

**PERCEIVED ORGANISATIONAL SUPPORT: A
PROSPECTIVE PROXY OF THE INDIVIDUAL
MANAGER'S COMMITMENT TO STRATEGIC
DECISION-MAKING IN ORGANISATIONAL
CONTEXT**

Nuno Correia

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Other than the natural difficulties related to the nature of a doctoral project, certainly increased by the fact that during the years that it took me to conclude this research, I had to cope with important professional and personal changes, while making sure that my professional behaviour and reputation remained unchallenged, one of the main difficulties of this project, if not the main one, is that the subjects supposed to answer the survey instruments used are managers. Being aware of the low rates of responses provided by managers in surveys, and being a manager myself, that is, knowing my own past behaviour in respect to surveys, my upmost gratitude needs to go to all those who helped me getting access to firms and managers in order to get a reasonable number of respondents.

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ABSTRACT

The purpose of this research project was the design of a model, which provides possible explanations of the behaviour of individual managers in organisational contexts when involved in strategic decision-making, but also some prospective level of prediction.

The model proposed integrates variables that are related to each individual manager, such as the experiences with decision-making outcomes and the illusions of control that individual managers have, variables which derive from the perceptions that individual managers have of some components of their organisational contexts and perceptions of the risks intrinsic to each topic, which is subjected to decision-making processes.

The organisational support for risk-taking, which is perceived by each individual manager, is considered as a proxy of the perception that that manager has of the risks for him or herself, and as a proxy of his or her behaviour, that is, is seen as a predictor of the willingness of the individual manager to engage in strategic decision-making activities on the behalf of his or her organisation.

The data gathered by the questionnaire, and the hypotheses defined in accordance with the model proposed, were treated within the structural equation modelling framework. The results provide support for the model proposed and suggest that the perceived organisational support has antecedents, which had neither been proposed nor tested thus far.

The findings of this study provide individual managers and their organisations with a better understanding of the variables involved in risk perception and risk behaviour, thus providing additional tools for risk management.

Key Words: *Individual Managers in Organisational Contexts; Risk Perception; Criteria for Decision-making in Organisational Contexts; Individual Risk-behaviour*

JEL: D81, M12

RESUMO

O objectivo deste projecto foi a concepção de um modelo que fornecesse possíveis explicações para o comportamento individual de gerentes e gestores em contexto organizacional, quando envolvidos na tomada de decisões estratégicas, mas também que previsse esse mesmo comportamento.

O modelo proposto considera variáveis que estão relacionadas com cada indivíduo, tais como a experiência com resultados de tomadas de decisão e com o controlo que pensam exercer sobre os assuntos a decidir e sobre as variáveis relacionadas com fatores que resultam dos contextos organizacionais.

O apoio da organização para a assunção de riscos que é percebido por cada indivíduo é considerado neste estudo como um indicador da percepção que cada um dos indivíduos tem dos riscos em que pode incorrer ele próprio, e, conseqüentemente, como um indicador do respetivo comportamento e da vontade desse indivíduo participar na tomada de decisões estratégicas organizacionais.

Os dados obtidos através do questionário final, e as hipóteses definidas de acordo com o modelo proposto, foram analisados com recurso a modelos de equações estruturais. Os resultados sugerem que o modelo proposto é fundamentado e que o apoio organizacional à assunção de riscos dependerá também de outros determinantes que não tinham sido anteriormente considerados nem testados.

Os resultados deste estudo permitirão aos gerentes e gestores a título individual e ainda às respectivas organizações, uma compreensão mais aprofundada das variáveis envolvidas na percepção dos riscos e nos comportamentos face aos riscos, proporcionando medidas adicionais de gestão de risco.

Palavras-Chave: *Gerentes/Gestores a título Individual em Contextos Organizacionais; Percepção de Riscos; Critérios para Tomadas de Decisão em Contexto Organizacional; Comportamento dos Indivíduos face ao Risco*

JEL: D81, M12

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CHAPTER 1. INTRODUCTION AND OVERVIEW

1.1 Research Background

The importance of strategic decisions and risks involved in business activities is manifest through simple observation of corporate life and behaviour of individual actors under organisational contexts. Furthermore, in the academic realm, the number of journals of relevance addressing strategy, decision-making, business venturing, organisational behaviour, risk behaviour, and so forth, is impressive and the number of published studies is even more impressive, definitely removing any doubt that could remain in respect to the importance of the general topic of risk-taking and risk-taking associated to strategic decision-making.

At this point, and to make things clear since the very beginning, it is important to stress that strategic decisions are to be understood in the context of this study as those decisions that are “*large enough to the organisation, but not so large as to be truly unique, or potentially fatal*” (Kahneman and Lovallo, 1993: 18), and to which organisations and managers are willing to devote resources and take actions of a certain importance (Mintzberg, Raisinghani and Théorêt, 1976).

The importance of risk is obvious. What is not obvious is how the risks perceived by the individuals, who contribute to decision-making in organisations, impact organisational decision-making and risk-taking and, ultimately, the performance of the organisations. Those impacts on organisations are beyond the scope of this study. Nevertheless, it is posited here that the risks perceived by individual managers, in organisational contexts, have an influence on the behaviours of those managers, which in their turn have an influence on organisational decision-making and, at last, on firms' results. Before getting to the end of the chain of behavioural influences into firms' results, which we restate is beyond the scope of this study, it is necessary to study the antecedents of individual behaviour in the face of risk associated to strategic decision-making in organisational contexts.

It is also quite clear that different people do not always ‘see’ situations in the same way, and with the same level of risk. Why is that so? That could be because people are different and, or, because things are different and, or, because people see the same things in different ways, that is, perceive them differently.

Regardless of decision-makers making decisions alone, in groups or in organisations, they have, as put by Beach and Mitchell (1996: 3), “*to make up their own minds first.*” Furthermore, Beach and Mitchell (1996: 3) argue that “*groups are not seen as decision makers per se; they are merely the contexts in which individual members' decisions become consolidated to form a group product.*” Cyert and March¹ (1992) see organisations as coalitions of individuals and groups, where individual goals may, and in general do, materialise into collective goals. This is the line of research embraced in this study where, therefore, the individual manager is the level of analysis, notwithstanding the fact that individual managers, by making decisions in organisational contexts, deal with organisational variables, and, eventually, make decisions at a group or organisational level. These organisational variables, which will be discussed at a later stage, are ‘seen’, that is, perceived, by the individual managers in certain ways, thus becoming, as far as this study is concerned, individual variables.

Individual decision-making behaviour and organisational decision-making meet at the workplace. In organisational contexts individual managers make many of the organisational decisions. On the other hand, “*participants in organisational decision-making are part of ongoing processes. Even if they don't take on active roles in all phases of decision making they are a part of the decision processes and its consequences*” (Shapira, 1997: 5). Research on individual decision-making behaviour has focused on laboratory studies, where no contextual variables are taken into account. However, “*organisations are systems of coordinated action among individuals and groups whose preferences, information, interests, or knowledge differ*” (March and Simon², 1993: 2). Furthermore, “*organisation members are social persons, whose knowledge, beliefs, references, loyalties are all products of the social environments in which they grew up, and the environments in which they now live and work*” (March and Simon, 1993: 13). Decisions and behaviours originate also from rules, such as procedures and norms, in which case decisions ‘happen’ as the result of behaving in accordance with those rules (March, 1991). Organisations have contexts, and individual behaviour needs to be understood and explained within the context in which that behaviour is produced. Individuals decide to join or leave organisations, and individuals

¹ Original work dates from 1963.

² Original work dates from 1958.

decide as well, depending on the contexts, how and with what intensity they get involved in decision-making (March and Simon, 1993).

When this research project started, the author came across two papers published in top journals, which provided him with guidance and, most importantly, gave him comfort, insofar the issues, which had been noticed, were real and had attracted the attention of renowned scholars.

In one of those papers, Sitkin and Pablo (1992: 11) in a proposition to reconceptualise the determinants of risk behaviour argue that there are “*three clusters of factors that influence a decision maker when he or she must choose a more or less risky response to a problem*”. Those authors say that those clusters are related to the very issues originating the decision process, that is, the decision subject, to the context in which the decision is supposed to be made, and to the decision-maker. It is not clear in the work of Sitkin and Pablo (1992) if the effects of the business environment, which would be a fourth cluster of variables, are, or not, part of those effects related to the organisational context and, or, to the issues that are at the centre of decision-making.

In addition, in the other seminal paper that was used to provide guidance to this research project, Baird and Thomas (1985) propose a model in which ‘environmental’, or external environment, and ‘industrial’ variables are included and separated from organisational, decision-maker or situation related variables.

Both the work of Baird and Thomas (1985) and Sitkin and Pablo (1992) refer to the relevance of the risk element in decision-making and, as far as risk behaviour is concerned, posit, among other propositions, that risk perception plays a crucial role in decision-making and risk-taking. However, the main shortcoming of the study of Sitkin and Pablo (1992), which this research project intends to gap, is the vagueness in respect to the unit facing the risk perceived. The unit perceiving the risk is clearly the individual manager. However, the unit facing the risk perceived is not spelled out.

Sitkin and Pablo (1992) first, and Sitkin and Weingart (1995) after, in a study that partially tests a model proposed by Sitkin and Pablo (1992), did not address the risks that managers perceive for themselves. This might be because that was not the focus of those authors. Nevertheless, one of the aims of this project is precisely to address that shortcoming, since much less is known about the perceptions that managers have of the

variables that determine the risks that managers perceive to incur, and about the support that they perceive in order to be able to incur those risks.

On the one hand, the main purpose of this study is to assess if the perceptions that managers have of the risks involved in decision making play a role in the way that those managers, at an individual level, 'see', that is, perceive, if they are supported by their organisations to engage in risk-taking activities, namely making or participating in strategic decisions in an organisational context. The intention is to assess the perception of risks from the individual manager perspective, including the risks that he or she faces at a personal level, through the perceived organisational support deemed adequate by the manager to reciprocate and commit, engage and take risks on the behalf of the organisation. The thesis supported in this study is that the organisational support perceived by the managers ultimately mediates the variables mentioned in this study, thus impacting directly the risk perceived by the managers and, consequently, their behaviour. On the other hand, the chief suggestion of this research project is that individual managers consider, consciously, or unconsciously, when deciding to engage, or not, in decision-making, the perceptions that they have of factors intrinsic to the decision subjects, the perceptions of aspects that relate the decision-maker to the decision subjects, and the perceptions that they have of factors embedded into the organisational contexts. Furthermore, that engagement results from the support that individual managers perceive as provided by their organisations, and that support wraps up all the other factors retained in this study.

1.2 Relevance and Expected Contribution of the Research to the Field of Applied Management

Risk and decision-making are pervasive in all organisations whether for profit or not. Risk and decision-making have been related to firm performance (Baird and Thomas, 1985; Bromiley, 1991; Lumpkin and Dess, 1996; Lumpkin and Dess, 2001; Singh, 1986; Wiseman and Gomez-Mejia, 1998). Risk perceived by individuals and risk propensity of individuals, together, have been posited by Sitkin and Pablo (1992) as mediators of individual risk behaviour. Sitkin and Weingart (1995), however, tested, partially, a model proposed by Sitkin and Pablo (1992), and concluded that risk perception is the main mediator of individual risk behaviour, mediating, inclusively, the effects of risk propensity. Weber et al. (2002) and Weber and Milliman (1997) suggest

as well that individual risk perception is the main mediator of the variables contributing to individual risk behaviour, and confirm that risk behaviour is associated with risk perception, rather than with risk attitudes, or preferences. It shall be noted that whereas the study of Sitkin and Weingart (1995) was conducted with subjects, students, who provided their perceptions of the risk associated to a hypothetical decision that would be faced by someone else, the study of Weber and Milliman (1997) was performed with subjects facing the risks themselves, as public transportation commuters and stock market brokers. Nevertheless, none of the studies was made in organisational contexts with managers.

Risk is pervasive in strategic decision-making. Moreover, the decision-making processes, through the outcomes and the dynamics of the decisions made, or not made, are undoubtedly a contributor to firm performance. If it is assumed that individual risk perception is a mediator of the factors contributing to individual risk behaviour, that is, to individual decision-making behaviour, and if individual decision-making behaviour, in organisational context, is related to organisational decision-making, then the conclusion is that individual risk perception plays a very important role in decision-making in organisational contexts, and, therefore, plays a relevant role in firms' performance.

1.2.1 Relevance of the Research

Drawing from the work of Hambrick (2007), who calls for managerial facts to be part of papers to be brought to the attention of the academy, the author decided to provide a real life example, experienced by the author, to better situate the research problem.

In 2005 a firm for which the author was working at that time underwent some significant management changes. There were changes in the board of directors and changes at the top management team level. Changes cascaded and led to other changes in the senior and middle management levels. Those management changes transformed the firm to a great extent. Transformations were seen, and felt, in aspects such as centralisation, procedures and controls, decision-making style, decision-making processes, decisions made or not made, focus on certain business segments rather than in others, including divestments, and so on.

In 2005 as well, the market in which that firm was active – chartering and operation of oil and gas drilling platforms – saw the commencement of one of its brightest up-cycles ever, with full utilisation of available capacity, and a multiplication of prices of services supplied to clients for the offshore (maritime) segment by a factor of 7 in certain cases. With that upward trend in prices of services driven by full utilisation of drilling platforms, which, on the other hand, was driven by sustained increases of the oil price, a number of oil and gas drilling firms decided to invest in new equipment worth, depending on the equipment, between US\$150 million and US\$750 million per piece, for offshore equipment, while a number of other firms decided not to invest. Those who invested adopted different strategies. Some opted to invest without a certainty of employment for the drilling platforms in which they were investing, that is, without contracts, while others decided to invest only if they had initial contracts. Some others decided not to invest at all. Some companies invested at the beginning of the cycle, while some others invested further down the road. Some invested in some type of equipment, while others invested in some other type. Some invested in an incremental manner and others at once. Some grew organically, while others grew through acquisitions of companies. Some took the risk of constructions. Others decided to acquire units once built and pay a premium to avoid construction risk. It is true that investing US\$750 million or US\$150 million is not the same. It is also true that operating equipment worth US\$150 million and equipment worth US\$750 million – quite different technically and in terms of expertise required – is not the same. Still, some companies without expertise went for the top dollars assets, others with expertise did not move, others without expertise went for the less expensive and easily operated assets, others, with or without expertise, went for both types of assets, and so on. The disparity of strategies adopted and of decisions made by the different players in that market was so striking, as was the disparity of behaviours perceived between the new top management of the author's employer and the former one, that it awakened in the author an intellectual curiosity and a willingness to investigate the reasons, or, at least, some of the reasons, of those differences that, as mentioned above, were so pungent and obvious.

The author commenced the sketch of this research project when the strong growth cycle initiated in 2005 was still in progress. It was intuitive that different decision-

making behaviours should lead to different consequences to the firms that were part of the drilling industry.

At that time, the company where the researcher was working had certain characteristics, promoted by the top management in place, which led to very slow decision-making processes and to a certain tendency to the status quo. The reasons for the slow decision-making processes were essentially two-fold:

- Participation in the decision-making processes of all the departments/functions of the organisation with equal decision-making power; and
- Extensive reviews of all the decision subjects

The CEO of the company, a relatively newcomer in the industry, considered that all the functions in the organisation, such as operations, marketing, finance, accounting, legal, marketing, etc., not only had the right, and the duty, to provide inputs, but had also the right to participate in the decision-making processes with the same power of any other department, regardless of the topics being considered. For example, at the executive committee level, which included the CEO, the COO, the CFO, Senior Vice President Marketing, Senior Vice President Human Resources and Chief Counsel, decisions were made by consensus, meaning that any member of the executive committee had the power to veto any decision.

Furthermore, the executive committee, and by default the whole organisation, attempted to forecast or to anticipate business scenarios in a rather unrealistic way, since, in reality, the purpose was the elimination of all uncertainty or risk.

Knowing that the assets involved in the drilling of offshore oil and gas wells have a lifetime of around 30 years, that the initial contracts for a newbuild asset range, typically, from 3 to 5 years, that the daily rates paid by oil and gas companies to drilling contractors depend very much on the price of the barrel of oil, which in its turn depends on international economic cycles, geostrategic considerations and so forth, it is clear that most of the lifetime of a given asset is subject to uncertainty. When we consider assets worth US\$750 million that explains a certain level of review of the strategic decision-making process and of the decision subject. However, the cost of the investment alone does not explain everything.

The behaviour that resulted from a requirement to have all the departments involved, with equal decision-making power, coupled with the aim to eliminate all uncertainty, was in sharp contrast with behaviours observed by the author in previous

organisations in the same industry. The author noticed that the search for zero risk led managers at all levels to seek zero risk for themselves. In short, why would someone take risks when nobody else, including the organisation, did? The researcher noticed as well, on the one hand, that the representatives of all the corporate functions became experts in finding risks or sources of risks. However, on the other hand, it was rare to see somebody proposing solutions to mitigate the risks found. The standard solution became, at least in the first years, not to invest, not to do, not to risk or, in other words, the status quo.

At the same time, however, competitors were moving their pieces. Some were investing heavily; others were looking for potential merger & acquisition targets, while some others were investing more modestly. The author realises that not all the companies had exactly the same resources at exactly the same time. There were, for sure, different financial conditions, different pools of human resources, different levels of engineering skills, etc. This could explain, and certainly does, part of the resulting behaviours. However, there were companies that with conditions that were objectively worse made bold decisions. The bottom line is that different decision-making behaviours (individual and organisational) led to very different market shares, and different financial situations, including firm survival in certain cases.

The situation depicted above led the author of this study to get interested by the human part of the picture. How do managers perceive risks in strategic decision-making and what leads managers to engage in strategic decision-making processes? Which factors contribute to that engagement and to lead managers to do or to propose to their organisations to do things or, alternatively, to lead them to look for reasons not to do anything?

The author thought that individual behaviour, in organisations and in the context of strategic decision-making, ought to be related to the way an individual perceives the support provided to him or her by his or her organisation.

CEOs have been so omnipresent in all the organisations where the author collaborated that it seemed obvious that their own behaviours should have contributed to the organisational support perceived by individuals and to the ways individual managers behaved. Likewise, the behaviour of the organisation as a whole, the rewards, the promotions, or lack of promotions, the praise or criticism, all that had to have an impact on the support perceived by managers. Other than the perceptions that individual

managers could have of organisational factors, that seemed obvious as well that characteristics of the decision-makers and of the decision matters should contribute to the support to engage in strategic decision-making that managers perceived in their organisations. After all, in spite of some 'standardisation' of behaviour resulting from the behaviour of CEOs and organisations, all individual behaviours were not exactly the same.

The author expected perceptions of certain dimensions, rather than the dimensions themselves, to be the key to explain the organisational support perceived. Decision-making being one the most important tasks of managers, if not the most important, and consequences of decisions made (or not made) impacting firms heavily, the relevance of the research subject for the field of the applied management and for organisations and individual managers is obvious.

The author expected as well that characteristics of individual managers, individual perceptions of decision problems and individual perceptions of organisational dimensions would be related and would contribute to explain the individual perceptions of the organisational support. Intuitively, the researcher predicted that perceptions of organisational factors coupled with characteristics of individuals and perceptions of the subjects being decided would contribute to the organisational support perceived. This is the core of this research project.

The business issues mentioned herein, and related individual behaviours, which are the main driver of this research project, are easily extrapolated to many other industries. What needs to be common is the complexity of the situations, the uncertainty in respect to the actions to be taken and to the outcomes and consequences, the ambiguity, the lack of clarity, hence the focus on strategic decisions, and above all the need for interpretation (Finkelstein, Hambrick and Cannella, 2009), which brings to the equation, if there were any doubts, the human factor. Simon (1955) suggests that the relations between an individual and the environment in which he or she acts play a relevant role, since the individual (the organism) adapts or reacts to the environment. As far as this study is concerned, we look for evidence, at least at a sample level, to conclude that the way individual managers of that sample, in their organisational contexts, 'see' certain aspects of the organisational life and of the situations being the subject of decision-making, play a role in the risks and the support for taking risks that they 'perceive'.

Kenneth Arrow (1951: 404) stresses that *“there is no need to enlarge upon the importance of a realistic theory explaining how individuals choose among alternate courses of action when the consequences of their actions are incompletely known to them.”* Still according to this same author (Arrow, 1951: 409) *“if we were to compare the businessman to the scientist, we would be forced to the melancholy conclusion that little of a systematic nature can be said about the former's decision-making processes.”* Hambrick (2007) calls for appealing and motivating facts to be reported, as a way for knowledge to advance, either through theory testing, or by bringing to the attention of the academic and practitioners' worlds important empirical aspects and let others, the academy for instances, test and, or, develop them. Locke (2007) calls instead for theory building based on induction, by going from substantial observations, or data, to general theories, and by looking for evidence of causality. In both cases, however, both authors call for facts to be raised and brought to the research realm. Miller and Tsang (2010: 140), making a point about theory testing in social sciences, including management, argue that one of the difficulties to make tests is the fact that *“organisational decision makers are not passive. They exercise choice and take actions that enact their organisations' environments.”* Risk perception and risk-taking by individuals, in the context of organisational decision-making, are certainly part of those important facts in management science mentioned by Hambrick (2007) and Locke (2007).

Decision-making is pervasive in the lives of firms and managers. Decisions are fraught with risk, especially strategic decisions. Risk-taking is related to decision-making and to risk behaviour and risk behaviour is related to the perceptions of risks and to the perceptions of organisational factors that managers held. Decision-making has drawn the attention of scholars and practitioners due to the relevance of the subject in many fields such as economy – decisions made by different agents such as families, businesses and governments, medicine – medical treatments, decisions such as to go, or not to go, for surgeries, for instances, management – firm performance, life in society – nuclear power, and so on. MacCrimmon and Wehrung (1986: 4) extend decision-making and risk-taking to all fields of life by saying that *“life requires choices; choices require risk.”* However, MacCrimmon and Wehrung (1986: 6) go on to say that *“although everyone makes daily decision involving risk, not all of us make decisions that result in risk for thousands or even millions of people”*, considering that managers are part of those who make important decisions, and referring, later on, that in the

context of firms “*strategic decisions are fraught with peril*” (MacCrimmon and Wehrung, 1986: 7).

