1: Internal Sources	**Civilian (C) or Military (M)**
(1) Internal organizational conditions	
Internal structural changes	C
Leadership/management	C / M
Colleagues	C / M
Complex and non-routine internal tasks	C
Policies/procedures of the organizations	C
Shareholders	C
Sub-theme 2: External Sources	
(2) Techno-economic conditions	
Worldwide economic crisis	C
Technological changes	C

(3) International instability and disasters	
Worldwide political instability	C / M
International terrorism	C / M
International migration and humanitarian crises	M
Disasters	M
(4) *Governmental Influence*	
Domestic policies	C
Resource allocation	C / M
Regulations	C
(5) Societal pressure	
Societal pressure	C
NGOs' pressure	C
(*6) Competition and Customers*	
Customers	C
Competition	C

The external theme compromises five different subthemes. The worldwide economic crisis, such as in 2008, and technological changes form the second source of uncertainty, viz: *techno-economic conditions*. The third source of uncertainty is *international instability and disasters.* Worldwide political instability such as the situation in Syria with ISIS, BREXIT, or selected unreliable leaders is one pillar of this sub-theme. Evolution of the geopolitical environments, such as international terrorism, migration, and humanitarian crises, affecting local, regional, and global stability, is the second pillar of this theme.

The last pillar of this theme includes disasters such as hurricanes, floods, and earthquakes. *Governmental Influence* is the fourth source of uncertainties. Changes of political vision, regulations, or resource allocation are the main reasons for labelling this sub-theme. Societal pressure alongside NGOs' pressure may affect regulations and policies in the country or even in international organizations such as the European Union. Thus, we labelled this sub-theme as *societal pressure.* The last sub-theme is *competition and customers* as the last source of uncertainties. The reaction of the

customers to potential strategic change and changes in their conditions, and entry of a new competitor to the market, may create uncertainties.

Table 3.4. Comparison of the sources of uncertainties

	Duncan (1972)	Miles and Snow (1978)	Daft, Sormunen, and Parks (1988)	Priem et al. (2002)	Voges et al. (2003)	
Internal						
Organizational Conditions	X			X	X	X
External						
Governmental Influence				X	X	X
International Politics and Competition				X	X	
International Instability and Disasters						X
Political	X				X	
Industry Competition	X	X	X	X		X
Economic		X	X		X	X
Societal	X	X	X	X	X	X
Technological	X		X		X	X
Regulatory		X	X	X		
Customers	X	X	X			X
Suppliers	X	X		X		

3.4.2. Emotional Responses

Our middle managers revealed their feelings, which we categorized into the theme of Emotional Responses and sub-themes Unconfident, Insecure, Stressed, and Positive (see Table 3.2). They indicated that when they faced an uncertain situation, certain emotions were apparent in dealing with those uncertainties (n = 24; see Table 3.2). Previous researchers inferred that uncertainty is connected to emotions of hope, surprise, worry, sadness and fear (Roseman, 1984; Scherer, 1984; J. D. Smith, Beran, Redford, &

Washburn, 2006; Tiedens & Linton, 2001). So, we categorized challenging, disliking, unconfident, frustrated, and disorienting states as unconfident. We labelled fear, worries about losing the job, and anxiety about a task or current position as insecurity.

Mostly middle managers find uncertainty challenging alongside stress when faced with an ambiguous task. Greco & Roger (2001) explained that uncertainty was linked to higher stress, and emotional uncertainty may lead to maladaptive coping patterns, where individuals react to uncertainty with anxiety and sadness. Anxious feelings are also salient according to our respondents and, to them, their feelings affect them negatively and even sometimes block their rational thinking, because uncertainty pulls them away from their comfort zone. Outside of this zone is a hateful and unsure sphere where it is difficult to act knowingly and achieve expected results or perform well. So the exemplary comments in Table 3.5 by two of our respondents are:

> *"[...]but I definitely also have lack of confidence in a way that it is very hard for me to learn new things for example. Because I think that I automatically think that I won't be able to make it. It is hard for me to just be curious, ambitious and stuff like that because for me I am not going to able to make it. So, that is why I prognosticate, that's why I asked for other people[...]" (19:7).*

> *"[...]You know what the very stressful - you know, very stressful because you don't know what to do and you don't know what to expect and you don't know where is the proper thing to do because you think [...]" (6:2).*

Those responses indicate how they are unconfident in confronting this new climate. Therefore, lack of confidence, in a way, accumulates stress in the business environment, which may lead to unhealthy results both for managers and for team members.

Pelham & Wachsmuth (1995) presented in their study that while individuals are uncertain about their self-views, they get involved in more systematic processing. Weary & Jacobson (1997) have revealed that individuals who always feel uncertain process information more methodically than do individuals who always feel certain. On the other hand, our findings show that managers try to stay positive. The response in Table 3.5:

> *"[...] just two things, one is optimism, you know, try to be positive, to keep positive, hope will - try to - try to think about the other side, try to think about opportunities, trying to think about hidden there [...] "(10:16).*

That shows how managers try to stay calm, positive, and optimistic to focus on opportunities hidden in an uncertain environment. Consequently, emotional responses are relevant because the substantial experience with uncertainty may eventually affect cognitive processing (Tiedens & Linton, 2001).

Individuals feel insecure when their job is threatened, and job insecurity involves future uncertainty, especially if a person has a concern that his current position is at stake (Witte, 1999). In response to the most difficult uncertain situation question, some managers explained their fear of losing a job or their positions when they faced uncertainty, because besides being a qualified stressor, job insecurity contains different aspects of uncertainty perceptions (Sverke & Hellgren, 2002). One manager explained that he first tries to understand his responsibility for getting this uncertain situation. If he had contributed to these conditions, he would have reviewed his career plans. Later he also added:

> *"[...]gets a bit harder to ensure that you have the next chapter either*

within or without the company[...]" (1:5).

Another manager said for a comparable situation:

"[...]curious about yourself, your position[...]" (2:6).

That expression also is an example of how they feel threatened. In addition to uncertain situations disagreements between the managers and their seniors contribute to job insecurity. Moreover, one manager stated that:

"[...]I think we are going to make a sort of atmosphere in the organization of permanent fear of losing your job[...]" (4:1)

Collective job insecurity may contribute to a maladaptive climate, because job insecurity is inconvenient due to lengthy uncertainty (Joelson & Wahlquist, 1987).

3.4.3. Collaborative responses

In Table 3.5, we report that our respondents indicated they relied on collaborative responses (n = 60). These responses were regarded as valuable in an uncertain situation. Listed in Table 3.2 are the sub-themes of *Advice seeking, Common platform, Discussing, Awareness making and Buying process.*

Dyer & Ross (2008) stated that advice seeking helps firms to face a complex environment to be successful. According to them, advice decreases uncertainty and supplements expertise in the decision-making process in a dynamic environment. Duncan (1972) identifies the complex and dynamic dimensions of the environment as the most crucial factors of the perceived uncertainty. Thus, in our findings, managers indicated that they seek advice horizontally and vertically in the organization or even sometimes outside the organization when they face uncertainty. They specifically

consult:

"[...]main manager[...]" (6:1),

"[...]the colleagues[...]" (7:5),

"[...]all relevant subject matter experts[...]" (13:1),

"[...]people outside the HQ[...]" (15:1).

They mentioned the reasons behind the advice-seeking as to get their support, share responsibility, use their experience, get specific information or knowledge, catch a different or comprehensive perspective, find a method, an inspiration, and different inputs to minimize uncertainty and develop an approach to prepare for unanticipated conditions.

Complex design problems necessitate the contributions of more than one person due to the distribution of the relevant knowledge among the stakeholders (Arias et al., 2000). Since complexity is one of the factors contributing to uncertainty, the uncertain situation requires a similar approach. Thus, crafting a shared understanding among the participants may help to reach new perceptions, new opinions, and new artifacts (Arias et al., 2000) to solve uncertain problems. Our findings also suggest that managers try to build shared understanding. One said:

"[...]shared meaning is gained through dialogue; leaders must adjudicate conflicting interpretations of their strategy[...]" (13:8)

Moreover, another also mentioned:

"[...]try to make sure that everybody within the organization, the team, has the same understanding[...]" (8:53).

To reach a shared understanding and contribution of every single team member, managers should create a common platform:

> *"[...]so you need to create that platform where people, even with distinct cultures and diverse backgrounds, feel that there is a common platform to stand on (1:51).*

According to managers, this is a platform in which everything binds people together and makes things into a concrete proposition or solid foundations when continuously dealing with uncertainty. In this platform, one can maintain a healthy level of uncertainty, which creates a kind of creativity. So it is essential to have the right strategy and involve everyone in the team to define a common goal, mutual understanding, and shared objective to build a comprehensive approach.

So managers try to reach every single person to make everybody aware - as one manager said:

> *"[...]try to make everybody aware of the situation[...]" (2:15).*

Then they take the awareness one step ahead by discussing. The discussion is a way for a manager to involve everybody, find new opinions, and build shared understanding. One manager stated:

> *"[...] Let us discuss until we come to an agreement [...]which is important because the more you discuss, the more[...]you have covered different areas[...]" (8:60)*

Moreover, another mentioned:

> *"[...]well, you make sure that everybody has a voice, you know[...]"*

(3:15).

In most situations, the personnel of the organization is inclined to accept the managerial rulings (Monin, Noorderhaven, Vaara, & Kroon, 2013). Managers frequently coerce their staff to accept new rules in an uncertain situation. Acceptance is described as the acceptance of the proposed sense of integration (Giessner et al., 2006). Although acceptance manifests itself in different ways, we are interested in buy-in, which is acceptance of distributive rules (Monin et al., 2013). Managers need to create a common platform for the buy-in process. As one manager stated:

> *"[...]you need to have you - need to create enough forums internally that you ensure that there is buy-in across your boss, your immediate direct reports, and their direct reports, that everybody moves in unison in an online fashion. That also, by the way, has a very good way of reducing uncertainty because one of the main elements of uncertainty, when you're implementing strategy, is how well your team implemented, and implemented not just how they do it, but they want to because they believe in it, and if they don't believe in it then it's much harder for implementation to happen in a smooth fashion. So, the buy-in process in as wide a way as is realistic is an important need. Part of the success of any strategy[...]" (1:44)*

It is also vital to create ownership in both development and implementation phases in strategy. This is also a social process that helps people to understand and make the strategy inclusive and their own.

Table 3.5. Exemplary Comments.

Theme	**Sub-theme**	**Civilian (C) or Military (M)**	**Examples of meaning units**
Collaborative responses	Advice seeking	C / M	"…then you ***go to colleagues*** who maybe have similar situations or who have had the same uncertainty and resolve to see if they have any solutions or what they did" (10:1)
	Common platform	C / M	"…you need to create that ***platform*** where people, even with different cultures and different backgrounds, feel that there is a ***common platform*** to stand on... you want the team to share in ***common,*** and you invest the time to develop that then the rest follows" (1:51)
	Discuss	C / M	"…the aspects that people give more importance comes from their area of expertise, but this is exactly how it should work: initial ***discussion*** and agreement on the main points should always be the starting point" (12:3)
	Buying process	C / M	"Early in the process to make sure that everybody is ***buying*** and …that's not just in the design of a strategy or a perfect - on paper but also in the social process of dealing with it" (9:2)
	Awareness making	C / M	"…organizing mobilizing communication sessions like webinars or - so trying to align them on what's going on actually in this very moment. We are having a drumbeat session...CEO and division head is present ... And there I am basically sharing all initiatives and try to ***make everybody aware*** of the situation" (2:15)
Emotional responses	Unconfident	C / M	"…but I definitely also have a ***lack of confidence*** in a way that it is very hard for me to learn new things … that I automatically think that I won't be able to make it. It is hard for me to just be curious, ambitious..." (19:7)
	Insecure	C / M	"I think we are going to make a sort of atmosphere in the organization of permanent **fear of losing your job"** (4:1)
	Stressed	C / M	"You know what the very ***stressful*** - you know, very ***stressful*** because you don't know what to do and you don't know what to expect, and you don't know where is the proper thing to do... So, it's very stressful because if you don't know the results or even if you don't agree with that …" (6:2)

	To be positive	C / M	"Well, just two things, one is optimism, you know, try to be positive, to keep positive, hope will - try to - try to think about the other side, try to think about opportunities, trying to think about hidden there" (10:16)
Cognitive responses	Clear direction	C / M	"I think. The most key thing is to identify ***a clear direction,*** a clear strategy to set the direction for the company with goals from there everything else follows so if you ever have to escalate uncertainty back up ultimately if it has to come to the leader the ultimate leader it's it has to be in line with his direction" (10:4)
	Cognitive process	C / M	"My usual way of doing this is ***trying to analytically split it up*** and see what part of that I understand and what part of that I don't understand and if it's really necessary to understand then or can I work around that. Or do I need to help other folks? So that the personal approach is going quite ***analytically***…" (7:4)
	Information exchange	C / M	"How close expertise can you ***get information*** and help from different areas, the better? Therefore, it may be necessary to establish a very wide network. Sometimes, the ***information*** needed can be somewhere in the organization…achieving this *information* is important" (11:1)
	Assumption	C / M	"… but in the absence of clarification, ***assumptions*** are necessary until they can be replaced by facts…" (13:4)
	Planning	C / M	"So, one way to handle the uncertainty is to ***plan ahead***… to me it's how to live under uncertainty, is a mix of both, so you need to ***plan ahead*** to give enough room for opportunities…" (8:66)
Value-based responses	Trust	C / M	"They believe what you say…that's the most important thing is to be ***trustable***... I ***trust*** him if he says something about it" (4:5)
	Honesty	C / M	"Talking to the people, it's all for me; it's about people and communication, you need to ***be very frank,*** direct. I think in those times being an ***open, frank, direct*** to people…" (5:4)
	Unproductive behaviours	C / M	"I needed to get information from subordinate elements about a subject at once that I had to make preparations based on this information. Subordinate elements provided me and my supervisors with ***different figures***…I had reached a false result due to the ***false information***,

			but you couldn't explain that your ***comrade gave wrong data"*** (14:10)
Bureaucratic responses	Leader's responsibility	C / M	"For those uncomfortable with an ambiguous situation, it is important for the ***leader*** to build a framework that reduces uncertainty" (13:10)
	Power	C / M	"… the problem with the owner was that he was always talking with the employers around…have a lot of discussion with him that is not good for both of us? …those guys chatted with him…were the biggest problem in restaurants of the market. Because they felt ***power*** and... I will solve it, but I will fire him" (6:6)
	Roles and responsibilities	C / M	"if the ***roles and responsibilities*** are not clarified... who should take out this problem and eventually nobody takes care of the problem" (8:68)
Sources of uncertainty	Internal	C / M	"The sources are the main sources of uncertainty, or you know the regular ***restructuring*** that goes on..." (1:63)
	External	C / M	"I think today uncertainty would be more economic and the **political situation**. When you see what happens in the world, what's happened in Syria with ***ISIS*** or what happens in the ***United States*** for **Trump**…have an impact to the economic situation and that brings uncertainty..." (5:8)

3.4.4. Cognitive responses

In Table 3.5, we display that our interviewees implied that managers developed cognitive responses (n = 58). These responses, listed in Table 3.2, are the sub-themes of *Clear direction, Cognitive process, Information exchange, Assumption, and planning.*

Cognitive uncertainty is related to the process of thinking, reasoning, cognition, and cognitive information (Ayyub, Gupta, & Kanal, 1992). We think that to deal with this kind of uncertainty; managers should use their cognitive capabilities. These capabilities allow managers to define the problem and develop a course of actions (Dosi & Egidi, 1991). Our respondents mentioned using these capabilities as well to frame uncertainty:

> *"[...]dealing with uncertainty is to go to the root of what's going on not, so much look at the phenomenon but it is the case in the markets or elsewhere where you have more to take a step back and look what's going on and hence you're probably less surprised, less likely to be surprised by the uncertainty[...]"(9:4).*

They logically and methodically identify their options. One said:

> *"[...]about the options you have as related to the impact of those options you need to take[...]" (2:9).*

Also, another:

> *"...create scenarios on taking advantage of all of these different options like playing chess[...]" (1:50).*

Perception of cognitive uncertainty prevents personnel from working efficiently due to the absence of essential information (Ayyub et al., 1992). So individuals seek information to decrease uncertainty (Hogg, 2000). Managers stated in their interviews that they look for data, information, or knowledge in an uncertain situation, as one respondent stated:

> *"[...]you need every information that is necessary at this moment…all kinds of data…I had to be prepared with data[...]" (4:11).*

They try not only to get information but also provide their colleagues with information.

> *"[...] I am busy myself, I have the habit of forwarding a lot of information to the whole team, which is a risk because I may create an information overload too. But I don't have time to read it[...]" (9:11).*

He wants to have information ready at the decisive moment. However, managers usually use the information to reduce uncertainty, make analysis, support their case, decide, or delegate responsibilities among the teams.

On the other hand, managers explained that they use assumptions to fill the information gap;

> *"[...]The uncertainties we face is that in strategy process[...]you have to make assumptions. The more assumptions you need to make in a strategy process, the more, you feel like, you are on the uncertain part[...]" (7:1).*

These assumptions will, if possible, be replaced by facts after reviews. However, mostly, planning is the main asset to reduce uncertainty;

"[...]if you have a thorough planning then you can really reduce the uncertainty because you create clarity for everyone down the chain to your senior leadership[...]" (1:59).

The focal point of planning under uncertainty is to comprehend and find a solution to the problem (Boutilier, Dean, & Hanks, 1995). In the continually changing environment, according to interviewees, plans should be flexible, and assumptions should be reviewed periodically; even contingency plans should be prepared based on scenarios.

Managers need a clear direction to follow to make them understand and make it clear for others or provide a framework. Problem-solving and model-building are the significant undertakings when leading under procedural uncertainty (Dosi & Egidi, 1991). In this condition, framing the problem or the uncertain situation or finding a path to follow helps to reduce uncertainty. Middle managers expect their seniors to frame the way ahead:

"[...]Leaders need to be like a compass[...] compass is accurate enough to keep you on the right track[...]in the right direction[...]" (14:8)

or

"[...]leaders provide the framework for action[...]" (13:6).

On the other hand, they are required to frame the uncertainty for their subordinates:

"[...]my biggest contribution is to end up with a document which is easy to read, easy to explain, easy to understand for people, to which they can relate, and which is executable[...]" (3:2).

3.4.5. Value-based responses

In Table 3.5, we present that our interviewees inferred they established value-based responses (n = 23). These responses, listed in Table 3.2, are the sub-themes of *Trust, Honesty, and Unproductive behaviours.*

Trust may present itself as a foundation to reduce uncertainty (Nooteboom, 1996) and empower people to cope with uncertainty as a social structure (P. Lewis, 2008). Also, trust enables us to act as if we are sure and concurrently reduce complexity (J. D. Lewis & Weigert, 1985), which is also the dimension of uncertainty. Similarly, in our interviews, managers stressed the importance of trust in uncertainties. Furthermore, they mentioned that trust helps to build a cooperative working environment:

"[...]In the government where they say OK, we have confidence that these people can try this[...]and you have to always work together so that you have collective cooperation[...]" (9:7).

Conversely, lack of trust may be detrimental for the working environment:

"[...]series of crises can escalate to the level where there is a total loss of confidence and leadership and the leadership change which could then eventually result in a strategic change[...]" (1:57).

Although honesty is not equal to trustworthiness, it is a significant fundamental value in a close relationship with trust (Rose-Ackerman, 2001). Furthermore, honesty completes trust in a way to build an environment to reduce uncertainty. Our respondent stated that they should openly communicate uncertain situations without hiding problems to let tensions come to the surface, because the inconsistency of the information postulated by a manager may be regarded as an indicator of dishonesty, which reduces trustworthiness (Gómez, Carbó, & Earle, 2007).

Another dishonesty that impairs trust is corruption (Rose-Ackerman, 2001). Our interviewees mentioned corruption as one of the most problematic situations under uncertainty:

> *"[...]it was stolen by waitresses and bartenders. So, we have to figure it…which group was stealing[...]that was the most difficult one, but we found them[...]" (6:3).*

Lack of robust control may be the reason behind this:

> *"[...]see uncertainty because people have to be able to act, but there was this strong case of corruption in there, in one of these offices, and I found it very difficult to operate from headquarters in trying to control what was taking place literally five thousand kilometers from my work[...]" (9:8).*

One manager gave a corruption example, not at the individual level but an organizational one:

> *"[...]other part is that we don't always know that it really is an attack. In cyberspace is that[...]it is common that sometimes these companies that we contract out our services to if their systems go down there's a penalty - a financial penalty that they have to pay[...]it's very easy for them to claim that 'hey this was attacked by a criminal group or Russia' [...]I'm really not convinced there was an attack[...]"*

(18:2).

In some cases, managers also reported that some staff were providing misinformation or telling lies:

> *"[...]They are telling things that are not true, that kind of things, that is dangerous for a change process [...]" (4:7).*

Moreover, another example is:

> *"[...]subordinate elements provided me and my supervisors with different figures…I had reached a false result due to the false information[...]" (14:10).*

Managers reflected that certain personnel who work with limited information make recommendations not based on a full picture or they are just lying, so they cannot rely on those recommendations or information, which means that telling lies may also increase uncertainty.

3.4.6. Bureaucratic responses

In Table 3.2, we show that our interviewees mentioned bureaucratic responses (n = 27). These responses, listed in Table 3.2, are the sub-themes of Leader's responsibility, Power, and Roles and responsibilities.

Organizational rules are meant to reduce uncertainty (Wall et al., 2002) such as standard operating procedures, decision-making processes, and dependence on rules (O'Toole Jr & Meier, 2003). In the responses of managers, we see that unclear roles and responsibilities may create difficulties in accomplishing a new task requiring cross-functional activities:

"[...]And for me a lot of trouble with that dealing with ..there is a team that is a task force that is set – set up to fix the issue which involves technology, communication…pricing, financial, partnership and a bit of everybody[...]who is in the driving seat to lead the task force to solve the thing, it's not very clear[...]it's not very clear who has to do what and to drive everyone in the same direction[...]"(8:70).

In those cases, crossing someone else's border also creates more challenges. Thus, some managers prefer defining clear-cut roles and responsibilities within and across the team. However, this provision is occasionally not enough to deal with uncertainty. At these times, they put forth their effort to empower teams or team members:

"[...]leaders are responsible to ensure that the environment is positive for execution to empower our team and to resources[...]" (3:4).

Because empowerment tactics are efficient under circumstances of high uncertainty (Ward & Chapman, 2003), in addition to empowerment, power is another way of reducing complexity and uncertainty by controlling the dynamics of the social relationship (Bachmann, 2001). Managers explained how power relationships affect their work:

"[...]the problem with the owner was that he was always talking with the employers around…have a lot of discussion with him that is not good for both of us[...]they (employees) felt the power, and I said OK this is a problem. Solve it (to the owner) [...] I will solve it, but I will fire him. Do you agree with it?" (6:6).

3.4.7. Variables affecting responses

To find the variables that might affect the responses, besides emerging themes, we have re-assessed interviews to find possible variables. We have found organizational, team, and individual variables affecting specific managerial responses to uncertainty.

One of the variables stimulating distinctive behaviours among the managers could be whether an organization embraces uncertainty or not. In our interviews, one manager explained how his organization sees the uncertain situation as an opportunity and forces the manager to take riskier steps:

> *"[...]And direction says no, no! At this moment we have to use this opportunity to hold the strong profiles[...], so that is a different point of view right now[...]" (4:17).*

In this case, the manager was compelled to act differently. On the other hand, another organization in uncertainty may feel threatened and act more cautiously, although managers think contrariwise:

> *"[...]so you know the only thing, the only thing I can do is try to convince companies that they still need to invest[...]otherwise, you know it was their own evolution will stop[...]" (5:11).*

So the organizational climate towards uncertainty may differ and influence the actions of the managers.

Organizational dimension is another variable that may affect managerial responses to uncertainty. For instance, in our interviews, managers stressed that decentralized structure influences them:

"[...]in the United States I was responsible for eight offices across the country…therefore, you have this classical principal agent dilemma[...] you have to love for it and see uncertainty because people have to be able to act." (9:14).

So, managers were inclined to empower their subordinates and have less control over them. On the other hand, the size of the company may also play a vital role. So, a manager explained that:

"[...]the small company is not formalized, there is no way, or there is nowhere to look for information[...]" (8:76).

Therefore, he must develop a more interpersonal relationship with the employees to reach information. However, in more prominent companies, political behaviours are more salient, and managers are less motivated to get efficient and effective under uncertainty.

We have found team cohesion to be another variable possibly affecting managerial actions. In our interview, a manager explained his most challenging position in an uncertainty putting the team cohesion at the epicenter:

"[...]we had been close to me[...]I had the perception that had betrayed me[...]I had contributed to that and to their actions because of the stress I put them under[...]you sometimes are so passionate about what you're doing professionally that you neglect the impact that it can have on team members who have a burnout in basically[...]" (1:69).

The cohesion affected team members' commitment to projects running in the company. Also, experience and proficiency level of the teams may affect managerial behaviours under uncertainty:

"[...]There are teams well senior enough and entrepreneurial enough[...] you just need to put the goal and [...] Other teams, you need to be more directive… you need more detailed where you need to be more on the control side, plan and control[...]" (5:13).

In this case, managers tend to change the level of control on their team according to these characteristics.

Age is also another variable affecting managerial behaviours. In our interviews, it is stated that:

"…So, I am in my mid-50s, and clearly, it is a different situation for someone in his mid-fifties than someone in his mid-40s or 30s. So, the younger you are, the more flexible and the more opportunities you still have…" (1:68).

Managers think that as they get older in management, they tend to feel insecure and take fewer risks. On the other hand, they are more experienced and can stay calm under uncertainty;

"…You know I am about fifty, so no panic. No, I think when you face uncertainty you just need to understand the problem and address the problem one way or another…" (5:12).

So, we believe that age is another variable that affects managerial responses to uncertainty in significant ways.

Consequently, we have found that organizational dimension, organizational climate, team cohesion, and age are the variables affecting different types of managerial responses to uncertainty. Although our findings support the relationship between the organizational dimension and managerial

responses to uncertainty, the evidence lacks clarity on the exact types of the dimensions. We believe that organizational dimensions could be loosely or tightly coupled, centralized or decentralized, and mechanical or organic structure organizations.

Like managerial responses, organizations have a different attitude towards uncertainty. Embracing responses by the organization are more critical than individual productive behaviour under uncertainty (Clampitt et al., 2001). Clampitt et al. (2001) suggest that various organizational responses together with employee responses create different organizational climates. Those different climates also affect individual managerial attitudes towards uncertainty and their typical responses.

Our results support that team cohesion affects the managerial responses to uncertainty. Since there is a positive relationship between team cohesion and trust in the social exchange theory concept (Mach et al., 2010), team cohesion may be related to the value-based and collaborative responses because trust is salient in both responses according to our findings. Age is also an essential factor to determine the type of responses, especially emotional responses, because job insecurity is more salient in older age.

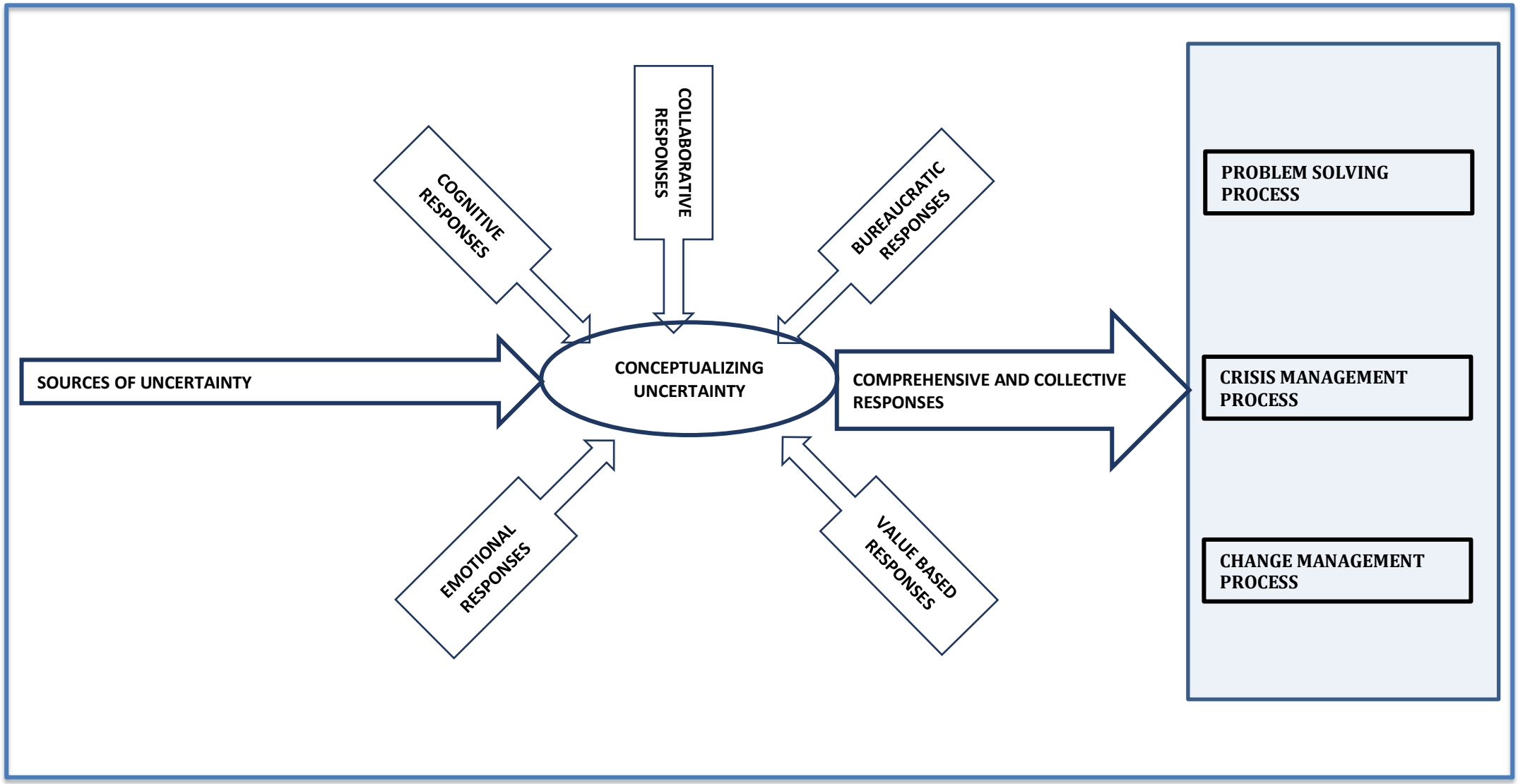
3.5. Discussion

Based on abductive reasoning, we analysed middle managers' collective comments (Tables 3.2 and 3.5) and suggest the uncertainty management model depicted in Figure 3.1. This study has outlined middle managers' responses to uncertainty in the strategy process and enhanced the assertion that middle managers dynamically contribute to both the development and the implementation of the organizational strategy (Wooldridge & Floyd, 1990).

The themes in our study indicate an answer to our first research question: what are the sources of uncertainty perceived by middle managers in the strategy process? The six uncertainty source groups shown in Table 3.2 result from two distinct sub-themes that were revealed in classifying uncertainties. The six uncertainty source groups are *Internal organizational conditions*; *Techno-economic conditions; International instability and disasters; Governmental influence; Societal pressure;* and *Competition and customers.*

In order to find similarities and differences, then, we have compared our finding with previous taxonomies, with the help of a study by Voges et al. (2003) in Table 3.4. Table 3.4 reviews the similarities and differences among our themes, three famous U.S. private sector typologies, Priem et al. (2002) and Voges et al. (2003). All six taxonomies include societal uncertainties and organizational conditions; economic, customers, and technological uncertainties are familiar sources among the taxonomies. This indicates consistency over the years. However, our economic source represents global economic conditions, and we also found international instability and disasters as a new theme in our study. This may imply that global environmental conditions or internalization are now considered more essential categorizations. The absence of some old sources is most probably because other sources subsumed them. For instance, regulatory and political sources were possibly included in governmental influences. Some others were no longer seen as uncertainty sources, such as suppliers.

Figure 3.1. Uncertainty management model



The second goal of the study was to find the middle managers' responses to uncertainties. We achieved this by identifying behavioural and emotional responses that help middle managers in dealing with uncertainty during the strategy process. Our model has been developed to present the findings from managers' responses to uncertainties. The findings show that it is essential that middle managers frame the uncertainty so that they can consequently develop a conceptual understanding and then finally reach comprehensive and collective appreciation for employing other necessary managerial processes such as problem-solving, crisis management or change management. It is not necessary for the uncertainty responses to be sequential or to have a specific beginning and end because every human interaction in the organizations results in new uncertainties.

Although developing individual cognitive responses is beneficial, managers find it more useful to develop mutual cognitive responses. One possible way of realizing these responses is to use distributed cognitive responses which were constructed by interactions between the personnel and their social and material setting (Michel, 2007). Managers individually still use reasoning, thinking, assumptions, and other analytical methods. However, this approach is not enough to solve the complexity, owing to both internal and external sources of uncertainty. Also, middle managers do not work alone; they must work together with their staff; thus, using distributive cognition to conceptualize uncertainty is one of the first attempts to do so, since cognition, dispersed across a cognitive system, has more excellent capability than any given individual (Michel, 2007). So managers exchange information to gain a distributed cognition viewpoint on finding clear directions (see Nilsson, van Laere, Susi, & Ziemke, 2012).

Collaborative responses have also been found valuable for middle managers to deal with uncertainty. Collaboration helps managers to combine interests, including all stakeholders, and discover different perspectives and opinions of the situation (Samarah et al., 2003). They need to enhance the capability of all people and empower them (Raelin, 2006). As the first step to reaching

collaboration, managers tend to increase the situational awareness of the staff. So, within the organization, they try to reach as many as people who can use their knowledge and information towards the goal (Endsley, 1995). Secondly, they try to get the best possible advice from them and discuss all the relevant circumstances. To do that, they need to create a platform where all participants feel comfortable and oriented under continued uncertainty. This platform fosters such a climate, in which people can realise their potentials within a healthy level of uncertainty. After reaching consensus or a decision, the next step will be buy-in, the process by which managers construct the high-level acceptance among the personnel.

Value-based responses also were revealed to be essential, enhancing collaborative responses and exchanging lack of information with trust and honesty in uncertainty management. Trust, especially, helps managers to enhance peoples' commitment and performance (Gould-Williams, 2003). Thanks to that, people are more likely to contribute effectively in collaborative responses. Furthermore, trust also contributes to the creation of a common platform to cultivate uncertainty responses. On the other side of the coin, value-based responses contain unproductive behaviours, which may negatively affect all these processes, because, on the one hand, distrust may pave the way to dysfunctional consequences (Carnevale & Wechsler, 1992). On the other hand, uncertainty can produce deviant behaviours. The combination of the two may lead to more unproductive behaviours in the organization.

Bureaucratic responses have also been found necessary for middle managers to deal with uncertainty. Managers may need to deal with discrepancies of the uncertainty emerging from role conflict in the organizations (Herzig & Jimmieson, 2006). One way of doing this is to have well-defined roles and responsibilities. When the extant roles and responsibilities do not match a new task, they are to be redefined by middle managers or their seniors. However, some circumstances require more than redefining the roles; then managers try to empower their personnel to overcome the uncertain situation as previously mentioned or redistribute power among the staff.

Emotional responses also were revealed to be essential for middle managers to cope with uncertainty. Although the emotional management of the personnel is essential for managers (Huy, 2002), their own emotional situation is also critical because emotions affect judgment under uncertainty (Tiedens & Linton, 2001); furthermore, they must manage emotions in order not to endanger the necessary climate, which is essential for collaborative responses.

Our model suggests that uncertainty is most probably a harbinger of serious problems, crises, or change. Middle managers conceptualize uncertainty into comprehensive and collective responses thanks to emotional, cognitive, value-based, bureaucratic, and collaborative responses. Nevertheless, uncertainty does not fade away entirely but lingers and revives again in different forms during the other managerial processes.

The third goal of the study was to find the variables that might affect the responses. So we will now discuss organizational and team variables affecting specific managerial responses to uncertainty. Like individuals, organizations also develop different approaches to uncertainty. Clampitt & DeKoch (2016) has found that organizations that embrace uncertainty can create better workplaces and managers in these organizations correctly frame information, inspire attentive decision making, generate synergy and nurture innovation. Those managers are likely to have collaborative responses to uncertainty. Because creating synergy, encouraging thoughtful decision making, and framing information require to include all stakeholders and empower employees.

On the other hand, managers in the organizations which avoid uncertainty may show either bureaucratic or emotional responses. If both organization and managers avoid uncertainty it will result in a Status Quo climate, which dispels surprises (Clampitt & DeKoch, 2016). Then managers will probably stick to organizational processes, procedures, roles, and responsibilities. When the organization avoids uncertainty, but the managers embrace it, it will result in a stifling climate in which processes are inefficient, and frustration is high (Clampitt & DeKoch, 2016). Then emotional responses among the managers will be high to cope with uncertainty and protect their positions.

Another variable affecting responses is organizational dimensions such as loosely or tightly coupled, centralized or decentralized and mechanical or organic. Managers in loosely or tightly coupled organization will possibly acquire different responses to uncertainty. Managers occasionally find a model of loose coupling inadequate, so they may try to compensate for its disadvantages or even reverse it (Orton & Weick, 1990). According to Orton & Weick (1990), two methods of compensation are to make use of strong leadership or shared values. In the first case, managers are likely to give bureaucratic responses to reverse loose coupling or mitigate the side-effects. In the latter case, value-based responses are more feasible because an agreement can only this way be possible (Orton & Weick,1990). Centralized and decentralized organizational structures will probably play the same role as loose coupling. Moreover, the centralized organization will have a mechanical structure to allow managers to practice formal and routine tasks (Wall et al., 2002). To sum up, organizational structure affects how managers behave under uncertainty.

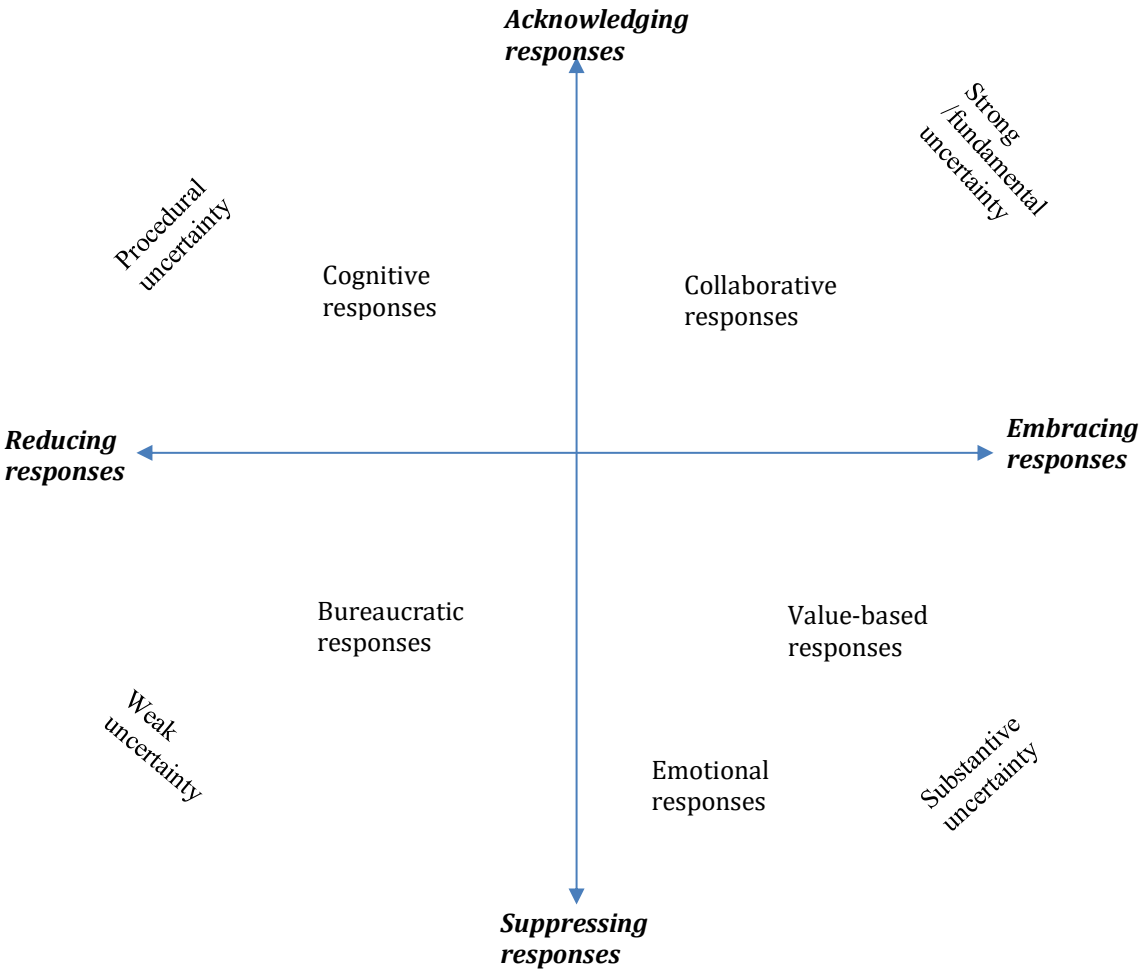
Team cohesion is another factor that affects managerial responses to uncertainty. Cohesive team members have a shared task focus and commitment, which leads to positive attitudes toward the team and the organization (Joo, Song, Lim & Yoon (2012). Therefore, leaders who manage cohesive teams will be likely to develop collective responses to uncertainty. Collective responses will foster team cohesion, and that will enhance performance level (Callow, Smith, Hardy, Arthur & Hardy, 2009).

Age is another determinant affecting responses. Younger members of the organizations respond to job insecurity more strongly in comparison with their older colleagues (Cheng & Chan, 2008). So the younger individual is prone to job insecurity, which will force them to respond to uncertainty more emotionally. Although this finding suggests a correlation between age and responses, the directions of the relation are not precise. In job insecurity studies, contrary to expectations, it is the younger workers who perceive the highest threat (Roskies & Louis-Guerin, 1990). Further studies will reveal the exact relationship.

3.6. Conclusions

The scope and purpose of this research is to unveil the sources of uncertainty, individual responses, and variables, which are critical for middle managers to deal with uncertainty in the formulation and implementation of the strategy process. The model we present is anticipated to show how middle managers develop collective understanding of and responses to uncertainty and how this understanding can serve as an essential function to deal with uncertainty.

Figure 3.2. Comparison of Responses and Uncertainty Types



Moreover, it is possible to compare middle managers' parsimonious responses to uncertainty with general typology responses presented in the literature review section and typology of uncertainty to expand our understanding (Figure 3.2). To begin with the emotional theme, this theme includes mostly states such as unconfident, insecure, and stressed, which lead to suppressing managerial responses to uncertainty. Managers, suppressing uncertainty, ignore the uncertain situation (Lipshitz & Strauss, 1997b), and use value-based responses under substantive uncertainty and bureaucratic responses under weak uncertainty. This is also consistent with our findings that most managers find uncertainty disturbing. Only a few see embracing uncertainty as positive.

The value-based theme includes the compensation mediums trust and honesty, to produce embracing responses, and unproductive behaviours, which result in suppression due to the dishonesty and mistrust. Managers communicate about uncertainty to discuss it with their subordinates to encourage them to see the opportunities. They are honest and build a trust relationship under substantive and fundamental uncertainty. Information-seeking and other responses are inadequate in a complex and volatile environment. On the other side of the coin, it is possible to see dysfunctional behaviours to suppress uncertainty. The bureaucratic theme stresses the leaders' responsibility and power relations, and emphasizes the roles and responsibilities. These are typically found in mechanical organizations and underline formal routines to reduce uncertainty. This is a more complicated version the following organizational procedures, which is one of the most common reducing responses (Lipshitz & Strauss, 1997b). Organizations used standardized workflows and regulated organizations' rules to reduce uncertainty (Wall et al., 2002) during the mass production and marketing era in which change was evolutionary (Chawla et al., 2012). This kind of environment barely exists nowadays. However, bureaucratic responses are sometimes necessary under weak uncertainty but not sufficient under other types of uncertainty. We will try to find the motive behind the uncertainty responses in the next study, and their relations with other variables such as organizational structure, sources of uncertainty, and team cohesion in the third study.

The cognitive theme includes both acknowledging responses such as assumption and planning, and reducing responses such as information exchange, seeking clear direction and cognitive processes. Overall this theme is related to expanding procedural capacity to deal with procedural uncertainty.

The collaborative theme is an embracing response by middle managers using a group of mixed responses containing advice-seeking options and information, creating a common platform to discuss uncertainty to make others aware and accept it. This response is efficient under strong and fundamental uncertainty.

To sum up, this study shows that middle managers develop five distinct managerial responses to face uncertainty. To expand our knowledge on these responses, we need further studies to understand their motives and the perceptions behind them. Furthermore, we can direct our efforts to see the effects of other variables such as internal and external environment, team cohesion, dissimilarity, and knowledge sharing on managerial responses.

When we compare responses between civilian and military managers, the finding indicates no significant differences among them regarding managerial responses to uncertainty. On the other hand, we can detect similarities and dissimilarities in the sources of uncertainties. First, both managers distinguish uncertainty sources from internal to external (see Table 3.3). They both report organizational conditions as internal sources of uncertainty, but military managers see leadership and colleagues as more critical in these internal conditions. The motive behind that could be that cohesion and unity of teams are considered more essential variables among the military managers. Policies and procedures of the organization are not considered sources of uncertainty among the military managers, because they most probably see bureaucracy as a means to deal with uncertainty but not as a source.

Military managers did not report techno-economic conditions and societal pressure as external sources of uncertainties. For the military, economic conditions are considered as resources allocation issues in the category of governmental influences. Regarding technology, it is the

solution for military managers since NATO has technological superiority over the adversaries. We also think that societal pressure is seen as the field of politicians by military managers.

On the other hand, civilian managers stress more items in five categories, except for International instability and disasters. For example, civilian managers include four more items - Internal structural changes; complex and non-routine internal tasks; Policies/procedures of the organizations; and Shareholders - in the internal sources of uncertainty. Although we can understand that military managers could exclude shareholders as an internal source, the other three items could still be included. This differentiation could be a result of the different educational background of the managers. Civilian managers have a more comprehensive managerial education in comparison to military counterparts, because, historically, the military emphasized good leadership (Larsson et al., 2006) instead of management. For external sources, civilian managers also contributed three different categories to the uncertainty sources: Techno-economic conditions; Societal pressure; Competition and Customers. We believe that the business perspective of civilian managers is the reason for the differentiation.

So these similarities and differences should be taken into consideration while transferring knowledge from military to civilian organizations or vice versa. Also, differences could be investigated deeply and used as a base for cross-fertilization between the organizational studies and military organizations.

CHAPTER 4

4. STUDY 2: Taxonomy of managerial responses to uncertainty perceived by Managers

4.1. Introduction

The previous study revealed that middle managers develop five different responses, namely collaborative, emotional, cognitive, value-based, and bureaucratic responses, under uncertainty. Collaborative responses are the ways for managers to embrace uncertainty mostly under strong and fundamental uncertainty. Value-based responses are also considered embracing uncertainty, but mostly under substantive uncertainty. Another response under substantive uncertainty is emotional uncertainty, which is closer to suppressing behaviours. The bureaucratic response is closer to reducing responses under weak uncertainty. The last response is cognitive, which is closer to acknowledging responses under procedural uncertainty.

Uncertainty is a challenge for managers. Managers should appreciate and develop responses to both environmental and internal uncertainty surrounding both military or public and business organizations to follow their purpose, evidence sustainability, or maintain competitive advantage and efficiency. Managers' decisions are previous to events; they must deal with uncertainty, and they may lead to organizational catastrophe due to severe competition and changes within the uncertain environment (Karimi et al., 2004).

The external environment is outside the boundaries of the organization, and the internal environment is inside the boundaries, in which it holds physical and social factors (Duncan, 1972). The external environment is also referred to as environmental uncertainty by some other

researchers. Whether it is referred to as external or environmental, managers must deal with environmental uncertainty or its specific components, which are unpredictable due to volatility, complexity, and heterogeneity (Milliken, 1987). What else creates managerial uncertainty? According to Lawrence, Lorsch, & Garrison, (1967), first, managers are in difficulty finding useful and precise information. Second, they cannot get timely feedback, and third, they cannot see the causal relationship in an uncertain environment. Although this is the case, managers should apprehend the state and the effect of the uncertainty and the cost of their responses in this environment (Milliken, 1987).

As Duncan (1972) and Priem et al. (2002) propose, the internal conditions of organizations serve as a source of uncertainty and create circumstances for managers to allocate their time and commitment. Duncan (1972) lists personnel, functional and staff units and other organizational-level factors as sources of uncertainties; later Priem et al. (2002) add human resources and production costs to the list. All these items and some others are referred to as internal organizational conditions (see Voges et al., 2003). In fact, the long list of items related to diverse organizational functions and processes are the reason behind the task variability and unpredictability (Grote, 2009). Accordingly, scholars have studied internal uncertainties mostly under the notion of task uncertainty (Van de Ven, Delbecq, & Koenig Jr., 1976). Since there is a positive relationship between task uncertainty and the volume of information processed by employees or managers in organizations (Chong & Eggleton, 2003; Kim & Burton, 2002a), it is essential for managers to collect, assess and process extra information to deal with task uncertainty (Chong, 1996). Otherwise, additional knowledge should be acquired to modify resource distribution, schedules, and priorities, which necessitates new information to carry on a task (Galbraith, 1973). In addition to an information gap, task features such as the possibility of failure (Kim & Burton, 2002a), analyzability and variability (Perrow, 1967, 1973, 2000) will increase the level of uncertainty. Even in the case of task uncertainty, managers should consider external and internal dynamics of the

organization on task (Wall et al., 2002). They can also increase information processing capacity (Ghani, 1992a), use decision support systems (Chong & Eggleton, 2003) and control mechanisms (Ylinen & Gullkvist, 2012), or increase the autonomy of the teams (Cordery, Morrison, Wright, & Wall, 2010). However, it is arguable that individuals always face uncertainty, but their response to a different kind and level of uncertainty may vary considerably (Van den Bos, 2001), because they are unable to perform deterministically (Thompson, 1967), or they have to delay their action or else they are totally blocked (Lipshitz & Strauss, 1997a) under task uncertainty.

Grote (2009) stresses that studies on managing uncertainties have focused on top-level managers as strategic decision makers or first-line personnel responsible for daily business. He also articulates that understanding the effect of uncertainty in organizations requires considering other actors. Nevertheless, an insufficient number of researchers have investigated how other groups deal with uncertainty so far. Thus, we will in this study focus on the managerial level, especially middle managers, and create an inductively developed taxonomy of managerial responses to uncertainty. As Grote (2009) implied, the literature lacks information on how uncertainty affects the managerial level, and also on the classifications of managerial responses. Since constructing theories requires classifications on which to base new theories (McKelvey, 1982), we will examine how middle managers deal with uncertainty and categorize their reactions in an organizational context. Subsequently, the future researcher will have the opportunity to cultivate new theories, and practitioners can understand the nature of actions based on the taxonomy that we developed in this part of the thesis. Accordingly, our research will allow us to find the new and empirically grounded categories of managerial responses to uncertainty or confirm existing theoretical categories. Based on our established typology, we compare it with earlier responses and typologies. Also, building this taxonomy will shed light on the characteristics used by middle managers to group similar responses to uncertainty, and on the actual groupings. Creating taxonomy means to group objects based on their similarities or differences that assist us in organizing or building knowledge (Klein,

2010). According to McKelvey (1982), taxonomy requires empirical derivation and induction from data; a class representative has the most attributes belonging to that class; all representatives have most of the class attributes; and none of the attributes is shared by all representatives (Priem et al., 2002, p. 727). In this study, we established a numerical taxonomy of managerial responses to uncertainty constructed by empirical data based on managerial perceptions.

4.2. Method

4.2.1. Summary

The literature review offers sufficient typologies in order to distinguish sources of uncertainty, such as Priem et al. (2002) and Voges et al. (2003). However, the literature lacks shared terminology and understanding on a generic typology of responses to uncertainties (Walker et al., 2003), specifically focusing on middle managers' perception of uncertainty management in the strategy process. Thus, our research aims to create a typology of managerial responses to uncertainty perceived by the present-day middle managers in the strategy formulation and implementation process. Building a taxonomy is vital in order to develop a theory (McKelvey, 1982). The lack of recent research in managerial (middle-level) classification of uncertainty responses may be obstructing the development of theories regarding organizations' environmental and internal uncertainties. Developing a typology of uncertainties merits great efforts to understand the nature of uncertainty in any organization. Thus, our goal is to proceed toward a new, empirically grounded typology of managerial responses to uncertainty. This may arouse new theory building for us to understand behavioural patterns of managers under uncertainty.