Theories of choice or decision-making have their origins within the economic science. Von Neumann and Morgenstern (1953³: 8) state that “*the subject matter of economic theory is the very complicated mechanism of prices and production, and of the gaining and spending of incomes.*” Nevertheless, those authors (von Neumann and Morgenstern, 1953: 8) add that “*in the course of the development of economics it has been found, and it is now well nigh-nigh universally agreed, that an approach to this vast problem is gained by the analysis of the behaviour of the individuals which constitute the economic society*”, thus bringing the individual decision-maker to the centre of the discussion.

Simple observation and an important bulk of literature (e.g. Allais, 1953; Beach and Mitchell, 1987; Bell, Raiffa and Tversky, 1988; Cyert and March, 1992; Edwards, 1954, 1951; Einhorn and Hogarth, 1981; Ellsberg, 1961; Fishburn, 1989; Gilboa, 2009; Kahneman and Tversky, 1979, 1984; Lopes, 1987, 1994; MacCrimmon and Wehrung, 1986; March, 1978, 1991; March and Shapira, 1987; March and Simon, 1993; Schoemaker, 1993; Simon, 1955, 1959, 1997) indicate that actual individual behaviour is different from behaviours prescribed by decision theories of a normative nature, such as those originated from economic science.

Behavioural theories, of a descriptive nature, posit the existence of determinants of, or contributors to, behaviour, which are not considered by normative theories, and challenge some of the fundamentals of normative theories, such as maximisation, the existence of clear preferences and some properties of probabilities, whether those are objective (based on frequencies) or subjective.

Recognising the relevance of decision-making and individual risk behaviour for the performance of firms, and the very importance of firms' performances, it would be a paradox not to study risk behaviour, including individual risk perceptions and individual perceptions of organisational support for decision-making and risk-taking.

³ First edition of Von Neumann and Morgenstern work is dated 1944.

1.2.2 Expected Contribution of the Research

The number of studies dealing with risk perception, outside the domain of the societal risk, is scarce. The studies dealing with risk perception in an organisational context are scarcer, and the studies dealing with risk perception in organisational context, using managers as subjects, are extremely reduced not to say non-existent. Furthermore, it is not clear if the existing studies on risk perception in organisational contexts address the perceptions that individuals have about the risks faced, or to be faced, by organisations and, or, by themselves. On the other hand, in spite of the fact that risk perception is referred to, or dealt with, in a few studies, there is also a gap in terms of an integration of perception theory with behavioural theory. This study tries to fill some of those gaps within the limitation of such a vast field.

There is a growing number of studies that deal with perceived organisational support (e.g. Conway and Coyle-Shapiro, 2012; Kraimer et al., 2011; Rhoades et al., 2002; Shore and Wayne, 1993), perceived supervisory support (e.g. Maertz et al., 2007; Shanock and Eisenberger, 2006) and leader-member exchange and social exchange (e.g. Settoon et al., 1996; Vidyarthi et al., 2010; Wayne et al., 1997). In those studies, the aspects related to the support perceived by employees as provided to them by their organisations and, or, by their leaders, and reciprocity, commitment and engagement by employees are treated. However, it is the opinion of the author that those constructs, or at least part of those constructs, shall be integrated with individual perceptions of other organisational variables, and with the perceptions of the decision subjects at stake, being this integration an expected contribution of this research project.

The findings of this study are of value for individual managers, for top managements of organisations and for the academic community interested in decision-making, in organisational behaviour, in individual risk behaviour in organisational contexts, in entrepreneurship and, or, corporate entrepreneurship, in relational matters under organisational contexts, in firms' performance, in short in firms' management. *“Understanding how organisational and individual characteristics influence executives' filtering processes may both help executives themselves to behave more effectively and help researchers to predict the types of filtering processes that executives use”* (Starbuck and Milliken, 1988: 42). Understanding the filters used by managers as the mechanism that allows individuals to see and, or, feel in a certain way, is important,

insofar, and from a managerial perspective, organisations and individuals have the opportunity to act upon those filters.

The conclusions of this thesis are expected to be important for managers and organisations. It is assumed that decisions can be made in more appropriated ways, that is, more informed and less biased, or unbiased if at all possible, by handling the 'right' factors. Managers may work on the factors affecting risk perception, thus influencing the decision-making processes, including their participation, and the decisions made, hence influencing the outcomes of the decisions. As for organisations, the conclusions of this research project could contribute for the definition of training programmes to minimise biasing aspects, raise awareness of the factors that are involved in decision-making and risk-taking, and reengineer decision-making and organisational processes.

Concerning the academic universe this research project follows several avenues for research suggested in the literature (Baird and Thomas, 1985; Cyert and March, 1992; Eisenberger et al., 1986; Kuratko et al., 2004; March and Shapira, 1987; March and Simon, 1993; Shapira, 1995; Simon et al., 1999; Sitkin and Pablo, 1992; Sitkin and Weingart, 1995), and is expected to contribute to assess the influence of some factors on risk perceptions, which have been posited but have, nevertheless, barely be tested, taking into account the difficulties to have access to managers and firms to develop academic work. This is the case of controllability, a factor that has been presented with the potential to impact risk behaviour (Baird and Thomas, 1985; Sitkin and Pablo, 1992; Slovic, 1987; Vlek and Stallen, 1980), which has been tested in psychometric studies in terms of societal risk (Slovic, 1987), but has not received full empirical attention as far as managers are concerned. This is also the case of a given combination of factors, including the perception that managers have of risks related to some contextual organisational variables (Baird and Thomas, 1985; Sitkin and Pablo, 1992). Likewise, this is the case of leadership behaviour, that is, in this specific case, the risk behaviour of CEOs and the relationship with perceived organisational support, as suggested by Eisenberger et al. (1986). Kuratko et al. (2004) suggest that research is necessary to determine the occurrence of entrepreneurial behaviour, which is related to the engagement in decision-making and the assumption of risks, and call for further research related to the relationship between the hierarchical levels of managers and their behaviour, a call that is addressed in this research project through the study of the moderator effects of hierarchical levels in the perceptions of variables of interest. Simon et al. (1999), on the other hand, suggest that researchers look for the impact of social

risks on risk perception. This aspect is also addressed in this research project through the perceptions that individual managers have of the variables retained, which are related to the organisational contexts in which managers are socially embedded.

The main contributions of this research are expected to be:

- i) Provide empirical evidence, within the limitations of the study sample, that context influences the risks and the support perceived by managers, and, therefore, the decisions that they make. This would be expected to lead managers to deal with contextual variables as they would deal with 'business variables', namely through training, relational work in their organisations, evaluation and monitoring of contextual variables, evaluation and debriefing of decisions made, and so forth;
- ii) Provide scholars and practitioners with findings allowing them to have a better understanding on how decisions are made in organisational contexts, namely the dynamics of decision-making;
- iii) Contribute to having decision-making in firms based, whenever possible, on hard business facts/assumptions, rather than on perceptions of the working environment and contexts, by making decision-makers aware of those perceptions and relationships;
- iv) Provide significant evidence, within the limitations of the sample of the study, of the existence of relationships among factors not considered by models of a normative nature assumed by economic theories of decision-making, thus promoting awareness of behavioural theories among policy makers and practitioners;
- v) Finally, it is expected that the model proposed is seen with a predictive role and not only as a model that simply describes relationships among constructs. It is contended in this research project that there is a point in studies like this one if they help people creating or sponsoring decision-making and other organisational processes, and better decision-making. From an applied management perspective a simple description of behaviour may not help managers, unless there are lessons learned and application of those lessons to management practices.

1.3 Research Aims

This study is meant to be about determinants of behaviour, more specifically about determinants of risk behaviour of managers, at an individual level of analysis, when managers are involved with decision-making of a strategic nature in the context of their

firms. The main aim of this study is to focus on those phases of the decision-making processes, where human cognition, namely perception, is more important, that is, during the phases of recognition/identification of the decision matter and the evaluation/assessment of the solutions, or actions, to deal with that same decision matter. It shall link the perception that a decision-maker has of a decision matter and some of his or her own idiosyncrasies to the perceptions that he or she has of certain organisational factors. And, finally, we shall see how all that contributes to the perception that the decision-maker has of the organisational support that he or she gets to carry on his or her decision-making tasks.

This research project has four research goals, each one of them involving the testing of several hypotheses:

- 1) Identify determinants, or antecedents, of the organisational support for risk-taking perceived by individual managers in their organisations, in the context of strategic decision-making. Identify relationships between the antecedents and the main construct. Define a model that explains, at least partially, the mechanisms that influence the organisation support for risk-taking, which is perceived by individual managers in the contexts of their organisations.
- 2) Find relationships among the antecedents of the organisational support. Namely, look for antecedents related to the organisational contexts, on the one hand, and for antecedents related to the decision subjects and personal experiences and heuristics of individual managers, on the other hand; check for cross influences, or effects.
- 3) Replicate and, or, develop existing studies and, or, known relationships, looking, for example, for mediation effects.
- 4) Control the effects of demographic variables related to organisational life on relationships among antecedents of the perceived organisational support, and between those antecedents and the main construct, with the purpose of identifying mechanisms that influence the intensity of those relationships.

The aims stated above will be further detailed through the hypotheses to be stated in chapter 5 (literature synthesis and model development, research aims and hypotheses) and will be analysed in the subsequent chapters.

1.4 Methodology

The approach followed in this study is of a deductive type, based on existing theory, with explanatory and predictive purposes, in spite of some exploratory work aimed at clarifying the nature of some concepts and relationships, and of the very nature of the constructs considered – unobserved variables, which could very well call for an inductive approach (Locke, 2007). Basically, hypotheses are deduced and theory is tested with the purpose of looking for dependency relationships.

The research strategy (Saunders, Lewis and Thornhill, 2007) employed in this study is based on a survey, using a questionnaire. However, due to the subjectivity of the matter of interest, mixed methods were used. In this study the researcher used direct observation and semi-structured interviews prior to the survey and to complement it.

As for the methods, direct observation and semi-structured interviews were used to frame the research subject, namely to clarify certain concepts, confirm, or not, certain relationships and look for new relationships.

A panel of 'experts', or 'judges', was utilised to match questions with prospective constructs while another panel was utilised to test for reliability, by answering the questionnaire at two different points in time (Hair et al, 2006). 4 'experts' or 'judges' were asked to assess the match between variables and potential constructs – one of the judges is Brazilian, another one is British and two other are French. A second panel helped assess reliability, by answering the first version of the questionnaire twice with a three weeks gap. All the 4 judges, who assessed the first version of the questionnaire for reliability purposes, are American.

Semi-structured interviews were conducted with 7 individuals of 5 different nationalities – American, Brazilian, British, French and Portuguese. The cut-off criterion, in respect to the number of interviewees, was established as the point in time when interviewees brought nothing new to the study.

A pilot questionnaire, whose development was made based on a mix of existing scales and questions derived from the semi-structured exploratory interviews and direct observation, served the purpose of making a first test and fine-tune the questions, or items, to be measured by the final questionnaire (Hair et al, 2006).

A final questionnaire was used to collect data.

Links to questionnaires were sent by email, and questionnaires answered directly via Internet through a survey site (www.surveymonkey.com). Answers were downloaded from that same site in excel format. Subjects were not requested to provide their names, or their organisations, in order to promote absolute anonymity. Based on lessons learned from the pre test questionnaire, which was also responded via internet through the same website, and where a significant number of respondents, percentage wise, answered only the demographic questions, and considering that the sampling methodology (purposive sampling) did not provide guarantees for a sounded methodology for missing data, it was decided to take an 'all or nothing' approach with the final questionnaire. Therefore, respondents had the option to drop the questionnaire at any time, but the questionnaire not being concluded was not retained, except for the demographic questions. 216 managers answered the final questionnaire completely. The questionnaire was developed originally in the English language. Then the questionnaire was translated from English into French, Brazilian Portuguese and European Portuguese and retro translated into the original language to avoid translation biases.

The items of interest were measured using questionnaires with Likert type scales of 5 points.

The author of this study relied on acquaintances to spread the questionnaire within organisations deemed representative of the universe of those organisations with substantial strategic decision-making processes. Given the universe of potential respondents - all managers involved in strategic decision making in organisational contexts - which is so vast that, from a practical standpoint, could be seen as infinite, and considering that resources, including time, are limited and shall be properly managed, the author decided to use a purposive sample. In order to limit the population, the author focused on a limited number of organisations in the domain of the energy and utilities industries. The respondents work for companies such as Petrobras, Technip, Enesco, Siemens and EDP, among a few others. Bearing in mind that people are different and so are companies, and that any generalisations, in this specific case, could always be challenged, even if the sampling methodology was irreprehensible, the sampling approach adopted seemed appropriated. It shall be noted, however, that the 'purposive' aspect was related essentially to a few people who acted as facilitators and sponsored the questionnaire within organisations of interest. In different words, the author picked the acquaintances, or facilitators, but did not select the respondents.

The direct observation and semi-structured interviews served to fine-tune and, or, find indicators for the first version of the questionnaire, to find any new relevant topics, including anecdotal information, or evidence, and to increase constructs' contents, or face validity (Hair et al., 2006). The semi-structured interviews were analysed as narratives in order to keep the whole story, rather than incurring into fragmentation (Polkinghorne, 1995; Saunders et al., 2007). Likewise the indicators vs. constructs matching served the purpose of fine-tuning the questions for the first version of the questionnaire, and to increase content validity (Hair et al., 2006).

The results of the pre-test of the first version of the questionnaire, of a quantitative nature, were analysed essentially using SPSS17. In spite of the small sample size (46 subjects), and lack of the required structural assumptions, it was decided to run an exploratory factor analysis in order to check if there was any evidence of the factorial structure. The correlation matrix was checked as well for evidence of associations among questions' measurements. Whenever any evidence of factorisation, corroborated by correlations among certain questions, matched existing theory, the author carried those questions to the final version of the questionnaire.

The data collected via the final questionnaire was statistically described or characterised using SPSS17 and Excel 97-2004.

Finally, the model proposed was built and tested within the structural equation modelling (SEM) framework. SEM allows for the simultaneous testing of relationships among latent variables, by using items that are directly measurable (Salgueiro, 2012). Hair et al. (2006) suggest that the utilisation of latent variables brings benefits, such as better statistical estimation and specification of measurement error, coupled with a better representation of theoretical concepts.

Considering that the author proposes a model with several latent variables, considering as well that the author decided to have the quantitative data related to the final questionnaire subjected to a confirmatory factor analysis to check the measurement of the latent variables by the indicators proposed, and, finally, considering that structural equation modelling is employed to test the research hypotheses, a software that allows for structural equation modelling, LISREL 8.8, is used.

1.5 Overview and Structure of the Study

This research project focuses on the perceptions of the risks involved in strategic decision-making, namely on constructs thought to contribute to that risk, and how those constructs influence the support that managers perceive from their organisations to incur in risk-taking activities. The views and structure adopted, as mentioned above, aim at checking on relationships among individual, situational and organisational characteristics, as far as risk and support for risk-taking are concerned, through the subjective views, that is, through the eyes of the individual managers. Furthermore, the intention is to show an underlying logic that brings us from the definition of risk and risk behaviour to the support perceived by individual managers to engage in risk-taking strategic decisions in their organisational contexts.

1.5.1 Overview of the Study

Organisations act and, or, react to the business environments of which they are part. Actions and, or, reactions are materialised through decisions. People make decisions, individually and, or, collectively, and decisions of a strategic nature are fraught with uncertainty and potential for losses at a firm, and at a personal level. Even when decisions are collective, individual managers need to make their own individual decisions or choices insofar they have to position themselves vis-à-vis their peers, bosses and subordinates, that is, they need to adopt the behaviours that they deem the more adequate.

Individual risk behaviour has been studied most of the time in laboratories, that is, outside organisational contexts, since contexts were not deemed important for risk theory as presented by the economy science from the 1940s through the 1970s, essentially.

Individual risk behaviour has been studied mainly with the utilisation of lotteries. In terms of risk behaviour individuals are categorised as risk adverse, risk neutral or risk seeking. Results of laboratory experiments provide strong evidence that individuals do not always behave as predicted by theories of a normative nature, which contend that rational individuals ought to follow a given method of preferences, coherence and consistency. Research projects using case studies with students (Simon et al., 1999; Sitkin and Weingart, 1995), or with entrepreneurs (Keh et al., 2002), have shown that risk perception takes an important part in the explanation of risk behaviour, although

risk perception is systematically analysed as if the individual does not face any personal risk, and perceives risk for something or someone else.

Studying if managers perceive support to engage in risk-taking strategic decision-making in an organisational context cannot be done without an understanding of what risk is, how risk behaviour has been approached in 'rational terms' and how the risk theory has evolved, and why risk is pervasive in decision-making. Perception, having a role in the way managers allocate risk to the variables of interest, is central to this study and to individual behaviour related to decision-making in the face of risk. On the other hand, since decision-making is viewed in this study as a process, and considering that certain phases of the process are the realm of perceptual phenomena, it is concluded that the phases of the strategic decision-making processes have to be disentangled. Finally, in order to close the loop, it is crucial to understand, which variables and, or, characteristics are important, whether related to the decision subject, to the individual or to the organisational context, and why certain variables of interest were retained and how that materialises into perceived support, or lack of support, by organisations to managers, keeping in mind that managers are part of the organisational contexts.

At the centre of the discussion is the influence of some personal heuristics on the organisational support perceived by individual managers to engage in risk-taking behaviour, and of the perceptions that individual managers have of a number of variables related to the context in which individual managers are embedded and of the decision subjects that they deal with. The organisational support perceived by individual managers is thought to be an antecedent of the risk-taking behaviour of those managers, insofar decisions are made, and managers operate, in organisational contexts. Ultimately, in those contexts, individual managers care essentially about the repercussions that their behaviour may have on themselves, as the result of organisational interpretation and scrutiny, being understood that the cues for acceptable behaviour are provided by the context.

1.5.2 Structure of the Study

In line with the overview provided in the previous section and to meet the research goals set forth in 1.3, this thesis is structured as follows (fig. 1.1):

Chapter 1 is meant to frame the study: it presents the reasons for having undertaken this study, its purpose, the expected contribution to the applied management field and how it is structured, that is, the logic behind it.

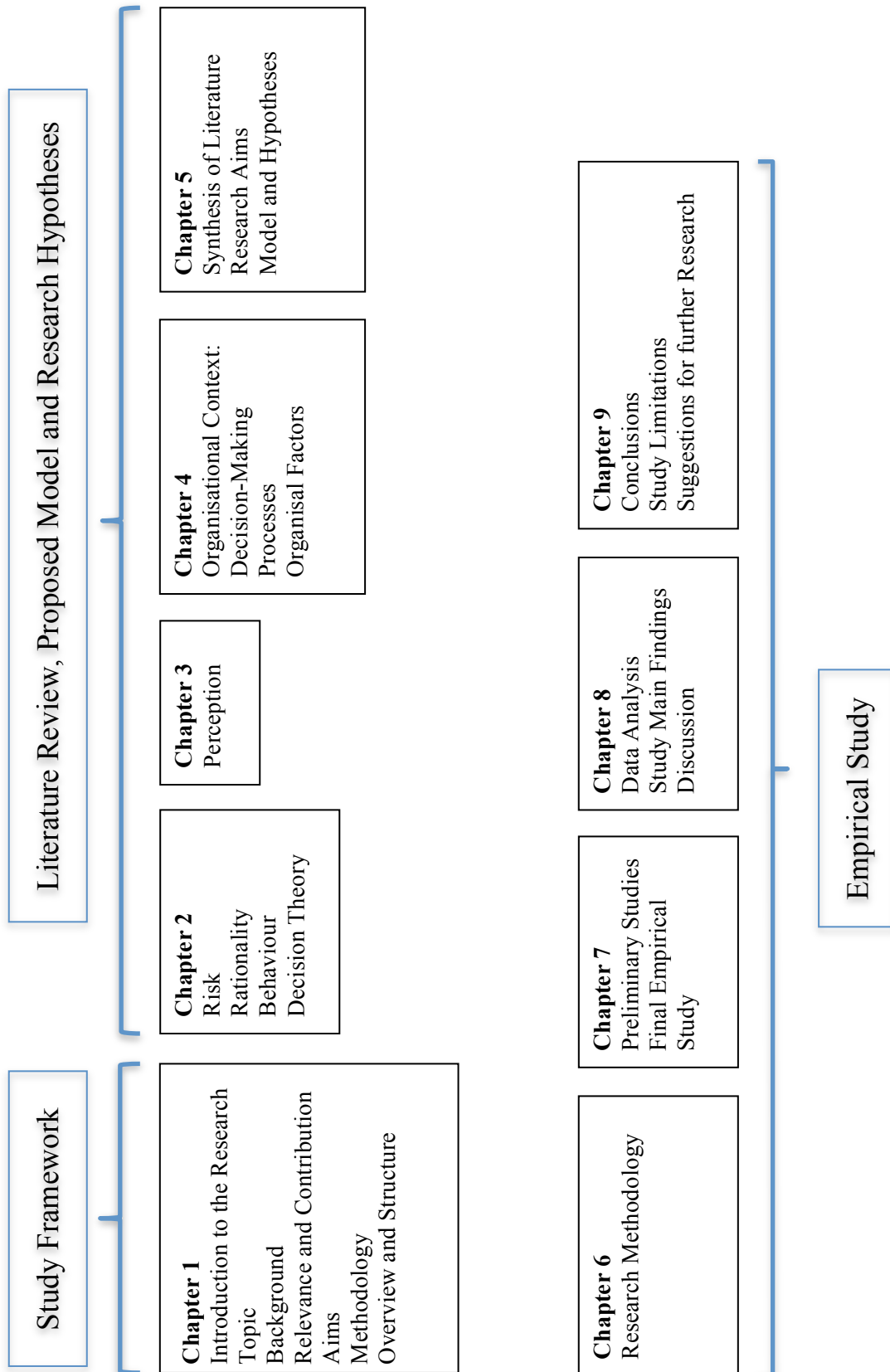
Chapters 2, 3 and 4 address the revision of academic literature, with each chapter addressing specific topics. Chapter 2 deals essentially with risk and individual risk behaviour, including decision-making theories. Risk is defined and, on the one hand, the main theories of risk behaviour are described with a special attention to the different views on rationality. On the other hand, variables related to the individual manager, such as experience and perceived controllability of outcomes, are brought forward. Chapter 3 addresses perception and how individuals transform stimuli, or 'objective' reality, into perceptions, or subjective reality. Chapter 4 presents the organisational context. A decision is seen as a process and the different phases of the process are detailed. Furthermore, Chapter 4 concentrates on the organisational context in which individual managers operate and three factors, which exist because of the very existence of organisations, are developed theoretically: organisational culture, CEO's risk behaviours and perceived organisational support, being this last factor suggested as a mediator of the risks that managers perceive as being possible to be incurred by them.

Chapter 5 provides a synthesis and integration of the literature and theories considered in this research project. The research aims are presented in detail, and the hypotheses to be tested are put forward.

Chapters 6, 7 and 8 are the core of the empirical study. Chapter 6 provides the research methodology adopted to carry out the study and the empirical research. Chapter 7 deals with the preliminary empirical studies such as observation, interviews and questionnaire pre-test and in Chapter 8 the data collected through the final questionnaire are analysed and discussed.

Finally, Chapter 9 presents the final conclusions and limitations of the study and makes suggestions for future research.

Fig. 1.1 – Structure of the study – source: the author



CHAPTER 2. RISK, RATIONALITY, BEHAVIOUR AND DECISION THEORY

2.1 Definition(s) of Risk and Risk Construct

2.1.1 Definition(s) of Risk

Risk is important in the context of this study insofar managers make strategic decisions, individually, or collectively, and individual managers see them as risky. Choices⁴ are generally defined as being riskless, or certain, risky and uncertain (March and Simon, 1993; Shapira, 1995).

On the one hand, riskless choices, from a normative standpoint, are those which outcomes are certain, such as choosing between two products with known prices. Riskless choices are also called certainty (March and Simon, 1993). Shapira (1995: 4) defines certainty in decision-making when “*each action is known to lead invariably to a particular outcome.*” On the other hand, risky choices, in economy science, and from a normative perspective, are those that involve known outcomes and known probabilities (Friedman and Savage, 1948), that is, probabilities that are based on frequencies and defined as objective. Risky choices are, for example, games such as tossing a fair coin, or rolling a fair dice, where all the outcomes and associated probabilities are known. The ‘only’ risk in such games is that the gambler, or decision-maker, does not know which outcome, of a fixed set of outcomes, will eventually materialise. Descriptively speaking, one could argue that the pleasure, or pain, that one draws from the outcomes of the choice is not known until the outcomes materialise, and that, therefore, there is a risk of failing to meet expectations⁵.

Another conception of risk related to the measurement, or evaluation, of outcomes, referred to as uncertainty, concerns situations where outcomes are certain, or uncertain, and probabilities of occurrence are uncertain. Uncertain choices are those that, still from a normative perspective, and in terms of economy science, concern alternatives for which the probabilities of occurrence of outcomes are not known and, therefore, become subjective, that is, dependent upon the decision-makers’ evaluations (Savage⁶, 1972). Certain categories of decisions, such as those of strategic nature, are not only

⁴ Definition in economic and decision-making theories.

⁵ Economic theory does not take pleasure/pain and emotions related to decision-making into account.

⁶ Original work dates from 1954.

uncertainty in terms of likelihood but are also uncertainty in respect to the set of outcomes that may, or may not, materialise (March and Simon, 1993). However, as partially put by Fishburn (1988: 78), who does not consider in his analysis the situations for which there might be outcomes not foreseen by the time a decision is made, decisions made under uncertainty are those related “*to the more general case in which outcomes are tied to uncertain events whose probabilities are not known.*” Events for which probabilities are not known are those related with insurance, for example. What is unknown is the probability of occurrence of the event for which the person insured wants to be protected against. Friedman and Savage (1948: 279) say that

“An individual who buys fire insurance on a house he owns is accepting a certain loss of a small sum (the insurance premium) in preference to the combination of a small chance of a much larger loss (the value of the house) and a large chance of no loss that is, he is choosing certainty in preference to uncertainty.”

Risk has different meanings and, or, is measured differently depending on the field of study (e.g. finance, economy, management, society, etc). In economy science, risk, whether resulting from known or unknown probabilities, is typically the product of the utility, that is, of the subjective value of something – an outcome for example - for someone, by the probabilities of occurrence of the outcomes carrying those utilities. In other words, risk is expected value. Other branches of science, such as finance, and businesses, such as insurances, measure, or define, risk, essentially in accordance with the probabilities associated to alternative outcomes, thus using measures such as variance and semi-variance – generally defined as volatility (Shapira, 1995), and not simply according to the expected value. Shapira (1995: 22), referring to the economy science, says that “*in classical decision theory, risk is most commonly conceived of as reflecting variation in the distribution of possible outcomes, their likelihoods, and their subjective value.*”

In managerial and societal risk-taking, and in spite of the presence of uncertainty and probabilities, as correlates to risk (Baird and Thomas, 1985), risk is seen essentially in terms of potential for losses, or existence of hazards (MacCrimmon and Wehrung, 1986; Shapira, 1995; Slovic, 1987). However, studies in the domain of the social sciences have suggested that probabilities associated with uncertainty, and, or, measures of the dispersion of probabilities are a way to measure and, or, to define risk (e.g.

Edwards, 1954; Edwards, 1961; Weber, Shafir and Blais, 2004). Besides, and on the other hand, many of the heuristics and related biases that are used by and affect decision-makers, are related to the way those decision-makers assign probabilities to events (Tversky and Kahneman, 1974).

There are two major conceptions of what risk is, and, depending on the notion adopted, risk may take different names. Those major conceptions are risk as hazards and, or, losses and risk as measures of the dispersion of probabilities and, or, a computation of some sort of risk measurement, typically probabilities associated to outcomes.

For risks seen as hazards and, or, losses, the measurement of uncertainty, or probabilities, if applicable, is seen as psychologically complex and involving contextual factors. For risks seen as measures of dispersion of probabilities, contextual, situational and individual factors are not considered directly, but rather indirectly, that is, “*embedded in the utility function*” of each individual (Cyert and March, 1992: 227).

Shapira (1995) contends that classical decision theory assumes that individuals “*are passive vis-à-vis the parameters of risk alternatives*” (pg.27), a view which in his opinion does not correspond to empirical evidence in respect to the majority of the decision subjects, since individuals exert control and apply skills to the decision subject. This latter conceptualisation of risk – risk as a measurement of some sort - contains in itself a circular reference, as risk and its measurement are presented interchangeably as the same concept. This characteristic is central to this study because sciences, such as economy, have cared essentially about the ways to measure risk, rather than about the ways to understand and define what risk is and how people actually deal with risk. This last aspect, it is argued in this study, has led to clear discrepancies between individual risk behaviours prescribed by some economic theories and actual risk behaviours. This is where most of the divergence lies.

Bernoulli (1954)⁷, a precursor of the use of mathematical expectation⁸, defines risk of a decision as the utility of the possible outcomes of that decision, utility being the sum of the products of the utility of each outcome by its probability of occurrence. Edwards (1954: 391) defines risk as “*a proposition about the future to which a number*

⁷ Translation from Latin to English of a paper from 1738.

⁸ Mathematical expectation is the product of the probability of occurrence of an event by the numerical value attributed to that event or in the case of a variable the weighted average of the variable.

can be attached, a number that represents the likelihood that the proposition is true.” In the same vein, Lopes (1987: 255) says that *“technically, the word risk refers to situations in which a decision is made whose consequences depend on the outcomes of future events having known probabilities.”* Baird and Thomas (1985: 231), in a study of strategic risk-taking, refer to risk *“as a condition in which the consequences of a decision and the probabilities associated with the consequences are known entities.”*

Several authors, however, argue that probabilities whether known, or unknown, bring no risk, unless there are losses associated to those probabilities (e.g. Fishburn, 1984; Vlek and Stallen, 1980), as suggested as well by empirical studies (MacCrimmon and Wehrung, 1986; Shapira, 1995). Vlek and Stallen (1980: 275) define risk as *“the complete description of possible undesired consequences of a course of action, together with an indication of their likelihood and seriousness”*. Likewise, Garrick and Kaplan (1981) suggest that without a potential for losses, or damages, there is no risk. However, Vlek and Stallen (1980) say that qualitative definitions of risk are irrelevant as criteria for risk acceptability, and propose, therefore, six different quantitative definitions: probability of loss, size of loss, mathematical expectation of loss (product of loss by associated probability), variance of the probability distributions for the utilities of the consequences, semi-variance of the probability distributions for the utilities of consequences around the mean, and linear function of the expected value and the variance of the distribution of consequences.

There are few definitions of risk that capture its complexity. Janney and Dess (2006) argue that one of the difficulties of the definition of risk is that it may have different meanings, and that its measurement is context related and is not easily expanded to all the contexts. Those authors conceptualise risk as a variance of outcomes, potential for losses and potential for gains. Vlek and Stallen (1980: 285) list a few determinants of risk including *“voluntariness of exposure”*, *“controllability of consequences”*, *“distribution of consequences in time”*, *“distribution of consequences in space”*, context and combination of probability and *“seriousness”*. MacCrimmon and Wherung (1986), March and Shapira (1987) and Shapira (1995), likewise, present several elements of risk both in terms of components and determinants, which are defined around losses, their probabilities and their magnitudes. In one of the few definitions of risk found in the managerial risk literature, Sitkin and Pablo (1992: 10) see risk as *“a characteristic of decisions that is defined as the extent to which there is uncertainty about whether*

potentially significant and or disappointing outcomes of decisions will be realised.” In a broader definition, Baird and Thomas (1985: 231), looking more specifically at corporate strategic risk-taking, define risk as “*corporate strategic moves that cause returns to vary, that involve venturing into the unknown, and that may result in corporate ruin – moves for which the outcomes and probabilities may be only partially known and where hard-to-define goals may not be met.*” These two latter studies, together with the study of March and Shapira (1987), introduce the concept of losses in relative terms, by saying that risk is also the failure to meet goals or targets, that is, risk is as well the possibility to get outcomes that, although not being losses in absolute terms, do not meet, or fail to meet, certain requirements. The definitions of Baird and Thomas (1985) and of Sitkin and Pablo (1992) capture and condense several elements of risk, which, in other studies, are presented individually.

Studies of risk-taking and, or, risk-behaviour and, or, decision-making in organizational contexts show clearly and beyond any doubt, it is argued in this study, that organisational actors do not see risk merely, if they see it in that way at all, as the sum of the product of the utilities of outcomes by probabilities, regardless of probabilities being objective or subjective, based on frequencies, or otherwise. They do not see risk either as variance or any other simple and single measurement of outcomes (MacCrimmon and Wehrung, 1986; March and Shapira, 1987; Shapira, 1995; Sitkin and Pablo, 1992; Yates and Stone, 1992). Aspects related, but not limited to, the notion of hazard and, or, loss, that is, to negative consequences (Shapira, 1995), are pervasive in the definitions that managers give of risk. It shall be noted that there are situations where the outcomes of the decisions to be made are not known to their full extent. That is the case of many strategic decisions made by firms, or governments, or even by individuals in their lives, where the outcomes depend on such a high number of factors that it makes any attempt to know all those factors, associate them probabilities, and get close to certainty, a nearly impossible task.

The approach adopted in this study concurs with those of the authors who support that risk is a multidimensional concept (Janney and Dess, 2006; MacGill and Siu, 2004; Renn, 1992; Yates and Stones, 1992), but concurs as well with Yates (1990), who says that, although risk is a combination of elements, “*typically, however, in specific applications and studies, individual measures [of risk] ... have proved sufficient*” (pg.

317). Nevertheless, from a managerial perspective there is overwhelming evidence that managers “*show very little desire to reduce risk to a single quantifiable construct*” (Shapira, 1995: 43). The elements of risk that are consistently mentioned by managers are the potential for losses, their dimension and the exposure of decision-makers to those losses (MacCrimmon and Wehrung, 1986). Furthermore, managers care considerably more about the magnitude of potential losses than about their probabilities of occurrence, and, therefore, separate decision-making from gambling (Shapira, 1995).

2.1.2 Risk Construct

In both managerial and societal contexts, risk is associated by managers, by the general public and by policy makers to losses and, or, damages (e.g. MacCrimmon and Wehrung, 1986 and Shapira, 1995, for organisational contexts and Kaplan and Garrick, 1981 and Fischhoff, Watson and Hope, 1984, for societal context), as also corroborated by Yates and Stone (1992). Shapira (1995: 3) says, referring to risk, that “*the emphasis is on negative consequences such as loss.*”

Yates and Stone (1992) have looked at what is common in risk definitions across situations, including managerial and societal contexts. The most important common features of risk, which are recurrent in studies related to risk behaviour and, or, risk-taking and, or, decision-making, are losses and their uncertainty (MacCrimmon and Wehrung, 1986, March and Shapira, 1987; Shapira, 1995; Yates and Stone, 1992). The importance of losses depends on their potential magnitudes and uncertainties, although magnitudes are given a heavier weight than uncertainties, especially if losses imply threats to firms' survival (Cyert and March, 1992; MacCrimmon and Wehrung, 1986). Besides, uncertainty is important only if there is a potential for important losses (March and Shapira, 1987). Potential for gains is not seen as something risky. Yates and Stone (1992: 5) observe that “*strictly speaking, risk is not an objective feature of a decision alternative itself; instead, it represents an interaction between the alternative and the risk taker*” and conclude that “*risk is an inherently subjective construct.*” Losses can be of various natures and here again it is worth stressing the degree of subjectivity involved. Losses can be financial, for example the loss of a bonus, or the failure to earn a reward that one was counting on, can be physical, injuries for instances, can be psychological, loss of self-respect, or of self-image, can be social, loss of a job, or loss of credibility, or of reputation. Loss, according to dictionaries' definitions, means

destruction or ruin, deprivation of something, or someone, that is, loss of something that one does not possess anymore, or does not control the utilisation any longer, harm, failure to win, or to gain, or to obtain, or to utilise, a decrease in amount, or magnitude, of something that one had before, costs that exceed earnings, or investments, and so forth.

MacCrimmon and Wehrung (1986) based on an empirical study made with 509 managers define three risk components and three risks determinants, all of which, it is argued in this study, shall be part of the risk construct and may induce different behaviours. Those components of risk are the potential for the existence of a loss, its possibility of occurrence and the exposure to that loss, while the determinants of risk are the lack of control, or rather the lack of total control, over the events, the lack of information and the lack of time. MacCrimmon and Wehrung (1986) argue that there is no risk involved with a sure loss, thus stressing the importance of the uncertainty element. Yates and Stone (1992) say that risk has three components, which are the potential for losses, the significance of those losses, that is, their magnitudes, and their uncertainty, or, in other words, the probabilities associated to the occurrences of losses. Shapira (1995), in a study with 706 managers, found that managers characterise risk basically in four ways: risk is loss, whether in absolute or relative terms, risk is related to the magnitude of losses, rather than to their associated probabilities, risk-taking is not gambling and risk is more than just a quantifiable measurement. Shapira (1995) suggests that risk is characterised as well by ignorance and incomplete information, similarly to MacCrimmon and Wehrung (1986), and by ambiguity, arguing that decisions-makers avoid options, or alternatives, that are ambiguous. Managers interviewed by MacCrimmon and Wehrung (1986) and managers interviewed by Shapira (1995) acknowledge that outcomes have positive and negative distribution sides, but define as risky only the negative sides. Both sets of managers assign heavier weights to magnitudes of losses than to their probabilities, and both sets of managers dispute that decision making is compared to gambling, on the basis that control and skills are used in decision-making in organisational contexts, but cannot be used in gambling. Controllability, shall, therefore, it is argued here, be considered as impacting the risk construct (MacCrimmon and Wehrung, 1986; Mitchell et al, 2002; Schwenk, 1988; Shapira, 1995; Simon et al, 2000).

Psychometric studies of risk in societal contexts confirm the finding of studies in managerial contexts. Studies made by Fischhoff et al. (1978), Slovic (1987) and Kasperson et al. (1988) show that the product of probabilities by outcomes, or consequences, is not enough to explain the conceptions that the general public have of risk, that is, risk is not represented by a number. Other aspects such as controllability, or illusions of control, familiarity and catastrophic potential, or extreme magnitudes of outcomes, similar to those put forward by managers, influence the assessments of those involved with societal risk.

An important aspect that has been raised in respect to risk-taking is whether losses and gains are compared against reference points (Kahneman and Tversky, 1979; Lopes and Oden, 1999; Tversky and Kahneman, 1981) and decision-makers are conditioned by their aspirations and expectations (Cyert and March, 1992; Lant and Shapira, 2008; MacCrimmon and Wehrung, 1986; March and Shapira, 1987; Shapira, 1995), or whether losses are simply seen in absolute terms. Sitkin and Pablo (1992) suggest that risk shall include disappointment, that is, that outcomes, including gains, are measured against aspirations and expectations, that is, against references, and Yates and Stone (1992) suggest that the references adopted by individuals are of a psychological, thus subjective, nature. Examples of references are targets, or goals, set in an organisational context, social expectations based on what individuals assume that others expect from them, and personal references based on experiences of individuals.

Personal losses and losses to firms seem to be accounted differently by individuals when they are acting on the behalf of firms. MacCrimmon and Wehrung (1986) and Cyert and March (1992) suggest that individual managers prefer to risk the resources of firms, rather than their own resources, in what could indicate that individual managers may not take risks on the behalf of firms if they feel that their own interests are threatened by their involvement in decision-making.

The risk construct in organisational context, from a manager's perspective, is thus characterised by the potential for and the exposure to losses of the individual manager, the magnitude and the probability of occurrence of those losses, and is conditioned as well by the possibility that the individual manager has to exert control and use skills during the decision-making process.

2.2 Rationality, Behaviour and Decision Theory

Behaviour of individuals, in the context of choice-making, was studied essentially in economic theories, such as, for example, consumer theory. The fundamental question was how individuals choose among alternatives, that is, how did individuals deal with preferences (von Neumann and Morgenstern, 1953; Friedman and Savage, 1948; Savage, 1972; Kahneman and Tversky, 1979; Tversky and Kahneman, 1992).

On the one hand, the axiomatic approach to preferences and choice among alternatives led to theories of a normative nature such as Expected Utility and Subjective Expected Utility and, to a lesser extent, Prospect theory and Cumulative Prospect theory, and was developed as well in theories of administrative behaviour and related decision-making processes (Cyert and March, 1992; March and Simon, 1993; Simon, 1944; Simon, 1946; Simon, 1959; Simon, 1965; Simon, 1997).

On the other hand, observation of actual behaviours led to challenges of the normative aspects and led to descriptive theories of risk behaviour such as Image theory, and Naturalistic Decision-Making theories⁹.

The main rift between normative and descriptive theories of decision-making and risk behaviour lies essentially on the definition of rationality.

2.2.1 Rationality and Behaviour

Behaviour of individuals has been subject to axiomatic developments by proponents of Expected Utility Theory (EUT) and Subjective Utility Theory (SEU)¹⁰, who are concerned with the ordering of preferences of choices, or alternatives, and the maximisation of alternatives. Supporters of EUT and SEU think of an 'economic' man, who behaves according to a set of axioms, as an approximation to an actual man (Arrow, 1951; Marschak, 1950). Baumol (1958) subscribes the same viewpoint and adds that the word 'rational' has been used to describe meeting certain preference patterns.

The axioms mentioned above for EUT and SUT concern essentially cancellation - if two alternatives provide the same outcome, the less preferred shall be disregarded, dominance – "*if one option is better than another in one state and at least as good in all*

⁹ A description of normative and descriptive theories of decision-making and risk behaviour is provided in Annex 5. The topic is addressed as well in Chapter 5 where a synthesis of the literature is presented.

¹⁰ The most relevant axioms of EUT and SEU are presented in Annex 5.

other states, the dominant option should be chosen" (Kahneman and Tversky, 1986: 253), invariance of preferences – *"the preference between options should be independent of their description"* (Tversky and Kahneman, 1986: 253) and transitivity for preferences - if A is preferred to B and B is preferred to C, then A is preferred to C.

On top of the preferences clearly ordered, proponents of preferences' axiomatisation propose as well the maximisation of a utility function, that is, the maximisation of subjective values, weighted by probabilities of occurrence, supposedly attributed by a decision-maker to the potential outcomes of a choice, or a decision, whether those probabilities are objective, or subjective. Not only are individuals assumed to have clear preferences, but also they are fully informed about all the alternatives available to them and of all outcomes resulting from all alternatives, and have computing capabilities that allow them to decide in a way that maximises the outcomes (von Neumann and Morgenstern, 1953). Among those authors who have provided axioms to define behaviour normatively it shall be noted von Neumann and Morgenstern (1953), Marschak (1950), Samuelson (1952), Savage (1972) and Bell and Raiffa (1988).