We want to identify managerial attitudes and responses under uncertainty that are observed and perceived to be valuable by present-day middle managers. We therefore analyzed the data obtained from semi-structured interviews done for the content analysis in study 1 of this research to detect

the managerial behaviours and then asked participants with managerial experience to group the responses by similarities. This method partly eliminates the researchers' influence, because participants themselves grouped the uncertainty responses (Priem et al., 2002). Multidimensional scaling (Kruskal & Wish, 1978) was the method to find out the significant underlying dimensions based on managers' classification. This method paves the way to descriptively clustering managers' cognitive representation of responses to uncertainty without requiring complicated explanations by the researchers (Priem et al., 2002).

In this study, we will apply a recognized inductive process in order to discover managers' perceived responses to uncertainty (Kruskal & Wish, 1978; Priem et al., 2002; Voges et al., 2003). The structure in the study of Priem et al. (2002) will be the epicenter of the research methodology, which will follow similar steps to their approaches. The first step will be different because identifying managerial responses requires more effort and time in comparison with collecting self-identified sources of uncertainty. Thus, we will detect the managerial behaviours by analyzing the data obtained from semi-structured interviews in study 1 of this research, having asked a different group of participants with managerial experience to group the responses by similarities. Multidimensional scaling (MDS - Kruskal & Wish, 1978) analysis will follow this procedure in order to define the underlying dimensions that managers used as the criteria to group the responses. Several dimensions will be determined based on MDS analysis, and names associated with dimensions will be decided based on a group of experts. The dimensions obtained via MDS will be used in a cluster analysis. With the help of MDS and the cluster analysis process, underlying classifications of managerial responses to uncertainty will emerge and be complete for interpretation. The outcome of this procedure will be an inductively derived classification of managerial responses to uncertainty used by middle managers in the strategy process.

4.2.2. Sample

The study has three different samples in accordance with its phases, since the scope and purpose of this research is to unveil the responses to uncertainty, individual strategies, and variables, which are critical for middle managers to deal with uncertainty in the formulation and implementation of the strategy process. Based on convenient accessibility and proximity, we searched for middle managers who were in a position, either in strategy formulation or in the implementation process or both, to adequately capture their perception of the responses to uncertainty. Thus, Sample 1 consists of two different groups: 11 military and 11 civilian middle managers (see chapter 3.3.2 and Table 3.1). Their average age was 43.6 (S.D. = 8.8), which shows a high experience level, and they had 18.1 years (S.D. = 6.6) of managerial experience. There were 20 males and two female participants.

Sample 2 consisted of 70 participants with managerial experience working at strategic headquarters at NATO (see Appendix C). Their average age was 44.3 (S.D. = 6.7), and they had 22 years (S.D. = 3.7) of experience. There were 68 males and two female participants.

Sample 3 – different from sample 1 and 2 - also comprised participants with managerial experience working at strategic headquarters at NATO. Sample 3 consisted of 74 participants to validate dimensions (29 for dimension 1; 22 for dimension 2 and 24 for dimension 3). Their average age was 38.11 (S.D. = 5.7), and they had 10.9 years (S.D. = 5.6) of managerial experience. There were 70 males and four female participants. For dimension 1, the average age was 38.7 (S.D. = 5.7), and they had 10.3 years (S.D. = 5.8) of managerial experience. There were 26 males and two female participants. For dimension 2, the average age was 38.8 (S.D. = 5.0), and they had 12.9 years (S.D. = 4.3) of managerial experience. There were 21 males and one female participant. For dimension 3, the average age was 38.8 (S.D. = 6.0), and they had 9.9 years (S.D. = 6.2) of managerial experience. There were 21 males and three female participants.

Those samples were suitable for our research goal for several reasons. First and foremost, data needed to be gathered from managers who confront uncertainties. The military sample consisted of the participants from NATO posts. As stated in the Warsaw Summit Declaration[4], NATO has faced multiple security problems and threats that are emanating from different regions, actors and sources, such as Russia's belligerent engagements in Ukraine, non-state actors in the middle east, and other hybrid confrontations[5]. The Alliance decided to apply a new strategy, namely the Readiness Action Plan, to confront those challenges[6]. All managers in Sample 3 took part in this strategy formulation or implementation process between Wales in 2014 and the Warsaw Summit 2016 while working at NATO headquarters. Thus, they faced and dealt with many uncertainties during that time. Civilian managers also faced uncertainties due to BREXIT, migration to EU, ISIL, and economic sanctions imposed on Russia[7]. Those environmental uncertainties alongside internal ones created many threats and opportunities for managers and organizations. This allowed us to make a comprehensive taxonomy of managerial responses to uncertainty.

Second, military managers' knowledge was also very significant because they were all selected for those duties by their national armed forces thanks to their achievements in their professions. Therefore, it is most likely that they represented almost the best human resources in their countries. Civilian managers had different nationalities and at the time of research, they were working for multinational firms, or for public organizations responsible for the integration of refugees and immigrants. Moreover, they were members of firms that have different scales in different sectors. Finally, the middle managers were all well-educated, multicultural, multilingual, and global managers.

[4] https://www.nato.int/cps/en/natohq/official_texts_133169.htm 4 Sep 19 0554 hours.

[5] http://www.mfa.gov.pl/resource/283018e4-2eb2-414f-b69f-de85afa1ac08:JCR 4 Sep 19 0557 hours.

[6] http://www.nato.int/cps/en/natohq/official_texts_112964.htm 4 Sep 19 0558 hours.

[7] https://www.weforum.org/agenda/2016/01/what-are-europes-big-challenges-in-2016/ 4 Sep 19 0559 hours.

Third, it is essential for this research that the sample middle managers actively participated in the strategy process. Therefore, all middle managers with a military background were working either at strategic-level headquarters, or at other headquarters but from strategic divisions or branches. Likewise, we searched for civilian managers who were active participants in the strategy process. Middle managers in the strategy process confront uncertainties regularly and present potentially meaningful behaviours to deal with them thanks to their long job tenure and diverse capabilities.

4.2.3. Statistical Procedure

One of the purposes of our research is to create a taxonomy of responses to uncertainty perceived by our managers. Thus, we mainly followed the method in the studies by Voges et al. (2003) and Priem et al. (2002), in which they created a taxonomy of sources of uncertainty perceived by the public and private managers.

Phase 1 - Listing managerial responses to uncertainty. We used data in the first study in this dissertation to identify responses to the uncertainty that the middle managers perceive. Therefore, we searched for behavioural and emotional actions of middle managers as a response to uncertainty in the semi-structured interviews. Phrases such as, '*First, the acquisition of expert opinion about the strategy we apply is of paramount importance'* were transformed into 'Managers get expert advice.' After examining all interviews eliminating redundancies, a comprehensive list of responses to uncertainty with 59 items was developed (see Appendix D).

Phase 2 - Producing the similarity matrix. Then, two sets of index paper cards were prepared. We divided items randomly into two sets because it is demanding for one participant to evaluate 59 items. One set contained 29 cards, and the other set contained 30 cards. Each card was labelled with one of the managerial responses to uncertainty identified via the interview analysis during Study 1. Two months after Study 1, the Sample 2 participants were each given two different sets of the

labelled index cards and were asked to “group the cards into as many groups as may be necessary to properly reflect the similarities and differences among the responses to uncertainty. When completed, similar responses to uncertainty should be grouped and numbered together, while dissimilar sources should be in different groups with different numbers.” Sample 2 participants each executed this task independently, and they were able to ask clarification questions during the task. When satisfied with their groupings, they assigned the same numbers to each group and paper clipped their cards before giving them back to the researcher (see Hair et al., 1987, p. 357, for a description of this process of obtaining similarity, or “confusion”, data).

Following this data collection process, the groupings for each sample were transferred to a similarity matrix. A 59x59 ½ upper diagonal matrix was generated for each set of cards. A "1" was placed where pairs of managerial responses to uncertainty were in the same group and a "0" for those pairs that were placed in different groups. The individual matrices were then aggregated for each set of cards into a single matrix that showed the number of times each pair of responses to uncertainty was assigned to the same category across the number of managers in that sample.

Phase 3 - Labelling the dimensions. Multidimensional scaling techniques (MDS) (Kruskal & Wish, 1978) were used to find out the number of dimensions. Buchko (1994) and Werner et al. (1996) have applied MDS for this kind of purpose, and Voges et al. (2003) and Priem et al. (2002) have shown that this is an appropriate method to define dimensions.

Analysis of the similarity matrix shows the underlying dimensions that the middle managers practiced by using multidimensional scaling techniques (Kruskal & Wish, 1978). We followed the suggestions of Ketchen & Shook (1996) and used various techniques to detect the most proper number of dimensions. First we considered the level of stress that different numbers of dimensions show. Borg & Groenen (2005) suggest refraining from using the MDS stress as the only indicator of the goodness of the configuration. Thus, we also assessed the scree plot of the inter-distance

correlation against the number of dimensions. Also, we considered the dimensions based on the attribute anchors. Consequently, we decided the most appropriate number of dimensions based on the assessment of three different techniques: Stress, Scree Plot examination, and Parsimony.

On the other hand, the assignment of labelling MDS dimensions is not easy and not precise (Hair Jr, Anderson, Tatham, & Black, 1995). "It is always important to remember that the dimensions in any scaling solution are merely coordinate systems used to locate a set of points. As such, they may or may not have substantive meaning" (Jacoby & Jacoby, 1991, p. 37). Items that appear at the extremes of the dimensions are mostly the determinants for labelling the dimensions. To prevent carryover effect, two groups of experts, with Ph.D. titles and managerial background, labelled each of three dimensions by following this procedure. First, four experts were given three one-dimensional plots and the list of uncertainty responses, and the plots were reflected on a screen, one at a time. The plots illustrated where the group had positioned all the responses to uncertainty along with the range of a specific dimension. All judges independently assessed the plots and decided provisional labels for the dimensions without any conversation among themselves. Second, all together, judges examined the dimensions consecutively, and discussed their labels and the rationale behind them in an iterative process until an agreement on labelling was reached for each dimension. Third, another group of four judges with Ph.D. degrees reassessed the labels and their descriptions. Then we generated final labels and descriptions based on the judges' assessments.

Phase 4 - Dimension validation. After labelling the dimensions, we used different groups of participants (sample 3) to validate the labels of the dimensions and MDS results. In the first place, three different questionnaires were developed for three different dimensions. The dimension labels and descriptions - created based on an assessment by two different groups of judges - were used to ask sample 3 to locate each of the responses to uncertainty based on their understanding along each dimension using a five-point Likert scale. Similar to Voges et al. (2003) and Priem et al. (2002),

each participant surveyed only one dimension to prevent order effects. We then used each dimension to determine the ten responses to uncertainty with the most extreme MDS scores by using the five uncertainty responses at each extreme of each dimension, because these 10 responses are better representative of the dimensions. These uncertainty responses were then t-tested using the validation data ratings for mean differences across the high-five and low-five-dimension responses to see whether these new groups could successfully distinguish among the responses to uncertainty. This process, the successful classification of responses to uncertainty by different samples based on sample 1 identification and labelling by judges, increased the confidence and efficacy of the MDS dimensions (Voges et al., 2003).

Phase 5 - Cluster analysis. To divide a given dimension at the mean would result in all possible categories of responses to uncertainty, but it is not possible to understand whether these prospective categories include the centroid of a group of responses to uncertainty identified by middle managers, because the taxonomy of responses to uncertainty may be more parsimonious (Priem et al., 2002). Moreover, determining clusters by visual interpretation of MDS results requires excessive caution to avoid misinterpretation (Hair Jr et al., 1995; Jacoby & Jacoby, 1991). Therefore, I decided instead to use cluster analysis using the positions of the responses to uncertainty on the MDS dimensions as input (Aldenderfer & Blashfield, 1984). Consequently, cluster analysis would allow me to define similar groups of responses to uncertainty based on the dimensions and data produced by the MDS.

In order to create an up-to-date taxonomy of managerial responses to uncertainty, in this step, we applied suggestions from Ketchen & Shook (1996) for the clustering procedure. First, we used Ward's minimum variance technique (Ward Jr, 1963) as a hierarchical agglomerative clustering method. To validate the hierarchical Ward’s methods, we repeated the clustering with K-means and the Average Linkage Method (ALM) (Sokal, 1958). Then, we compared each cluster solution item

by item. Using different cluster methods and finding similar cluster numbers and composition would increase the overall validity of the solution (Milligan & Sokol, 1980; Punj & Stewart, 1983). Likewise, finding similar solutions will suggest that the clusters are the outcome of the data rather than a by-product of the clustering algorithm used.

4.3. Results

Phase 1: Listing Uncertainty Sources.

We acquired 59 items for middle managers' responses to uncertainty, based on the analysis of semi-structured interviews in study 1 (See Appendix D).

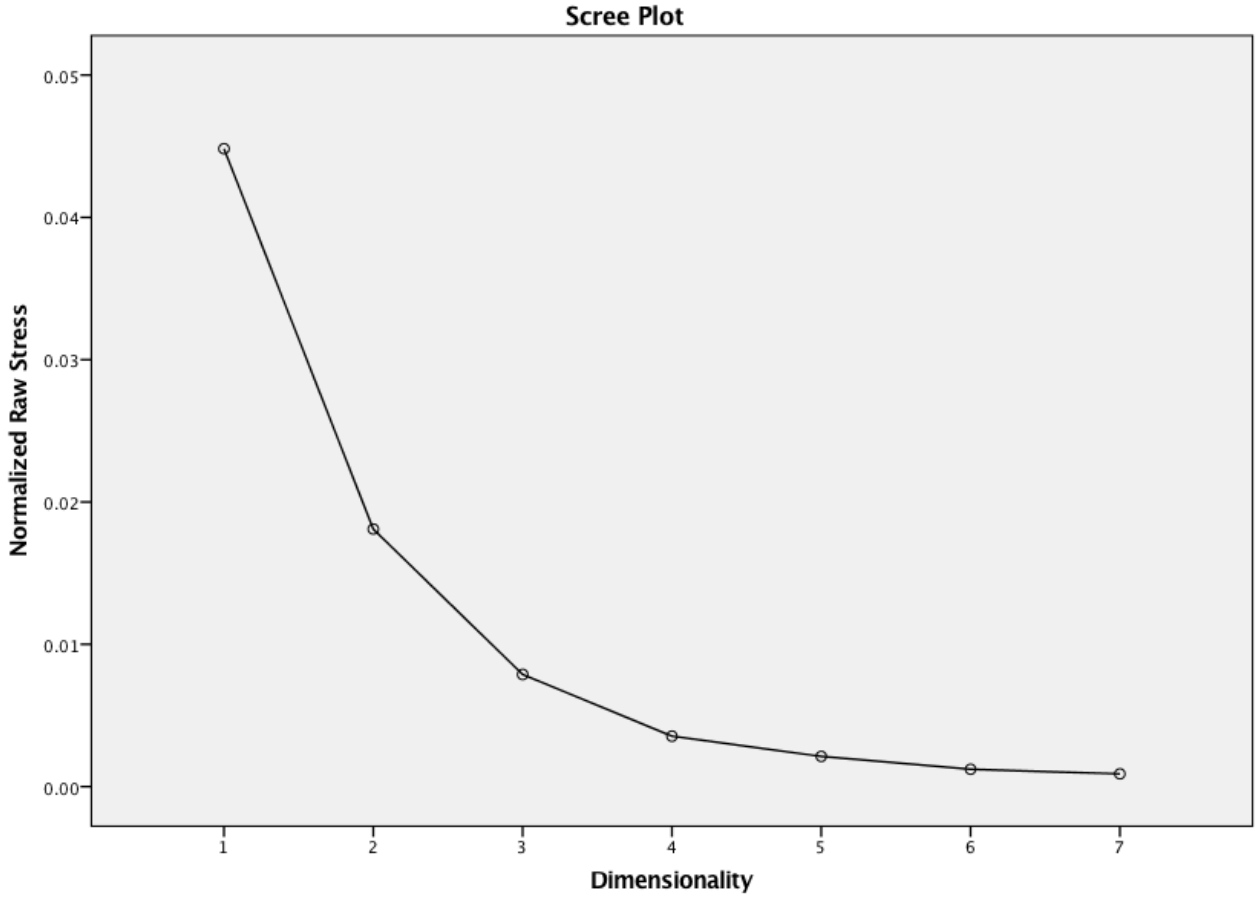
Phase 2: Generating the Similarity Matrix

Using the 59 managerial responses to uncertainty, we generated a 59 x 59 half-diagonal matrix for the MDS analysis.

Phase 3: Dimension Identification and Labelling

The first stage to identify the dimensions is the examination of stress values. To deliver stress values, we analyzed the similarity matrix using the Multidimensional Scaling (PROXSCAL) in SPSS. Stress indices for MDS solutions of 1,2, 3 and 4 dimensions were 0.0448, 0.0100, 0.0078 and 0.00354, respectively (see Kruskal, 1964). However, the fit improvement levelled off somewhat for four dimensions, and even more for five dimensions. Then we examined the scree plot in the second stage. A scree plot of the stress levels at 1,2, 3, and four dimensions is displayed in Figure 4.1.

Figure 4.1. Stress vs. Dimensions Scree Plot



In the third stage, we examined the anchors on each of the dimensions for interpretability to decide the appropriate number of dimensions. After examining the stress test, scree plot, and parsimony relative to the four- and five-dimensional solutions, and the more likely ease of interpretation (Cattell, 1966; Kruskal & Wish, 1978), we selected the three-dimensional solution for the subsequent analysis. The three-dimensional solution is adequate both for distinctive middle managers' responses to uncertainty and for better interpretability.

Figure 4.2. Perceived Responses to Uncertainty Arrayed in Three Dimensions (23 Items)

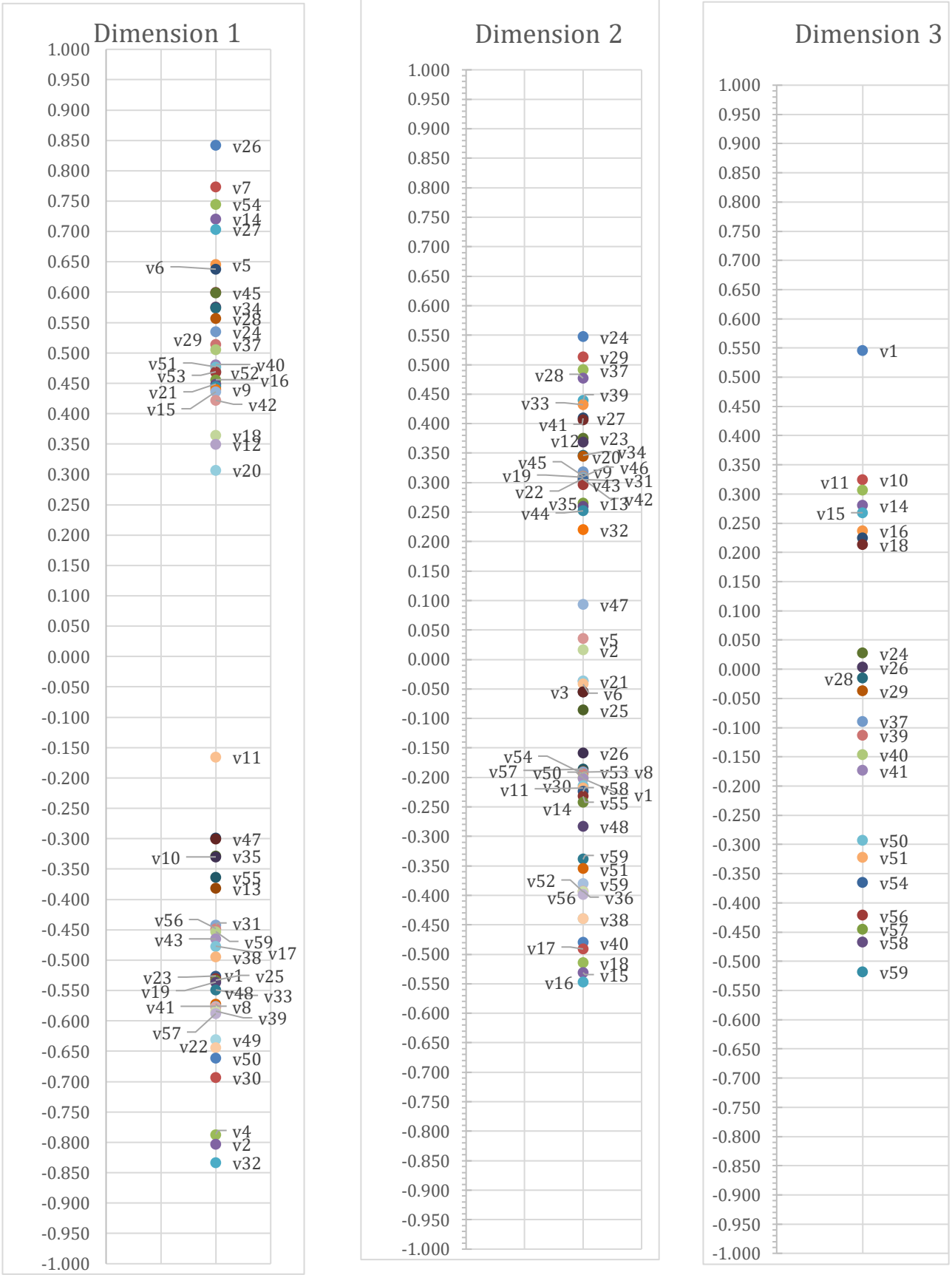


Figure 4.2. (continued)

v1	Managers blame the staff.
v10	Managers feel unconfident when facing uncertainty.
v11	Managers tolerate that staff avoid taking the task.
v14	Managers do not share their jurisdiction.
v15	Managers dislike uncertainty.
v16	Managers feel desperate when facing uncertainty.
v17	Managers take actions without resolving uncertainty.
v18	Managers find uncertainty challenging.
v24	Managers get their subordinates' opinion.
v26	Managers create structures without a concept.
v28	Managers ask subordinates and relevant stakeholders to take part in the strategy process.
v29	Managers get colleagues' advice.
v37	Managers discuss the task within the team.
v39	Managers get others' opinion outside the organization.
v40	Whatever they do, managers know that they cannot avoid some aspects of uncertainty.
v41	Managers get expert advice.
v50	Managers create flexible plans.
v51	Managers know that expected, envisaged or initial design will be different at the end.
v54	Managers make assumptions to fill the information gap.
v56	Managers think that crisis teaches them new things.
v57	Managers develop a new procedure.
v58	Managers know that the task forms its shape over time within the ongoing effort.
v59	Managers think that crisis positively affects strategy implementation.

A common approach in MDS to label the dimensions is to decide according to objects that appear at the extremes of a dimension. On the other hand, first, we requested two groups of judges to name the dimensions, and then we labelled the dimensions based on their assessments. The 59 responses to uncertainty perceived by managers are depicted in Appendix D. We labelled the first dimension "normative approach to uncertainty vs. flexible implementations." On the one side, managers try to avoid uncertainty by creating predictive structures and by developing strict rules that fill up potential procedural gaps. They defend themselves against uncertainty by relying on following the rules. On the other side, managers create a flexible environment to implement strategies despite

possible obstacles. Judges used this dimension to distinguish those responses to uncertainty that were associated with managerial behaviours such as creating structures without a concept, making assumptions to fill the information gaps, and not sharing their jurisdiction from responses associated with behaviours like developing new procedures to deal with likely crisis/problems, creating flexible plans, and not giving details of the implementation of the strategy in order not to constrain staff. We labelled this dimension "normativity" accordingly with the definitions of the judges.

We labelled Dimension 2 "shared the embrace of uncertainty vs. uncertainty avoidance" based on the judges' assessments. On the one side, managers embrace uncertainty by sharing opinions and perspectives, and involving staff, colleagues, experts, and other participants. On the other side, uncertainty avoidance by middle managers results in undetermined and unconfident managerial behaviours. Judges apparently used this dimension to distinguish those responses to uncertainty that were associated with managerial behaviours such as getting subordinates' opinion, discussing the task within the team, and asking subordinates and relevant stakeholders to take part in strategy process from responses associated with behaviours like taking actions without resolving uncertainty, blaming the politicians, and feeling desperate when facing uncertainty. We labelled this dimension, "proactivity."

We labelled Dimension 3 "unaccountability vs. effective crisis management" according to the evaluation of the judges. On the one side, managers avoid uncertainty by creating ways to disengage themselves by being unaccountable in uncertain situations. On the other side, middle managers tend to exploit and learn from the crisis. Judges used this dimension to distinguish those responses to uncertainty associated with managerial behaviours such as tolerating the staff who refuse to work beyond job descriptions, blaming the staff, and supposing that higher-level executives' disagreement hinders solutions from responses associated with behaviours like realizing

that crisis creates an opportunity to resist unforeseen events, developing new procedures to deal with likely crises/problems, and noticing that a task forms its shape over time within the ongoing effort. We labelled this dimension "accountability."

Consequently, the MDS analysis shows that the middle managers distinguished among the responses to uncertainty by positioning them along dimensions reflecting behaviours: (1) normativity/bureaucratic power (rated as normative approach to uncertainty vs. flexible implementations), (2) proactivity (rated as shared embrace of uncertainty vs uncertainty avoidance), and (3) accountability (rated as unaccountability vs. accountable crisis management).

Phase 4: Dimension Validation

After developing three different questionnaires for three different dimensions, questionnaires, containing labels and descriptions, were given to sample 3 participants, who were asked to locate each of the responses to uncertainty using a five-point Likert scale. Each participant surveyed only one dimension to prevent order effects. Twenty-eight participants (sample 3a) for dimension one, 22 participants (sample 3b) for dimension two, and 24 participants (sample 3c) for dimension three replied to the survey. We then used each dimension to determine the ten responses to uncertainty with the most extreme MDS scores by using the five uncertainty responses at each extreme of each dimension. These uncertainty responses were then t-tested using the validation data ratings for mean differences across the high-five and low-five responses to see whether these new groups could successfully distinguish among the responses to uncertainty items. Significant "high-five" versus "low-five" rating differences were discovered for each dimension (dimension one and three $p< 0.001$ and dimension 2 $p< 0.005$). This shows that the dimensions and labels of the second sample were predicted by the third group. They successfully distinguished and rated responses to uncertainty items.