The main opposite view has been promoted mainly by Herbert Simon (1944, 1946, 1955, 1959, 1979, 1997), and also by his colleagues from the Carnegie Mellon University either alone, as is the case of James March and Richard Cyert (1992), or by Simon in cooperation with one of them (March and Simon, 1993). Basically, Simon (1955) and March and Simon (1993) counter-argue that human beings have limited computing capabilities and cannot be fully informed, due to physical limitations, and that, therefore, humans are rationally bounded. Based on that bounded rationality they conclude that individuals do not maximise, that they rather satisfy themselves with the attainment of certain goals, that is, they rather 'satisfice' (Simon, 1959; Simon, 1997). In order to be clearly in opposition to the idea of maximisation, Simon (1959) says that people act based on motivation drivers that are fed by goal attainment and that, therefore, people satisfy those drivers, rather than maximise utility. That author adds that individuals cannot be isolated from the environment in which they are in, hence bringing into the analysis factors, such as human cognition, cost of information, expectations and goals and conflict of interests. Simon (1955: 101) declares that *"some of the constraints that must be taken as givens in an optimisation problem may be physiological and psychological limitations of the organism (biologically defined) itself."* He adds, as an example, that *"the maximum speed at which an organism can*

move establishes a boundary on the set of its available behaviour alternatives”, concluding that (Simon, 1955: 101) “*similarly, limits on computational capacity may be important constraints entering into the definition of rational choice under particular circumstances.*”

In general, being von Neumann and Morgenstern (1953) an exception, proponents of rational behaviour do not explicitly mention that the ‘rational man’ or, rather, the ‘economic man’, as called by Simon (1955), has full knowledge of all the states of the world. However, paraphrasing Savage (1954), who uses states of the world to define all the potential situations that may occur, getting to the conclusion of full knowledge is just a small step, since the ‘rational man’, in order to maximise utility, needs to have complete information and full computing capabilities.

Simon (1955, 1959, 1979, 1986, 1995) was in the period that followed the advent of the maximisation of utility one of the main critic of the maximisation assumption. Herbert Simon is the author who created and developed the concepts of ‘bounded rationality’ and of ‘satisficing’, two concepts which are opposed to maximisation assumptions.

It is worthwhile noting that Marschak (1950: 112) extends the concept of rational man “*to cover the rational consumer, the rational firm, the rational government, etc*”. If both Marschak’s and Simon’s viewpoints were adopted and generalised, then, according to Marschak, on top of individual decision-makers, firms, governments, etc, would maximise expected utility, while, according to Simon, firms and governments, like individuals, would ‘satisfice’, rather than maximise (1959).

The view adopted in this study is that there is no point in saying that someone ought to do something, and if he or she does not say that he or she is irrational. On the other hand, there is no point either in just describing what people do, only to make the point that they do not do what some say that they ought to do. In an organisational context it is important to know how people decide, in order to have ways to influence their decisions, if necessary.

Von Neumann and Morgenstern (1953: 8) say that “*the subject matter of economic theory is the very complicated mechanism of prices and production, and of the gaining and spending of incomes. In the course of the development of economics it has been found, and it is now well-nigh universally agreed, that an approach to this vast problem*

is gained by the analysis of the behaviour of the individuals which constitute the economy community.” Those same authors (von Neumann and Morgenstern, 1953: 8) argue that “one of the chief difficulties lies in properly describing the assumptions which have to be made about the motives of the individual. This problem has been stated traditionally by assuming that the consumer desires to obtain a maximum of utility or satisfaction and the entrepreneur a maximum of profit.” In order to deal with a complex problem, generalisations are made to assume that individuals in an economic context, whether consumers or entrepreneurs, are looking after and shall maximise money, or something that could be translated into money (von Neumann and Morgenstern, 1953).

Simon (1959: 254), in a strong statement, says that economists, who have, mainly and generally speaking, macroeconomic concerns, “lack of concern with individual behaviour.” He justifies that lack of concern with the behaviour of individuals by some economists and policymakers, with the assumptions of rationality made in respect to individuals and the assumptions of perfect competition, which, according to Simon (1959: 254) “requires almost no contact with empirical data once its assumptions are accepted.”

One problem with the definition of rational behaviour, from a maximisation perspective, is the competition among firms. Economic theory says that in the case of perfect competition one economic agent has no impact on the other economic agents. It is intuitive to conclude that most of the main markets in free economy countries are oligopolistic, that is, markets are controlled by a relatively small number of firms. Therefore, most managers, who are involved in strategic decision-making in the context of their firms, act in oligopolistic contexts. Rational behaviour, as implied by maximisation theories, assumes that the decisions made by an individual, or by a firm, are independent from the decisions made by another individual, or another firm (von Neumann and Morgenstern, 1953). Furthermore, as Simon (1959: 266) puts it “rationality requires one to outguess one's opponent but not to be outguessed by them.” However, this is not the case, since decision-makers are forced to anticipate the results of their moves on their competitors, and, conversely, are forced to react to the actions of their competitors in the case of oligopolistic markets. Simon (1959) concludes that if someone outguesses, someone needs to be outguessed, which reveals the inconsistency of economy theories' premises. Shapira (1995: 17) argues, like Simon (1959), that “a

large portion of managerial risk-taking is done in situations that hardly resemble an efficient market.”

Another problem related to rational behaviour, always from a maximisation perspective, is that of what is maximised by individuals. Marschak (1950: 137) recognises that what he calls “*love of danger*” is “*incompatible with*” the postulates from which rational behaviour is drawn. Von Neumann and Morgenstern (1953) when analysing the difficulties related to the measurement and comparability of utilities among individuals – consumers presumably – argue that measurement and comparability is not an issue for entrepreneurs, since those can calculate their utilities in monetary terms. However, Simon (1959: 262), points out that the entrepreneurs “*may obtain all kinds of psychic income from the firm*” and that, if that psychic utility is allowed, “*the criterion of profit maximisation loses all of its definiteness.*” Von Neumann and Morgenstern (1953), in spite of what they argue above, are conscious of the possibility of the existence of a utility of gambling, that is, a utility related to the decision-making processes and, or, to the decision subjects, when they question (pg. 28), “*may there not exist in an individual a (positive or negative) utility of the mere act of ‘taking a chance’ of gambling, which the use of the mathematical expectation obliterates?*” Morgenstern (1974) referring to the hypothetical existence of an utility of gambling, that is, the possibility that a decision-maker takes pleasure, or displeasure, in the act of gambling¹¹, and referring as well to a note in the book that he co-authored with von Neumann, *The Theory of Games and Economic Behavior*, indicates that the inclusion of the utility of gambling, into the axioms of expected utility, would go beyond the requirements that fit the purpose of choices considered by economics, thus restricting somehow the application of expected utility. However, Friedman and Savage (1948: 279) show no problems of generalisation when they say that “*whether or not they realise it and whether or not they take explicit account of the varying degree of risk involved, individuals choosing among occupations, securities or lines of business activity are making choices analogous to those that they make when they decide whether to buy insurance or to gamble*”, though they confess (1948: 283) that “*the influence of risk is revealed most markedly in gambling and insurance, so that these phenomena have a significance for testing and elaborating the hypothesis out of proportion to their importance in actual economic behaviour.*” Certainly because there

¹¹ Or the act of making a choice or a decision.

are decisions that can be assimilated to gambling, and certainly because working with lotteries makes theoretical developments easier, theory on utility may mention business decisions from time to time, but exemplifies always with games. However, paraphrasing Samuelson (1952: 671) who says that “*when I go to a casino, I go not alone for the dollar prizes but also for the pleasures of gaming - for the soft lights and sweet music*”, it is obvious from simple observation, extrapolating this idea to business and to other contexts where decisions are made, that utility is not only in the outcomes and, or, associated probabilities, but also in the decision-making processes.

Last but not the least, the number of laboratory experiments showing that decision-makers do not always follow canons of rationality in the EUT or SEU sense, and which challenge the axioms supporting EUT or SEU, is overwhelming. Not surprisingly, some theories were developed in an attempt to explain those ‘deviations’. Not surprisingly as well, new fields such as ‘behavioural finance’ got conditions to flourish.

2.2.2 Decision Theory

Lipshitz et al. (2001) contend that the study of decision-making has been made through classical decision-making theory¹², behavioural decision theory and judgement and decision-making¹³, organisational decision-making theory¹⁴ and naturalistic decision-making¹⁵. In an organisational context for sure, and, it is argued in this study, in any other context, most of the people would like to have ‘mechanisms’ to make decisions, mechanisms which would remove from the decision process, ambiguity, indecision, procrastination, and so forth. Savage (1972: 6) considers that “*what is ultimately wanted is criteria for deciding among possible courses of action*”, and those views are, from a principles’ viewpoint, shared here. However, empirical evidence (MacCrimmon and Wehrung, 1986; Shapira, 1995; Sitkin and Weingart, 1995) challenges the existence of well-defined criteria for decision-making, and provides evidence that indicates the presence of several determinants of decision-making and risk-taking that may undermine any intentions to define clear choice criteria. Therefore, rather than focusing on the choice criteria, it might be more appropriate to focus on understanding the determinants of decision-making and risk behaviour.

¹² e.g. Expected Utility Theory and Subjective Expected Utility Theory.

¹³ e.g. Prospect and Cumulative Prospect Theories, Security-Potential/Aspiration Theory, Heuristics and Biases.

¹⁴ e.g. Behavioural Theory of the Firm.

¹⁵ e.g. Image Theory, Recognition-Primed Decision Theory, Story Telling Theory.

Decision-making is all about outcomes and their consequences. Someone makes a decision, including the decision not to make a decision and perpetuate the status quo, with the purpose of obtaining a certain outcome. Before a decision is made the decision-maker gives some thought to the consequences of the decision to be made, and the question 'if I make a decision what will be the consequences' is certainly asked.

It is not said in this study that any decision-maker thoroughly evaluates all the consequences, all the alternatives made available to him or her, and so forth. In reality, in this study we concur with the views of Herbert Simon and James March in respect to bounded rationality and the concept of 'satisficing'. However, the same empirical evidence that challenges the existence of clear criteria for decision-making in organisational contexts, also suggests that decision-makers make some sort of evaluation. Empirical evidence in organisational contexts, and in the day-to-day life out of the working place, tells us that value and, or, probabilities of outcomes are in the mouths and, or, in the minds of everybody making decisions, regardless of their complexity and the contexts in which they are made. If everybody, scholar or otherwise, in one way or another, has to give some thought in respect to the outcome(s) that he or she would like to get, and if everybody, scholar or otherwise, in one way or another, thinks about likelihoods of getting a certain outcome out of a decision to be made, it should not be a surprise to realise that many scholars, from many fields, have devoted their efforts to study value, or utility, and probabilities in association, in the context of choices or decision-making, and that there are thousands of academic studies dealing with that association.

Edwards (1961) assumes that value and probabilities can be either objective, or subjective, and that the combination of value and probability can lead to decision-making models that, therefore, consider i) objective value and objective probabilities, ii) subjective value and objective probabilities, iii) objective value and subjective probabilities, and iv) subjective value and subjective probabilities. At this point in time it is worth mentioning that besides the difficulty to define what is objective and what is subjective, both in terms of value and probabilities, there is disagreement in respect to the very definition of what probability is (Savage, 1972). More than two hundred years before Edwards (1954, 1961) and before the most prominent authors who developed and promoted the association between outcome value and probabilities, Bernoulli

(1954) explained decision-making behaviour by associating frequencies of occurrences with value, and introduced the notion of utility. However, the association of outcome values and probabilities got huge notoriety with the book of von Neumann and Morgenstern, *The Theory of Games and Economical Behavior*, published for the first time in 1944 and, in a second phase, with the book of Leonard Savage, *The Foundations of Statistics*, published for the first time in 1954.

2.2.2.1 Utility and Probabilities

Economy risk theories are based essentially in the notions of utility, probabilities and maximisation. Daniel Bernoulli (1954: 24) says that “*the determination of the value of an item must not be based on its price, but rather on the utility it yields*” and adds that “*there is no doubt that a gain of one thousand ducats is more significant to a pauper man than to a rich man though both gain the same amount.*” Thus, a given monetary outcome may have different value to different people. In other words, there is an absolute, objective, easily measurable value - for example, one million units of a certain currency is an objective value - and a value that is relative, subjective and difficult to measure, that is, the utility of one million units of a certain currency to a given person¹⁶.

Probabilities play an important role in decisions made under uncertainty, since decision-makers think of potential outcomes and assign them probabilities, or think about likelihoods of success, when making those decisions, as this is widely recognised by a vast body of literature (e.g. Edwards, 1954, 1961; Fischhoff, 1975; Kahneman and Tversky, 1979; MacCrimmon and Wehrung, 1986; Savage, 1972; Shapira, 1995; Slovic et al., 1977; Tversky and Kahneman, 1974)¹⁷.

The way individuals, more specifically individual managers in the case of this study, construct the values of the probabilities that they assign to potential outcomes, is of particular relevance for those decisions that are not recurrent, and for which there is little experience, such as those of a strategic nature. Furthermore, several heuristics and biases related to the utilisation of probabilities by individuals have been identified (Tversky and Kahneman, 1974). Those heuristics may contribute, naturally, to biased decision-making.

¹⁶ The notion of utility is further developed in Annex 5.

¹⁷ A brief discussion on types of probabilities is presented in Annex 5.

Strategic decisions made in the context of business organisations are significant in economic terms. Therefore, the aspects contributing to those decisions, such as the way decision-makers assign probabilities to events that, ultimately, make them decide in one way, or another, become themselves relevant for economics. Gilboa, Postlewaite and Schmeidler (2008: 175) state that *“in many economic problems of interest it is not clear how one should define probabilities. Probabilities are actually ‘given’ only in very restricted situations such as state lotteries or casino games. In other situations, such as insurance problems, probabilities can be reasonably approximated by relative frequencies of comparable instances computed from publicly available data. But in a vast range of economic problems, probabilities are neither explicitly given nor can they be approximated by relative frequencies or regression analysis.”* Decision-making is very much about prediction. De Finetti (1937: 99), quoting Henri Poincaré, says *“predictions can only be probable”* and adds that *“however solidly founded a prediction may appear to us, we are never absolutely sure that experience will not refute it.”* The possibility that experience counters a prediction made on solid grounds, and the possibility that managers have experienced that phenomenon, could help explaining why managers seem to care more about levels of losses than about levels of probabilities. Shafer (1981) argues that probabilities shall be based on evidence. Undoubtedly, the assignment of probabilities has behavioural implications, and behavioural phenomena related to the way individuals assign probabilities to events, or make probabilities' judgments, have been identified (Gilboa, 2009; Shafer and Tversky, 1985; Slovic, 1972; Tversky and Kahneman, 1974; Yates, 1990).

The meaning of a probability has raised disagreement. Some authors, however, such as Shafer (1986), argue that the different meanings, or definitions, are entangled and that the disagreement is more apparent than real. Savage (1972: 2) seems to disagree and says, in respect to the definition of probability, that *“there has seldom been such complete disagreement and breakdown of communication since the Tower of Babel.”* Still in respect to probability, Savage (1972), however, concludes that nearly everybody agrees with its mathematical properties being the disagreement around the extra mathematical ones, that is, around the practical utilisation. The meaning of probability is essentially related to the different views on what a probability is, and on how a probability should be measured. Savage (1972: 3) mentions *“objectivistic”*, *“personalistic”*, or subjective, and *“necessary”* views, while Gilboa (2009: 3) makes

reference to “*three ways of assigning probabilities to events*”, that is, the “*frequentist*”, “*subjective*” and “*classical*” ways. Followers of John Keynes (Davidson, 1991: 130), however, argue that there is “*true uncertainty*” and that there are decisions that cannot be made based on probabilities, what leads to the conclusion that inference cannot be made from some probabilistic base. Shafer (1992) provides three interpretations of probability based on ‘belief’, ‘frequency’ and ‘support’, where belief is compared to the odds, or betting behaviour, frequency is the relative frequency of the occurrence of events, and support concerns the logical grounds that lead someone to believe that an event will occur with a certain probability.

Subjective probability is quite appealing in studies of decision-making and risk-taking in business contexts, because managers quite often assign probabilities to outcomes (Baird and Thomas, 1985; MacCrimmon and Wehrung, 1986; March and Shapira, 1987; Shapira, 1995), and those probabilities are subjective, based on their personal views of situations, contexts, and so forth. As such, subjective probability is getting more attention in this study than other viewpoints of probability.

Individuals assessing the probabilities of an event may assign a prior probability value, based, for example, on experience, and, later on, fine tune that probability based on new information. However, this practice is not accepted by classic statistical theory, because the probabilities are part of the event and not part of the individual, and, as such, should not change even in the face of new evidence. De Finetti (1937: 111) declares that subjective views of probability are those which are “*the closest to that of the man in the street*” and that “*better yet, it is what he applies every day in practical judgments*”, although he recognises that the man in the street often violates the rules of coherence. Though the approach of this study is that the ‘man in the street’ sees probabilities subjectively, it is worthwhile noting that that same ‘man in the street’ is the one being accused of being irrational when he is not ‘consistent’ in terms of preferences, or when he does not maximise utility.

Decision-making is about getting to outcomes, which, being uncertain, are subject to prediction. Prediction, or “*reasoning by induction*” in the words of de Finetti (1937: 155), is thus an important topic in decision-making. Prediction, in spite of its subjectivity, is based many times on past frequencies, or on events for which there is apparent symmetry. However, as pointed out by de Finetti (1937), past frequencies and,

or, events equally probable are also of a subjective nature due to the discretionary power of the decision-maker to elect a certain class of events with certain characteristics, rather than another class of events and or other characteristics.

In the context of this study, following the leads provided by MacCrimmon and Wehrung (1986), March and Shapira (1987) and Shapira (1995), and empirical observation, the definition of probability that is retained is simply the plausibility of occurrence as perceived, or predicted, by each individual decision-maker.

2.2.2.2 Heuristics and Biases

Heuristics and biases are relevant insofar managers are rationally bounded and heuristics, which allow for information processing limitations to be circumvented, have an impact on decision-making and risk-taking behaviour. It is argued in this study that empirical evidence and supporting theoretical studies show that decisions are not made according to the canons of rationality, as defined by normative decision-making theories. Not necessarily because decision-makers do not want to follow canons of rationality but simply because, even if they want to, they cannot due to their natural limitations (Simon, 1959; Tversky and Kahneman, 1974). On the other hand, most of the same empirical evidence, whether resulting from laboratory, or field, studies, shows that the natural limitations of human beings lead them to apply heuristics to decision-making and that human beings are subject to many biases (Tversky and Kahneman, 1974). Furthermore, a number of studies has posited and, or, provided evidence that heuristics and biases impact the perceptions that individuals have of the risks that they, and their organisations, face, and, consequently, their risk behaviours (De Carolis and Saparito, 2006; Keh, Foo and Lim, 2002; Simon, Houghton and Aquino, 2000).

Decision-makers have limited information processing capabilities (Hogarth and Makrikadis, 1981; March and Simon, 1993; Schwenk, 1984, 1988; Simon, 1965, 1976; Taylor, 1975). Due to those information-processing limitations, decision-makers make decisions based on their judgments of the decision subjects, within the limits of their bounded rationality (Simon, 1959, 1979). Heuristics, that is, “*perceptual processes...for simplifying information processing*” (Duhaime and Schwenk, 1985: 288), or cognitive simplification processes (Schwenk, 1984), or “*general inferential rules that people seem to use when evaluating uncertainty*” (Barnes, 1984: 129), or simply ‘rules of

thumb' (Schwenk, 1988), are used by decision-makers to simplify decision-making (Schwenk, 1984, 1988). There is a substantial volume of literature that provides theoretical and empirical evidence of the utilisation of heuristics (e.g. Finucane et al, 2000; Slovic, Fischhoff and Lichtenstein, 1977; Slovic, Finucane, Peters and MacGregor, 2007; Tversky and Kahneman, 1974), and the influence of their biases in risk perception (Busenitz, 1999; Busenitz and Barney, 1997; Hogarth and Makrikadis, 1981). However, and in general, heuristics are associated to biases. Therefore, if, on the one hand, heuristics simplify decision-making, on the other hand, they may lead to significant biases (Tversky and Kahneman, 1974). An example of such a duo heuristic and bias is provided by Schwenk (1988), who contrasts availability, which is how easily someone recalls similar events, with the bias provided by recent events, which are easier to recall than older events, even if they are less frequent. Some authors (e.g. Hogarth and Makrikadis, 1981) use the word 'bias' to refer to both heuristics and biases, although, in those circumstances, biases are not necessarily seen as something negative.

Heuristics allow decision-makers to simplify the main features of complex environments surrounding them, deal with uncertainty and "*act on a simplified model of reality*" (Schwenk, 1984: 112), thus making timely decisions, which, otherwise, could not be made. Complex decisions, such as those of a strategic nature, foster the utilisation of heuristics since that type of decisions implies the treatment of considerable higher volumes of information and or data. However, the price to pay is that the more heuristics are utilised the more the decisions are prone to biases (Duhaime and Schwenk, 1985; Tversky and Kahneman, 1974).

2.2.2.2.1 Heuristics and Biases Related to Subjective Probabilities

"Because of the importance of probabilistic reasoning to decision making, considerable effort has been devoted to studying how people perceive, process, and evaluate the probabilities of uncertain events" (Slovic, Fischhoff and Lichtenstein, 1977: 2). It is generally agreed that decision-makers use subjective probabilities, or likelihoods, or degrees of belief, when making decisions. The utilisation of subjective probability in decision-making is undeniable and broadly accepted by theorists, regardless of whether they support normative theories (de Finetti, 1937, 1970; von Neumann and Morgenstern, 1953; Friedman and Savage, 1948; Savage, 1972), descriptive theories that accept the combination of utilities with probabilities (Edwards,

1954, 1961; Kahneman and Tversky, 1979; Tversky and Kahneman, 1992), or bounded rationality and 'satisficing' concepts (Cyert and March, 1992; March, 1978; March and Simon, 1993; Simon, 1959, 1979, 1986).

Kahneman, Slovic and Tversky (1982) have identified and, or, compiled an important number of heuristics, and associated biases, related to the judgment of probabilities (table 2.1). Among the heuristics that are the most present in the literature related to probabilities, likelihoods, or beliefs, there are the representativeness, the availability and the adjustment and anchoring heuristics (Tversky and Kahneman, 1974).

Representativeness is the way by which decision-makers relate what, in their minds, are similarities between situations, or events, and, or, between samples and a whole population, thus leading them to establish, for example, likelihoods of occurrence, or links of causality. Decision-makers assess probabilities of events, or of occurrences, according to the way that they find those events, or occurrences, similar to other known occurrences, or events (Tversky and Kahneman, 1974). This heuristic may lead to several biases. For example, prior outcomes may not be taken into account when making decisions, and decision-makers may be insensitive to sample sizes (law of small numbers bias).

Availability is a heuristic that represents how easily an individual recalls events similar to the one being evaluated, and allows that individual to assign probabilities, or likelihoods, to it. For example, if a manager is involved in making a decision, and if that manager recalls the result of a somehow similar decision for vivid reasons, it may happen that those vivid reasons influence the probabilities of occurrence that that manager assigns to the probabilities of certain outcomes. Availability is prone to several biases, including irretrievability and illusory correlation.

Adjustment and anchoring is a phenomenon that biases estimates of values towards the initial value estimated by, or provided to, the decision-maker. The decision-maker tends to stick to his or her first estimation.

Considering that decision-makers use subjective probabilities when assessing outcomes of decision-making, and that those probabilities may suffer from considerable biases, it is quite obvious that the decisions themselves may suffer also from significant biases, regardless if we consider maximisation metrics or simply 'satisficing' targets.

Heuristics and biases related to the assessment of likelihoods, or probabilities, draw once again our attention to the relevance of the decision-maker in decision-making.

Table 2.1: Examples of Heuristics and Biases Related to the Utilisation of Probabilities

Heuristic	Possible Biases	Description	Author(s)
Representativeness	Insensitivity to prior probabilities of outcomes or to base rates.	Decision-makers do not consider base rates or prior probabilities, provided evidence of similarities is available.	Kahneman and Tversky (1973); Tversky and Kahneman (1974)
	Insensitivity to sample size.	Decision-makers assume that samples, regardless their size, are similar to the population.	Tversky and Kahneman (1971); Tversky and Kahneman (1974)
	Misconceptions of chance.	Decision-makers see probabilities that fail to meet the similarity between the sample and the population as self-corrective.	Kahneman and Tversky (1972); Tversky and Kahneman (1974)
	Insensitivity to predictability.	Decision-makers predict by similarity.	Kahneman and Tversky (1973); Tversky and Kahneman (1974)
	Illusion of validity.	Decision-makers chose alternatives representative of inputs.	Kahneman and Tversky (1973); Tversky and Kahneman (1974)
	Misconceptions of regression.	Inputs and outputs are not perfectly correlated.	Tversky and Kahneman (1974)
Availability	Retrievability of instances.	Something easier to remember seems more numerous.	Tversky and Kahneman (1974)
	Imaginability.	The way events are imagined and how easily they are imagined define the probability assessed.	Tversky and Kahneman (1974)
	Illusory correlation.	The availability of information or how easily information is remembered correlates to outputs.	Tversky and Kahneman (1974)
Adjustment and Anchoring	Assessment of subjective probability distributions.	People tend to anchor their assessments of probabilities around an initial figure distributing all probabilities around that figure, narrowing the confidence intervals and leading to over certainty.	Tversky and Kahneman (1974)

2.2.2.2.2 Heuristics and Biases Related to Personal and Contextual Variables

Decision-making processes are subject to biases, which are related to the heuristics employed by the individuals participating in those processes. Hogarth and Makrikadis (1981) suggest that judgements on decision subjects depend on the decision-maker, on the decision subject environment and on the consequences of the outcomes to the individual decision-maker and to the environment where the decisions are made, namely the firms. Several authors (e.g. Hogarth and Makrikadis, 1981; Kahneman and Tversky, 1973; Tversky and Kahneman, 1974) have identified a vast number of heuristics, which are employed by decision-makers depending on the phase where they are in terms of the decision-making process (table 2.2).

Research on entrepreneurship has provided most of the studies where cognition and heuristics and biases have been addressed, in an effort to find differences between entrepreneurial and non-entrepreneurial individuals. Considering that there is little evidence that indicates that entrepreneurs (word used in this specific context to refer to those who are creating, or founding their own companies) and managers in business organisations have different psychological traits (Brockhaus, 1980; Busenitz and Barney, 1997; De Carolis and Saporito, 2006; Simon, Houghton and Aquino, 2000), some scholars in the field of entrepreneurship have studied the differences between companies' founders and managers in organisational contexts, namely in large organisations (e.g. Busenitz and Barney, 1997), in terms of cognitive aspects such as heuristics, or in terms of cognitive schemas (Corbett and Hmieleski, 2007). Researchers have identified heuristics, which are related to inner characteristics of the individuals and to their experiences in decision-making, but also to the type of strategic decisions to be made (Das and Teng, 1999).

Some of the heuristics or biases that have been systematically identified, and, or, referred to in studies of strategic decision-making are availability, law of small numbers, selective perception, illusion of control, illusory correlation, conservatism, wishful thinking, regression bias and logical reconstruction hindsight. These heuristics and biases may limit the number of alternatives considered by decision-makers and filter the information required for their assessment (Schwenk, 1988). In the realm of entrepreneurship, including corporate entrepreneurship, or intrapreneurship, other heuristics, or biases, that have been considered on top of those related to strategic decision-making are overconfidence (Busenitz and Barney, 1997; De Carolis and

Saparito, 2006; Keh et al., 2002; Simon et al., 1999), representativeness (Busenitz and Barney, 1997; De Carolis and Saporito, 2006) and reasoning by analogy (Simon and Houghton, 2002). Other heuristics considered in managerial literature are, for example, escalation of commitment (Schwenk, 1986) and affect (Finucane et al., 2000; Slovic et al., 2004; Slovic et al., 2007).

Table 2.2: Examples of Heuristics and Biases related to Personal and Contextual Variables

Heuristic	Possible Biases	Description	Author(s)
Belief in the law of small numbers	Looking for success rate (or failure rate), which is not representative, leading to making (or not making) certain decisions.	Individuals rely on information resulting from small samples or from a few sources. Small samples may not represent the population and large samples are rarely available to managers.	Busenitz and Barney (1997); Keh et al. (2002); Simon and Houghton (2002); Simon et al. (1999)
Hindsight Bias	Past occurrences increase the perception of the probability of reoccurrence.	Individuals may over rely on past outcomes and may be unaware that past occurrences increase the perception of reoccurrence.	Barnes (1984); Fischhoff (1975); Schwenk (1998)
Illusion of Control	Risk underestimation when illusion of control is high.	Individuals over rely on skills when uncertainty is present. The more an individual is involved in a decision-making process the more he or she believes to be in control.	Keh et al. (2002); Simon and Houghton (2002); Simon et al. (1999)
Overconfidence	Assumptions are seen as facts rather than assumptions. Overconfidence lowers perceptions of risks.	Individuals may not know the limits of their knowledge, relying heavily in their judgments and beliefs. Furthermore, new information is slowly incorporated.	Busenitz and Barney (1997); Kahneman and Lovallo (1993) Russo and Schoemaker (1992)
Planning Fallacy	Planning or forecast that results essentially from inside views of the firm is most of the time intuitive and not always based on facts.	Planning leads to prediction and prediction leads to failure to consider past experience.	Hogarth and Makridakis (1981); Kahneman and Lovallo (1993); Keh et al. (2002)

The vast number of heuristics used by people making choices or decisions suggests, here again, that the decision-maker, rather than the alternatives to be chosen in a decision-making process, is at the centre of the discussion related to choices and decision-making.

2.3 Summary of Chapter 2

In Chapter 2 we address the notion of risk and present the risk construct. We present risk as defined by the economic theory and risk as seen by managers.

On the one hand, we conclude that managers associate risk with loss, and mainly with the magnitude of losses, and not with the variance of the distribution of outcomes or consequences of decisions made. Furthermore, managers do not see positive outcomes, or the positive part of the distributions of outcomes, as risk.

On the other hand, we see that economic theory sees risk as the distribution of the probabilities or likelihoods of events or the distribution of uncertainty.

After discussing the concept of risk we examine decision theory and concepts such as 'rationality', 'utility' and its maximisation, 'bounded rationality' and 'satisficing'. Through a vast body of literature, and in spite of the attractiveness of the logical aspects subjacent to preferences and choices among alternatives, we argue that managers are not rational in the sense portrayed by economic theory, that they do not maximise utility and that they make decisions, which are not based on decision theory axioms.

We present decision-making theories based on axioms of preferences and maximization of utility and decision-making theories based on actual behaviour of individual decision-makers. We address the normative and descriptive aspects of decision-making theories and suggest the need for a certain level of predictability in decision-making in organisational contexts, in spite of the strong evidence against theories of a normative nature.

Finally, we present an extensive list of heuristics used by managers, on purpose or not, intuitively or not, to make decisions. We stress that heuristics are related mainly to the assessment of likelihoods and to personal and contextual characteristics.

CHAPTER 3. PERCEPTION

3. Risk Perception

3.1 Significance of Perception(s) in the Managerial Realm

Gregory (1974: xix) argues that *“to perceive is to read the present in terms of the past to predict and control the future”* and adds that *“perception is predictive”*. Such argument in respect to predictability aims at justifying that perception leads to inference. Although literature about perception makes reference to objects and events, in reality theories are most of the time about objects, sounds, words isolated, or not, making units more or less complex – from phonemes and, or, syllables to words, from words to sentences, from an image less complex to an image more complex, from a sound with a simple frequency to a symphony, but, possibly, substantially less complex than business environment contexts. Neisser (1967: 286) captures the essence of the significance of perception when he says that *“...when you see a friend across the street, you are not seeing only him. He, a person of a particular kind with a particular relevance to your life, is appearing there, a particular place in space, and then, at certain point in time. Similarly, a spoken sentence is not just a string of words to be identified, but it has a particular meaning, is spoken by a particular person, at a particular time and place.”* We would argue that when a manager hears something in a meeting with a client, or a supplier, for instances, he or she is hearing, and interpreting, what the other party says, looking at the body language of the speaker and of other people attending the meeting, should that be the case, and apprehending the environment in general. In that meeting that manager would certainly be matching all those stimuli with his or her ‘view’ of his or her firm, of the other party and the business environment in general, ‘cataloguing’ things as good, bad or neutral, and so on. That manager would not simply be there in that meeting hearing some words and looking at some motion without any sort of connections. Walsh (1995: 280) says that managers *“spend their time absorbing, processing and disseminating information about issues, opportunities and problems”*. He further argues that the *“information worlds [of managers] are extremely complex, ambiguous and munificent”* (pg. 280). The author of this study has noticed many times that within the same firm, and even within the same department, there are differences, sometimes quite substantial, in respect to the way people see the business environment, the firm, the department and other individuals.

Many times we leave a meeting with a client, for instances, attended by several people of the same firm and realise that there are as many different perspectives of the meeting outcome, as people attending it. It is also relatively easy to identify firms in certain industries that, in a given business environment, make opposite strategic decisions and, or, opposite tactical decisions with a strategic impact. Starbuck and Milliken (1998) provide a concurrent view and make reference to several authors sharing that perspective. They emphasise that idea by saying that “*the stimuli that one executive receives may be precisely the stimuli that another executive filters out. Furthermore, executives who notice the same stimuli may use different frameworks to interpret these stimuli and therefore disagree about meanings or causes or effects*” (pg. 41).

Anderson and Paine (1975: 811) relate “*managers' leeway in making strategic choices*” with perceptions of environment and internal characteristics of their firms. In other words, the stimuli received by managers from the business environments and firms, in which those managers operate, impact their behaviours and the decisions that they make. We argue that what is important for a manager is what he ‘sees’, realising that what he or she ‘sees’ is what gets to his or her brain and not just what gets to his or her eyes. There is a general understanding that there are ‘objective’ things out there, but that each person constructs his or her own reality according to the way he or she ‘perceives’ that ‘objective’ reality (Anderson and Payne, 1975). It can be argued that for a manager making a decision, and also for an observer, it is totally irrelevant if his or her views are objective, or subjective. His or her views are what he or she takes into account when he or she makes decisions, regardless the objectivity, or subjectivity (March and Simon, 1993). That may explain why most authors refer to perceptions of managerial variables by managers, simply by qualifying those perceptions as the views that managers have. We contend, however, that an understanding of the perceptual phenomena is important because perception may explain, or contribute to the explanation, of why certain variables are related to decision-making and risk behaviour.

Perceptions feed the cognitive systems of managers and play a role in actions, which result from the cognitive treatment of those perceptions, namely the way that perceptions fit the mental frames of managers. Managers ‘view’ and ‘read’ the world around them, and, more specifically, themselves, their organisations and the decision subjects that might be faced by their firms, according to their experiences, their values and principles, in short, according to the way that they ‘feel’ things should work. Thus, saying, for example, that a construct, such as the organisational culture of a given firm,

is this way or that way in respect to a given aspect, makes sense only if that unobserved variable is noticed by the organs of sense of a given manager and matched with the views that that same manager has of that construct. Actions by that manager that could result from, say, the organisational culture, need to be analysed according to the way the manager 'sees' and 'reads' that unobserved variable and not according to the way an observer 'sees' and 'reads' it. *"The steps that lead, for an actor, to his defining the situation in a particular way involve a complex interweaving of affective and cognitive processes. What a person wants and likes influences what he sees; what he sees influences what he wants and likes"* (March and Simon, 1993: 172).

Managerial perceptions or, in other words, perceptions by managers of managerial dimensions, which have been proposed by scholars as being important for the understanding of many facets of business firms, are the topic of many reputed studies (table 3.1).

Table 3.1: Examples of Studies involving Managerial Perceptions

Purpose of Study	Context	Author(s)
Strategic choice	Theory and research on executives	Finkelstein, Hambrick and Cannella (2009)
Perceptions	Accuracy of managers' perceptions	Mezias and Starbuck (2003)
Selective perceptions	Manager's belief structures and information processing	Walsh (1988)
Strategy formulation processes	Differences in perceptions of firm strengths and weaknesses and environmental uncertainty	Ireland, Hitt, Bettis, de Porras (1987)
Selective perceptions	Perceptions as a function of functional area of employment	Beyer, Chattopadhyay, George, Glick, Pugliese (1997)
Measuring Perceptions Risk	Strategic decision processes constructs Determinants of risk perception and risk propensity	Fredrickson (1986) Sitkin and Pablo (1992)

3.2 Definition of Perception

Individuals get to understandings of managerial constructs of interest to them through the organs of sense and the mind. Practical observation makes the author argue that stimuli of interest to study managers' perceptions related to risk associated to strategic decision-making, are those conveyed by the eyes and ears of managers. Managers attend meetings and, or, conferences, drink coffee together informally, have business lunches and, or, dinners, socialise, meet peers and, or, clients and, or, competitors, and so forth. They hear what people say, they see how people speak, or how people behave when they speak, they see how others behave when they listen to what others have to say, they feel through their eyes and ears the environment in which they are, and they position all that into a context. In short they 'read' the environment (Neisser, 1967; Gregory, 1974). Organs of sense make individuals aware of stimuli, which are a specific part of a general picture. Stimuli are filtered (Finkelstein et al, 2009; Hambrick and Mason, 1984; Starbuck and Milliken, 1998), and the mind provides understanding. Perceptions are seen as outcomes, that is, the results of a process. However, other viewpoints are such that perception is a process. Perception is a process by which information is delivered, rather than a process by which information is dealt with (Dretske, 1999), suggesting that perceptual filters are part of the cognitive system. What an individual perceives about the environment around him, results from the treatment that stimuli have been subject to by the organs of sense and by "*complex systems, which interpret and reinterpret sensory information*" (Neisser, 1967: 3). Neisser says that "*the term cognition refers to all the processes by which the sensory input is transformed, reduced elaborated, stored, recovered and used*" (Neisser, 1967: 4) and that perception is part of cognition. Perceiving is also apprehending, that is, absorbing and treating stimuli. In the case of human beings, and especially in the context of decision-making in business firms, stimuli are information that is detected, and transformed to get meaning assigned. Perception is a phenomenon, a process, although perception, in everyday language, is understood at the result of perceiving.

Most of the literature that deals with managerial perceptions, which the author of this study had access to, may define the type of perception of interest to the authors of that literature, e.g. 'risk perception', but does not define and, or, explain the role played by perception. That might be because scholars researching managerial aspects take perception for granted and, or, because perception is not easy to define and, or, perhaps,

because scholars think that the phenomenon perception in itself is not important for the research matters, or yet because authors use the noun, or verb, with the day-to-day understanding. It might be as well, as argued above, because to certain scholars perception might mean the equivalent to personal, or subjective views, and as such the word is used simply as an equivalent of those personal views. Not surprisingly the authors who have studied risk behaviour in general, and risk perception in particular, do not treat perception from a theoretical stand point (Baird and Thomas, 1985; Brockhaus, 1980; Lowenstein et al, 2001; MacCrimmon and Wehrung 1990; March and Shapira, 1987; Simon, Houghton and Aquino, 1999; Sitkin and Pablo, 1992; Sitkin and Weingart, 1995; Slovic, 1987; Weber, Blais and Betz, 2002; Weber and Hsee, 1998; Weber and Milliman, 1997). Such overlooking of the theoretical aspects of perception is understandable, since in business contexts the concerns are not the stimuli, but rather what is done once the stimuli have been identified, or noticed. However this weakens the importance of the risk perception construct, or diverts the focus away from it. In spite of the reasons that may justify the lack of concern with the theoretical basis of perception, the position of the author of this study is that it is important to introduce the subject, since that helps explaining why certain aspects are taken into account in this study, and, furthermore, why the author speaks about perceptions of those aspects. The author does not say that this study is a research on perception. It is not. It is, however, a research on the reasons why certain features relate to other features, based on the perceptions that individual managers have of those facets. And this is also why the level of analysis of this study is the individual manager and why certain dimensions that one could define as being organisational are, in reality, dealt with at the individual level of analysis, since they are 'seen' through the eyes of the individual manager. It is worthwhile noting that the constructs retained in this study are not the aspects or dimensions related to individuals, to decision subjects or to contexts, but rather the perceptions of those aspects or features.

Perception is not something that is available for observation, or direct measurement. The main issue, though, is whether perception involves cognition, or not. The author of this study contends that all scholars who have addressed managerial perceptions of managerial dimensions of many sorts do so, because they assign a cognitive perspective to perception. What is exposed below may not be enough to remove the doubt about what perception is, or is not. However, without defining perception at this point in time,

the author argues that it makes sense to speak about perception, in the context of this study and of decision-making in general, only if perception includes cognitive aspects.

Perception is commonly defined as the understanding, interpretation or awareness of something and, or, of a situation. In one of the few studies presenting a definition of perception, Mezas and Starbuck (2003: 4) say that perception is “*apprehension by means of the senses or of the mind.*” It is not clear based on that definition if apprehension results from the senses, from the mind, or from both. However, what seems clear is that whatever is apprehended, that apprehension results from both something external and from something internal to individuals. And what is internal to individuals should not be only the organs of sense, unless those organs have cognitive capabilities, otherwise we would not be able to act but simply to record information. What seems clear as well is that simple observation of corporate life is enough to conclude that managers working for the same firms, who, thus, are subject to the same organisational cultures, top management teams, including CEOs, and are involved with the same decision subjects, have, very frequently, different views, some times opposite views, in respect to the meaning of signals, inputs and stimuli, assuming that they have recognised the same stimuli, and draw different information and build different knowledge from those stimuli. The views on the meaning of the stimuli are not only frequently different, as are different the opinions with what to do with the stimuli. Moreover, as observation of life in business organisations tells us, and as Mezas and Starbuck (2003: 4) corroborate, “*when managers make decisions about their organisations or their business strategies, their analyses may be based on such diverse sources as formal corporate documents, on their personal experiences, on rumours they heard beside water coolers, on conversations during committee meetings, on articles they read in periodicals or on speeches by their CEO.*” Therefore, it is concluded that, apprehension of the working environment may be formal and, or, informal, purposeful, or not, and that different managers apprehend different information from the same sources.

That perception exists seems to be of no doubt, or disagreement. There is, however, on the one hand, disagreement in respect to if and how perception impacts behaviour and, on the other hand, disagreement in respect to the very definition of perception. As we will see below there are two approaches in respect to perception, although the

understanding of stimuli is somehow confusing. One approach says that perception is in the stimuli and in the individual perceiving (Neisser, 1967), and the other one says that perception is in the stimuli and in the environment (Gibson, 1960).

Disagreement lies, first of all, in the influence of perception in choices, therefore, on decisions and on decision-making processes. As we have seen throughout this study, behaviour of managers is seen either as 'rational', and resulting from maximisation efforts related to a utility function and coherence in terms of preferences and consistency (von Neumann and Morgenstern, 1953; Savage, 1972), or as resulting from bounded rationality, that is, from their limitations in terms of information, knowledge and computational capabilities (March and Simon, 1993; Simon, 1955, 1959, 1979).

Disagreement lies, secondly, on whether the organs of senses and, or, the mind are the key elements of the perceptual physiological system and on the roles that they play, and on the roles played by stimuli.

There is an extensive body of literature (Allais, 1953; Edwards, 1954, 1961; Ellsberg, 1961; MacCrimmon and Wehrung, 1986; March and Shapira, 1987; Shapira, 1997; Simon, 1979; Sitkin and Pablo, 1992) that provides evidence and suggests that behaviour is not always explained by theories of maximisation, coherence and consistency, and that the more complicated, or out of the ordinary, the matters are, the less the behaviour is explained by those theories. Theorists of maximisation themselves have not, all the time, maximised. Instead, from time to time, they satisfy themselves with the attainment of some goals (e.g. von Neumann and Morgenstern, 1953, when they decided not to axiomatise the utility of gambling). Therefore, if personal, organisational and situation variables play a role in decision-making and risk-taking (Baird and Thomas, 1985; Sitkin and Pablo, 1992), and if behaviour has other explanations, then it is acceptable to think that the way managers perceive those variables plays a role in those same decision-making and risk-taking situations. Despite the fact that, often, in organisational contexts, decisions are seen as the result of collective action, the fact is that each individual manager "*has to make up his or her own mind, and then differences of opinion are resolved in some manner that depends upon the dynamic of the group*" (Beach and Mitchell, 1996: 3).