Phase 5: Cluster Analysis

Based on the dimension validation process, MDS analysis suggests that the managers differentiated among responses to uncertainty by locating them along the dimensions: normative approach to uncertainty - flexible implementations; shared the embrace of uncertainty - uncertainty avoidance; and unaccountability - effective crisis management. This process also contributed to the justification of an appropriate number of dimensions alongside interpretability. Instead of interpreting the visual presentation in three dimensions, we decided to cluster managerial responses to uncertainty. As Ketchen & Shook (1996) suggest, we applied the following procedure for clustering. First, correlations among the three dimensions were examined. Results for the clustering attributes were 0.000061, -0.000085 and -0.000075. That shows there was no multicollinearity among the dimensions. Second, hierarchical Ward's methods (WM) and average linkage methods (AVL) were used for cluster analysis. After examining dendrograms of Ward's and the Average Linkage Method, six cluster solutions were accepted for further analysis, since Aldenderfer & Blashfield (1984) suggest that the number before the jump is the most reasonable clustering solution (See Appendix F). Then a hierarchical agglomerative clustering method, Ward's minimum variance technique, was used to identify managerial responses to uncertainty (see also Hair Jr et al., 1995). To validate Ward's minimum variance technique, the average linkage method -another agglomerative method that uses a different algorithm – and the K-means clustering technique were used. The AVL results also implied a six-cluster solution. That implies that the six-cluster solution was not a by-product of the WM approach (Priem et al., 2002). Then I used the iterative and centroid-based K-means technique using WM output as the initial cluster sources. In addition to Ketchen & Shook's (1996) two-step method, if two remarkably unique cluster techniques such as WM and K-means result in similar outputs, these similar outputs indicate validation of the cluster solutions (Aldenderfer & Blashfield, 1984). All 59 managerial responses to uncertainty were

converged - except one item - in the same cluster grouping, which raises confidence in the reliability of the cluster groupings.

All 59 perceived managerial responses to uncertainty were classified in the same clusters for both the WM and K-means analyses. 58 of the 59 perceived managerial responses to uncertainty were classified in the same clusters for both the Average Linkage and Ward's Method analyses, and 58 of the 59 perceived managerial responses to uncertainty were classified in the same clusters for both the K-means and AVL method analyses. This indicates that all items but one converged in the same cluster groupings by creating a pattern in the results, which increases the confidence in the reliability of the cluster solution. Perceived managerial responses to uncertainty, grouped across different methods, were presented in Appendix G.

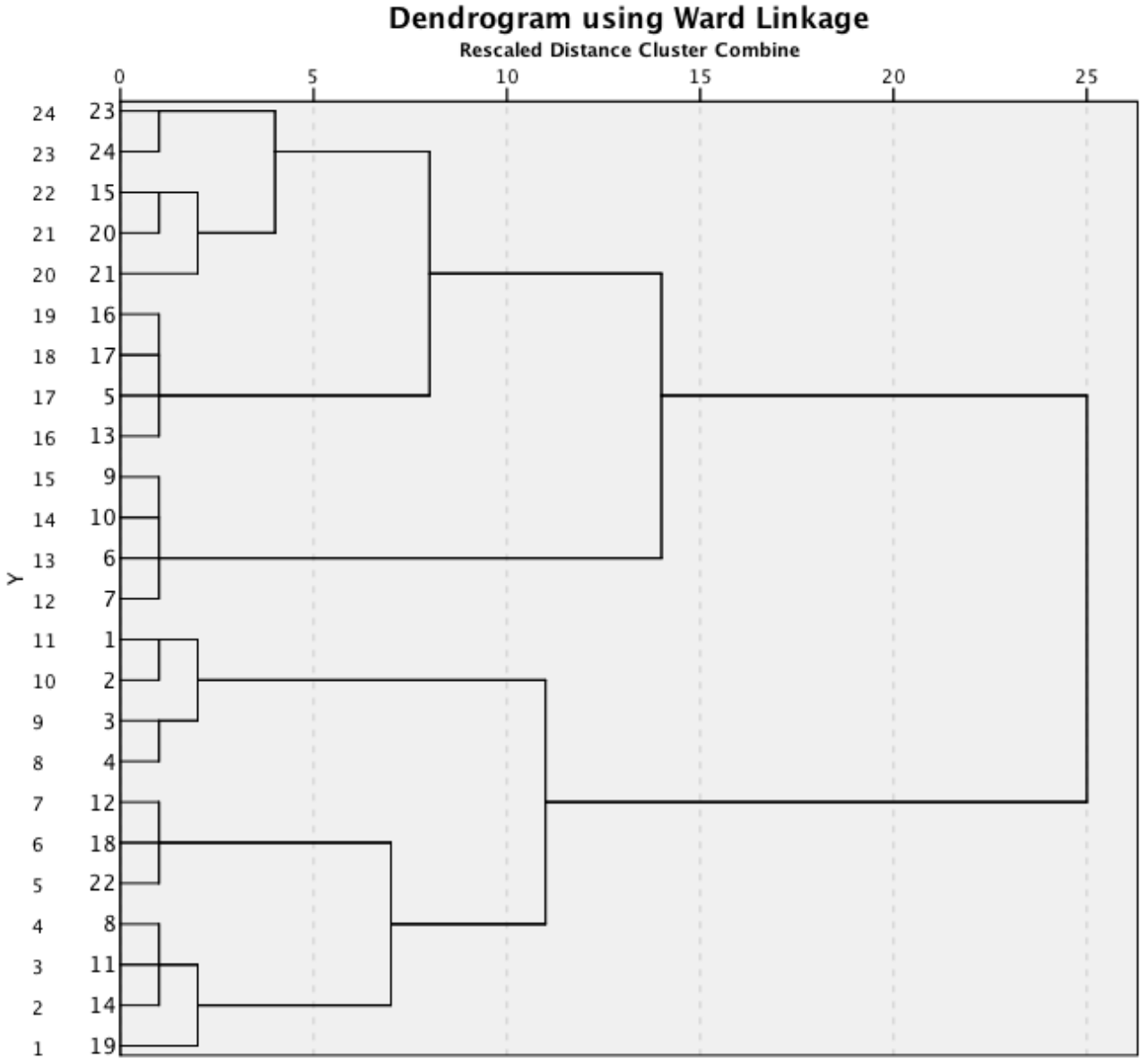
Based on the assessments of four judges with Ph.D.s in social psychology and psychometrics (2 males and two females; ages are 38, 45, 46 and 50 years old), we labelled the clusters based on the perceived managerial responses to uncertainty in the groupings as shown in Table 4.2. We labelled the first grouping as “development by change” because items in the cluster suggest that managers perceive that change is positive and promotes development. We labelled the second grouping as “certainty of change” because items in the cluster suggest that managers perceive that change is unavoidable and should be exploited. We labelled the third grouping as “development by debate” because items in the cluster suggest that managers perceive that exchanging ideas and discussion is positive and promoting. We labelled the fourth grouping as “protection by support” because items in the cluster suggest that managers want to protect their decisions by getting others’ support, preferably experts or superiors. We labelled the fifth grouping as “protection by structure” because items in the cluster suggest that managers want to protect their decisions by creating strict structures that justify their lack of lateral thinking and risk-taking. We labelled the sixth grouping as

“protection by scapegoats” because items in the cluster suggest that managers want to protect their decisions by creating possible scapegoats.

At this point, we decided to shorten items in the clusters to comprehend them better, increase understandability, and make the use of taxonomy practicable. So we deleted some of the paired items which had the same meaning and coordinates. For example, we compared ‘Managers know that the task forms its shape over time within ongoing effort’ and ‘Managers think that fermentation or infusion time is needed to see the big picture.’. This will allow items to be used conveniently and comprehensible as scale items. Subsequently, we have reached 24 items.

Later, we applied the similar clustering procedure stated in phase 5. Hierarchical Ward’s methods (WM) and average linkage methods (AVL) were used for cluster analysis. After examining the dendrograms of Ward’s and the Average Linkage Method, six cluster solutions were accepted for further analysis (See Figure 4.3). Then, as in phase 5, Ward’s minimum variance technique was used to identify managerial responses to uncertainty, and for validation, the average linkage method and K-means clustering technique were used. The AVL results also implied a six-cluster solution. That implies that the six-cluster solution was not a by-product of the WM approach (Priem et al., 2002). Then we again used the iterative and centroid-based K-means technique using WM output as the initial cluster sources.

Figure 4.3 Dendrogram using Ward Linkage Method



All 24 perceived managerial responses to uncertainty were classified in the same clusters for both the WM and k-means analyses. 23 of the 24 perceived managerial responses to uncertainty were classified in the same clusters for both the Average Linkage and Ward's Method analyses, and 23 of the 24 perceived managerial responses to uncertainty were classified in the same clusters for both the K-means and AVL method analyses. This indicates that all items but one converged in the same cluster groupings by creating a pattern in the results, which increases the confidence in the reliability of the cluster solution. On the other hand, we decided to exclude that exception item,

since we had sufficient items representing the cluster. Accordingly, perceived managerial responses to uncertainty, grouped across different methods, were presented in Table 4.2.

Table 4.2. Clustering Comparison

Cluster Name	Perceived Managerial Responses to Uncertainty
Development by change (Cluster 1)	Managers think that crisis positively affects strategy implementation.
	Managers think that crisis teaches them new things.
	Managers develop a new procedure.
	Managers create flexible plans.
Development by debate (Cluster 2)	Managers discuss the task within the team.
	Managers ask subordinates and relevant stakeholders to take part in the strategy process.
	Managers get colleagues' advice.
	Managers get their subordinates' opinion.
Certainty of change (Cluster 3)	Whatever they do, managers know that they cannot avoid some aspects of uncertainty.
	Managers make assumptions to fill the information gap.
	Managers know that expected, envisaged or initial design will be different at the end.
	Managers know that the task forms its shape over time within the ongoing effort.
Protection by support (Cluster 4)	Managers get expert advice.
	Managers get others' opinion outside the organization.
Protection by structure (Cluster 5)	Managers create structures without a concept.
	Managers do not share their jurisdiction.
	Managers find uncertainty challenging.
	Managers dislike uncertainty.
	Managers feel desperate when facing uncertainty.
Protection by scapegoats (Cluster 6)	Managers blame the staff.
	Managers take actions without resolving uncertainty.
	Managers feel unconfident when facing uncertainty.
	Managers tolerate that staff avoid taking the task.

4.4. Discussion

This study has been one of the first attempts to thoroughly examine middle managerial responses to uncertainty in the strategy process. The findings of our study enhance our understanding of managers' behavioural patterns in dealing with uncertainty. One of the issues that emerge from these findings is an answer to the first research question: what are the managerial responses to uncertainty perceived by middle managers in the strategy process? The six managerial responses to uncertainty in Table 4.2 (Clustering Comparison) are the outcome of the distinct dimensions that were used by managers in classifying responses to uncertainties. These dimensions are development by change (cluster 1), development by debate (cluster 2), the certainty of change (cluster 3), protection by support (cluster 4), protection by structure (cluster 5), and protection by scapegoats (cluster 6).

Table 4.3. Comparison of Classification Systems of Responses to Uncertainty

	CL1	CL2	CL3	CL4	CL5	CL6
Suppressing responses						
People may value a risky prospect less than its worst possible realization, which is called the uncertainty effect (Gneezy, List, & Wu, 2006).			x			
How organizations suppress uncertainty: a) over-emphasis on planning processes, b) over-use of research studies, c) over-reliance on computer modelling and forecasting, d) inappropriate use of consultants (Clampitt et al., 2001a).					x	
An uncertain or unfamiliar condition threatens members of a culture regarded as high uncertainty avoidance when they face uncertainty or ambiguity (Wennekers et al., 2010)					x	
Reducing responses						
Gathering/producing further information or postponing decisions (Lipshitz & Strauss, 1997a).			x			
Identifying the knowledge gap related to uncertainty (Harris & Woolley, 2009).			x			
Information seeking (Berger & Calabrese, 1975).			x			
Passive strategies—reactivity search, social comparison, and disinhibition search Active strategies—asking others about the target and environmental structuring Interactive strategies—interrogation, self-disclosure, and deception detection (Berger, 1979).				x	x	x
For newcomers, seeking to predict, understand, and control the task environment similar to other organization members (Saks & Ashforth, 1997b).				x		
Planning and monitoring and giving the least amount of freedom to the practitioner in charge of implementing these plans (Grote, 2004).					x	
Shaping and controlling external events, Passing the risk on to others, Disciplining competition (Allaire & Firsirotu, 1989).					x x	x
Routine is a standard means to decrease complexity and uncertainty (Grote et al. 2009).					x	
Choosing a course of action and preparing to avoid or confront potential risks are two prominent ways of acknowledging uncertainty (Lipshitz & Strauss, 1997).					x	
Embracing responses						
Cultivating an awareness of uncertainty, Communicating about the uncertainty, Catalyzing action in an uncertain environment (Clampitt et al., 2000).		x	x			

	x					
However, a real option is also a way to mitigate the effects of late responses to uncertainty by splitting the decision into at least two parts in which the initial decision creates the opportunity, but not the obligation, to make a subsequent, beneficial decision, built upon the first (Janney & Dess, 2004).	x		x			
One way of dealing with those uncertainties for organizations is to have flexible routines and rules, which can create an accurate balance between stable and flexible organization (Grote et al. 2009)	x					
Occasionally delaying a decision allows organizations to find new opportunities by providing more flexibility in facing challenges (P. Clampitt et al., 2001a).	x					
A wait-and-see approach allows managers to make a decision in better conditions and is likely to decrease uncertainty about the future (Sauner-Leroy, 2004).	x					
This time adequate and flexible local autonomy is given to subordinates so as to handle uncertainty by deciding or modifying goals and rules for the sake of effectiveness (Grote, 2004).		x				
Any disruption inherent in a situation is regarded as an opportunity to develop a new capability for the system (Grote et al., 2009a).						
Loose coupling examples such as: motivation through task orientation, higher order autonomy, flexible changes between organizational modes and culture as a basis for coordination/integration (Grote, 2004).		x				
When individuals are faced with uncertainty, they respond more intensely to perceived fairness (Van den Bos, 2001).						
Finds relationship between role clarity and individual task proficiency; role breadth self-efficacy and role productivity (for all three levels); openness to change and adaptivity (for all three levels); perceptions of team supportiveness and team member behaviours (for three sub-dimensions); perceptions of organizational commitment and organization member behaviours (for three sub-dimensions) (Griffin et al., 2007).						
Argues that fear of negative evaluation is an important determinant to explain ambiguity aversion (Trautmann, Vieider, & Wakker, 2008).						
While to some extent one can find uncertainty exciting, a considerable amount is somehow uncomfortable, especially if it is uncertainty about one's existence or about important things (Hogg, Meehan, & Farquharson, 2010)						
Uncertainty avoidant individuals are inclined to focus on planning and create a steady environment to cope with uncertainties in their social life (Hogg, 2000).					x	

CL1: Cluster 1-Development by change

CL2: Cluster 2-Development by debate

CL3: Cluster 3-Certainty of change

CL4: Cluster 4-Protection by support

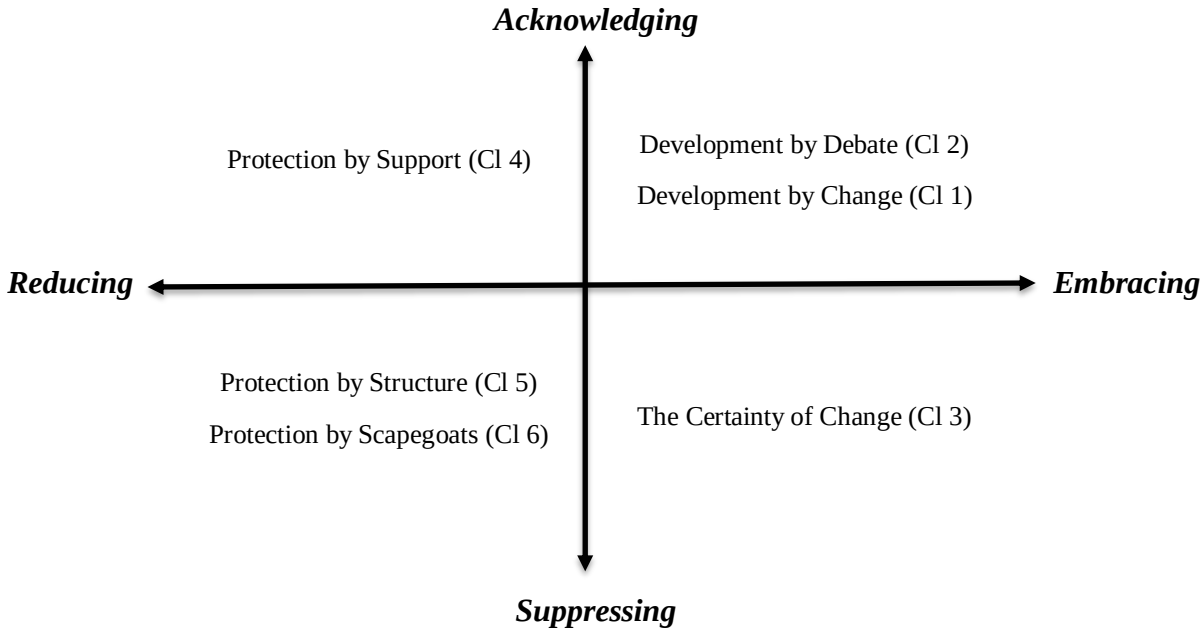
CL5: Cluster 5-Protection by structure

CL6: Cluster 6-Protection by scapegoats

Results also help us to compare previous classifications in the literature straightforwardly with those of contemporary managers (Table 4.3). Presenting similarities and dissimilarities is the answer to the second research questions: what are the similarities and differences between the previously recognized classifications and contemporary managerial responses to uncertainties?

For a more systematic comparison, we added studies in the literature not only in the context of strategy but also in other disciplines. We also collected studies not only for managers but also for other individuals, teams, and organizations. This would allow us to compare our results with responses to uncertainty in a more general context. Then we classified those responses in the literature in four main groups, namely suppressing responses, reducing responses, acknowledging responses, and embracing responses. Then we compared each response with the clusters developed in this study.

Figure 4.4. Comparison of classifications



A closer inspection of the six clusters is presented in figure 4.4 based on acknowledging-suppressing and embracing-reducing dimensions. From reducing to embracing, managers' attitude changes from protection to development. Put differently, the acknowledging-suppressing axis

divides the responses into two as protectionist and developmental responses. This demonstrates that more beneficial traits in favor of the organization increase from left to right. Reducing responses in the literature mostly accumulated in the left quadrants, in which middle managers try to protect themselves against the effects of uncertainty. Based on these clusters, managers display three different protective methods; using structure, getting support, and creating scapegoats. Three responses related to information-seeking are clustered in the certainty of change quadrant. Information-seeking under uncertainty is the most common and perpetual response by either managers or others. On the other hand, suppressing responses aggregated similarly to reducing responses instead, in two clusters; protection by structure and certainty of change. In this point, it is better to explain the quadrants in detail.

The quadrant containing Development by Debate and Change presents the embracing responses under uncertainty. In the development by debate cluster, managers believe that exchanging ideas and discussion is positive and promoting under uncertainty. They try to construct shared meaning, and they value empowerment and participative leadership. When faced with uncertainty, empowerment will result in better performance and higher productivity (Wall et al., 2002), because empowering team members will increase their capability (Raelin, 2006). Moreover, thanks to the collaboration, managers can combine the interests of all stakeholders and reveal all perspectives and opinions (Samarah et al., 2003). Also, their positivity and proactivity help them to cope with uncertainty.

Additionally, the development by change cluster represents managerial behaviours by which managers exploit uncertainty as an opportunity. Managers believe that change is positive and promotes development, so they can cope with uncertainty during the change process; correspondingly, they can foster a conceptual understanding of it (Herzig & Jimmieson, 2006). This is valuable both for managers and organizations because there is a continuous requirement to

manage change and uncertainty (Öner, Benson, & Göl Beşer, 2014). They also think that crisis may present opportunity. They are mostly embracing uncertainty accumulated in those two clusters.

The second quadrant containing the certainty of change cluster shows the strong relationship between uncertainty and change. Uncertainty requires change and change produces uncertainty. The certainty of change cluster reflects this notion. Managers in this cluster believe that change and uncertainty are unavoidable. The initial strategy, policy, product, or task will change over time within ongoing effort under uncertainty. This cluster characterizes acknowledgment of uncertainty (Lipshitz & Strauss, 1997).

In the third quadrant containing the Protection by Support cluster, managers tend to take protective actions by finding supports. Still, protection by support can be more constructive in comparison with other protective clusters. The support cluster contains advice-seeking from teammates, leaders, and even people outside the organization, and capturing guidance from the existing policy. Managers find support both from the seniors and the staff beneficial to manage the uncertainty and deliver guidance (Herzig & Jimmieson, 2006). Also, support also increases managers' commitment (Huy, 2002). Managers want to protect their resolutions by getting others' support, preferably experts or superiors.

The fourth quadrant contains the Protection by Scapegoats and Protection by Structure clusters. On the scapegoats' side, managers want to protect their verdicts by creating scapegoats. Managers possibly blame the staff, team, or superiors, although they allow the workforce to avoid taking responsibilities and stay only in the boundaries of the job descriptions. This is a way of defending self-esteem (Hepper, Gramzow, & Sedikides, 2010). They are unconfident under uncertainty and prefer to go on without resolving uncertainty. In fact, they see uncertainty as a threat. This perception paves the way to developing maladaptive behaviours (Norman, Boer, & Seydel, 2005). On the protection by structure side, managers want to protect their rulings by creating or sticking to

strict structures to justify their lack of lateral thinking and uncertainty avoidance. Managers also find uncertainty challenging and expect their leaders to build a framework to reduce uncertainty. They are reluctant to share their jurisdiction. However, in some cases, following organizational standard procedures and staying within the boundaries of bureaucracy is beneficial, especially for the clients in the public sector and top management teams who use bureaucracy as a control function to reduce uncertainty (Gajduschek, 2003). Also, standard workflows of employees and regulated organizations' rules (Wall et al., 2002) and standard operating procedures can decrease internal and external uncertainties (Thompson, 1967).

On the other hand, even in highly bureaucratic organizations, personal emotion and moral judgment could be detrimental for the system (Gajduschek, 2003). In a similar vein, specific responses in a cluster of protection by scapegoats and responses in the protection by structure cluster may be maladaptive and unfavorable managerial behaviours for the organizations.

The reason behind the protection behaviours could be fear, because researchers apprehended that uncertainty is linked to the emotion of fear (Roseman, 1984). This could be fear of negative evaluation (FNE), which results in ambiguity aversion among the managers, because aversive behaviours are to be observed in the salience of FNE (Trautmann, Vieider, & Wakker (2008). Alternatively, it could be fear of losing a job, because people feel insecure when their job is threatened, and fear of losing their current vocation involves uncertainty about the future (Witte, 1999) and other different aspects of uncertainty perceptions (Sverke & Hellgren, 2002). According to the protection motivation theory, when faced with a threat, individuals produce adaptive or maladaptive behaviours (Cismaru & Lavack, 2006).

Although this comparison presents commonalities, it also shows discrepancies. The existence of different aspects between the established typologies and our taxonomy may be due to several factors, including the distinctive perception of middle managers in the strategy context; changes of

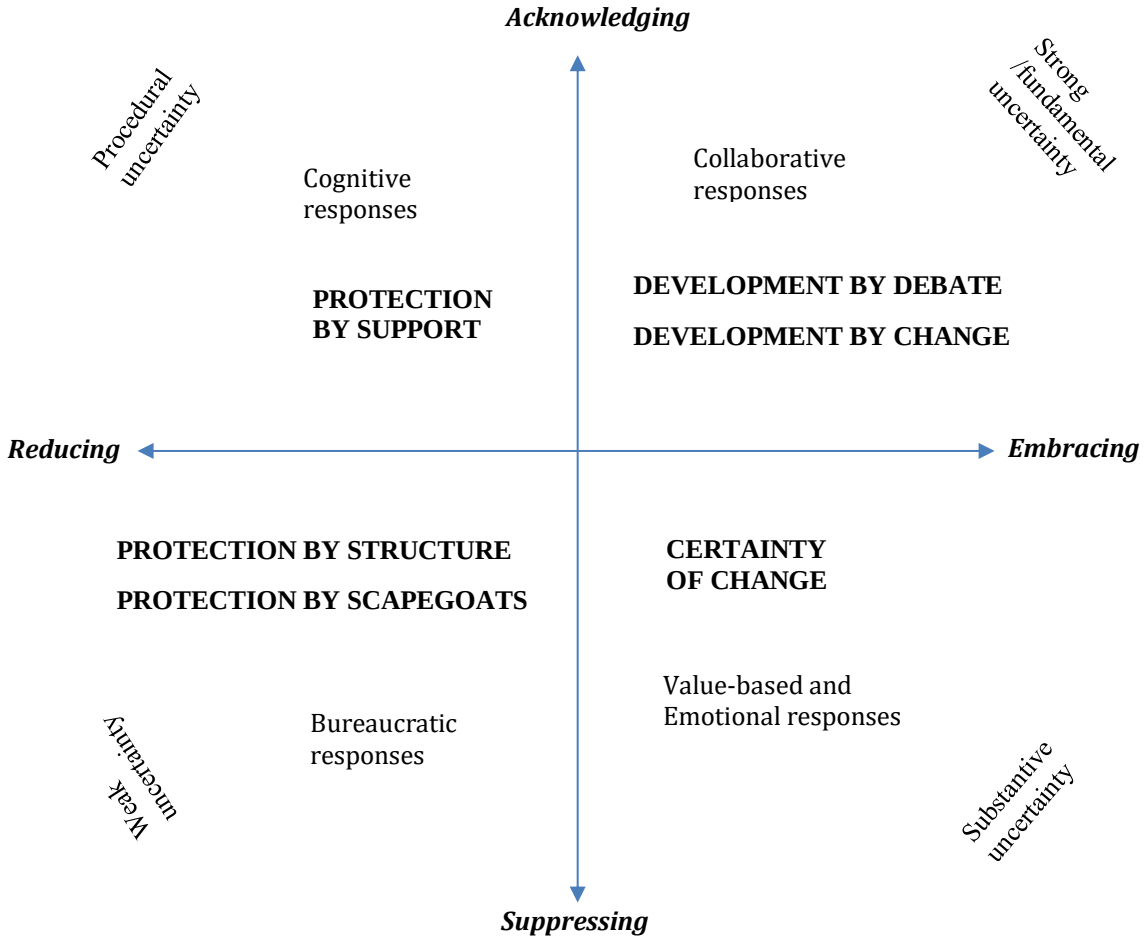
managerial thinking over the past years; and complications of the unequivocal analysis of interview and recollection-based inquiry (Golden, 1992).

4.5. Conclusion

Our study aimed to find out how middle managers deal with uncertainty individually in the strategy process. To answer this question, we set out to create a taxonomy of perceptional managerial responses to uncertainty to understand the nature of uncertainty in any organization and to help to build new theories. This research contributes to improved understanding of middle managers' classifications of responses to uncertainty and raises questions about the effectiveness of previously accepted typologies of responses. Comparison of the taxonomy and dimensions of this study with existing literature suggests both commonalities and discrepancies that require additional research. As McKelvey remarks, "The best that can be hoped for is that in the event that there is not a good fit between a phyletic and numerical solution, both solutions are considered suspect until further investigation or replication by other investigators shifts the benefit of the doubt in favor of one or the other" (McKelvey, 1982, p. 423). On the other hand, we hope that the middle manager-derived taxonomy of responses to uncertainty identified in this study helps 1) to construct better defined managerial responses to uncertainty, and 2) to develop new theories dealing with uncertainty.

We revealed that perceived managerial responses could be categorized into four quadrants to show the motive behind the responses found in the previous study (figure 4.5). The first quadrant containing development by debate and change implies that managers whose perception of uncertainty is on the developmental side use collaborative responses to embrace fundamental and strong uncertainty. Collaborative responses do not ensure embracing uncertainty. Managers can use either collaborative or value-based behaviours to leverage uncertainty, which results in embracing. Thus, embracing is more a perceptional attitude rather than specific types of action.

Figure 4.5. Comparison of managerial responses to uncertainty



Furthermore, this attitude is not only towards embracing but also towards the change. This is understandable because uncertainty requires change and change breeds uncertainty, or vice versa.

The next quadrant, containing certainty of change, differs from the first quadrant in the attitude of the managers. They see that change is unavoidable and undisputable under uncertainty, specifically strong and substantive uncertainty. Managers see uncertainty and change in the same manner. Additionally, they develop value-based or emotional responses to either embrace or suppress uncertainty, because values and emotions have two edges: honesty vs. dishonesty, trust vs. mistrust, and positive feelings vs. negative feelings. Despite this dichotomy, emotional responses are mostly close to the suppressing side.

The first two quadrants show managers using uncertainty and change together in their sentences. The other two quadrants include managers using uncertainty and risk together in their speech. This explains their protectionist perception of uncertainty. Some managers cognitively reduce procedural uncertainty with the help of others to protect themselves. Some other managers use bureaucracy for protection under weak uncertainty.

Understanding of taxonomy of managerial responses could help organizations to deal with uncertainty in different manners. First, training programs could be built up for managers to understand the consequences of responses under uncertainty and obstacles against development. So this kind of training could also help managers to develop appropriate and efficient behaviours on behalf of organizations by distinguishing between protective and developmental actions. Thus, this will promote the internal growth ability of an organization to adapt to its environment and capacity to change. Second, organizations could revise selection, promotion, and evaluations systems for the managers. Those changes could have significant implications for the career development of managers.

This study also broadens our understating of uncertainty, completes the first study, and shows new directions for researchers. So, in the next study, we will try to show the relationship between the responses and variables such as individual responses, internal and external uncertainty, dissimilarity, team cohesion, and knowledge sharing on managerial responses.

CHAPTER 5

5. STUDY 3: Variables Affecting Middle Managers' Responses to Uncertainty in the Strategy Process

5.1. Introduction

Managers are obliged to evaluate the external environment and try to comprehend its uncertain nature (Boulton et al., 1982) and also the internal environment to answer the task requirements (Karimi et al., 2004). The combination of both internal and external uncertainty in an organization requires managers to take necessary actions to resolve the complication. Thus, managers develop different responses to uncertainty. In this study, we focus on managers' suppressing, bureaucratic, and collaborative responses to uncertainty. Suppressing uncertainty involves the denial of information and rationalization responses, which result in ignoring uncertainty (Lipshitz & Strauss, 1997a). Managers who suppress uncertainty incite unfortunate consequences for their organizations. By developing bureaucratic responses, managers stress the leaders' responsibility, power relations, and the roles and responsibilities in the organizations. This response may produce useful solutions for previously defined uncertainties, but not the emerging ones. In this manner, managers also avoid uncertainty. If both organization and managers avoid uncertainty it will result in surprises (Clampitt et al., 2000). On the other hand, collaborative responses have been found beneficial for managers to deal with uncertainty. Collaboration helps managers to combine interests, including all stakeholders, and discover different perspectives and opinions of the situation (Samarah et al., 2003). The literature on uncertainty often neglects the understanding of reasons behind those managerial responses. Thus, one of the objectives of this third research study is to evaluate the extent to which managers' desire of change, emotional uncertainty and cognitive uncertainty induce collaborative, suppressing, and bureaucratic responses to uncertainty.

On the other hand, parallel to managerial responses to uncertainty, organizations develop different attitudes under the uncertainty. Most of the times, an organization's response to uncertainty is more important than those of individuals (Clampitt et al., 2001a). Thus, organizations must create the required climate for managers in their confrontation with uncertainty. This is a prerequisite for organizations to embrace and take advantage of uncertainty and the unexpected. Therefore, we need to determine organizational-level factors and their impact on managerial responses.

Consequently, in this third research study, we intend to understand organizational factors that might affect both the specific managerial and individual responses to uncertainty among the managers. So, we go deeper to comprehend which company level factors have effects on the managerial responses.

In this third research study, we also explore the impact of other variables discussed in previous chapters on the managers' behaviours. First, we will focus on individual factors affecting responses.

5.2. Individual factors affecting managerial responses to uncertainty

5.2.1. Emotional uncertainty

The majority of scholars agree that uncertainty itself produces increased physiological stimulation (Greco & Roger, 2003). Those scholars also commence with the conclusion that we live in an uncertain world (Nelson & Shankman, 2011). The uncertainty creates challenges for us. Specifically, any given work requires people to adapt themselves to an uncertain environment in order to be successful, regardless of their organization, job, or job tenure (Hartley, 1998). People need to have information to be prepared for an unpredictable, unknown, and maladaptive environment (Bordia, Hunt, Paulsen, Tourish, & DiFonzo, 2004a). Otherwise, individuals may tend to respond negatively when they are dealing with uncertainty, especially when they see uncertainty as a threat rather than a challenge (Nelson & Shankman, 2011). This notion lies beneath many

theories explaining uncertainty reduction incentives (Bordia et al., 2004a). Accordingly, our emphasis will be on perception and psychological uncertainty and, for now, its relationship with emotions.

As individual responses differ in how they handle uncertainty (Sorrentino et al., 2008), managers also construct a different coping mechanism. Some who chronically feel certain prefer processing information systematically (Tiedens & Linton, 2001). Some others who are certainty oriented develop a self-regulatory style that circumvents uncertainty (Sorrentino et al., 2008). On the other hand, emotional uncertainty stimulates suppressing responses among individuals as well as managers. Suppressing uncertainty encompasses denial and rationalization procedures, which result in ignoring uncertainty (Lipshitz & Strauss, 1997a). As the emotional uncertainty promotes negativity and increases the threat perception of the uncertainty, this creates a barrier to developing appropriate reactions among the managers. Then, managers tend to deny the state of uncertainty and suppress the uncertainty.

Also, emotional uncertainty is a maladaptive reaction because it has a positive relationship with both neuroticism aspects and with contemplation, and a negative relation with self-esteem and detachment (Greco & Roger, 2001). This notion forms hesitancy, confusion, and reluctance in the manager's struggle with uncertainty. Also, uncertainty arouses some other emotions such as surprise, fear, worry, and, to a certain degree, sadness (Smith & Ellsworth, 1985). Arouse of those emotions obstruct managers to take the necessary steps. Because, responding uncertainty with anxiety and sadness pave the way to maladaptive behaviours (Greco & Roger, 2001). In this case, managers cannot embrace uncertainty; instead, they ignore or suppress it. Additionally, unanticipated disappointments (Nelson & Shankman, 2011) and stress under uncertainty (Greco & Roger, 2001) cultivate the use of suppressing responses.

The emotional experience identifies the uncertainty responses, causes anxiety, and produces fear if health and safety are at stake (Brashers et al., 2000). Under those conditions, especially when an event is adverse, there is no doubt that uncertainty is aversive much of the time (Wilson, Centerbar, Kermer, & Gilbert, 2005) when the conditions reach extreme threat and bring panic or anguish accompanied with insecurity (Brashers et al., 2000). All those circumstances generate once again suppressing behaviours. Accordingly, for us, one of the main motives behind the suppressing responses among the managers is emotional uncertainty.

H1 *– Managers' emotional uncertainty will positively influence the use of suppressing responses to uncertainty.*

5.2.2. Cognitive uncertainty

Cognitive uncertainty is mainly negatively correlated with a tolerance of ambiguity (Carleton et al., 2007). Cognitively uncertain individuals tend to develop some particular types of behavioural patterns because of this correlation. This pattern requires advanced planning, and pursuing clarification and collecting information to avoid ambiguity (Carleton et al., 2007). What is the main reason behind those behavioural patterns? It is the intolerance of the concept that the future is full of adverse incidents, and there is no ultimate method of forecasting such happenings (Carleton et al., 2007). Actually, the intolerant of uncertainty coerce people to assess all ambiguous information as intimidating (Dugas, Gosselin, & Ladouceur, 2001). This belief compels managers to stay within the boundaries of the organizational rules to use bureaucratic responses under uncertainty, because bureaucratic responses involve passing responsibility to the leaders, using bureaucratic power norms to regulate relations and emphasizing the roles and responsibilities.

For instance, Hofstede (2001) showed that individuals high in uncertainty avoidance are more conservative, less tolerant of diversity, and less open to new experiences and alternative lifestyles. At this point, we can state that managers avoiding uncertainty are less likely to accept risks, because

in the context of decision making, Ladbury & Hinsz (2009) showed that uncertainty avoidance is a significant moderator of whether somebody will choose a sure-thing possibility or an uncertain opportunity in a gain-framed state. At that point, managers, in an organization, will possibly stick to organizational processes, procedures, roles, and responsibilities. Their relation with uncertainty is to determine whether or not a risky option is taken for granted (Ladbury & Hinsz, 2009). Managers with cognitive uncertainty will tend to show bureaucratic responses under uncertainty.

Another drawback of cognitive uncertainty is vulnerability. This cognitive vulnerability is mostly related to their intolerance of uncertainty (Carleton et al., 2007). Intolerance of uncertainty (IU) is also a predictor of multiple facets of behavioural patterns (Luhmann, Ishida, & Hajcak, 2011). People with higher IU are inclined to choose the more certain option even if it is disadvantageous (Carleton et al., 2016). When uncertainty is prolonged, the choice of more immediate reward tends to increase.

Moreover, the riskier possibility becomes an option in order to decrease time spent under uncertainty (Luhmann et al., 2011). So this immediate reward could be gained by practicing bureaucratic responses. Bureaucratic responses are a sophisticated form of following organizational procedures. Following organizational procedures is one of the most popular uncertainty reduction process (Lipshitz & Strauss, 1997b), because, in order to decrease the uncertainty, organizations employed standard workflows and ruled organizations (Wall et al., 2002). This practice was dominant during the mass production and marketing era (Chawla et al., 2012). We can still find organizations and managers applying this practice. From a managerial point of view, we classified these practices as bureaucratic responses to uncertainty. The efficiency of these responses is still valid in some cases, especially preventing managers from use of suppressing responses due to emotional uncertainty. On the other hand, it is insufficient to embrace uncertainty using collaborative responses due to cognitive uncertainty.

Another factor related to cognitive uncertainty leading bureaucratic responses is intolerance of

uncertainty. Organizational life is full of uncertainties, and managers have to deal with problems under those uncertainties. The longer individuals with elevated intolerance of uncertainty remain under uncertainty, the more likely they are to deteriorate from effective forms of actual activities (Luhmann et al., 2011). This may weaken individuals' problem-solving abilities, and lead to indecisiveness and avoidance of uncertainty (Dugas, Freeston, & Ladouceur, 1997). Besides, managers should accomplish organizational procedures like a decision-making process while spending more time under uncertainty. So managers with intolerance of uncertainty may select an option with more immediate rewards, bureaucratic responses, to avoid stress triggered by uncertainty.

Consequently, cognitive uncertainty's negative correlation with tolerance of ambiguity, and positive correlation with intolerance of uncertainty and uncertainty avoidance, suggests that managers with cognitive uncertainty are likely to use bureaucratic responses. So we predict that managers' cognitive uncertainty will result in the use of bureaucratic responses to uncertainty.

H2 *– Managers' cognitive uncertainty will positively influence the use of bureaucratic responses to uncertainty*

5.2.3. Desire of change

People strive to find stimulation and diversify their tasks to meet their self-development needs and remain interested in and satisfied with their work (Leana & Barry, 2000). An organization's ability and desire to change depends primarily on the acceptance, devotion, and motivation to change of its staff (Eby, Adams, Russell, & Gaby, 2000). However, the desire for change becomes more important when it comes to managers. The desire for change, especially the impulsiveness part, was expected to be linked to extraversion (Greco & Roger, 2001). What is the desire of change? The desire for change that has been characterized by uncertainty and novelty has been associated only with impetuosity and sociability (Greco & Roger, 2001). Especially in certain types of jobs with

regular social interactions, extraversion leads to betters performance (Barrick & Mount, 1991). Moreover, the desire for change, therefore, clearly forms part of the cluster of extraversion (Greco & Roger, 2001).

Due to various internal and environmental factors, including uncertainty, many organizations find it essential to invest in some restructuring or change processes to preserve or gain the competitive advantage (Allen, Jimmieson, Bordia, & Irmer, 2007). However, unfortunately, a smaller number of organizations, at between 30% and 60%, are successful in executing substantial change processes (Burnes, 2003). Moreover, managers play crucial roles in change implementation processes. The notion of the desire of change becomes essential. Because change-oriented behaviours are types of leader behaviour that support and drive change in teams and organizations (Derue et al., 2011), those behaviours of leaders include measures such as developing and communicating a vision to change, promoting innovation, and accepting risks (Yukl & Yukl, 2002). Moreover, change behaviours improve productivity by providing a vision for the future, and by encouraging followers to give up the status quo (Derue et al., 2011), as individual initiative involves behaviours designed to bring about change, such as 'voluntary acts of creativity and innovation designed to improve one's task or the organization's performance' (Podsakoff, MacKenzie, Paine, & Bachrach, 2000, p. 524). Also, change-oriented behaviour can increase followers' tendencies to change and satisfaction (Derue et al., 2011).

The interpersonal traits of leaders, such as extraversion, should, in particular, predict the degree to which leaders are engaged in change-oriented behaviour (Derue et al., 2011), since extraverted people are more likely to seek followers' input, to talk about the job eagerly, and to find the direction and vision for the team (Derue et al., 2011). Moreover, collaboration helps managers to combine interests, including all stakeholders, and discover different perspectives and opinions of the situation (Samarah et al., 2003). Also, collaboration increases the possible implementation of distributed cognitive responses, which are beneficial in the uncertain environment (see Michel, 2007). Aragón-

Correa et al. (2013) showed that information-sharing and promoting collaboration is essential for the organization in an uncertain environment and helps to implement more proactive strategies. We believe that collaborative responses help the manager to deal with uncertainty. Within the organizational change, the collaboration also helps managers in different ways. Collaboration increases innovation capacity during uncertain times (Hattori & Lapidus*, 2004), enables novel resolutions for multifaceted problems (Lawrence, Hardy, & Phillips, 2002), and allows personnel to donate their best practices and contribute to multiparty problem-solving activities (Quan-Haase, Cothrel, & Wellman, 2005).

Managers need to enhance the capability of all people and empower them (Raelin, 2006) because, in addition to being advocated as a special formula for improved job performance, empowerment is highly efficient when performing critical tasks when faced with a higher level of uncertainty (Wall et al., 2002). Empowerment also increases the level of employee participation in collaborative activities. Besides empowerment, the first managerial step to reach collaboration, managers tend to increase the situational awareness of the staff. So, within the organization, they try to reach as many people as possible who can use their knowledge and information towards the goal (Endsley, 1995). It is also logical to assume that an individual who is favorably disposed toward change would develop more collaborative responses to uncertainty. Thus:

H3 *– Managers' desire for change will positively influence the use of collaborative responses to uncertainty.*

5.3. Organizational-level contextual factors affecting managerial responses to uncertainty

Understanding managers' responses to uncertainty during the strategy process, and the factors affecting that response, was explored in the last few paragraphs. Since uncertainty perception is related to attitudinal and behavioural variables (Hui & Lee, 2000),, managers develop different responses to those uncertainties based on their attitudes and behaviours. Our inquiry also specified

that individual factors - desire of change, emotional and cognitive uncertainty - are the main motives behind the managerial responses. This perspective gives the literature an all-new perspective on these kinds of dynamics. However, the analysis made in previous chapters was focused only on one side of the coin – managers' responses and perceptions. This story can only be finalized by understanding organizational-level contextual factors affecting managers' reported behaviours and decisions under uncertainty.

Since the contemporary civilizations consist of organizations (Czarniawska, 2007), and humans cannot be separated from the social context of organizations because we are embedded in, rather than being independent of, the organization (Perrow, 2000), every organization has a different approach to both environmental and internal uncertainty; managers' responses to uncertainty will be different in these organizations because of the organizational-level contextual factors. Thus, we will articulate the effects of internal uncertainty, environmental uncertainty, dissimilarity, cohesion, and knowledge-sharing on managerial responses to uncertainty as organizational-level contextual factors. We included internal and external uncertainty variables because those two variables are the main two dimensions of the uncertainty sources. We find the dissimilarity and cohesion significant factors because most organizations are nowadays multinational. We also added knowledge sharing due to the strong relationships between information and uncertainty. We will discuss those variables in detail in the subsequent paragraphs. First, we begin with internal uncertainty.

Outside the borders of the organization lies the external environment, and the internal environment is inside the boundaries that hold physical, social, and other psychological factors (Duncan, 1972). The internal environment requires allocation of managers' time and commitment because internal conditions of organizations also serve as a source of uncertainty and create uncertain circumstances. Although managers are mostly not comfortable with uncertainty, there will be no evolution without uncertainty (Perminova, Gustafsson, & Wikström, 2008). Therefore, novel strategies and activities are necessary to exploit opportunities and manage threats arising from uncertainty (Hillson, 2002).

This explains why uncertainty management is one of the critical factors in improving company performance (Perminova et al., 2008). To do that, managers must find appropriate responses to deal with internal uncertainty.

Since we are concerned with inter-organizational aspects, we need to search for consideration of task environment characteristics (Downey & Slocum, 1975), specifically internal differences among the organizations. As found in the first study, internal structural changes, leadership/management, colleagues, complex and non-routine internal tasks, policies/procedures of the organizations and shareholders are the primary sources of internal uncertainties (see also Priem et al., 2002). Since these internal sources of uncertainties are different among the organizations, their effect on perceptions of managers will lead to different managerial responses in different organizations.

Additionally, in several cases, the decision maker's uncertainty relies on internal sources (Bereby-Meyer, Meyer, & Budescu, 2003). Tapinos (2012) has found in his study, probing the small business environment, that internal uncertainty can influence decisions, assessments, and perceptions. As Duncan (1972) and Priem et al. (2002) propose, the internal conditions of organizations serve as a source of uncertainty and create circumstances for managers to allocate their time and commitment. Those conditions are mainly techno-economic conditions, international instability and disasters, governmental influence, societal pressure, and competition and customers (see also Priem et al., 2002; Voges et al., 2003). Since the internal conditions are proposed as a stimulus to cause uncertainty among decision-makers (Wood, 2008), this will affect managerial responses to uncertainty. Thus, we propose that:

H4a *– The positive relationship between individual responses to uncertainty (emotional uncertainty, cognitive uncertainty, and desire of change) and managerial responses to uncertainty (suppressing, bureaucratic and collaborative responses to uncertainty) is mediated by managers' internal uncertainty perception.*

We will continue with environmental uncertainty. Organizations are in a worldwide crisis (Tourish & Hargie, 2004). Organizations do not operate isolated from this world; they must handle problems created by environmental uncertainties to survive (Kreiser & Marino, 2002a). These problems are increasingly interdependent, highly unpredictable, and nobody knows the next show hitting the global economy (Tourish & Hargie, 2004). To discover an answer, thus, organizational researchers have been studying organizational uncertainty for more than half a century (Gerloff et al., 1991). Likewise, managers look for ways to sustain competitive advantage and adapt their organizations to environmental conditions (Tamayo-Torres et al., 2011).

Organizations compromise the open system with their surrounding environment (Ford, 2015), which is replete with different uncertainty sources. In the first study, we have found five external sources; techno-economic conditions, international instability and disasters, governmental influence, societal pressure, and competition and customers (see also Priem et al., 2002; Voges et al., 2003). So all different organizations will have a different combination of sources of uncertainty and various effects on managers' perception.

On the other hand, managers' perception of uncertainty may differ according to their organizational specifics, industry, and general environment (Miller, 1993), because the environment offers additional inputs into the individual's perception mapping processes (Downey & Slocum, 1975). In this environment, political, policy, and macroeconomic uncertainties are systematically differentiated across countries (Miller, 1993). Moreover, dimensions of the organizational environment vary as simple-complex and static-dynamic dimensions (Duncan, 1972). These dimensions play a significant role in the perceived uncertainties of the external environment (R. Andrews, 2008).

According to Duncan (1972) the complex and dynamic environment surrounding an organization should not be regarded as a set of constant features, because they vary based on the individual's perception. So Milliken (1987) defines it based on individuals' inability to comprehend the direction

of the changes, the possible consequences of these changes on their organizations, and the ramifications of their responses to the environment. However, the nature of the organizational environment is full of uncertainty, which could endanger the existence of organizations (Salancik & Pfeffer, 1978). Of course, a perceived environment like this tends to create a high degree of stress and anxiety and feelings of inadequacy among the managers (Waldman, Ramirez, House, & Puranam, 2001), because the success or failure of the organization depends on the manager's decision based on their perception of this environment (Chenhall & Morris, 1986). These perceptions have an impact on managers' psychological and cognitive processes, and their assessment and responses to uncertainty (Gerloff et al., 1991). So, we propose:

H4b *– The positive relationship between individual responses to uncertainty (emotional uncertainty, cognitive uncertainty, and desire of change) and managerial responses to uncertainty (suppressing, bureaucratic, and collaborative responses to uncertainty) is mediated by managers' external uncertainty perception.*

We will thirdly discuss dissimilarity. Dissimilarity means the extent of differing features between an individual and a second entity (Jackson, May, & Whitney, 1995). It can also refer to the extent to which two people share common attributes, and to how much other team members share the attributes of an individual in the team (Jackson, Stone, & Alvarez, 1992). Since individuals tend to "react on the bases of perceptions of reality, not reality per se" (Ferris & Judge, 1991, p.45), we need to make a definition for perceived dissimilarity. So, perceived dissimilarity is a subjective measure of how different people see each other as members of the team (Hobman, Bordia, & Gallois, 2004).

Although integration is essential for making sense of the potential benefits of diversity, dissimilarity may thus limit this integration or participation of an individual in teams (Shaw & Barrett-Power, 1998), because dissimilar people are less involved in group tasks (Kirchmeyer & Cohen, 1992). They also tend to communicate fewer with people (Zenger & Lawrence, 1989) and to be less involved in decision-making processes (Lichtenstein, Alexander, Jinnett, & Ullman, 1997). Moreover, they see

teamwork as less efficient (Baugh & Graen, 1997). Therefore, visible, informational, and value dissimilarity prevent people from attending workgroups (Hobman et al., 2004). Thus, based on these facts we propose:

H4c *– The positive relationship between individual responses to uncertainty (emotional uncertainty, cognitive uncertainty, and desire of change) and managerial responses to uncertainty (suppressing, bureaucratic, and collaborative responses to uncertainty) is mediated by managers' dissimilarity perception.*

The fourth factor is cohesion. Cohesion is a process to maintain unity among members of a small group or a more significant social entity (Dion, 2000). Cohesion is typically defined as one of the main characteristics of a group (Golembiewski, 1962). When it comes to perception, the degree to which each group member is feeling part of or attached to their social group reflects the perceived cohesion (Dion, 2000). The high level of cohesion is expected to stimulate more communication between group members, thus creating more excellent uniformity and consistency of the opinions (Dion, 2000). It influences group members to think, act, and behave alike, and share the same attitude (Dion, 2000). Moreover, there is a strong relationship between coaching behaviour and group cohesion (Westre & Weiss, 1991). That brings more success and unity to highly cohesive groups in comparison with groups with little cohesion (Mach et al., 2010).

There is a link between many variables in task content that would allow high integration and cohesion to make the implementation of those activities in a team setting more efficient and effective (Magni, Proserpio, Hoegl, & Provera, 2009). Similarly, it will help managers to deal with uncertainty, because the more integrative and cohesive, the better team members are prepared for individual improvisation (Magni et al., 2009). Also, cohesive teams are generally more efficient than non-cohesive types (Clément, Dörnyei, & Noels, 1994), indicating that their uncertainty coping mechanism is likely to be effective. Cohesion increases the commitment level among the team members and encourages them to collaborate against risky situations (Lawler, Thye, & Yoon,

2000) and motivates them to coordinate efforts to perform well (Beal, Cohen, Burke, & McLendon, 2003). Based on these explanations, we propose:

H4d *– The positive relationship between individual responses to uncertainty (emotional uncertainty, cognitive uncertainty, and desire of change) and managerial responses to uncertainty (suppressing, bureaucratic, and collaborative responses to uncertainty) is mediated by managers' cohesion perception.*

The last factor we will discuss that mediates the relationship between individual and managerial responses to uncertainty is knowledge sharing. Knowledge sharing is the process by which people share their knowledge and create new knowledge together (Van Den Hooff & De Ridder, 2004). Since the information is one of the most significant variables affecting coping with uncertainty, that makes knowledge sharing critical. Knowledge sharing allows managers to attain necessary information because it requires both donating and collecting knowledge (Osterloh & Frey, 2000).

Earlier scholars like Galbraith (1973) put information deficiency at the centre of uncertainty management, recent scholars like Cleden (2017) redefine uncertainty as lack of knowledge, which is a harbinger of both threat and opportunity. So, in order to make an important decision, it is better for the manager to be aware both of the uncertainty management process and of the information needed to manage uncertainties (Terje Karlsen, 2010), because knowledge management processes within organizations significantly contribute to the creation of competitive advantage (Michailova & Husted, 2003). Moreover, knowledge sharing helps with developing state-of-the-art ideas, coping with changes and crisis, achieving complicated tasks, and creating plans (Davidson & Voss, 2002). Furthermore, according to Terje Karlsen (2010), knowledge sharing helps the manager to cope with uncertainty by creating supportive culture; establishing collaborative, respectful, professional and trustworthy relations; understanding management of uncertainty; acquiring a state of awareness of uncertainty; and improved decision-making. Thus, it decreases uncertainty and integrates mental model distribution into coherent solutions (Jarke, 1986).