There are two main views on how perception can be explained, being one by passive, or direct, theory and another by active, or indirect, theory (Gregory, 1974; Michaels and Carello, 1981). Gregory (1974: xviii), however, calls it rather a

“*spectrum*” of theories and suggests that intermediate positions are justifiable. Direct theory, as named by their proponents, stresses that stimuli and organs of senses should be enough to achieve perception. They assume that the stimuli carry all the information that is necessary, and that if that is not the case, then more stimuli should be looked for, rather than having the cognitive system building representations of the stimuli missing (Michaels and Carello, 1981). Proponents of the direct theory argue as well that “*perception is, quite simply, the detection of information*” (Michaels and Carello, 1981: 2). In other words, for the followers of direct theory the world is perceived directly from the stimuli “*without effort, or information processing, or inference*” (Gregory, 1974: xviii), since stimuli define the environment in a precise way (Gibson, 1960; Michaels and Carello, 1981). Direct theorists “*hold that perceptions are selections of external reality*” (Gregory, 1974: xxvi) and that “*...all knowledge of the world is mediated rather than direct, that no royal road to reality bypasses the need for analysis of the input*” (Neisser, 1967: 173). Indirect, or active, theory proposes that stimuli, once captured by the organs of senses, are ‘worked’ by the cognitive system, that is, perceptions are constructed by the mind (Gregory, 1974; Neisser, 1967). Perceptions are, therefore, richer than stimuli, which represent properties of the environment. The sensory organs provide stimuli to the brain, where those stimuli are given meaning, thus becoming perceptions. In the words of Neisser (1967: 16) “*perception is not a passive taking-in of stimuli, but an active process of synthesising or constructing.*” J.J.Gibson, seen as the father of direct perception, that is, perception emanating directly from the stimuli, spots a very important issue when he warns for the lack of definition of stimuli given by most of the researchers, and for contradictions that are found when a definition is given (Gibson, 1960). Notwithstanding the fact that most of the research on perception mentions objects and events, in reality those authors who seem to favour direct perception, are those who speak less about objects and more about events, namely events that are continuous in time. Naturally, when one speaks about events that are continuous in time, and materialise into perceptions, hours, days or even months after the initial input has been noticed, as is the case of the phenomena related to the life of firms in general, and to strategic decision-making in particular, it is considerably easier to say that an input is not momentary, in which case, according to theorists of direct perception, the input carries information and is intimately related to the environment. However, a critique made by proponents of indirect theory to direct theory is that, if behaviour resulted from perceptions received directly from stimuli, that is, from

'objective' reality, without any type of cognitive treatment, human beings would be permanently seeking for stimuli. Gregory (1974: xix), arguing that behaviour does not stop in the absence of stimuli, puts things in an interesting way when he asks "*how 'output' can be controlled by 'input' when there is no input?*" This same author, (Gregory 1974), in the same tone, argues that since uncertainty and ambiguity are not part of a stimulus, and since "*perceptions are selections of external reality*" (pg. xxvi), according to followers of direct, or passive, theory, uncertainties could not be perceived. Rock (1985), Cutting (1987), Louis and Sutton (1991) and Walsh (1995) mention 'top-bottom' and 'bottom-up' information and, or stimuli, processing. Whereas top-bottom processing is of a cognitive nature, that is, a stimulus is processed through the cognitive system (Neisser, 1967; Gregory, 1974), bottom-up processing is stimuli related only. On top-down processing, stimuli are seen as almost instantaneous and stimulus and perceiver are seen as different entities, while authors such as Gibson (1960) and Michaels and Carello (1981), who defend direct perception, argue that stimuli are not necessarily limited in time and that perceiver and environment make a single unit. Neisser (1967:3), however, says that "*whether beautiful or ugly or just conveniently at hand, the world of experience is produced by the man who experiences it*" and adds that "*whatever we know about reality has been mediated, not only by the organs of sense but by complex systems which interpret and reinterpret sensory information.*" Michaels and Carello (1981:9), seeing themselves as representatives of the direct perception view, argue that "*representatives of the direct perception view...have sought the basis of that perceptual richness not in the elaboration done by cognitive processes but in the richness of the stimulation.*" The position defended by proponents of indirect perception is clearly different from that of direct perception, as illustrated by Neisser (1967: 173), who declares that "*...the meaning of a sentence cannot leap directly from the speaker's mind into the listener's.*"

Authors, such as Neisser and Michaels and Carello, have obviously different views in respect to the processes that lead to perception. To Neisser, and many other scholars such as Tolman, Brunswick and R.L.Gregory, perception is the outcome of a process mediated by the cognitive system, thus indirect, where the stimulus is just a starting point, while for Michaels and Carello, and other scholars, as J.J. Gibson, the key of perception resides in the stimuli, and perception is obtained directly from them. Furthermore, the authors who defend direct perception argue that stimuli must contain

information. For those who defend perception as a phenomenon that is mediated, information does not need to be in stimuli, information can be in the senses.

Rock (1985), not necessarily on purpose, provides a somehow conciliatory view between direct and indirect perception when he says that knowledge is independent of perception, except when the stimulus is ambiguous. On the one hand, he argues that there is a preliminary perception achieved by bottom-up processes, and, on the other hand, argues that "*knowledge [information stored in memory based on past experience] ... not only governs the final step in perceptual processing, namely recognition and interpretation, but that it also can affect perception itself*" (Rock, 1985:4). That is, top-bottom processes play a role under certain circumstances, such as ambiguous stimulus, for instances. Louis and Sutton (1991: 55) argue that "*individuals...rely on habits of mind to guide interpretation and behaviour*" and add that, in general, that works under normal business conditions, or 'business as usual', as they put it. Empirical observation makes the author concur with Louis and Sutton and add that 'habits of mind' may also provide the detection of stimuli to rise. Under 'business as usual' scenarios, managers seem to process stimuli based on their experiences in a kind of effortless, 'automatic' way, while for 'novel' situations they need to switch to active thinking and be in conscious cognitive mode (Louis and Sutton, 1991). These authors suggest, therefore, as Rock (1985) did, that information processing is not of one type only, and that, depending on stimuli, different cognitive modes apply.

Perception is sometimes described by the same authors (e.g. Gregory, 1974; Dretske, 1999) as a process, and sometimes as the outcome of a process. Dretske (1999: 135) says that "*perception is concerned with the pick up and delivery of information, cognition with its utilisation*" in what is an indication that this author does not see perception as a cognitive process. In reality, Dretske (1999) proposes an analogy between analogical and digital modes, or between a picture and a verbal statement providing information about something in the picture, to make the point that perception is the process in which one moves from what is general to what is specific, and that what is specific is what feeds the cognitive system. Dretske (1999: 137) exemplifies as follows:

"Suppose a cup has coffee in it, and we want to communicate this piece of information. If I simply tell you 'the cup has coffee in it' this (acoustic) signal carries the information that the cup has coffee in it in digital form. No

more specific information is supplied about the cup (or the coffee) than that there is some coffee in the cup. You are not told how much coffee there is in the cup, how large the cup is, how dark the coffee is, what the shape and the orientation of the cup are, and so on. If, on the other hand, I photograph the scene and show you the picture, the information that the cup has coffee in it is conveyed in analog form. The picture tells you that there is some coffee in the cup by telling you, roughly, how much coffee there is in the cup, the shape, size, and colour of the cup, and so on.”

If the information of interest were the fact that there was coffee in the cup, that information would be the one picked by the perceptual system, and that information would be the one treated by the cognitive system. The cognitive system would not treat information present in the picture, such as, for example, the colour of the cup, if that was not the focus of the perceiver. This matches the assessment made by Neisser (1967) who sees perception as a process resulting from two phases: i) pre-attention, and ii) attention to stimuli. However, Neisser (1967: 4) argues that perception is a “*stage or aspect of cognition.*” It shall be noted that Dretske (1999), in spite of the indication that is drawn above from his words, suggests, when he uses his example of a picture to speak about stimuli, that in order to notice pieces of information from that picture full of details one needs to recognise, identify, classify, or judge, which are processes of a cognitive nature. Pre-attention, or the preattentive phase, corresponds to what in current language could be translated into looking without seeing. That is a phase during which the receiver of the stimuli is rather passive and takes a holistic approach. In the example above, one would look at the picture with a cup of coffee containing some coffee and if there was nothing else there to draw one's attention to that picture, such picture or rather most of its details, would most likely be forgotten overtime. During the attention phase, or ‘selective attention’ or ‘focal attention’ (Neisser, 1967) the receiver analyses the stimuli, or the part of the stimuli, of interest to him in order to apprehend it as much as possible. Still using the same example of the cup of coffee provided by Dretske (1999), if one had a particular interest in cups of coffee, or in that particular cup of coffee, then, certainly, details, or certain details of interest, would be remembered and the information drawn from the picture would be treated by the cognitive system. It shall be noted that selective attention depends on particular interests of the receiver, namely his functional, or departmental, area of activity, or scope of work (Beyer et al,

1997; Dearborn and Simon, 1958; Walsh, 1988), and, or, his or her motivations. A receiver needs to have a motivation, or an interest, to focus his or her attention, or to get his attention drawn by the stimuli.

Dretske (1999: 142) argues that *“perception is a process by means of which information is delivered within a richer matrix of information (hence in analog form) to the cognitive centres for their selective use. Seeing, hearing, smelling are different ways we have of getting information about ‘s’ to a digital-conversion unit whose function is to extract pertinent information from the sensory representation for purposes of modifying output. It is the successful conversion of information into (appropriate) digital form that constitutes the essence of cognitive activity.”* The words of Dretske raise questions in respect to the definition of perceptions and sensations, such as, if perception starts when sensation ends, if sensation is part of perception, if perception is part of cognition, why do the organs of sense ‘look’ more for some ‘things’ rather than for other ‘things’, and so forth. Do organs of sense provide information in analogical form only? If so, what is the ‘digital-conversion unit’ mentioned by Dretske (1999), the brain? What seems evident is that what is important, once signals are received, is the digital information, or signal, which, drawing from the work of Dretske (1999), we conclude to be in the cognitive domain. Many authors see perception, or the phases that constitute the phenomenon known as perception, as part of cognition (Barr, Stimpert and Huff, 1992; Starbuck and Milliken, 1988). The author of this study sees perception as part of human cognition, and conceives perception in terms of the interactions between the brain and the organs of sense. In the context of strategic decision-making and risk-taking in business firms, and drawing from the work of Mezias and Starbuck (2003), we define perception as an outcome of a process, by which raw information is transformed into meaning, providing individual managers with representations of the various managerial factors around them.

Regardless of whether perception is a process or the outcome of a process, what really matters, in the context of this study, is how perceptions are built and provided with meaning, in order to get clues to substantiate why constructs such as the perceptions of some managerial aspects have to be considered in studies of strategic decision-making, risk-taking and individual behaviour in organisational contexts. The position adopted here is that managers are rationally bounded and that, regardless of in which phase and, or, system perception plays its most important role(s), if different

people have, frequently, different perceptions of the same stimulus, or of the same set of stimuli (Mezias and Starbuck, 2003), perception needs to be taken into account in decision-making and behavioural studies. Mezias and Starbuck (2003: 4) suggest that “*managerial perceptions include everything that goes into managers’ understanding of their work situations.*”

3.3 Perception and Cognitive Maps

Some scholars contend that perception has non-conceptual content (Dretske, 1999; Peacocke, 2001). In order to perceive a given shape, say a square, one does not need to know that that shape is a square. In other words, one does not need to have the concept of a square, that is, one does not need to know what a square is. Other authors, e.g. Kiesler and Sproull (1982: 552), argue, according to theories of social perception, that “*perception is a process in which the perceiver constructs reality by performing cognitive operations on cues derived from the environment*”, suggesting the existence of conceptual content. However, Kiesler and Sproull (1982: 556), say, basing themselves in information-processing theories of social cognition, that the representations of the environment held by individuals rely on the “*steps that follow perception*”, thus suggesting that perception may not have conceptual content.

Let it be assumed that two managers of a same firm, a firm that supplies some sort of services, meet with a manager of a client. Let it be assumed that the manager representing the client complains about the services provided by the supplier, by speaking loudly and even shouting. What do the two managers of the services supplying firm perceive? If perception has non-conceptual content those two managers are going to hear the loud voice, are going to hear the shouts and are going to see, perhaps, a certain state of disturbance by observing the way that the manager representing the client firm moves his arms and, or, hands, moves in the chair, stands up and seats consecutively, and so on. If perception had non-conceptual content, the two managers would not, through perception itself, perceive the behaviour as rude, or not, they would not feel their business threatened, or not, they would not feel themselves threatened, or not, and so forth. They would simply notice that loud voice, those shouts and that disturbance, like any other observer who had been in that meeting room. Assume now that one of the two managers of the services supplying firm knows the manager representing the client, and has attended similar tempestuous meetings with him, and the other one does not know that manager and has never met him before. Further

assume, at your will, that the manager of the firm supplying services, who knows the manager of the client is used to getting good, or bad, results out of those meetings. Finally assume, again at your will, that the second manager of the firm supplying services has, or has not, been briefed before his or her very first meeting by his or her peer manager. It is clear that in respect to what scholars dealing with managerial matters refer to as perception, perceptions of the meeting by the two managers of the supplying firm would be very different, depending on the previous knowledge they had of the individual they were meeting, and of the typical outcomes of other meetings with that individual. Perceptions may, or may not, have conceptual content and that is not the purpose of this discussion. However, for what is understood as perception in the day-to-day usage of the word, which we argue is the meaning assumed by scholars in the field of decision-making and risk-taking behaviour in the context of business firms, there are no doubts that perceptions, that is, the outcomes of the stimuli treated by the organs of sense and by the brain, are assigned with meaning and that perceptions are affected by experience, values, beliefs and motivations (Kitchin, 1994), that is, by the cognitive map of the individual. Cognition, says Neisser (1967:4), "*refers to all the processes by which the sensory input is transformed, reduced, elaborated, stored, recovered and used.*" Individuals being rationally bounded have mechanisms to deal with a plethora of information and to filter and codify it (Barr, Stimpert and Huff, 1992; Bartunek, 1984; Hambrick and Mason, 1984; Kiesler and Sproull, 1982; Starbuck and Milliken, 1988). Harris (1994: 311) says that "*perceptions and interpretations of events and information are shaped by the schemas applied to them*" and further argues that "*as a result of cuing a different schema the meaning distilled is very different.*"

Tolman (1948) in a study to measure the time that rats take to learn the right paths to get access to food in a labyrinth, suggests that rats, like men, get experiences engraved in the brain and that behaviour is not just about stimuli-responses at the level of the organs of sense. Although he agrees that stimuli are the starting point and the raw material that feeds the system, he argues (Tolman, 1948: 192) that "*the stimuli, which are allowed in, are not connected by just simple one-to-one switches to the outgoing responses.*" Tolman (1948: 192) adds that "*rather, the incoming impulses are usually worked over and elaborated in the central control room into a tentative, cognitive-like map of the environment*" and that the cognitive map is what "*finally determines what responses, if any, the animal will finally release.*" Since initial studies carried on with

rats were concerned with 'geographical' choices, the designation 'map' was adopted (Kitchin, 1994), although other designations are used (Walsh and Fahey, 1986), such as 'frames of reference' or 'schemata' (Markus, 1977; Schwenk, 1998; Wagenaar, 1992), 'mental models' (Barr, Stimpert and Huff, 1992) 'schemas' (Harris, 1994) or 'frames' (Beach and Connolly, 2005; Beach and Mitchell, 1996). Assumptions about the environments surrounding individuals are the elements making their frames of reference. Those assumptions are, however, subject to biases (Kahneman and Tversky, 1974; Schwenk, 1988), and are not directly observable (Schwenk, 1988) by individuals, since those assumptions are, most of the time, "*ingrained and taken-for-granted*" (Fiol and Huff, 1992: 268). In spite of the biases to which they are subject, those assumptions, which are simplifications, are extremely important, since, should those simplifications do not exist, individuals could not evaluate all the information available and could not make sense of situations (Calori, Johnson and Sarnin, 1994). It shall be noted that frames of reference and framing are not equivalent designations. Framing applies to events, or information, in order to provide them with meaning, or sense, according to a frame. If, however, meaning is not achieved, a new framing process, that is, a new attempt to provide meaning, may be developed by the individual (Beach and Connolly, 2005), without, necessarily, changing his or her frame of reference, or cognitive map. Framing is an indication, or cue, based on experience, to deal with a situation under one frame of reference, or cognitive map. However, if framing processes do not provide meaning then frames may change, or be created, to provide reasonable explanation to the stimuli.

Fiol and Huff (1992: 267) define cognitive maps as "*representations that locate people in relation to their information environments.*" They add that "*maps provide a frame of reference for what is known and believed*" and that "*they highlight some information and fail to include other information, either because it is deemed less important, or because it is not known.*" Harris (1994: 310) declares that schemas "*refer to the dynamic, cognitive knowledge regarding specific concepts, entities and events used by individuals to encode and represent incoming information efficiently.*" Beach and Mitchell (1996: 6) describe frame as "*that portion of the decision maker's knowledge that he or she brings to bear on a particular situation in order to endow that situation with meaning.*" Beach and Connolly (2005: 22-23) define frame as a "*mental construct consisting of elements, and the relationships among them, that are associated*

with a situation that is of interest to a decision maker". They add that *"the elements are salient current events and associated past events"* and that *"relationships define the expected interactions among the elements"* (pg. 23). Kitchin (1994) presents several definitions of cognitive maps having in common notions, such as the acquisition, storage and use of information, the selection of the information available and respective treatment, and the provision of meaning to new information received by individuals, by matching that information with values, beliefs and motivations, and by promoting action. Actions are considered within cognitive maps (Fiol and Huff, 1992; Ireland et al, 1987). Motivation, besides being a reason for action, is an element playing a direct role into the very nature of the cognitive maps. Tolman (1948) develops the idea that cognitive maps, like real maps, can be narrower, or broader, depending on the contents, and suggests that experience leads to broader maps, while strong motivations may lead to narrower cognitive maps. More specifically, the roles of cognitive maps consist in treating information provided, and in providing, from memory, or from thought, missing information to fill the gaps, matching new information with experience and anticipating future actions (Harris, 1994; Markus, 1977). Neisser (1967: 286) provides an interpretation on how the system perception-cognition works, when he says that *"the preattentive processes delineate units, provide partial cues, and control simple responses; focal attention builds complexly structured objects or movements, one at a time, on a basis thus provided; the background processes build and maintain schemata to which these objects are referred."* These notions, which are common to many definitions of cognitive maps, are corroborated by Fiol and Huff (1992), who argue that those maps are divided into sub-maps containing beliefs and values, frames and relations of causality, respectively. Likewise, Harris (1994) suggests the existence of different schemas related to the way individuals 'see' themselves, those around them, the organisation context in which they are, the concepts and the events. Ireland et al (1987: 470) subscribe the importance of 'schemas' to simplify a complex world, and, suggesting a reference to the information selection, add that *"without schemas a manager, and ultimately organisations, would become paralysed by the need to analyse 'scientifically' an enormous number of ambiguous and uncertain situations."*

Cognitive maps of individuals are not immutable. Maps, or sub-maps, as broken down by Fiol and Huff (1992), may be modified depending on the circumstances faced by individuals. Furthermore, changes in cognitive maps of individuals, whether gradual,

or radical, are seen as a requirement to meet changes in environments, thus avoiding, for example, firms' declining (Barr, Stimpert and Huff, 1992; Bartunek, 1984).

Cognitive maps provide meaning to information, but they may change as a result of information. Maps tend to become broader through the addition of new information. However, as Harris (1994: 311) stresses, "*since schemas direct searches for information, it is likely that the information uncovered will reinforce those schemas.*" In the same line, Markus (1977) argues that accumulated experience may make changes to cognitive maps more difficult. Ireland et al. (1987) suggest that most of the decision matters faced by managers, including those which are novel, are framed based on past experience.

Motivations induce changes in cognitive maps, which may get broader, or narrower (Bartunek, 1984; Tolman, 1948).

Modifications of cognitive maps are likely to occur if and when there are violations of the relationships expected between the elements of the situation being framed and of those elements already present in the maps. Likewise, modifications of cognitive maps may occur when ongoing events conflict with frames (Beach and Connolly, 2005).

Cognitive maps can change incrementally or radically (Bartunek, 1984). This last author argues that radical changes are likely to occur in the case of situations of a fundamental strategic nature, and that incremental changes are more related to work processes. Individuals are more prone to 'think out of the box' and change their cognitive maps, when facing threats, or crisis. Novel situations, if they do not have an overwhelming nature, tend to be framed according to the existing maps (Calori et al., 1994).

Cognitive maps of individuals might be modified by environmental changes, that is, by changes in their organisations, and by changes in the business environments in which those organisations are integrated.

Maps are subject, as well, to modifications by changes in experiences of the individuals.

Barr et al. (1992) consider that changes in cognitive maps are of great importance to ensure organisational adaptation and renewal. However, differently from what is suggested by Bartunek (1984), Barr et al (1992) conclude that in successful companies cognitive maps change continuously and not necessarily due to major events. Nevertheless, when information is completely unexpected, individuals may tend to disregard that information as suspicious, or not credible, otherwise, should that

information be considered, that would involve the “*deletion of concepts or assumed association between concepts and the environment, and the addition of new concepts and associations*” (Barr et al, 1992) and internal conflict (Bartunek, 1984), since the individual would need to consider new perspectives against current ones, including changing his or her values and principles. However, Beach and Mitchell (1996) argue that adults rarely change principles and values. Kiesler and Sproull (1982) posit that managers incorporate into their cognitive maps new information gradually, and that very discrepant information tends to be disregarded, unless managers themselves decide to be the driving force of change, in which case cognitive maps may change dramatically.