H4e *– The positive relationship between individual responses to uncertainty (emotional uncertainty, cognitive uncertainty, and desire of change) and managerial responses to uncertainty (suppressing, bureaucratic, and collaborative responses to uncertainty) is mediated by managers' knowledge sharing.*

5.4. Methodology

For the current study, we used multi-level modelling, conducted with SPSS (version 25). Multilevel modelling is a powerful tool to analyze different levels and cross-level relationships (Heck, Thomas, & Tabata, 2013). Since we intend to see the effects of organizational-level contextual factors on managerial responses, the multilevel framework is appropriate for our analysis. We defined variables in two different levels, namely, individual and organizational. Defining variables within hierarchical levels is a concept found in multilevel analysis (Hox, Moerbeek, & Van de Schoot, 2017). This concept allows us to evaluate the effects of different levels separately (Gelman, 2006). Thus, our research model suggests the use of a multilevel analysis framework in this study. Before the multilevel analysis, we applied correlations and linear regression analyses to observe the relationship between managers' individual responses and managerial responses to uncertainty. Before examining the hypotheses, we conducted a confirmatory factor analysis to verify measures' validity. Additionally, we also calculated Cronbach´s alpha and Kaiser-Meyer-Olkin Index to see the adequacy of those tests (see Appendix F).

Regarding the sample, we have selected managers based on their LinkedIn profile. Questionnaires were sent to potential respondents with a note via LinkedIn. We explained the relevant details of the research and confidentiality terms. A single questionnaire was prepared to collect information about managerial responses to uncertainty from managers based on their perception. The questionnaire contains Environmental Uncertainty Scale, Internal Uncertainty Scale, Cohesion, Perceived Dissimilarity, knowledge sharing, Managerial responses to uncertainty questionnaire, and individual Uncertainty Response Scale. All constructs were measured based on individual perceptions and

answered online in a computer-based questionnaire tool (Google survey). The managers in the same organization were sent a separate link to match managers' responses with their organization. As a result, 310 questionnaires with 21% response rate in 43 different organizations were completed. The average manager number in organizations was seven individuals.

In the managers' sample, 54 participants were women. Around 7.5% were aged between 26 and 30 years old; 15.9% were aged between 31 and 35; 18.8% were aged between 36 and 40; 21.8% were aged between 41 and 45; 14.3% were aged between 46 and 50, and 21.7% were 51 or more years old. 24.2% of managers had been employed in the organization for fewer than three years; 15.8% for 3 to 5 years; 17.7% for 6 to 10 years; 31.6% for 11 to 20 years; 10.6%had been employed in the organization for 21 or more years.

5.5. Measures

5.5.1. Demographic characteristics

Gender, ethnicity, education, age, and time interaction within the team were collected. Although in most studies, one or two attributes (Jackson, Joshi, & Erhardt, 2003) were considered, in this, we include multiple attributes to ensure a wider understanding.

5.5.2. Individual Responses to Uncertainty Scale

The individual responses to uncertainty scale is adapted from uncertainty responses scale (Greco & Roger, 2001). It was originally composed of 15 items. All items use a 4-point scale with anchors of 1 = Never, 2 = Sometimes, 3 = Often, 4 = Always. In this research study, we have used only ten items with higher loadings with three factors: the desire of change, emotional uncertainty, and cognitive uncertainty as developed by Greco & Roger (2001). Some items are: "I think variety is the spice of life."; "I get worried when a situation is uncertain."; "I like to plan ahead in detail rather than leaving things to chance.". Cronbach alpha was 0.798 for the desire of change, 0.785 for the emotional

uncertainty and 0.587 for the cognitive uncertainty. The reliability of the first two factors is good, but for the last it is below the acceptable level. Factorials are included and explored in Appendix F.

5.5.3. Managerial Responses to Uncertainty Scale

We have developed a managerial responses to uncertainty scale based on the findings of studies one and two. Additionally, we used one item regarding trust from the Trust Scale (Fernandes da Costa, 2000). It is composed of 13 items and contains three factors: collaborative responses, bureaucratic responses, and suppressing responses. Some of the items are: "I discuss the implementation of tasks within the team."; "I follow organizational procedures to deal with problems."; "I try to solve first predictable problems then uncertain ones regardless of their importance.". Cronbach alpha was 0.836 for the collaborative responses, 0.556 for the bureaucratic responses, and 0.543 for the suppressing responses. Bureaucratic responses and suppressing responses are below the acceptable level. Factorials are included and explored in Appendix H.

5.5.4. Environmental Uncertainty Scale

Adapted from the environmental uncertainty scale (Sia, Teo, Tan, & Wei, 2004). All items use a 7-point scale with anchors of 1 = strongly disagree, and 7 = strongly agree. The environmental uncertainty scale consists of 8 items with two factors: perceived environmental complexity and variability. Some items are: "The organizational environment is such that it is difficult to have adequate information on our external environment to assist us in decision making."; "The organizational environment is such that it is difficult to capture sufficient information on our external environment before making a major decision."; and "Trends in my organization's external environment vary frequently.". Cronbach alpha was 0.906 for the environmental complexity, 0.865 for the environmental variability. Factorials are included and explored in Appendix H.

5.5.5. Internal Uncertainty Scale

The internal uncertainty scale is adapted from the task uncertainty scale (Ghani, 1992b). It is originally composed of four items. In this research study, we have also selected all four items with two factors: analyzability and variability measures. All items use a 7-point scale with anchors of 1 = small extent and 7 = great extent. Some items are: “To what extent is there a clearly known way to do the major types of work you normally encounter?”; “To do your work, to what extent can you actually rely on established procedures and practices?” and “To what extent would you say your work is routine’?”. Cronbach alpha was 0.800 for the internal uncertainty analyzability, 0.743 for the internal uncertainty variability. Factorials are included and explored in Appendix H.

5.5.6. Dissimilarity Scale

This perceived dissimilarity scale is adopted from the perceived dissimilarity scale (Hobman et al., 2004). It is originally composed of six items. In this research study, we have also used all six items. Also, we have added two more items regarding socio-cultural and working language dissimilarity. All items use a 5-point scale with anchors of 1 = strongly disagree, and 5 = strongly agree. Some items are: “I feel I am visibly dissimilar to other group members.”; “I feel I am professionally and educationally dissimilar to other group members.”; and “I feel my cultural and social values are dissimilar to other group members.”. Cronbach alpha was 0.890 for the perceived dissimilarity scale. Factorials are included and explored in Appendix H.

5.5.7. Cohesion Scale

The perceived cohesion scale is adapted from the “Team Cohesion” measure (Dion, 2000). It is originally composed of nine items. In this research study, we have also used all nine items. All items use a 5-point scale with anchors of 1 = strongly disagree, and 5 = strongly agree. Some items are: “There is a friendly atmosphere among people.”; “People treat each other with respect.”; and

"People are proud to belong to the group." Cronbach alpha was 0.931 for the perceived cohesion scale. Factorials are included and explored in Appendix H.

5.5.8. Knowledge Sharing Scale

The knowledge sharing scale is adopted from knowledge donating and collecting measures (Van Den Hooff & De Ridder, 2004). It is originally composed of ten items. In this research study, we have used only five items. All items use a 5-point scale with anchors of 1 = Very little; 2 = Little; 3 = Moderate amount; 4 = Much; 5 = Very much. Some items are: "I share the information I have with the colleagues outside of my department."; "I share my skills with the colleagues outside of my department"; and "Colleagues within my department tell me what they know when I ask them about it.". Cronbach alpha was 0.812 for the knowledge sharing, and 0.848 for the knowledge donating. Factorials are included and explored in Appendix H.

5.6. Results

Based on correlation results (Table 5.1), regarding managers' responses to uncertainty, firstly, managers' emotional uncertainty has a significant correlation with suppressing responses to uncertainty (Hypothesis 1). Secondly, managers' cognitive uncertainty has also a significant correlation with bureaucratic responses to uncertainty (Hypothesis 2). Thirdly, managers' desire of change has a strong positive correlation with managers' collaborative responses to uncertainty (Hypothesis 3). Moreover, emotional uncertainty also has a significant positive correlation with bureaucratic responses and is negatively correlated with collaborative responses with no significance. Cognitive uncertainty also has a positive correlation with both collaborative and suppressing responses.

We defined different models in order to test the hypothesis. We conducted a regression analysis in all models and used gender and age as control variables.

Table 5.1. Correlation Analysis for Study 2

	Correlations	Mean	SD	1	2	3	4	5	6	7	8
1	Manager gender?	1.18	0.381								
2	Manager age?	4.94	1.733	-.258**							
3	Collaborative responses to uncertainty	3.952	0.609	-0.007	0.012	(0.836)					
4	Bureaucratic responses to uncertainty	3.232	0.699	-0.023	-0.044	.394**	(0.556)				
5	Suppressing responses to uncertainty	2.818	0.812	-0.11	-0.065	.178**	.325**	(0.543)			
6	Desire of change	3.261	0.556	0.089	0.017	.460**	0.065	0.06	(0.798)		
7	Emotional uncertainty	1.915	0.632	-0.069	-0.056	-0.102	.210**	.148**	-.288**	(0.785)	
8	Cognitive uncertainty	2.854	0.593	0.028	-0.104	.232**	.400**	.270**	.123*	.319**	(0.587)

Significance at ** p<0.01; * p<0.05, diagonal shows value of Cronbach's alfa

The regression analysis was accomplished to determine which demographic variables and types of uncertainty (emotional or cognitive) contributed to explaining managers' suppressing responses to confirm hypothesis 1 (Table 5.2). As shown in Table 5.2, the type of uncertainty with a positive relationship with suppressing responses is cognitive uncertainty, and the demographic variable with a positive relationship is gender (Model 1 and Model 2).

Table 5.2. Regression Analysis for Suppressing Responses

	Suppressing Responses		**Bureaucratic Responses**		**Collaborative Responses**	
Independent Variables	**1**	**2**	**3**	**4**	**5**	**6**
(Constant)		1.531		1.878		1.865
Managers' Gender (male)	.125*	.264*	.030	.030	.025	.026
Managers' Age	-.037	-.072	-.002	-.002	.004	.023
Emotional Uncertainty		.063		.091		-.042
Cognitive Uncertainty		.373**		.475**		.182 **
Desire of Change		.034		.019		.481**
ΔR2 Adjusted		.016		.162		.031

****P<0.01, *P<0.05**

High cognitive uncertainty results in suppressing responses to uncertainty among the managers (F Change=5.201, $p < 0.05$). This simple regression also shows a positive relation between managers' gender (male) and suppressing responses (the suppressing responses are higher among the male managers – Model 2). Based on these results, Hypothesis 1 is not validated. Managers' emotional uncertainty was expected to predict suppressing responses instead of cognitive uncertainty.

To test Hypothesis 2, we also conducted a simple regression analysis. Table 5.2 shows that cognitive uncertainty has a positive relationship with the bureaucratic response (Model 4). Therefore, higher levels of managers' cognitive uncertainty will increase the tendency to show bureaucratic responses to uncertainty (F Change=59.120, $p < 0.01$). Based on this, we can validate our Hypothesis 2.

Regarding Hypothesis 3, we also conducted another simple regression analysis. Table 52 shows that the desire of change has a positive relationship with a collaborative response in Model 5 (F Change=81.882, $p < 0.01$, cognitive uncertainty excluded). This validates hypothesis 3. Therefore, higher levels of the desire of change will cause more collaborative responses among the managers. Additionally, in model 6, both desire of change and cognitive uncertainty have positive relations with collaborative responses (F Change=12.330, $p < 0.01$).

After the linear regression analyses showing the relationship between managers' individual responses and managerial responses to uncertainty, then we applied the multilevel analysis with SPSS (version 25) to examine the organizational variables affecting these relations. Before that analysis, we should see whether individual and managerial responses to uncertainty vary across the companies as the null hypotheses (Heck et al., 2013).

Regarding the managerial responses, we designated the company variable as a subject identifier for this model. Then we introduced managerial responses to uncertainty as dependent variables (Heck et

al., 2013). As seen in Table 5.3., the result of an analysis indicated that none of the managerial responses (suppressing, bureaucratic, and collaborative responses) are significant at level 2. Thus, we cannot reject the null hypothesis. As a result, we are confident that managerial responses to uncertainty do not vary across the organizations.

Table 5.3. Multilevel Analysis for Managerial Responses to Uncertainty

	Suppressing Responses	**Bureaucratic Responses**	**Collaborative Responses**
	(Null Model)	(Null Model)	(Null Model)
	(A)	(B)	(C)
Fixed Part			
Level 1 (Manager)			
	2.80**	3.21**	3.95 (N/A)
Random Part			
σ2e τe Level 1	.64**	.46**	0.37** (N/A)
σ2u0 Intersec Level 2	0.01 (NS)	0.02 (NS)*	N/A
Deviance	748.957	653.094	748.957

**P<0.01; *P<0.05; NS: Nonsignificant; NA: Nonapplicable

Regarding individual responses, we also designated a company variable as a subject identifier for the new model. Then we introduced individual responses to uncertainty as dependent variables as well. First, we examined emotional uncertainty. In terms of emotional uncertainty, Table 5.4 shows that the null model is validated by this first analysis conducted. Therefore, organizational factors affect managers' emotional uncertainty. However, when we applied contextual factors to the model, none of them was significant. We found only level 1 individual factors significant. Therefore, managers' internal uncertainty is positively, and knowledge sharing is negatively related to emotional uncertainty (respectively, $\beta=0.06$, $p<.05$ and $\beta=-0.16$, $p<.01$).

Table 5.4. Multilevel Analysis for Emotional Uncertainty

	Emotional Uncertainty		
	Null Model	Model 1	Model 2
	(A)	(B)	(C)
Fixed Part			
Level 1 (Manager)			
Intersection	1.86**	2.44**	2.24**
Knowledge sharing (Donating)		-1.5*	-0.16**
Internal uncertainty (Variability)			0.06*
Level 2 (Company)			
Random Part			
σ2e τe Level 1	0.34**	0.33**	0.32**
σ2u0 Intersec Level 2	0.04*	0.04*	0.03*
Explained Variance			
Δ R2 Level 1		4.3%	2.7%
Δ R2 Level 2	89.5%	6.0%	11.0%
Δ R2 Total R2		1.3%	13.3%
Deviance	572.736	558.184	551.909

**P<0.01; *P<0.05

Second, we examined cognitive uncertainty, to see whether it varies across organizations or not. Nevertheless, it was not significant at level 2, but only at level 1 (β= .32, p<.01). So we continued analysis with the desire of change as our third variable.

Concerning desire of change (Table 5.5), the null model is confirmed by this third analysis. Thus, organizational factors affect managers' desire of change. Then we applied contextual factors to the model. As seen on model 4, we found environmental uncertainty at level 1 and knowledge sharing at level 2 positively significant with the desire of change (respectively, β=0.08, p<.01 and β=0.24, p<.05).

Table 5.5. Multilevel Analysis for Desire of Change

	Desire of Change		
	Null Model	Model 3	Model 4
	(D)	(E)	(F)
Fixed Part			
Level 1 (Manager)			
Intersection	3.30**	2.98**	2.09**
Environmental uncertainty (Variability)		0.08*	0.08**
Level 2 (Company)			
Knowledge Sharing (Donating)			0.24*
Random Part			
σ2e τe Level 1	0.28**	0.27**	0.26**
σ2u0 Intersec Level 2	0.02*	0.02*	0.02*
Explained Variance			
Δ R2 Level 1		3.8%	1.7%
Δ R2 Level 2	92.7%	5.0%	2.5%
Δ R2 Total R2		3.9%	1.9%
Deviance	500.422	487.996	483.915

**P<0.01; *P<0.05

5.7. Discussions

The main objective of this research study was to understand the relationship between individual and managerial responses to uncertainty, and organizational factors that might affect both the managerial and individual responses to uncertainty. Outcomes of the study are important because they clarify the relationship between managers' responses under uncertainty and their individual attitude towards uncertainty. Our results show that managers have three main behaviours to deal with uncertainty. They can suppress uncertainty, stick to bureaucracy, or collaborate with different stakeholders within the organizations. The results also indicate a pattern between individual responses (cognitive and

desire of change) and managerial responses (bureaucratic and collaborative) under uncertainty. On the other hand, we could not find a significant relation between suppressing responses and emotional uncertainty.

We thought that motive behind the suppressing behaviours was emotional uncertainty because suppressing uncertainty encompasses denial of information and rationalization responses, which result in ignoring uncertainty (Lipshitz & Strauss, 1997a) and responding to uncertainty with anxiety and sadness due to high emotional uncertainty may pave the way to maladaptive behaviours (Greco & Roger, 2001). Nevertheless, our analysis does not directly confirm the significant relationship between the two variables. The main reason behind that could be the high self-esteem and cohesion of managers and their connection and affiliation with the organization, because according to Greco & Roger (2001), emotional uncertainty is a maladaptive reaction based on low self-esteem and detachment (Greco & Roger, 2001). Moreover, managers' higher education level and experience within an international environment help them to cope with their emotional uncertainty.

About bureaucratic responses, the results exposed that this variable is positively related to cognitive uncertainty. This is in line with the idea that bureaucracy could be used to reduce uncertainty in the organization besides its problematic inefficiency (Gajduschek, 2003). Managers find having well-defined roles and responsibilities valuable. Thus, remaining within the boundaries of bureaucracy is beneficial for managers who use bureaucracy as a control function to reduce uncertainty (Gajduschek, 2003). Nonetheless, cognitive uncertainty is not only positively related to bureaucratic responses, but also with suppressing and collaborative responses. For the latter, it is the desire of change variable that paves the way to collaborative responses. For the first one, the question is what mediates the cognitive uncertainty to cause three diverse responses. The difference does not originate from organizational factors because, based on outcomes of our multilevel analysis, none of the managerial responses vary across the organizations. Therefore, the difference most probably comes

from individual variables. Unfortunately, finding out those individual variables requires further investigations.

When we focus on managers' collaborative responses, results show that when the desire of change and cognitive uncertainty are high, these kinds of responses tend to increase to deal with uncertainty. The desire of change supports and drives change in teams and organizations (Derue et al., 2011). Moreover, collaboration increases the possible implementation of distributed cognitive responses, which are useful under uncertainty (see Michel, 2007). As a result of the collaboration, managers can incorporate the interests of all stakeholders and bring out all perspectives and opinions (Samarah et al., 2003).

On the other hand, results indicate that managerial responses to uncertainty do not vary across the organization. Thus, organizational variables have no effects on these responses. Apparently, the influence of the organizational factors on the positive relation between individual responses (cognitive uncertainty and desire of change) and managerial responses to uncertainty (suppressing, bureaucratic, and collaborative) is insufficient. On the contrary, individual responses, emotional uncertainty, and desire of change all vary across the organizations. However, organizational-level internal uncertainty, environmental uncertainty, dissimilarity, cohesion, and knowledge sharing have no significant impact on emotional uncertainty. When we focus on level 1 factors, managers' internal uncertainty is positively, and knowledge sharing is negatively related to emotional uncertainty. Negative relation with knowledge sharing validates that emotional uncertainty could be maladaptive. Moreover, the positive relationship with internal uncertainty confirms that high perceived internal uncertainty will result in emotional uncertainty among the managers.

Finally, the desire of change was positively related with level 1 perceived environmental uncertainty and level 2 knowledge sharing. As Aragón-Correa et al. (2013) showed that information sharing is essential for the organization under uncertain environment and help managers to implement more proactive strategies. High level 1 perceived environmental uncertainty shows that managers assess

the external environment and try to comprehend its nature (Boulton et al., 1982) and they are aware that the significant environmental uncertainty may generate organizational maladjustment (May et al., 2000). Thus, their desire of change will be higher.

5.8. Conclusion

In this study, we focused on three managerial responses to uncertainty. First, suppressing uncertainty means the denial of information and rationalization of actions to ignore uncertainty (Lipshitz & Strauss, 1997a). Second, bureaucratic responses to uncertainty emphasize the formal routines to reduce uncertainty as a more complicated version of following organizational procedures, which is one of the most common reactions to reduce responses (Lipshitz & Strauss, 1997b). Third, collaborative responses include advice-seeking for options and information, creating a common platform to discuss uncertainty to make others aware and accept it. Collaborative responses are means to embrace uncertainty for managers mostly under strong and fundamental uncertainty to leverage and embrace uncertainty towards the change.

Managers' cognitive uncertainty results in suppressing, collaborative and bureaucratic responses to uncertainty and their desire of change with cognitive uncertainty produce collaborative responses. Organizational aspects - internal uncertainty, environmental uncertainty, dissimilarity, cohesion, and knowledge sharing – do not contribute to those relationships. On the other hand, internal uncertainty variability causes more emotional responses, and environmental uncertainty is more related to desire of change than the internal ones. Knowledge sharing is a crucial variable enhancing managers' desire of change.

These findings are of useful interest for organizations as they let human capital teams and related branches understand what the aspects are to evade or to strengthen in order to ensure that managers behave on behalf of the organizations under uncertainty. The conclusions are also useful to a better understanding of the results obtained on the two previous studies.

CHAPTER 6

6.1. General Conclusions

Uncertainty is one of the preeminent concepts in the literature on decision making (Kahneman, Slovic, Slovic, & Tversky, 1982), economics (Dequech, 2011), strategic management (Álvarez, del Valle, & García Merino, 2008), organizational change (Bordia, Hunt, Paulsen, Tourish, & DiFonzo, 2004b) and many more. Congruently, this dissertation studies uncertainty and shows middle managers' coping styles to deal with uncertainty in organizational theory and strategic management contexts. Then, the study portrays managerial actions under uncertainty to allow us to understand the individual uncertainty perception, cognition, and emotions behind their behaviours. Moreover, the thesis reveals the sources of uncertainty, individual responses, and variables, which are of grave importance for managers to cope with uncertainty in the formulation and implementation of the strategy process. Furthermore, this research establishes a taxonomy of perceptional managerial responses to uncertainty to comprehend the essence of uncertainty in organizations and to assist in shaping new theories. Finally, it analyzes organizational factors that might affect both certain managerial and individual responses to uncertainty among the managers.

For this study, we have decided to focus on both military and civilian managers because studying uncertainty and including business and military environments enriches the contribution of the dissertation. Both organizations have similarities and differences, but military ones face with relatively harder environments to deal with uncertainties (Posen, 2016). In addition, military organizations differentiate from their civilian counterparts in terms of attitudes towards hierarchy, obedience and discipline, the readiness to serve, authoritarianism (Gregersen et al., 1998), competence and loyalty to an impersonal legitimate power (Nuciari, 2018), and their ultimate purpose in war (Posen, 2016) to direct their activities to conduct organized violence (Nuciari, 2018) in order to defeat adversaries (Posen, 2016). To achieve this goal, military organizations keep a

comparatively extremely centralized and unified organizational framework (Kemeny, 1983), in contrast, many other civilian ones have a decentralized and diverse organizational design, which diversifies managers' uncertainty coping style for our study. Furthermore, civilian organizations give more weight to a measure of effectiveness and profit, which are not necessarily priorities in the military (Augier et al., 2014). Owing to those commonalities and discrepancies, focusing on both types of organization enriches and broadens our research.

In Chapter III, the first study, we intended to find how middle managers appraise the sources of uncertainty, respond to uncertainty, and develop a coping mechanism in civilian and military organizations. We also hoped to find the variables influencing those coping strategies (see objective 1, 2, and 3 in Chapter I). Primarily, after examining the literature, we discovered room for further inquiry both from a theoretical and from an empirical perspective on this subject, as explained in the introductions of Chapter I and III.

In the first study, we initially tried to find sources of uncertainties from a middle manager's perspective. Our results indicated that managers perceive the sources in six categories. Those six categories could be divided into internal and external types as previous studies suggested (Priem et al., 2002 and Voges et al., 2003). Thus, the consistency of appreciation sources as internal and external across the studies is maintained over the years. Internal sources stem from organizational conditions, mainly human capital and other formal structures of the organization. Although civilian managers embrace all sources, military managers only see human capital as a central internal source.

On the other hand, external sources derive from Techno-economic conditions, International instability and disasters, Governmental Influence, Societal pressure, and Competition and Customers. 'International instability and disasters' has emerged as a new category of external sources. Also, economic conditions refer to the more global economic situation instead of local

ones. The reason behind this could be the increasing instability of global environmental conditions or the effect of internalization on these conditions. We also noticed that 'International instability and disasters' was generated mostly from a military managers' point of view, which underlines the importance of this topic from their perspective. This new category emanates from global political instability and fluctuations of the geopolitical environment such as international terrorism, migration, and humanitarian crises, affecting local, regional, and global stability. Lastly, disasters, including hurricanes, floods, and earthquakes, contribute to this category as well.

The first study also showed that middle managers develop five different responses, viz.: collaborative, emotional, cognitive, value-based, and bureaucratic responses under uncertainty. Managers embrace uncertainty by developing collaborative and value-based responses, mostly under strong and fundamental uncertainty. Managers suppress uncertainty with emotional reactions, typically under substantive uncertainty. They try to reduce uncertainty with bureaucratic responses under weak uncertainty. Finally, they acknowledge uncertainty by developing cognitive uncertainty under procedural uncertainty. Although it is beneficial to develop individual managerial responses, our model in Chapter III suggests it is more reasonable to build collective understanding and responses to uncertainty and to understand how these can perform an essential role in dealing with uncertainty. The model shows that middle managers must accurately describe uncertainty in such a manner that they can create a conceptual understanding and then finally achieve a complete and collective appreciation of the necessary processes, such as problem-solving, crisis management or change management.

Finally, in the first study, we found the variables affecting specific managerial responses to uncertainty. Organizations with an embracing climate create better workplaces to correctly frame information, encourage attentive decision making, produce synergy and cultivate innovation (Clampitt & Dekoch, 2016) to allow managers to give collaborative responses to uncertainty. On

the other hand, an organization with an avoiding climate is likely to give either emotional or bureaucratic responses.

On the other hand, managers in the organizations which avoid uncertainty may show either bureaucratic or emotional responses. If both organization and managers avoid uncertainty it will result in a Status Quo climate, which dispels surprises (Clampitt & DeKoch, 2016). Then managers will probably stick to organizational processes, procedures, roles, and responsibilities. When the organization avoids, but the managers embrace uncertainty, it will result in a stifling climate in which processes are inefficient, and frustration is high (Clampitt & DeKoch, 2016). Then emotional responses among the managers will be high to cope with uncertainty and protect their positions. We also found organizational structure, such as a loosely or tightly coupled, centralized or decentralized, and mechanical or organic structure; cohesion; and age variables affect how managers behave under uncertainty. We will further address the variables which influence managerial responses in the paragraphs on the third study.

In our second study, Chapter IV, the objective was to create an inductively developed taxonomy of managerial responses to uncertainty perceived by middle managers, to improve our knowledge of managers' behavioural patterns in coping with uncertainty. We found two distinct patterns among the responses. One side is towards development and change, and the other side is the protective behavioural patterns. The former pattern includes three clusters: development by change, development by debate, and the certainty of change. The latter also includes three clusters: protection by support, protection by structure, and protection by scapegoats. When we compared the taxonomy of modern managers with classification in the literature based on the acknowledging-suppressing and embracing-reducing dimensions (Chapter IV), we revealed that from reducing to embracing, managers' perspective changes from protection to development to establish more valuable traits in favour of the organization. Thus, the Development by Debate and Change cluster

exposes the embracing responses under uncertainty. Exchanging ideas and discussion promote shared meaning, empowerment, and participative leadership. Thus, empowerment prompts better performance and higher productivity (Wall et al., 2002) and boosts the capability of team members (Raelin, 2006). Moreover, collaboration allows managers to combine overall interests and unfold entire perspectives and opinions (Samarah et al., 2003). Also, change is the opportunity window to endorse development to foster a conceptual understanding of uncertainty (Herzig & Jimmieson, 2006). Uncertainty entails change and changes harvest uncertainty; both are inevitable.

On the protection side of the coin, protection emerge either by finding support, creating scapegoats or using structure. Finding support contains advice-seeking from teammates, leaders, and even people outside the organization, and searching for guidance from the existing policy. Finding the support both from the seniors and the staff helps managers to manage the uncertainty by delivering guidance (Herzig & Jimmieson, 2006), by increasing commitment (Huy, 2002) and by protecting resolutions. On the other hand, Protection by Scapegoats is a way of self-protection using possible blaming of the staff, team, or superiors, besides avoiding taking responsibilities and keeping team members only in the boundaries of the job descriptions. It is partly the desire to defend self-esteem (Hepper, Gramzow, & Sedikides, 2010) and partly lack of confidence that coerces managers to move without resolving uncertainty. Moreover, protection by structure is protection with organizational rules, policies, and procedures to justify their lack of lateral thinking and uncertainty avoidance.

Based on the results of the previous two studies and on the literature, we selected three primary managerial responses to uncertainty for further investigation in our third study, Chapter V. The goal was to examine the relationship between individual responses (emotional uncertainty, cognitive uncertainty, the desire of change) and managerial responses (suppressing, bureaucratic, collaborative). Moreover, we wanted to see the mediator roles of internal uncertainty,

environmental uncertainty, dissimilarity, cohesion, and knowledge sharing on this relationship as organizational-level factors. Our investigation specified a pattern between individual responses (cognitive and desire of change) and managerial responses (bureaucratic and collaborative) under uncertainty. In contrast, the result did not depict a significant relation between suppressing responses and emotional uncertainty. The reason behind this could well lie in the high self-esteem and cohesion of managers and their connection and affiliation with the organization.

Additionally, their higher education level and experience working under uncertainty in an international environment may enable them to cope with their emotional uncertainty. Then again, the positive relation between bureaucratic responses and cognitive uncertainty explains how managers use bureaucracy as a control function to reduce uncertainty in the organizations, besides its problematic inefficiency (Gajduschek, 2003). Moreover, the desire of change and cognitive uncertainty result in collaborative responses, because the desire of change reinforces and stimulates collaboration in teams and organizations (Derue et al., 2011) thanks to collaboration's role in implementing distributed cognition (Michel, 2007) and cultivating all new perspectives and opinions (Samarah et al., 2003).

The multilevel analysis demonstrated that organizational variables have effects only on the desire of change. Organizational level knowledge sharing contributes to managers' desire of change. This fact underlines the importance of knowledge sharing within the knowledge management processes in the organizations, because information sharing is crucial for the managers under uncertainty to implement more proactive approaches (Aragón-Correa et al., 2013). The multilevel analysis also showed that individual-level perceived environmental uncertainty increases managers' desire of change. This fact illustrates that managers appraise external uncertainty and attempt to understand its nature (Boulton et al., 1982).

As managers dynamically contribute both to the development and to the implementation of the organizational strategy (Wooldridge & Floyd, 1990), they need to develop effective responses to uncertainty. Developing responses requires them to detect the sources of uncertainty and conceptualize uncertainty. Sources emanate from both the internal and external environment of the organizations. The sources are internal organizational conditions; techno-economic conditions; international instability and disasters; governmental influence; societal pressure and competition; and customers. Although we cannot de-emphasize the importance of any sources because of the consistency of the sources over the years,, global environmental conditions or internalization are now considered more critical for the organizations. In order to reach a conceptual understanding of uncertainty, thorough and collective awareness is necessary to employ the required processes like problem-solving, crisis management, or change management. Then managers develop responses to uncertainty.

Managers use individually reasoning, thinking, assumptions, and other analytical techniques to develop individual cognitive responses. This approach, however, might not be sufficient to resolve the complexity due to both internal and external uncertainty sources, so it is safer to develop mutual cognitive responses. They need to protect themselves by finding supports against uncertainty in a constructive way. Managers get support both from the seniors and the staff to manage the uncertainty and deliver guidance (Herzig & Jimmieson, 2006). To achieve this, managers need to find distributed cognitive reactions built up through personal relationships within their social and material setting (Michel, 2007). Use of distributive cognition helps managers to conceptualize uncertainty and develop collaborative responses, since cognition dispersed across a cognitive system offers a better capability than any other person (Michel, 2007).

When we focus on managers' collaborative responses, the higher the desire of change, the more these kinds of responses tend to increase to deal with uncertainty. The desire of change supports and

initiate change in teams and organizations (Derue et al., 2011). Collaborative responses enable managers to combine interests, including all stakeholders, and discover various perspectives and opinions (Samarah et al., 2003). Managers need to enhance the capability of all individuals, empower them (Raelin, 2006), and increase their situational awareness to develop collaboration. So they attempt to reach as many as people as possible who can use their knowledge and information within the organization (Endsley, 1995) to obtain the best feasible advice and discuss all the relevant situations. A platform where all participants feel comfortable and oriented under uncertainty is necessary to foster such a climate, in which people can release their potentials to construct high-level acceptance. Managers embrace uncertainty through the use of collaborative responses since they have a developmental perception of uncertainty. Development is possible through change, debate, exchanging ideas, and discussion even under fundamental and strong uncertainty. Change is unavoidable but positive and promotes development, so managers leverage uncertainty not only with collaborative responses but also with value-based responses to exploit change.

Value-based responses also allow the manager to address uncertainty by providing values such as trust and honesty for the absence of information. Trust, especially, enhances peoples' commitment and performance (Gould-Williams, 2003) and contributes to the creation of a common platform to cultivate uncertainty responses. However, value-based responses could produce unproductive behaviours and negative consequences, because values such as distrust may pave the way to dysfunctional consequences (Carnevale & Wechsler, 1992) and uncertainty is associated with deviant behaviours.

Uncertainty sources can produce discrepancies emerging from role conflict in the organizations (Herzig & Jimmieson, 2006). In similar circumstances, managers may develop bureaucratic responses to uncertainty by following the organizational policies, processes, and procedures, and

stress the importance of extant roles and responsibilities due to their individual cognitive uncertainty. Under weak uncertainty, standard workflows of personnel and regulated organizations' rules (Wall et al., 2002) and standard operating procedures can reduce internal and external uncertainties (Thompson, 1967) and serve as a control function (Gajduschek, 2003). When the existing roles and responsibilities do not correspond to the new task, bureaucratic responses will not be adequate to overcome uncertain problems. Some managers insist on the use of the existing roles and responsibilities to protect their rulings and jurisdiction by adhering to the structures to justify their lack of lateral thinking and uncertainty avoidance. Another way of protection is to create scapegoats. Managers probably blame the personnel, team members, or superiors, although they allow the workforce to avoid taking responsibilities and stay only within the boundaries of the job descriptions. This is a method of defending self-esteem (Hepper, Gramzow, & Sedikides, 2010). In fact, such situations require redefining the roles and responsibilities, empowering staff, or redistributing power among the staff to overcome the uncertainty.

Emotions have an essential role under uncertainty because emotions affect judgment (Tiedens & Linton, 2001). Managers' emotional responses to uncertainty are a double-edged sword. On the one side, uncertainty is challenging because managers are unconfident, frustrated, and disoriented under uncertainty. Those feelings affect managers negatively and even sometimes block their rational thinking. They tend to suppress uncertainty. On the other side, uncertainty is positive because managers are calm and optimistic about discovering opportunities hidden in an uncertain situation.

6.2. Limitations and Future Research

Despite the requirement for future inquiry, this study has practical benefits for middle managers and the organizations. Our study tries to show that middle managers participate in both strategy formulation and implementation processes in military and civilian organizations. They can make a meaningful contribution in the interest of their organizational goals. Although some managers understand the concept and importance of uncertainties to create collective and developmental managerial responses to cope with uncertainties, some others try to protect themselves from unwanted drawbacks of uncertainties during strategy processes.

We suggest that other scholars replicate this study with both civilian and military managers to compare findings. The motivation behind that would be to test the reliability of our findings. Furthermore, our proposed model could be evaluated within the public and corporate sector to find the differentiation — not only with a larger sample of military leaders but also with leaders from private-sector organizations.

The findings of this study may help scholars to extend the theory with new research related to perceived managerial responses to uncertainty. In future researches, it might be possible to use perceived managerial responses to uncertainty in different contexts. For instance, further research should be undertaken to investigate the relationship between uncertainty types or uncertainty sources and managerial responses to uncertainty, such as: how do managerial responses differ under substantive, task, or environmental uncertainty? Alternatively, since the cluster of protection by scapegoats is very close to the boundaries of deviant behaviours, further work is required to establish the relationship between deviant behaviours among (middle) managers and the uncertainty and variables affecting this relationship, since empirical research lacks studies examining the relationship between uncertainty and its negative consequences (Bordia et al., 2004b).

Although middle managers who took part in this study were working mostly in international organizations at the time of the research, the effects of culture were not the primary focus. Thus, further studies, which take variables related to culture into account, will need to be undertaken. Research questions that could be asked include: what are the cultural traits affecting managerial responses to uncertainty?

This study includes individual managerial responses; therefore, further work is required to establish the effectiveness of managerial responses to uncertainty, because we do not know whether these responses contribute to or are aligned with the overall goals of the organization. In addition to that, further investigation is required to examine the organizational responses to uncertainty in order to embrace uncertainty for developing better structures, organizational culture, or best practices.

When it comes to limitations, due to inherent research trade-offs between simplicity, accuracy, and generalizability (Weick, 1969), this study shows several limitations. First, although the middle managers in the sample are multilingual, working for international organizations, which is a significant advantage, the sample is relatively small, non-random, purposeful, and convenient.

We should also approach these findings with caution. First, this study suffers from the small size of the samples of military and civilian managers. They all work in a multi-cultural environment; thus, managers who decided to participate in the study have more or less similar proficiency levels (around average and high); this may decrease their representativeness of middle managers in general. Second, this study is one of the rare attempts to thoroughly examine middle managerial responses to uncertainty in the strategy process. However, it is unable to encompass the entire uncertainty typologies in the previous researches. Thus, a full discussion understanding the existence of discrepancies with extant literature lies beyond the scope of this study, which requires validation of the result through replication. Third, another potential problem is that the scope of our thesis may be too broad; it may be useful to make different studies focusing only on corporate

business, the public sector, or military organizations. The practical advantage of this approach is to compare the effects of different types of organizations on responses to uncertainty.

6.3. Managerial Implications

This study proposes some practical implications both for managers and for organizations to deal with uncertainty during the strategy process. The results of this thesis showed that collaborative responses to uncertainty help managers to embrace uncertainty. Managers' desire of change helps managers to develop collaborative responses. Organizations can foster managers' desire for change through knowledge sharing. Like collaborative responses, cognitive responses are more useful for managers if they can develop mutual cognitive responses to cultivate distributed cognitive responses (Michel, 2007). Value-based responses and emotional responses have two sides: suppressing or exploiting uncertainty. Thus, managers should try to create an atmosphere to prosper trust and honesty and mitigate maladaptive emotions to deal with uncertainty. Bureaucratic responses could be helpful faced with weak uncertainty, and on the other side, they could could obstruct embracing uncertainty under strong and fundamental uncertainty which require innovative actions.

Developing a better understanding of managerial responses to uncertainty and practice of proper coping strategies could potentially allow managers to increase their performance and productivity, and exploit uncertainty by providing them with actionable responses. Organizations could form the necessary climate for managers to cope with uncertainty, improve the managerial selection and promotion process, and develop advanced training programs for managers by explaining the use of different managerial responses to uncertainty.

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APPENDICES

Appendix A. An overview of empirical studies of Uncertainty Management

Paper	Sample	Method/test	Uncertainty Type Management Strategy	Results	Type of study	Conclusions
P. Clampitt et al., (2001)	1,000 employees across the US and Canada	Factor analysis	Individual/ Organizational	Organizations that embrace uncertainty tend to foster more employee commitment, greater job satisfaction, and less cynicism than those that avoid or suppress uncertainty. Employees in uncertainty-embracing organizations are better able to cope with change than their counterparts in uncertainty-suppressing organizations	Organizational climate leads to employee's satisfaction/commitment/cynicism	It was discovered, for example, that employees in the dynamic and unsettling climates (both of which are climates where employees see their organisation embracing uncertainty) express more satisfaction with their job, commitment to their organisation, identification with their organisation, satisfaction with organisational communication, satisfaction with communication with their supervisor and less cynicism about organisational life. Employees in the status quo and stifling climates (both of which are climates where employees see their organisation avoiding uncertainty) express less job satisfaction, less commitment,

						less identification, less satisfaction with organisational communication, less satisfaction with communication with their supervisor, and more cynicism.
Johansson, B. J. E., & Persson, P.-A. (2009)	The paper is based on a case study, a UN peace-enforcing and peace-keeping operation, (11 informant)	The main data were transcribed interviews with Swedish officers who had been deployed in a peace-enforcing and peacekeeping mission in former Yugoslavia during 1993 and 1994.	Uncertainty grows from information load, contradictions, misunderstandings, and abundant or scarce communication.	'Communication as a means of control outside the 'own' system'' and ''Creating conditions for improving personal relations in the cooperative system'' describe techniques for upholding and creating space for personal trust, which must be seen as a basis for successful coordination in a high-risk environment.	This paper describes and analyzes the central role of human–human communication in a dynamic, high- risk environment.	It was concluded that ''control'' largely is based on the ability to communicate and that efficient human–human communication is grounded in relations between individuals, which preferably should be based on physical meetings. Uncertainty, and how humans cope with it through interpersonal communication
Wennekers, S., Thurik, R., van Stel, A., & Noorderhaven, N.	Regression analysis	Macro data from 1976, 1990 and 2004 across 21 OECD countries	A culture is characterized by high uncertainty avoidance when its members feel threatened by uncertain or unknown situations	Uncertainty avoidance is positively correlated with the prevalence of business ownership	This paper deals with the influence of cultural attitudes towards uncertainty on the rate of business ownership across 21 OECD countries.	In modern service economies, high uncertainty avoidance may indirectly have a negative impact on the development of business ownership and may hamper the exploitation of new

(2010)						economic opportunities.
Gneezy, U., List, J. A., & Wu, G. (2006)	1000 experimental participants	Z test	A violation model to expected utility theory or prospect theory	Individuals value a risky prospect less than its worst possible realization.	Decision making under uncertainty	Expected utility theory and prospect theory are based on the same fundamental premise: individuals choose among risky prospects by balancing the value of the possible consequences. Contrary to this premise, we document an uncertainty effect—individuals value a lottery less than the lottery's worst outcome.
Karimi, J., Somers, T. M., & Gupta, Y. P. (2004)	Responses were matched from 77 CEOs and 166 senior managers	The partial least squares technique	Organizational level environmental uncertainty	Environmental uncertainty has a positive impact on task characteristics. Task characteristics have a direct and mediating impact on user satisfaction with data.	Decision making under uncertainty	The findings suggest that task characteristics have both a direct and mediating impact on user satisfaction with data. The "more" tasks are non-routine and interdependent; the lower user satisfaction is with data. Any impact of environmental uncertainty on user satisfaction with data is completely mediated by task characteristics for the perceptual measures. Users are more satisfied with

						data when they are more satisfied with the IS and with IS support.
Duncan, R. B. (1972)	22 decision group	T test, Analysis of variance	Organizational level environmental and perceived environmental uncertainty (PEU)	Simple-complex and dynamic-static dimensions are identified	Decision making under uncertainty	Perceived individual is greatest under dynamic-complex environment.
Andrews, R. (2008)	Responses were received from 46 percent of services (n = 90) and 29 percent of individual informants (n = 237).	Two-tailed tests	Managerial perceptions of environmental uncertainty	The results show that consultation with citizens, organizational inertia, and strategic stance are all associated with PEU and that uncertainty about the external political environment is linked with better service performance.	PEU in public organizations by exploring its relationship with internal factors and organizational outcomes	Higher perceptions of uncertainty lead managers to pay increased attention to the strategies, structures, and processes that are likely to improve organizational performance.
Priem, R. L., Love, L. G., & Shaffer, M. A. (2002).	Twenty Managing directors and executive vice presidents in Hong Kong, who enrolled in an executive	Multidimensional scaling (MDS) Cluster analysis	External and internal uncertainty	The 29 uncertainty sources identified by the executives	To develop a perceptions-based taxonomy of uncertainty	The numerical taxonomy of sources of environmental uncertainty

	DBA program at a large Hong Kong university					
Priem, R. L., Love, L. G., & Shaffer, M. A. (2002)	Twenty Managing directors and executive vice presidents in Hong Kong, who enrolled in an executive DBA program at a large Hong Kong university	Multidimensional scaling (MDS) Cluster analysis	External and internal uncertainty	The 29 uncertainty sources identified by the executives	To develop a perceptions-based taxonomy of uncertainty	The numerical taxonomy of sources of environmental uncertainty
Nebeker, D. M. (1975)	47 naval aviation maintenance shop supervisors	Multiple Regression analysis	Environmental Uncertainty	The results indicate that decision uncertainty is consistently related to the components of situational favorability, separately and in combination. Control and influence, on the other hand, was found to be most highly associated with only one component of the situation—group atmosphere	The purpose of these studies was to test whether situational favorableness could be empirically related to environmental uncertainty	Situational favorability is a good index of environmental uncertainty; and that situational favorability is more appropriately interpreted as an uncertainty dimension than as a control and influence dimension
Diekmann,	148 members	Regression	Task uncertainty	Results for procedural	When people face increased	Results reveal that uncertainty

K. A., Barsness, Z. I., & Sondak, H. (2004)	98 supervisors	analysis		fairness reveal that procedural fairness was positively associated with job satisfaction	uncertainty, fairness becomes more important to them and judgments of fairness affect their reactions more strongly	moderates the positive relationship between fairness perceptions and job satisfaction such that the more uncertain people are about performance standards and appropriate behaviours, the stronger the relationship between fairness and job satisfaction.
Van den Bos, K. (2001)	77 Student 96 Student 160 Student	Three experiments	By means of fairness	Effects of uncertainty salience effects reactions to perceived fairness	Effects of uncertainty salience	Fairness is important to people because it helps to manage uncertain aspect of their lives
Lipshitz, R., & Strauss, O. (1997)	102 students	An inclusive method of classifying conceptualizations of uncertainty and coping mechanisms developed from the decision-making literature	Perceived uncertainty	The results showed that decision makers distinguished among three types of uncertainty: inadequate understanding, incomplete information, and undifferentiated alternatives.	Decision uncertainty	to develop a heuristic method, the R.A.W.F.S. heuristic (designating its five components: Reduction, Assumption-based reasoning, Weighing pros and cons, Forestalling, and Suppression.
Kellermann, K., &	1,159 students at 10 universities	Three study Factor analyses	URT	Tests of these models in terms of their ability to	Multiple models were considered, each model defining	Tests of these models in terms of their ability to predict

Reynolds, R.		and reliability analyses		predict information seeking and attraction reveal that none of the models provides a consistent integration of motivation to reduce uncertainty into uncertainty reduction theory.	motivation to reduce uncertainty in a different way	information seeking and attraction reveal that none of the models provides a consistent integration of motivation to reduce uncertainty into uncertainty reduction theory.
Goldsmith, D. J. (2001)	Four case studies from various sociocultural contexts	Case Study Ethnographic research	URT	Instead of seeking to isolate the effects of uncertainty in order to understand its role in motivating behaviour, a normative approach views uncertainty reduction in the context of other conflicting motives, including uncertainty maintenance as well as other countervailing goals such as harmony or aesthetics.	A new approach to URT	Major shift in emphasis is to focus on the meaning of uncertainty, identifying communicative practices, predicting and explaining the evaluation of behaviour as more or less appropriate and effective
Sunnafrank , M. (1990)	258 Student	Regression analysis	Predicted outcome value (POV) theory	Predicted outcome value theory proposals were consistently supported by the results of this investigation	POV vs. URT	The predicted outcome value perspective and its claim that uncertainty reduction processes are subservient to outcome maximization goals in initial interactions
Sauner-	1,578 firms	Multiple	Uncertainty and risk	Productive investment is	To examine the links among	The main conclusions of this

Leroy, J. (2004)		regression model	aversion	correlated positively with risk taking and is correlated negatively with uncertainty.	uncertainty, manager's risk-taking attitude, and the level of productive investment of small and medium-size enterprises	study show the existence of a negative and significant correlation among uncertainty, risk aversion, and productive investment, consistent with what literature on the subject has indicated
Gneezy, U., List, J. A., & Wu, G. (2006)	1000 experimental participants	Z test	Expected utility theory, prospect theory	Our results suggest that there are choice situations in which decision-makers discount lotteries for uncertainty in a manner that cannot be accommodated by standard models of risky choice	Decision making	a violation of this condition in which individuals value a risky prospect less than its worst possible realization
Grote, G., Weichbrodt, J. C., Günter, H., Zala-Mezö, E., & Künzle, B. (2009)		Case study	Flexible routines and rules Loose coupling	Difficulties in aligning rules with given uncertainties	On organizational routines and uncertainty management	Connecting organizational routines with loose coupling as a form of managing uncertainties

Appendix B. Interview Questions

Good afternoon, how are you today? I want to thank you for taking the time to meet with me today. My name is _____, and I would like to talk to you about your experiences in middle management. Specifically, I am researching middle managers' responses to uncertainty and how they manage uncertainty.

The interview is intend to take less than an hour. If you accept I want to tape the interview because I don't want to miss any of your explanations.

All responses will be kept confidential and anonymous. This means that your interview responses will only be reachable by our research team members and we will guarantee that any information we include in our dissertation does not identify you as the respondent. We will not use any classified information, but only features of your daily life at the organization that might affect the way you deal with demands of the uncertainty

Keep in mind that, you don't have to talk about anything you don't want to, and you may terminate the interview at any time you want.

Do you have any questions about what I have just explained? Do you want to participate in this interview?

Nature and sources of uncertainty

1. Can you describe what uncertainty is?
2. What are the sources of uncertainty that you face in your activities in this organization?

Uncertainty management strategy

3. When you are given a task that you don't know what to do, what actions do you take?
4. Could you give me an example of how you handle that kind of situations?
5. Can you tell me more about others kinds of interaction do you do in this kind of situations?
6. How did this help you to manage your uncertainty?

7. Could you describe the most difficult situation you have encountered at work related to complex / ambiguous / exceptional situations?
8. How do you feel when you face with a task that you don't know what to do?
9. Could you describe your attitude when you had an ambiguous task and how did you handle it?

Contribution to Strategy process

10. How do you participate in the strategy process?
11. Could you give specific examples, where possible?
12. Could you give an example of your meaningful contributions to organizational strategy making?
13. What kind of problems and uncertainty issues have you faced?
14. Could you tell me how you manage uncertainty in this process?

Contribution to Strategy implementation

15. What is your role to make the strategy work in your organization? Could you describe your own role in strategy implementation?
16. Could you give specific examples?
17. Could you give an example of your meaningful contributions to the implementation of organizational strategy?
18. What you usually think about the definition of responsibilities and definition of leadership on the implementation of strategy?
19. When a strategy is acknowledged by members of the staff in order to implement, how is it usually understood by the different persons involved? I mean how people make a shared meaning about what is being acknowledged? And what are the aspects that people give more importance?
20. How different perspectives co-exist or how consensus is achieved?
21. What problems might occur due to the differences in cultures, status, skills in project teams in the implementation processes? Why they occur? How do you face them?
22. When information the information you need is not transmitted to you or is not understandable, in what ways you can deal with the existing gaps?
23. Did you experience any crisis due to the disagreement/conflict on the methodology of the implementation? How did crisis make a contribution to agree on the way ahead is?
24. What problems do you aim to avoid when transmitting implementation plans to

other areas or subordinates? What is the best way to surpass them?
1. Is there anything more you would like to add? 2. Do you have any questions? 3. I'll be analyzing the information you and others gave me and submitting a draft report to you in the coming months. I'll be happy to send you a copy to review at that time if you are interested. 4. Thank you for your time.