3.4 Perception and Decision-Making Behaviour

Decision-making processes commence with stimuli (Mintzberg et al., 1976). Drawing from the work of Mintzberg et al. (1976) and MacCrimmon and Wehrung (1986) we conclude that decision-making is a process, and that a decision is constructed overtime. The phases that have been identified as being part of most of the decision-making models are the recognition, or identification, of the decision subject, the assessment of the decision subject and the choice among alternative solutions, including keeping the status quo. Scanning for stimuli, evaluating them and making choices provide the links from cognition to behaviour, that is, from cognition to action (Wally and Baum, 1994). Cognitive maps, and their subunits, identity, categorisation and causality, promote attention, sense-making and action, but also act as powerful filters, especially the sub-units identity and categorisation (Fiol et al., 1992). Consequences of perceptions to decision-making and behaviour result from the cognitive filters used by managers when they notice the stimuli, and make sense of them (Hambrick and Mason, 1984). When managers ‘see’, or notice, stimuli, they do not necessarily evaluate them, and act upon them, in the same manner. This view is corroborated by Starbuck and Milliken (1988: 42), who argue that “*the stimuli that one executive receives may be precisely the same stimuli that another executive filters out*” and state that “*executives who work in the same organisation frequently disagree about the characteristics of that organisation, and executives whose firms compete in the same industry may disagree strongly about the characteristics of that industry*” and by Neisser (1967: 7), who says that “*people select some parts [of what is said, seen] for attention at the expense of others, recoding and reformulating them in complex ways.*”

Managers are rationally bounded (Simon, 1979). Being rationally bounded and having computability limitations, cognitive maps are the way for managers to deal with an amount of information, which they would be, otherwise, unable to evaluate (Calori et al., 1994). As put by Walsh and Fahey (1986: 326), “*without [cognitive maps] a decision maker is lost in a sea of data*”. Starbuck and Milliken (1988: 39), argue that “*one thing an intelligent executive does not need is totally accurate perception*” and they continue by saying that “*someone who perceived without any distortion would hear background noise as loudly as voice or music, and so would be unable to use an outdoor telephone booth beside a noisy street, and would be driven crazy by the coughs and chair squeaks at symphony concerts.*” In other words, perceptual filters and cognitive maps allow managers to focus and make sense of information. However, simplifications made to cope with a complex world, and the use of heuristics, may lead to cognitive biases and to significant errors (Ireland et al, 1987; Kiesler and Sproull, 1982), and may lead decision-makers’ to fail to make reasonable decisions (Walsh, 1995). The biases are related directly to the views of the world held by managers. Drawing from social perception, social motivation and information theories, Kiesler and Sproull (1982) suggest several biases, or principles as they name it, affecting decisions makers and, consequently, decision-making. However, Stanovich and West (2008), who, through seven empirical studies conclude that cognition and biases are not correlated, do not confirm these views. Among those principles, or biases, mentioned here above, there are the ‘augmentation’ and the ‘discounting’ principles and the ‘illusory’ correlations and causation. The augmentation principle stresses that an individual sees a reason to cause a favourable result with higher probability if that reason is countered by another reason, than if that favourable reason is the only explication available, while the discounting principle basically says that if a reason explains clearly a given causal effect, any other reason is going to be discounted (Kiesler and Sproull, 1982). Illusory correlation and causation refer to inference of correlations among events, which may be accidental, and consequent artificial association, respectively (Kiesler and Sproull, 1982). On top of the biases mentioned herein above, which are, essentially, related to information and social theories, other biases, mainly related to subjective probabilities and likelihoods, framing and levels of reference (Kahneman and Tversky, 1974), such as anchoring, availability,

representativeness, base rate, and so forth, may play a role in decision-making in general, and strategic decision-making in particular.

Besides the aspects related to the inner limitations of managers, namely in terms of processing information, and their heuristics and biases, we argue that factors, such as the experience of the manager (Louis and Sutton, 1991; Tesluk and Jacobs, 1998) and his or her perception of the controllability of the nature of the decision matter (Vlek and Stallen, 1980), influence the way the manager perceives the risk inherent to the decision matter itself and his or her decision-making behaviour. However, it is also argued in this study that factors that are exogenous to the decision-maker, such as organisational culture related to risk or risk-taking (Miller and Friesen, 1982; Venkatraman, 1989), and CEOs' risk behaviour (Tsui et al, 2006), become part of the decision-maker thinking process through the way that the decision-maker perceives those factors and makes sense of what he or her perceives.

Mezias and Starbuck (2003) suggest several variables that may have an impact on perception. Among those variables there are the characteristics of the decision subject, that is, if we speak about an opportunity, or about a threat, or about a problem not clearly identified as a threat, or as an opportunity, and how the manager assesses those characteristics. There is as well the experience of the manager with other decision subjects, and his or her overall working experience. There are relationship aspects between the manager and his or her organisation whether we speak about peers, subordinates or bosses. There is self-interest, that is, managers' protection of their own interests. And there are organisational culture characteristics that the manager may or may not 'see' as conditioning his or her behaviour and, consequently, impacting the decision-making process. In broader terms, Neisser, (1967: 287), declares that "*in general, a cognitive structure may be defined as non-specific but organised representation of prior experiences*", thus suggesting that stored experiences of all sorts influence the way managers 'see' the numerous decision-specific and environmental factors around them.

Perceiving is apprehending information through filters and making sense of that information, in line with managers' views of their organisational worlds (Hambrick and Mason, 1984; Starbuck and Milliken, 1988). In strategic decision-making processes "*stimuli are often ambiguous, complex and even contradictory*" (Finkelstein, Hambrick and Cannella, 2009: 47). Finkelstein et al. (2009) propose a model, adapted from

Hambrick and Mason (1984), where the stimuli linked to the decision subject are treated according to the 'executive orientation' of the individual receiving the stimuli, and pass through a three stage process where the filters are the 'focus of attention', 'selective perception' and 'interpretation'. Selective perception and interpretation are, according to Finkelstein et al. (2009), what Starbuck and Milliken (1988) call 'noticing' and 'sensemaking'. However, Finkelstein et al. (2009) do not think of 'executive orientation' as a filter. They say that 'executive orientation' is made up by experience and by psychological aspects, or characteristics, which are the basis for the filtering process. The author of this study contends that if we think of a filter as a screen made of wire mesh, with the mesh more or less coarse depending on what one wants to filter, the 'executive orientation' would represent the total area of the screen and the filters mentioned above would be parts of the total area, that is, the 'executive orientation' would be a filter as well. We see the 'executive orientation' of Finkelstein et al. (2009) as the cognitive map of the manager. Consequently, we argue that a perceptual filter can be defined by an adaptation of the definition attributed to 'executive orientation' by Finkelstein et al. (2009: 49), who state that 'executive orientation' is "*the person's interwoven set of psychological and observable characteristics, that engages the filtering process, and which in turn yields a construed reality, gives rise to strategic choices, and ultimately affects organisational performance.*" Therefore, in the context of strategic decision-making in business firms, we define 'perceptual filter' as the manager's mix of psychological and observable characteristics that filter the stimuli associated to a decision subject and which, in turn, yields a construed reality and gives rise to strategic choices, and consequent risk and decision-making behaviour.

The author of this study argues that the perception of the risks involved in decision-making plays its role essentially during the identification and assessment phases. Once, for a given decision matter, a manager gets to the choice phase, it is assumed that the alternatives to resolve the decision subject, if any, have been found and that only the alternatives that passed through the filters and match the cognitive map of that manager, namely his or her principles and goals, are retained (Beach and Mitchell, 1987). However, it is contended herein as well that the role of perception, as far as risk is concerned, is more relevant during the assessment phase than during the recognition phase. Provided that the manager has his or her attention focused in noticing the decision subject, during the identification phase perception applies essentially to a 'fit

no fit' analysis, that is, the manager gets a first impression if the decision subject fits into his firm's strategy, should it be defined and known, and if the decision subject fits, to his or her eyes, into the continuum opportunity-threat. "*Roles in organisations, as contrasted with many of the other roles that individuals fill, tend to be highly elaborated, relatively stable, and defined to a considerable extent in explicit and even written terms*" (March and Simon, 1993: 22). In an organisational context, and for matters related to his or her scope of work, which includes everything that a manager does with an organisational purpose, in the facilities of the organisation, or not, a manager should be in an attentive mode. And we contend that managers, actually, are in attentive mode. However, in spite of being attentive, that does not mean that managers notice the stimuli. Stimuli may fail to be noticed due to cognitive reasons. "*Presented with a complex stimulus, the subject perceives in it what he is 'ready' to perceive; the more complex or ambiguous the stimulus, the more the perception is determined by what is already 'in' the subject and the less by what is in the stimulus*" (Dearborn and Simon, 1958: 140). During the identification phase, a stage of sense-making occurs simultaneously (Starbuck and Milliken, 1988), where, based on experience of other decision subjects and based on the experience that the manager has on his or her organisation dealing with risky situations, the manager gets not only a 'fit no fit' perception but also a perception of the risk involved. During the evaluation phase, that is, when the manager starts assessing the courses of action, and anticipates difficulties and risks, internal and external, related to those courses of action, perceptions of the several dimensions involved become more important. That is also the phase when questions and, or, statements, such as 'this is too big, or not big enough for the organisation', 'what is senior management (or my peers, or my CEO) going to think, or how are they going to react?', 'is this worth it?', 'why bother?', 'what am I going to get, or to lose, with this?' and 'do they care?' arise.

Everybody has faced situations where one asks him or herself why one should do this or why one would do that, based on assessments that one makes of the difficulties and risks that one would face, should one decide to undertake a certain path of action (Harris, 1994; Hornsby et al, 2002). Many factors impact the managers' behaviours and, consequently, the decision-making processes. This is the case of the perceptions of the reactions of the organisation, peers, subordinates, or higher level management, in respect to the risks incurred in providing justifications to do something and, or, to follow one given path, and, or, to commit resources. This is also the case of the

perceptions of the risks related to exposing one's competency and challenging other people's ideas, or positions. The perceptions of the risks incurred by oneself and, or, by the firm result from the evaluation of the factors by the cognitive system of the manager.

When a stimulus gets through a manager's filters and that manager makes sense of it through appropriated framing, that manager may get perceptions of certain factors that lead him to behave in one way, or another. When decision matters are fraught with uncertainty and, on top of the uncertainty, there is potential for losses, monetary, or other, such as credibility, reputation, and so forth, the perceptions that managers have of the decision subjects themselves, and of the way that the decision subjects are going to be perceived and dealt with by the managers' subordinates, peers and top management, that is, by the organisation as a whole and by his top management, in particular, are going to play an important role (Williams and Narendran, 1999). Based on the perceptions that the individual manager is going to have, he or she is going to conclude if the organisation is going to provide him or her with support and, therefore, if, on top of the risk subjacent to the decision subject, there are risks for the manager related to his or her implication in the decision-making process (Harris, 1994).

Drawing from the work of Hambrick and Mason (1984), Starbuck and Milliken (1988), Sitkin and Pablo (1992), Harris (1994), Sitkin and Weingart (1995) and Mezas and Starbuck (2003), and being understood that a decision is a process and that managers assess as well the riskiness of the factors influencing the process, we adopt as a definition of risk perception, in an organisational context, the assessment made and the understanding by individual managers, through their own perceptual filters, of the riskiness of a decision subject considering therein the risk to themselves. Starbuck and Milliken (1988) divide perception into 'noticing' and 'sensemaking'. These last authors argue that they prefer those terms to scanning and interpretation, respectively, since, in the case of noticing and scanning, they consider noticing rather 'informal and involuntary' whereas scanning implies 'formal and voluntary' actions. We agree with this distinction, since managers may scan raw information, or scan the environment for information, without, necessarily, getting any stimulus, while, on the other hand, stimuli arise sometimes even if one is not looking for them. Besides, the author contends that in the day-to-day activities of a manager he or she does not scan voluntarily the environment, unless he or she is part of a planning group, for example, and does that for

a living, though the manager is attentive to his or her environment. It goes without saying, however, that in order to get a stimulus related to a certain business domain, one needs to be embedded in that domain, or needs somehow to interact with it. Beach and Connolly (2005: 16) argue that “*events seldom occur in isolation; the decision-maker usually has some idea about what led up to them – what is going on and why. This knowledge supplies the context, the ongoing story that gives coherence to one's experience, without which everything would appear to be random and unrelated.*” There is, therefore and notwithstanding the informal and involuntary aspects related to the raise of a stimulus, a rational and voluntary approach towards the domain of activity. Sales and or business development people, for instance, meet clients regularly looking for information, that is, they adopt formal and voluntary actions, they have a motivation and are trying to do or achieve something and are not “*neutral or passive toward the incoming information*” (Neisser, 1967: 7).

3.5 Summary of Chapter 3

Perception plays a role essentially during the recognition and assessment phases of the strategic decision-making processes.

In the case of perception of events that become strategic decisions matters, it is argued in this study that the perception of the risks involved in the process results from stimuli from multiple origins. Basically, there are the stimuli that trigger the recognition of the decision subject, which can be one-time stimuli, and the ongoing stimuli related to the environment in which the managers operate on a daily basis, and which are present essentially during the assessment phase.

Perception, as far as it impacts decision-making and risk-taking behaviours, has, therefore, we contend, two components: one component related to the subject to be decided, that is, related to the decision subject located in the continuum threat-opportunity, and one component related to the working environment, or determinants of the working environment, surrounding the manager.

The author of this study suggests that stimuli related to the strategic decision-making processes are recognised, assessed, and provided with meaning, by the cognitive maps of managers. Cognitive maps, resulting from the work experience of the manager, the level of controllability that he or she assigns to the outcomes of the presumed decision, and to factors related to the working and business environments,

namely variables related to the firm and the type of decision subject, provide the filters that make managers recognise and assess situations the way they do.

Therefore, what seems to be relevant in decision-making processes are the personal views that decision-makers have of the variables involved, rather than 'objective' variables, and the variables that contribute to build the cognitive maps of managers.

CHAPTER 4. ORGANISATIONAL CONTEX: DECISION-MAKING IN ORGANISATIONAL CONTEXTS AND ORGANISATIONAL FACTORS

4. Organisational Context

This study is about the risk behaviours of individual managers, namely the determinants of those behaviours. Therefore, this study is also about risk behaviour in organisational context, since organisational contexts contribute to framing the behaviours of individual managers. Individual managers in organisational contexts influence their organisations, and are influenced by them. The decisions of interest to this study are those of a strategic nature, made in the context of business firms, not those made by managers in the context of their private lives, although one important assumption that is made is that managers also consider the effects of decision-making in organisational contexts on their private lives. However, decision-making in organisational context, and organisational decision-making, shall not be confounded, and are not meant to be confounded in this study. This study is about individual decision-making in organisational contexts, or about individual participation in organisational decision-making, not about organisational decision-making itself, notwithstanding the fact that the behaviours of individual managers, as far as decision-making is concerned, are expressed in organisational decision-making.

Decisions are conditioned by the contexts in which they are produced. The decision-making processes result from the way companies are organised, result from the balances of power within the organisations, result from stronger, or weaker, top managements and, or CEOs, and result also from the very core businesses of firms. However, the outcomes of decision-making in organisational contexts are definitely coined by the behaviours of the individuals involved.

As mentioned elsewhere in this study the level of analysis is the individual manager. As Hofstede et al. (1993: 484) point out, "*the level-of-analysis problem in behavioural research occurs when conclusions applying to one level have to be drawn from data only available at another.*" This is not the case of this study, since there is no intention to measure organisational constructs, or to use organisational constructs to draw conclusions applicable to individuals. The intention is to study perceptions that individual managers have, among other factors, of some factors of an organisational

nature. Shapira (1997: 4) conciliates the levels of analysis, and condenses the subject, when he says, *“indeed, individual and organisational decision making overlap greatly because many decisions in organisations are made by individual managers. In that sense, the reference is to decisions made in organisational contexts.”*

Payne (1997: 353) argues that *“Simon [Herbert] proposed similar ideas for both individual and organisational decision making”* and adds that *“this approach is reasonable insofar as descriptions of organisational decision making are really descriptions of individual decision making within an organisational context.”* Payne (1997) suggests that most of the decision-making features are common to individual (in organisational context) and organisational decision-making, although he recognises, as the author of this study does, that organisational decision-making does not result from the sum of individual decision-making nor from the sum of individual behaviour.

The same type of analysis is made by Walsh and Fahey (1986), who say that, *“individual beliefs are certainly the fundamental elements of any group or organisational belief structure, yet this is the configuration of individual beliefs that forms the premise for any strategic decision.”* This is also the approach retained in this research project. Clearly, there would be no organisational decision-making without individual behaviour. Individual managers engage and participate in decision-making at different degrees, depending on their personal views of the decision subject, of the organisation, and of their personal interests.

Organisational context is the context in which are prevalent those factors, which are inherent to organisations, and which are suggested to influence individual behaviour of managers, such as organisational culture, top management, and so forth.

Organisational contexts are, or are not, favourable to managers and provide them, or not, with support (Dutton et al., 1997). Numerous organisational factors, which influence the behaviours of managers at an individual level, have been suggested, or identified. Some of those factors are organisational culture and group decision-making (Baird and Thomas, 1985), incentives, rewards and penalties provided by the organisation (March and Shapira, 1987), cultural risk values and leader risk orientation (Sitkin and Pablo, 1992), power and conflict (Shapira, 1995), social influence (Salancik and Pfeffer, 1978) and perceived organisational support (Lynch, Eisenberger and Armeli, 1999; Rhoades and Eisenberger, 2002).

This study, drawing from the work of Baird and Thomas (1985), Sitkin and Pablo

(1992), Eisenberger et al. (1986), Harris (1994), Mayer et al. (1995) and Wayne et al. (1997), looks for three factors, which are part of the organisational contexts, that is, the organisational culture (from a risk-taking perspective), the risk behaviour of the firm's CEO, and the organisational support perceived by the individual manager to engage in risk-taking behaviour in the context of strategic decision-making.

The perceptions of the factors mentioned above are retained in this study, since those factors are relevant in organisational contexts, have not been considered simultaneously and have not been related in a model describing and predicting the organisational support perceived by individuals.

However, before approaching some of the factors that may influence the risk behaviours of individual managers in organisational contexts, it is important to have some understanding of the decision-making processes in organisations¹⁸, since, it is contended in this study, it is during the initial phases of the decision-making processes, well before a choice, or a decision, is effectively made, that the influences of those factors are perceived.

4.1 Decision-making Processes in Organisational Contexts - Where do Human Cognition and Contextual Variables fit into the Decision-making Processes?

Mintzberg, Raisinghani and Théorêt (1976: 246) ask, "*how do organisations go about making 'unstructured', 'strategic' decisions*" and add that

"Researchers of administrative processes have paid little attention to such decisions, preferring instead to concentrate on routine operating decisions, those more accessible to precise description and quantitative analysis. As a result, the normative models of management science have had a significant influence on the routine work of the lower and middle levels of organisations and almost no influence on the higher levels. But is at the top levels of organisations where better decision-making methods are most needed."

Strategic decision-making is a process, whose 'visible' steps are, undoubtedly, controlled by the top levels of organisations. However, middle-level management provides a huge contribution to strategic decision-making, through its involvement in

¹⁸ Decision-making as a Process is further developed in Annex 6.

most of the steps of the process, including as well those, which are more 'visible' and some times are confounded with the decision process, such as the point in time when the decision is signed off. If managers recognising and evaluating decision subjects, and screening for alternative solutions, decide that there are risks that they cannot, or do not, want to afford, many decisions subjects may never get to the final decision-makers.

Many times, in business organisations, decisions are made by the members of top management teams, or by senior managers to whom authority is delegated. Top managers make decisions on business opportunities, or threats, identified, and, or, suggested, and, or, created, and, or, developed, often, by other people, such as members of business development groups, planning groups, marketing groups, operations groups, and so on. Shapira (1997: 5) affirms that "*decision making in and by organisations is embedded in a longitudinal context*", that "*participants in organisational decision making are a part of ongoing processes*", and that "*even if they don't take on active roles in all phases of decision making, they are a part of the decision process and its consequences.*" Mintzberg, Raisinghani and Théorêt (1976: 246) argue that a "*decision process*" is something that begins with a "*stimulus*" and "*ends with*" a "*specific commitment for action*". Since a decision is a continuous process, it may very well happen that a decision is made by managers, who did not receive the 'stimulus', which, put into perspective, underlines the importance of those, who receive and treat the stimuli during the initial phases of the decision-making processes.

Hambrick and Mason (1984: 194), making reference to the views of Cyert and March (1992) and March and Simon (1993), say that "*bounded rationality, multiple and conflicting goals, myriad options, and varying aspiration levels all serve to limit the extent to which complex decisions can be made on a techno-economic basis. Generally, the more complex the decision, the more applicable this behavioural theory is thought to be. So, for that class of choices called 'strategic' – complex and of major significance to the organisation – the behavioural theory is especially apt.*" Finkelstein et al. (2009: 44) concur, and stress that "*decision makers inject a great deal of themselves*" in situations "*in which stimuli are many, complex and ambiguous.*" By the same token, Wally and Baum (1994: 933) stress that the conceptualisation of strategic decision-making by phases, that is, as a process, "*enlightens movement of the process from cognition to behaviour.*"

MacCrimmon and Wehrung (1986), who proposed a model of managing risk, which they named REACT, an acronym for Recognise, Evaluate, Adjust, Choose and Track, imply that studies of risk behaviour have focused too much on choice, the phase generally associated with decision-making, and too little on the other phases, especially recognition and evaluation, that is, pre choice phases, and adjustment, that is, the post choice phase. Beach (1993) takes a similar approach, and argues that the point is not really about choosing among alternatives, but rather about knowing how such alternatives are retained. Schwenk (1995:472) assumes that "*personal and organisational characteristics*" influence the strategic decision processes. Schwenk (1995: 474) also stresses that the diagnosis of strategic issues is "*closely related to strategic decision making.*" However, diagnosis does not simply influence the strategic decision processes, since, in reality, diagnosis is part of the decision process (Beach and Connolly, 2005; Beach and Mitchell, 1978).

During the diagnosis phase (Beach and Connolly, 2005; Mintzberg et al., 1976) of a decision-making process, also referred to as the recognition, evaluation and adjustment phases (MacCrimmon and Wehrung; 1986), or the identification phase (Schwenk, 1995), which includes the recognition and diagnosis routines, is when the cognitive processes, namely perception, play their most significant roles. Thomas, Clark and Gioia (1993) summarise the whole decision-making process, from a cognitive perspective, by saying that decision-makers look for sense making and that 'sensemaking' "*subsumes the key cognition-action of environmental scanning, interpretation, and associated responses*" (pg. 240). Thomas et al. (1993) performed a study to test the links, if any, between scanning, interpretation and action, on the one hand, and firm performance, on the other hand. Those authors argued that "*if cognition and action are linked, however, it is intuitively apparent that both should be related to performance*" (pg.239), and they confirmed their intuition, since they did find relations in their study between cognition-action and performance.