Appendix C. List of Sample 2

Number	Age	Gender	Nationality	Job tenure	Civilian or military
1	40-45	Male	Turkish	20-25 years	M
2	40-45	Male	Turkish	20-25 years	M
3	35-40	Male	Turkish	15-20 years	M
4	40-45	Male	Turkish	20-25 years	M
5	40-45	Male	Turkish	20-25 years	M
6	40-45	Male	Turkish	20-25 years	M
7	35-40	Male	Turkish	15-20 years	M
8	35-40	Male	Turkish	15-20 years	M
9	40-45	Male	Turkish	20-25 years	M
10	40-45	Male	Turkish	20-25 years	M
11	40-45	Male	Turkish	20-25 years	M
12	40-45	Male	Turkish	20-25 years	M
13	40-45	Male	Turkish	20-25 years	M
14	40-45	Male	Turkish	20-25 years	M
15	40-45	Male	Turkish	20-25 years	M
16	40-45	Male	Turkish	20-25 years	M
17	35-40	Male	Turkish	25-30 years	M
18	40-45	Male	Turkish	20-25 years	M
19	35-40	Male	Turkish	10-15 years	M
20	40-45	Male	Turkish	20-25 years	M
21	35-40	Male	Turkish	15-20 years	M
22	40-45	Male	Turkish	20-25 years	M
23	40-45	Male	Turkish	20-25 years	M
24	40-45	Male	Turkish	20-25 years	M
25	40-45	Female	Turkish	20-25 years	M
26	45-50	Male	Spanish	20-25 years	M

27	45-50	Male	Spanish	20-25 years	M
28	45-50	Male	Spanish	20-25 years	M
29	45-50	Male	Spanish	20-25 years	M
30	45-50	Male	Spanish	20-25 years	M
31	45-50	Male	British	20-25 years	M
32	45-50	Male	Czech Republican	20-25 years	M
33	45-50	Male	Spanish	20-25 years	M
34	45-50	Male	Spanish	20-25 years	M
35	45-50	Male	Spanish	15-20 years	M
36	35-40	Male	Spanish	15-20 years	M
37	35-40	Male	Spanish	15-20 years	M
38	35-40	Male	Spanish	15-20 years	M
39	40-45	Female	Canadian	20-25 years	M
40	40-45	Male	Spanish	20-25 years	M
41	40-45	Male	Spanish	20-25 years	M
42	40-45	Male	Italian	20-25 years	M
43	40-45	Male	Italian	20-25 years	M
44	40-45	Male	Italian	20-25 years	M
45	40-45	Male	Italian	20-25 years	M
46	40-45	Male	Italian	20-25 years	M
47	40-45	Male	Italian	20-25 years	M
48	40-45	Male	Norwegian	20-25 years	M
49	40-45	Male	Italian	20-25 years	M
50	40-45	Male	Italian	20-25 years	M
51	40-45	Male	Italian	20-25 years	M
52	40-45	Male	Italian	20-25 years	M
53	40-45	Male	German	20-25 years	M
54	40-45	Male	German	20-25 years	M
55	40-45	Male	German	20-25 years	M

56	55-60	Male	Netherlander	25-30 years	M
57	55-60	Male	Netherlander	25-30 years	M
58	55-60	Male	Netherlander	25-30 years	M
59	55-60	Male	Netherlander	25-30 years	M
60	55-60	Male	Netherlander	25-30 years	M
61	55-60	Male	Netherlander	25-30 years	M
62	55-60	Male	American	25-30 years	M
63	55-60	Male	American	25-30 years	M
64	55-60	Male	American	25-30 years	M
65	55-60	Male	Belgian	25-30 years	M
66	55-60	Male	Belgian	25-30 years	M
67	30-35	Male	French	10-15 years	M
68	30-35	Male	French	10-15 years	M
69	30-35	Male	Albanian	10-15 years	M
70	30-35	Male	Hungarian	10-15 years	M

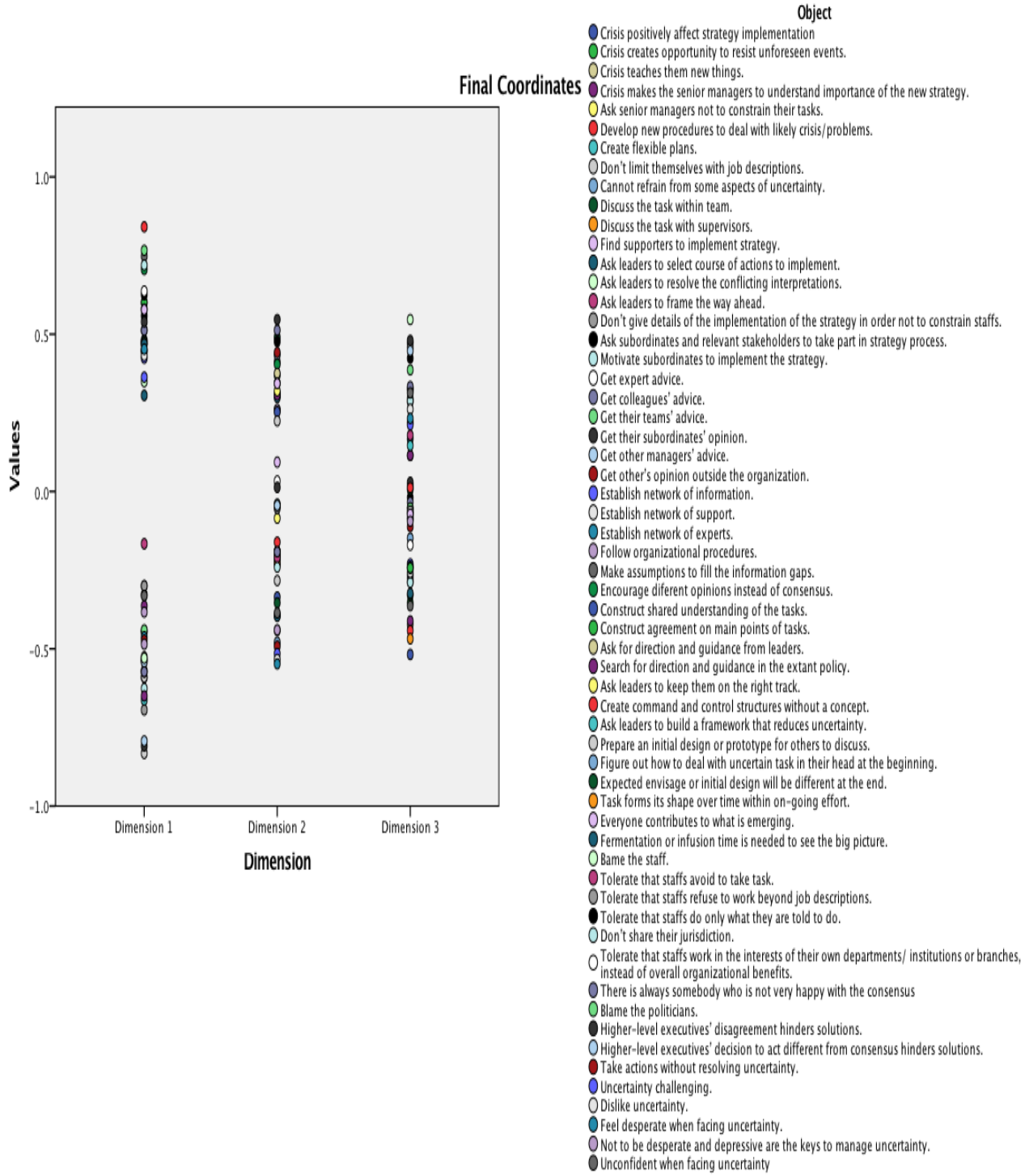
Appendix D. Managerial responses to uncertainty

NU	Managerial responses to uncertainty
1	Managers think that crisis positively affects strategy implementation.
2	Managers think that crisis creates opportunity.
3	Managers think that crisis teaches them new things.
4	Managers think that crisis makes the senior managers to understand the importance of the new strategy.
5	Managers ask senior managers not to constrain their tasks.
6	Managers develop a new procedure.
7	Managers create flexible plans.
8	Managers don't limit themselves with job descriptions.
9	Whatever they do, managers know that they cannot refrain from some aspects of uncertainty.
10	Managers discuss the task within the team.
11	Managers discuss the task with supervisors.
12	Managers find supporters to implement the strategy.
13	Managers ask leaders to select a course of actions to implement.
14	Managers ask leaders to resolve the conflicting interpretations.
15	Managers ask leaders to frame the way ahead.
16	Managers don't give details of the implementation of the strategy in order not to constrain the staffs.
17	Managers ask subordinates and relevant stakeholders to take part in the strategy process.
18	Managers motivate subordinates to implement the strategy.
19	Managers get expert advice.
20	Managers get colleagues' advice.
21	Managers get their teams' advice.
22	Managers get their subordinates' opinion.
23	Managers get other managers' advice.
24	Managers get other's opinion outside the organization.
25	Managers establish a network of information.
26	Managers establish a network of stakeholders.

27	Managers establish a network of experts.
28	Managers follow organizational procedures.
29	Managers make assumptions to fill the information gap.
30	Managers encourage dissension instead of consensus.
31	Managers construct a shared understanding of the tasks.
32	Managers construct agreement on main points of tasks.
33	Managers ask for direction and guidance from leaders.
34	Managers search for direction and guidance in the extant policy.
35	Managers ask leaders to keep them on the right track.
36	Managers create structures without a concept.
37	Managers ask leaders to build a framework that reduces uncertainty.
38	Managers to prepare an initial product or prototype for others to discuss.
39	Managers to figure it out how to deal with the uncertain task in their head at the beginning.
40	Managers know that expected envisage or initial design will be different at the end.
41	Managers know that the task forms its shape over time within on-going effort.
42	Managers know that almost everyone contributes what's emerging.
43	Managers think that fermentation or infusion time is needed to see the big picture.
44	Managers blame the staff.
45	Managers tolerate that staffs avoid taking the task.
46	Managers tolerate that staffs refuse to work beyond job descriptions.
47	Managers tolerate that staffs do only what they are told to do.
48	Managers don’t share their jurisdiction.
49	Managers tolerate that staffs work in the interests of their own institutions or branch, instead of overall organizational benefits.
50	Managers think that there is always somebody who is not very happy with the consensus
51	Managers blame the politicians.
52	Managers think that higher-level executives’ disagreement hinders solutions.
53	Managers think that higher-level executives’ decision to act differently from consensus hinders solutions.
54	Managers take actions without resolving uncertainty.

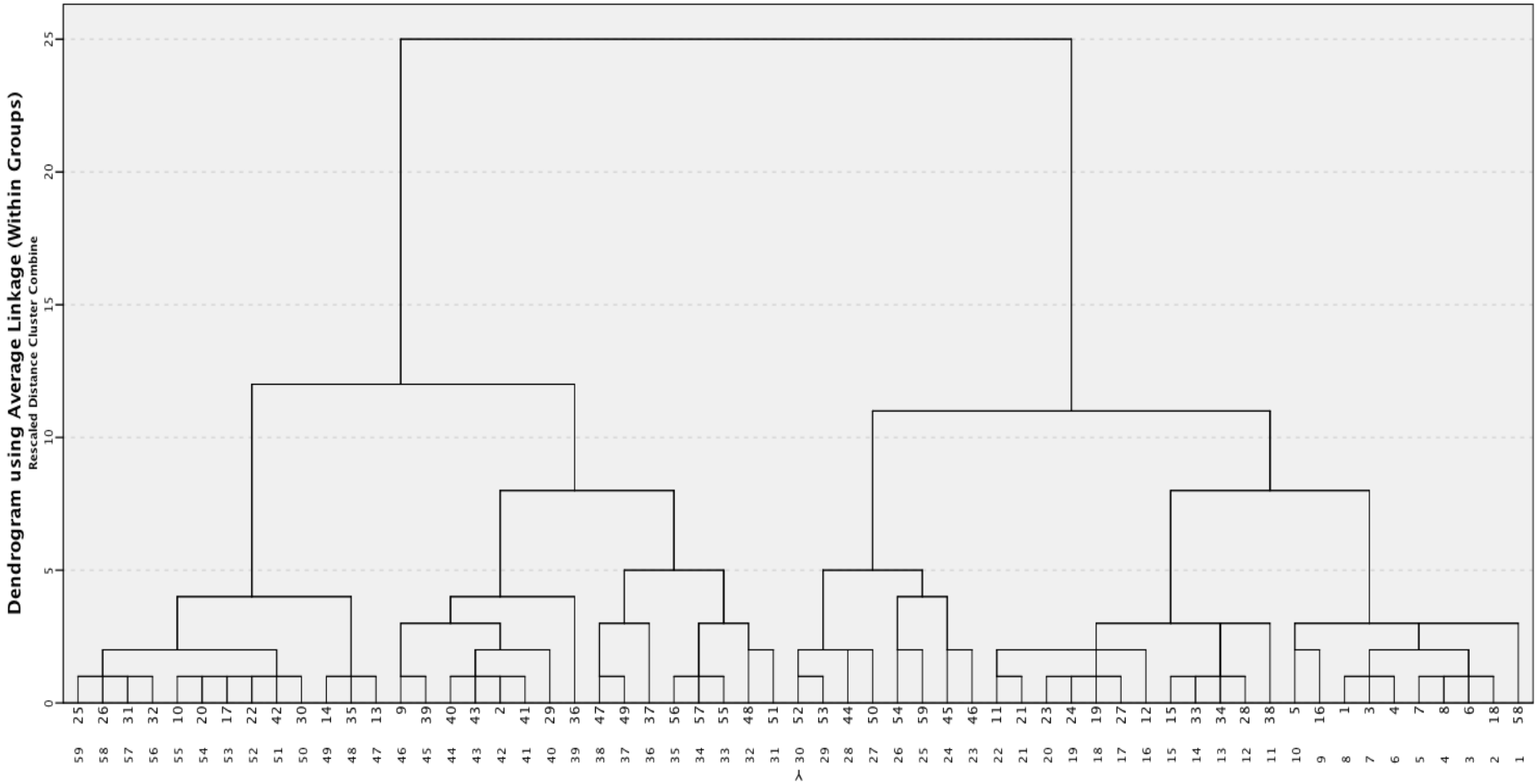
55	Managers find uncertainty challenging.
56	Managers dislike uncertainty.
57	Managers feel desperate when facing uncertainty.
58	Managers think that not to be desperate and depressive are the keys to manage uncertainty.
59	Managers feel unconfident when facing uncertainty

Appendix E. Perceived Responses to Uncertainty Arrayed on Three Dimensions

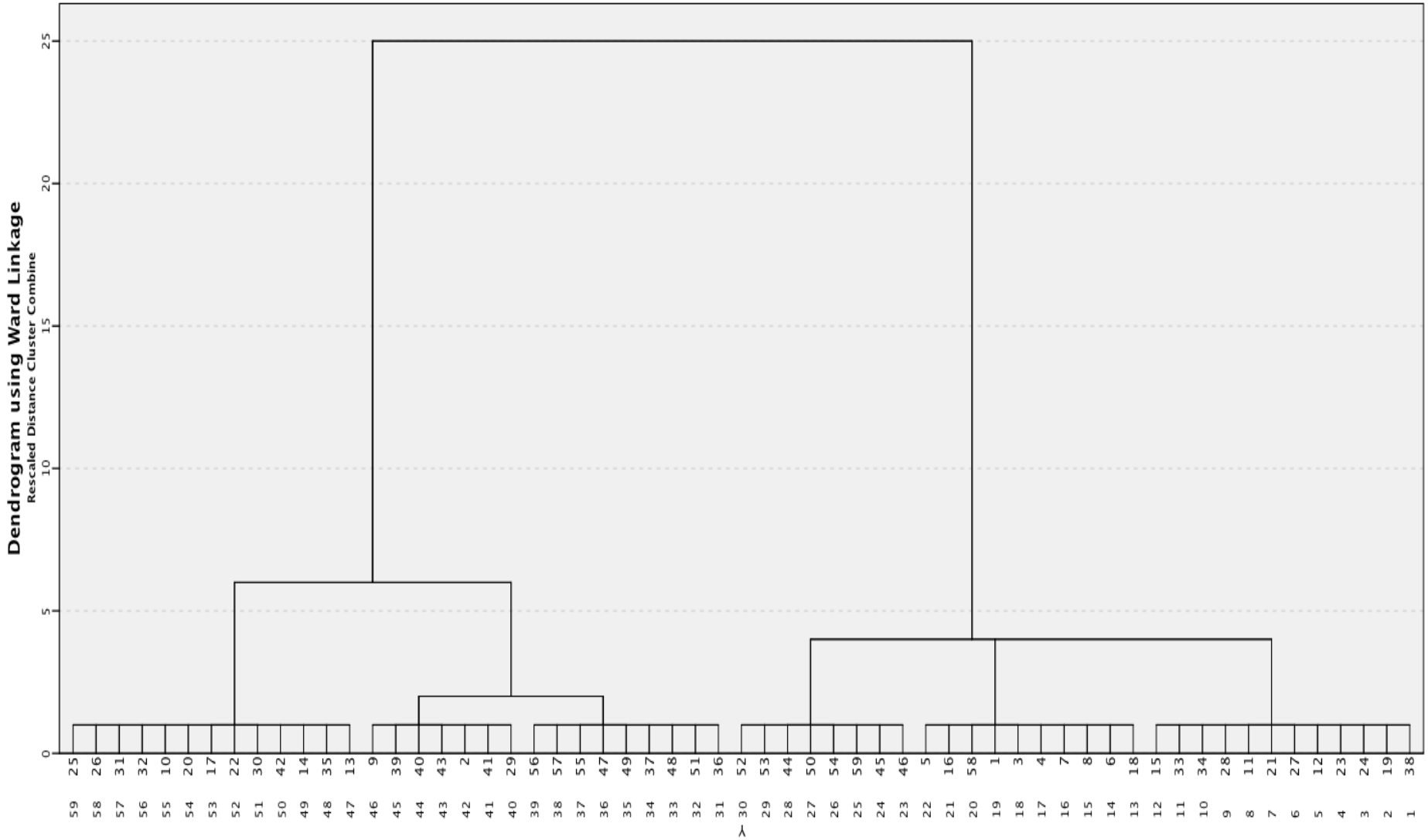


Appendix F. Dendrograms

Average Linkage Method



Ward Linkage Method



Appendix G. Clustering Comparison

Cluster Name	Perceived Managerial Responses to Uncertainty
Development by change (Cluster 1)	Managers think that crisis positively affects strategy implementation.
	Managers think that crisis teaches them new things.
	Managers think that crisis makes the senior managers understand the importance of the new strategy.
	Managers ask senior managers not to constrain their tasks.
	Managers develop a new procedure.
	Managers create flexible plans.
	Managers don't limit themselves with job descriptions.
	Managers don't give details of the implementation of the strategy in order not to constrain the staffs.
	Managers motivate subordinates to implement the strategy.
	Managers think that not to be desperate and depressive are the keys to manage uncertainty.
Certainty of change (Cluster 2)	Managers think that crisis creates opportunity.
	Whatever they do, managers know that they cannot refrain from some aspects of uncertainty.
	Managers make assumptions to fill the information gap.
	Managers to figure it out how to deal with the uncertain task in their head at the beginning.
	Managers know that expected envisage or initial design will be different at the end.
	Managers know that the task forms its shape over time within on-going effort.
	Managers think that fermentation or infusion time is needed to see the big picture.
Development by debate (Cluster 3)	Managers discuss the task within the team.
	Managers ask leaders to select a course of actions to implement.
	Managers ask leaders to resolve the conflicting interpretations.
	Managers ask subordinates and relevant stakeholders to take part in the strategy process.
	Managers get colleagues' advice.
	Managers get their subordinates' opinion.
	Managers establish a network of information.
	Managers establish a network of stakeholders.
	Managers encourage dissension instead of consensus.
	Managers construct a shared understanding of the tasks.
	Managers construct agreement on main points of tasks.
	Managers ask leaders to keep them on the right track.
	Managers know that almost everyone contributes what's emerging.
Protection by support (Cluster 4)	Managers discuss the task with supervisors.
	Managers find supporters to implement the strategy.
	Managers ask leaders to frame the way ahead.
	Managers get expert advice.
	Managers get their teams' advice.

	Managers get other managers' advice.
	Managers get other's opinion outside the organization.
	Managers establish a network of experts.
	Managers follow organizational procedures.
	Managers ask for direction and guidance from leaders.
	Managers search for direction and guidance in the extant policy.
	Managers to prepare an initial product or prototype for others to discuss.
Protection by structure (Cluster 5)	Managers create structures without a concept. *
	Managers ask leaders to build a framework that reduces uncertainty.
	Managers tolerate that staffs do only what they are told to do.
	Managers don't share their jurisdiction.
	Managers tolerate that staffs work in the interests of their own institutions or branch, instead of overall organizational benefits.
	Managers blame the politicians.
	Managers find uncertainty challenging.
	Managers dislike uncertainty.
	Managers feel desperate when facing uncertainty.
Protection by scapegoats (Cluster 6)	Managers blame the staff.
	Managers tolerate that staffs avoid taking the task.
	Managers tolerate that staffs refuse to work beyond job descriptions.
	Managers think that there is always somebody who is not very happy with the consensus
	Managers think that higher-level executives' disagreement hinders solutions.
	Managers think that higher-level executives' decision to act differently from consensus hinders solutions.
	Managers take actions without resolving uncertainty.
	Managers feel unconfident when facing uncertainty

* This item is a member of cluster 3 based on AVL method.

Appendix H. Exploratory factor analysis for study 3

a. Factorials for Individual Responses to Uncertainty

Items			
Cronbach's Alpha	**0.798**	**0.785**	**0.587**
	Factor 1	Factor 2	Factor 3
I think variety is the spice of life.	**.845**	-.087	-.033
New experiences can be useful.	**.778**	-.211	.131
I find the prospect of change exciting and stimulating.	**.773**	-.086	-.024
New experiences excite me.	**.715**	-.073	.177
I get worried when a situation is uncertain.	-.161	**.842**	.165
I feel anxious when things are changing.	-.100	**.834**	.116
When uncertain about what to do next, I tend to feel lost.	-.116	**.765**	.103
I like to plan ahead in detail rather than leaving things to chance.	.076	.135	**.781**
When facing an uncertain situation, I tend to prepare as much as possible, and then hope for the best.	.204	-.007	**.702**
I like to know exactly what I'm going to do next.	-.111	.324	**.681**

N=310. Kaiser-Meyer-Olkin Index = 0.78. Total Variance Explained by the factor 1 in 4.93%, in 3.58% factor 2 and 3.16% in factor 3. The factors loadings were obtained from Varimax rotation.

b. Factorials for Managerial Responses to Uncertainty

Items			
Cronbach's Alpha	**,836**	**,556**	**.543**
	Factor 1	Factor 2	Factor 3
I discuss implementation of tasks within team.	**,774**	,034	,085
I construct a shared understanding about the content and possible results of tasks to implement	**,757**	,063	,008
I take into account each other's opinions when decisions have to be made.	**,746**	,167	-,056
I ask for subordinates' opinions	**,734**	,044	,091
I try that everyone contributes to what is emerging	**,706**	,234	,039
I make an initial design of the tasks knowing that it will be different at the end	**,600**	,249	,034

I ask for advice from colleagues.	**,547**	**,175**	,176
I follow organizational procedures to deal with problems.	,176	**,752**	,192
I seek for direction and guidance in the extant policy.	,069	**,730**	,171
I maintain my jurisdiction while dealing with problems.	,264	**,561**	-,025
I sometimes think that uncertain situations are in great extent result of staff behaviours	,147	-,059	**,754**
I try to solve first predictable problems than uncertain ones regardless of their importance.	,005	,194	**,711**
Within my work unit, I tell others as little as possible about myself.	,026	,159	**,644**

N=310. Kaiser-Meyer-Olkin Index = 0,86. Total Variance Explained by the factor in 18,09%, 4,32% in factor 2 and 5.91 in factor 3. The factors loadings were obtained from Varimax rotation.

c. Factorials for Environmental Uncertainty

Items		
Cronbach's Alpha	**0.906**	**0.865**
	Factor 1	Factor 2
The organizational environment such that it is difficult to understand cause and effects of the trends and events in our external environment.	**,864**	,143
The organizational environment such that it is difficult to capture sufficient information on our external environment before making a major decision.	**,855**	,225
The organizational environment such that it is difficult to have adequate information on our external environment to assist us in decision making.	**,837**	,179
The organizational environment such that it is difficult to provide the reason for the occurrence of an event in our external environment.	**,824**	,258
The organizational environment such that it is difficult to predict with good confidence the trends and events in our external environment.	**,753**	,232
Event in my organization's external environment change rapidly.	,173	**,902**
Trends in my organization's external environment vary frequently.	,237	**,848**
There is a large number of possible outcomes in my organization's external environment.	,229	**,834**

N=310. Kaiser-Meyer-Olkin Index = 0,87. Total Variance Explained by factor 1 in 43,94% and 19,99% by factor 2. The factors loadings were obtained from Varimax rotation.

d. Factorials for Internal Uncertainty

Items		
Cronbach's Alpha	**0.800**	**0.743**
	Factor 1	Factor 2
To what extent would you say your work is routine?	**.918**	.084
To what extent are your major tasks the same from day to day?	**.873**	.260
To what extent is there a clearly known way to do the major types of work you normally encounter?	.090	**.896**
To do your work, to what extent can you actually rely on established procedures and practices?	.240	**,824**

N=310. Kaiser-Meyer-Olkin Index = 0.60. Total Variance Explained by factor 1 in 7.89% and 7.83% by factor 2. The factors loadings were obtained from Varimax rotation.

e. Factorials for Cohesion

Items	
Cronbach's Alpha	**.931**
The work group trust each other.	**.849**
People work well together as a team	**.842**
People cooperate with each other	**836**
People almost always speak well of it.	**.815**
People are warm and friendly.	**.804**
People are willing to share resources.	**.786**
There is a friendly atmosphere among people.	**.782**
People treat each other with respect	**.777**
People are proud to belong to the group	**.754**

N=310. Kaiser-Meyer-Olkin Index = 0.93. Total Variance Explained by the factor in 49.92%. The factors loadings were obtained from Varimax rotation.

f. Factorials for Dissimilarity

Items	
Cronbach's Alpha	**.890**
I feel I am professionally and/ or educationally dissimilar to other group members	**.835**
I feel my work values and/ or motivations are dissimilar to other group members.	**.809**
In terms of principles that guide my work (e.g., patient care, reward driven), I think I am different from other group members	**.808**
In terms of functional background (e.g. professional background and/ or work experiences), I think I am different from other group members.	**.772**
I feel my cultural and social values are dissimilar to other group members	**.765**
I feel my proficiency concerning the working language is dissimilar to other group members.	**.727**
I feel I am visibly dissimilar to other group members.	**.667**
In terms of visible characteristics (e.g., age, gender, ethnicity), I think I am different from other group members	**.625**

N=310. Kaiser-Meyer-Olkin Index = .089. Total Variance Explained by the factor in 111.2%. The factors loadings were obtained from Varimax rotation.

g. Factorials for knowledge sharing

Items		
Cronbach's Alpha	**.812**	**.848**
	Factor 1	Factor 2
I share the information I have with the colleagues outside of my department	**.873**	.145
When I've learned something new, I see to it that colleagues outside of my department can learn it as well	**.866**	.096
I share my skills with the colleagues outside of my department	**.761**	.283
Colleagues within my department tell me what their skills are, when I ask them about it	.148	**.918**
Colleagues within my department tell me what they know, when I ask them about it	.208	**.908**

N=310. Kaiser-Meyer-Olkin Index = 0.69. Total Variance Explained by factor 1 in 6.38% and 2.82% by factor 2. The factors loadings were obtained from Varimax rotation.