Regardless of the ways authors describe the decision-making processes, there are phases in all those processes where managers see, listen and feel, in respect to situational and contextual factors, in short, where cognition is present and play a role of paramount importance. For example, Kiesler and Sproull (1982: 548) say that "*a crucial component of managerial behaviour in rapidly changing environments is problem sensing, the cognitive processes of noticing and constructing meaning about environmental change so that organisations can take action.*" Cognition factors, being

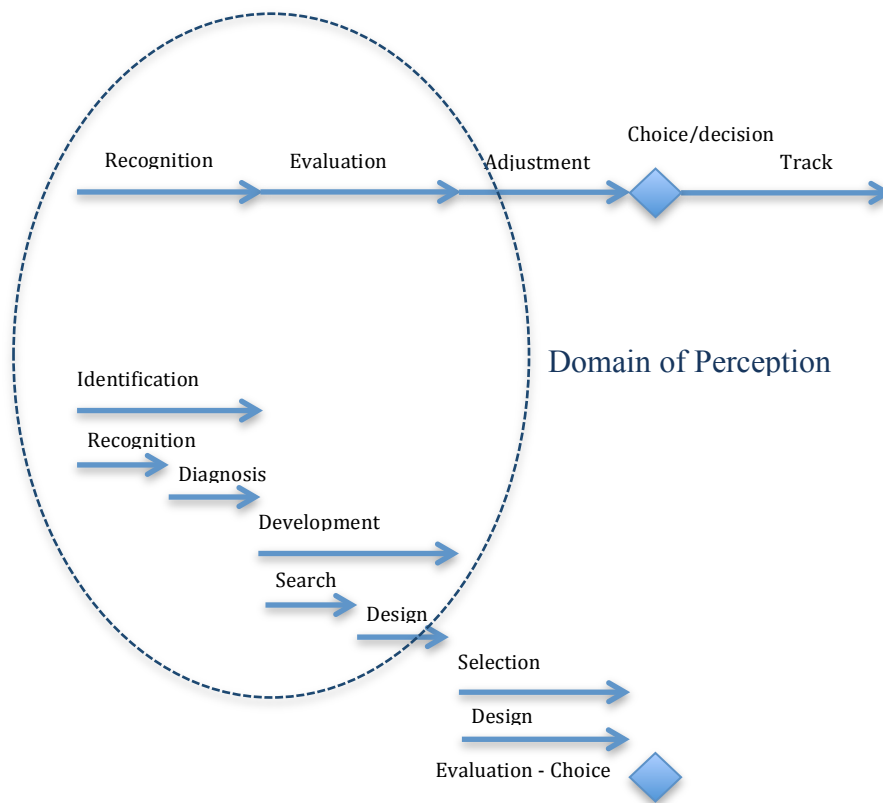
heavily present in the earlier phases of the decision-making processes, condition the 'choices' made and, therefore, the outcomes, and consequences, resulting from those choices. Anderson and Payne (1975: 811), recognising the importance of cognition and behaviour, argue that "*depending on perceptions of both environmental and internal properties, managers have considerable leeway in making strategic choices to meet various contingencies.*" Beach and Connolly (2005) suggest that at the centre of the discussion should be the way decision-makers treat information cognitively to make decisions. Reality, or, in other words, the reality of a given individual decision-maker is constructed through cognition, and that process is called perception (Kiesler and Sproull, 1982). Dutton and Jackson (1987), Fredrickson (1985) and Thomas et al. (1993) stress the importance of the perceptions of individual decision-makers during the early stages of the decision-making processes, by arguing that the way decision-makers label a situation (e.g. opportunity, threat, minor problem) influence their motivations, and their recommendations in respect to that situation.

In a study where a process model of problem recognition is proposed, Cowan (1986) suggests that problem recognition is a process that can be divided into three stages, gestation, or latency, categorisation and diagnosis, where general cognitive frameworks and task-role schemas are present. The cognitive frameworks proposed by Cowan correspond to the principles of image theory (Beach and Mitchell, 1987), and, basically, are the models that people have of the world (Cowan, 1986). On the other hand, task-role schemas allow individuals to make sense of specific information related to a specific context, as in the case of organisational contexts. Specific schemas arise depending on the information available, and focus the attention of individuals on certain aspects of a situation, making them ignore others (Cowan, 1986; Kiesler and Sproull, 1982).

Kiesler and Sproull (1982: 565) suggest "*that managerial problem sensing, a necessary precondition for managerial activity directed toward organisational adaptation, is composed of the macro-processes of noticing, interpreting, and incorporating stimuli.*" In other words, without problem noticing, there would be no decision-making. Stimuli are noticed depending on the mental schemas of decision-makers. Interpretation of stimuli, or, in other words, the categorisation of a situation (Cowan, 1986), depends on how the decision-maker sees the goals, policies and strategies of his organisation (Kiesler and Sproull, 1982), and depends as well on the principles, goals and plans of the decision-maker (Beach and Mitchell, 1987). Dutton

and Jackson (1987) suggest that decision-makers focus their attention on some issues, and not on others, that is, they suggest that attention is dedicated to some specific matters, and that meaning is attributed to situations through categorisation, that is, through description. Description is a cognitive process, since interpretation is provided, that is, description follows interpretation. Furthermore, Dutton and Jackson (1987: 77) also suggest that “*the perceptual and interpretive processes of decision makers are consequential for determining organizational level action*”, thus, reinforcing the importance of cognitive aspects, namely perception, during the early phases of the decision-making processes. Strategic decision-making is fraught with ambiguity (Dutton and Jackson, 1987). In the presence of missing and, or, ambiguous information, cognition allows for information gap-filling, or information reconstruction, that is, the reinterpretation of ambiguous information according to the categorisation made of it. Moving from categorisation of issues to action is clearly a sign of a relationship between cognition and behaviour, since behaviour is reflected into action making.

Fig.4.1: Where Perception fits into Decision-Making – source: the author



4.2 Organisational Culture - Risk Culture Dimension

Schein (1984: 3) declares that in order to understand the culture of an organisation *“it is imperative to delve into the underlying assumptions, which are typically unconscious but which actually determine how group members perceive, think and feel.”*

Schein (1984) defines three levels at which culture manifests itself: assumptions, values and artefacts, and creations. Hofstede et al. (1990), on the other hand, proposes two levels of manifestations of culture, that is, values and practices. Values, however, seem to have different meanings for Schein (1984) and Hofstede et al. (1990), although Schein (pg. 4) divides values into *“taken for granted values for which the term ‘assumptions’ is more appropriate and debatable, overt, espoused values, for which the term ‘values’ is more applicable”* and Hofstede et al. (pg. 291) define values as *“broad, non specific feelings of good and evil, beautiful and ugly, normal and abnormal, rational and irrational – feelings that are often unconscious and rarely discussable, that cannot be observed as such but are manifested in alternatives of behaviour.”* This indicates significant overlap in both concepts. However, the main difference between those two authors is that, while Schein (1984) argues that values lead to behaviour, Hofstede et al. (1990) and Hofstede (1998) claim that organisational practices are the main driver of individual behaviour.

Drawing from the work of Deal and Kennedy (1982), Hofstede et al. (1990) suggest that organisational practices encompass manifestations of organisation culture, such as ‘symbols’, ‘heroes’ and ‘rituals’. Practices are the manifestations that are visible to any observer. However, only corporate members understand practices’ meanings. Managers link those practices to the values embodied in the organisation (Hofstede et al., 1990). Corporate heroes personify values, while symbols, rites and rituals show what is valued and how people should behave in order to be valued (Deal and Kennedy, 1982).

Organisational culture is defined by Schein (1990:111) as *“a pattern of basic assumptions, invented, discovered or developed by a given group as it learns to cope with its problems of external adaptation and internal integration, that has worked well enough to be considered valid, and, therefore, is to be taught to new members as the correct way to perceive, think, and feel in relation to those problems.”* Hofstede (1990: 286), alternatively, suggests the following definition of the organisational culture construct: *“is (1) holistic, (2) historically determined, (3) related to anthropological*

concepts, (4) socially constructed; (5) soft, and (6) difficult to change.” O'Reilly (1989) assumes culture as a set of controls and norms, although norms and controls seem not to be formal, but rather informal. Control concerns direction and coordination, while norms, which are drawn from values and styles, provide guidance in terms of behaviour. However, definitions are in general simpler and organisational culture, in broad terms, as put by Schein (1984: 3) “*settle for the notion that culture is a set of shared meanings that make it possible for members of a group to interpret and act upon their environment.*” By the same token, Glick (1985: 601) says that “*organisational climate has been loosely used to refer to a broad class of organisational and perceptual variables that reflect individual-organisational interactions and affect individuals' behaviour in organisations*”, and he is seconded by Pettigrew (1979), who suggests that culture provide the means for organisational members to interpret their own situations within the organisational contexts, and to behave accordingly.

Denison (1996) defends that what some scholars have called organisational culture is what other scholars have called organisational climate, and that the constructs have to be disentangled, in spite of “*contrasting perspectives with little overlap in style or substance*” (pg. 624). Denison (1996: 625), however, argues that “*although it is clear that culture and climate are, in fact, very different perspectives on organisational environments, it is far less clear that they actually examine distinct organisational phenomena.*” Hofstede (1998: 485), concurring with the words of Denison (1996), says that many times survey instruments related to organisational culture and organisational climate are “*indistinguishable*” and that some studies, in different time periods, deal with the same type of phenomena, which, depending on the time period, are part of organisational culture, or part of organisational climate. Differences and similarities between organisational cultures and climates are provided in table 4.1. Hofstede, however, argues that there is a fundamental difference between climate and culture. On the one hand, climate has “*an evaluative connotation*” (Hofstede, 1998: 485), which culture has not. On the other hand, climates may be better or worse, that is, climates are comparable, while cultures are not (Hofstede, 1998). That evaluative connotation is not shared by Hellriegel and Slocum (1974), who, making reference to their definition of organisational climate, argue that “*perceptual responses sought are primarily descriptive rather than evaluative.*”

Table 4.1: Comparison between Organisational Culture and Organisational Climate

Organisational Culture	Organisational Climate
Qualitative research methods	Quantitative research methods
Unique features of a given organisation	Generalisation across organisations
Evolution of Culture	Impact of Culture on groups and individuals
Comprehension of assumptions of culture	Comprehension of perceptions of practices of culture
Assumptions, values and beliefs held by organisations' member	Perceptions of organisations' practices held by organisations' members

Based on Denison (1996)

Originated in Anthropology	Originated in Sociology
Related to the organisational level	Related to individual motivation and behaviour
Cultures are not better or worse, they are different	Climates are evaluative and, therefore, comparable

Based on Hofstede (1998)

Organisational culture, or organisational climate, has been suggested as influencing behaviour patterns of individual members of organisations (Denison, 1996; Denison and Mishra, 1995; Hofstede, 1998; Kuratko et al., 1990). Denison and Mishra (1995: 204), making reference to the “*adaptation of social organisations*”, claim that some authors (e.g. Keesing, 1974), view “*culture as a system of socially transmitted behaviour patterns that serve to relate human communities to their ecological settings.*” Forehand and von Haller (1964: 362) define organisational climate as the “*set of characteristics that describe an organisation and that (a) distinguish the organisation from other organisations, (b) are relatively enduring over time, and (c) influence the behaviour of people in the organisation.*” However, Glick (1985) argues that perceptions of individuals are related to psychological climate, rather than organisational climate, in spite of the fact that the main difference between organisational and psychological climates seems to be the unit of analysis. Glick and Roberts (1984) and Glick (1985) show concerns in respect to the unit of analysis and draw the attention of researchers for wrong inferences that would result from the aggregation of perceptions of individual managers to explain and, or, measure organisational climate. Glick (1985: 602) calls it the “*the fallacy of the wrong level*” of analysis. Although understandable, it is argued here that the concerns of these authors are misplaced if the focus of a study is not the finding, or the measurement, of factors, or determinants, of organisational climate, or culture, but rather to get the perceptions that individual managers have of those factors, as is the case of this study.

Organisational culture sets norms of behaviour and drives people to action (Deal and Kennedy, 1983; Pettigrew, 1979). It is contended herein that action shall be qualified to mean the continuum action-inaction, since the signs of culture arising out of any given organisation, visible, or uncovered, to an outside observer, whether supposed to promote action, or inaction, are subject to exactly the same treatment by the cognitive system of a given individual belonging to that organisation, and who perceives the cultural signs. What changes, based on inputs, is the outcome, that is, the behaviour of the individual, or, in other words, his or her actions, or inactions. Other authors have stressed the importance of organisational culture, or organisational climate, insofar it influences behaviour of organisational members (Denison, 1996; Gordon and Ditomaso, 1992; Harris, 1994; Williams and Narendran, 1999), and, ultimately, impacts, among other aspects, firm performance (Denison, 1984; Gordon and Ditomaso, 1992), organisational performance (Wilkins and Ouchi, 1983), and organisational effectiveness (Denison and Mishra, 1995). These views on organisational culture are not totally shared by Wilkins and Ouchi (1983: 469), who suggest that “*organisation’s culture may be less relevant to organisational performance than is generally believed*”, although they add (pg. 469) that “*organisational performance cannot be adequately nor accurately understood without a comprehension of the culture of the organisation.*” In both cases, whether we speak about organisational culture or about organisational climate, what is clear and relevant for this study is that there is an interaction between organisations and individuals, and that the culture of organisations is reflected in the overt behaviour of their members (Schein, 1984). Quoting Harris (1994: 309), the importance of organisational culture, or rather the importance of organisational risk culture for this study, is summarised as follows:

“Specifically, I propose that in the social setting of the organisations, individuals make sense out of their experiences based in large part on the outcomes of contrived mental dialogues between themselves (e.g. ‘I think it means this and I would be inclined towards this response’) and other contextually-relevant (past or present; real or imagined) individuals or groups (e.g. ‘What would my boss and peers think about this? What would they want me to do?’).”

It is contended in this study that a good starting point to understand the creation of culture, and the impact of organisational culture on organisational members’

behaviours, is to draw from concepts related to entrepreneurship, including corporate entrepreneurship. Pettigrew (1979: 572) sees “*man as a creator and manager of meaning*” and sees entrepreneurs, defined as “*any person who takes primarily responsibility for mobilising people and other resources to initiate, give purpose to, and manage a new organisation*” (pg. 573), as creators of culture and suggests that culture drives people to action. Schein (2010) proposes that corporate culture impacts entrepreneurial behaviour, while Hofstede (1998) says that organisational practices are related to the values of founders in the earlier phases, and to the values of relevant top managers in the later phases. As put by Hofstede (1998: 483), “*leaders’ values become followers’ practices.*” Furthermore, Hofstede (1998) argues that organisational members have to follow the practices, should they want to remain members, even if they do not share the values. Therefore, organisations with certain decision-making and expected risk-taking practices should drive members to behave in accordance with those practices. Wilkins and Ouchi (1983) argue that, in spite of some reservations in respect to the causal relationship between organisational culture and performance, the performance of an organisation, including decision-making and risk behaviour practices, cannot be fully appreciated without an understanding of its culture. Basically, people do what they believe that the organisation expects them to do (Wilkins and Ouchi, 1983).

Kuratko et al. (1990) suggest that an entrepreneurial culture (intrapreneurship culture) leads people to innovate and take risks, while the lack of such culture has the opposite effect. These authors argue that management support and risk-taking are some of the conditions needed to have an entrepreneurial culture or environment, thus suggesting a causal relationship between those particular dimensions of organisational culture and innovation and risk-taking. There is considerable overlap between organisational culture and other aspects of an organisation, from the perspective of the organisational members (Schein, 1984), including, necessarily, strategy (Ireland et al., 2009; O’Reilly, 1989). O’Reilly (1989: 16) sees value in a strong culture due to “*the fit of culture and strategy, and the increased commitment by employees to the firm.*” Strategic decision-making is related to the decisions made in the continuum opportunity-threat, regardless of whether those decisions result from planned, or unplanned, search (Burgelman, 1983). An important part of strategic decision-making, and certainly the most studied one, deals with the opportunity side of the continuum. Studies of entrepreneurship, including corporate entrepreneurship, or intrapreneurship,

have been concerned with the way people focus on, and make good use of, opportunities. Some of those studies claim that entrepreneurship is part of corporate culture (e.g. Kuratko et al., 1990). Corporate entrepreneurship is systematically identified with innovation (Sharma and Chrisman, 1999) and, or, risk-taking (Lumpkin and Dess, 1996), being risk-taking assumed as part of innovation, whenever it is not considered as a dimension per se.

In addition, other than drawing from corporate entrepreneurial practices to understand risk behaviour, it is also important to stress the importance of the trait approach to understanding organisational culture and its impact on other variables of interest. Organisational climate and organisational culture share many features (Denison, 1996). One of the features retained in this study, is that there is a trait approach to both the organisational culture (Saffold, 1988), and to the organisational climate (James and Jones, 1974). A number of studies have related variables of interest to their authors with specific traits of organisational culture (e.g. Akin and Hopelain, 1986; Denison, 1984; Gordon and Ditomaso, 1992; Shadur, Kienzle and Rodwell, 1999; Stevenson and Gumpert, 1985). Schein (2010) supports the use of specific dimensions of organisational culture to measure performance, and, or, to compare organisations and, or, to “*educating employees about certain important dimensions that management wants to work on*” (pg. 162). This is the approach taken in this study. There are certain traits of organisational culture, or climate, which are more relevant to the purpose of this study, namely the cultural risk orientation of the organisations, which will be retained.

In the perspective of a study that deals with the risk behaviour of individual managers in organisational contexts, that is, the behaviour that is associated to decision-making involving risk-taking, it is of particular importance to address the dimensions of the organisational construct that impact individual risk behaviour. Organisational culture is a complex multidimensional construct (Hofstede, 1990), and crosses organisations transversally (Schein, 1990). Denison (1984) uses two dimensions, or traits, of cultural organisation in his study to measure the impact of culture on organisational performance, measured by financial indicators, and points out that the two dimensions are a small part of a large group of twenty-two dimensions that were identified in previous research. Other studies of organisational or corporate culture, or climate, have identified numerous dimensions and levels of culture, or typologies of

culture, or typologies of organisations based on their cultures. For example, Calori and Sarnin (1991) argue that other levels of culture such as professional, business, industry and national, impact corporate culture. James and Jones (1974) concur with the position of Calori and Sarnin (1991) when claiming for a model where individual characteristics and the socio-cultural environment would be taken into account together. Hofstede (1998), who sees behaviour as a reaction to practices, rather than to values, found six dimensions of organisational culture in a study involving twenty firms, while Denison and Mishra (1995) found 4 traits in a qualitative study of five firms, different from the two traits used by Denison (1984). Deal and Kennedy (1983) suggest the existence of different types of organisational culture, depending on the way risk and outcome feedback are associated. O'Reilly (1989) links culture with innovation, where innovation is a mix of creativity and implementation. Creativity includes, among other factors, 'risk-taking' and 'rewards for change', while implementation includes 'autonomy', a factor that is strongly related to decision-making.

Studies, however, need to be differentiated depending on their purposes. In this research project the aim is not the study of organisational culture. The aim is rather the study of the perceptions that individual managers have of the support from their organisations in respect to risk-taking, in the context of strategic decision-making, which, ultimately, make them engage, or not, in strategic decision-making and risk-taking behaviour. Therefore, the dimensions, or traits, of organisational culture, which are relevant, are the ones that impact perception. It is common practice to use a limited number of traits of organisational culture, or climate, and check on the effects that those traits have on certain variables of interest to researchers. For example, Gordon and Ditomasi (1992) predict firm performance from organisational culture using five cultural traits, which were combined into two traits, 'adaptability' and 'stability'. On the other hand, Williams and Narendran (1999) use 'organisational risk' as a cultural trait that impacts individual risk preferences, while O'Reilly et al. (1991) use eight dimensions of organisational culture to assess person-organisation fit, among which, one, innovation, includes risk-taking features. As mentioned above, Denison (1984) uses two dimensions or traits of cultural organisation, organisation of work and decision-making practices, out of 22 dimensions, with a specific purpose, arguing that he is particularly interested on the effects of those two dimensions into the financial performance of organisations.

Denison (1984) suggests that corporate culture fosters, or refrains, it is contended here, the engagement of organisational members. Similar ideas are presented by Smircich (1983: 346), who suggests that culture “*facilitates the generation of commitment for something larger than the self*”, and helps organisational members making sense of things, thus shaping organisational members behaviour. O’Reilly et al. (1991) advocate that interactions between organisational and individual factors shape the reactions, that is, the behaviours of individuals. Furthermore, specific characteristics of organisations lead to specific fitting of individuals in those organisations (O’Reilly et al., 1991). In the context of business firms, one individual hardly ever makes decisions alone, and consequences of the decisions affect, with even lower probably, just a single individual. Individual managers, in spite of their individual contributions to organisational decision-making, are integrated into organisations and, because of those individual’s contributions, they consider the implications for themselves, and for the firm, of their participation in decision-making processes. Furthermore, individual behaviour is a function of the individual and of the environment in which the individual is embedded (Chatman and Barsade, 1995; Schein, 1984). Implications for individuals are seen, in general terms, as a balance between the risks that they may face and the benefits that they may get by, in the context of this study, engaging in strategic decision-making processes, being risk a possibility of loss, according to the day-to-day usage of the word, and benefit a possibility of gain. Thus, the behaviours that the managers perceive as acceptable, or expected, by their organisations, and the perceived implications to managers of their participation in strategic decision-making, can be assessed by the perceptions that they have of the organisations’ practices in respect to decision-making and risk-taking. Individual perceptions of the riskiness of a decision subject take into account the way the individual evaluates the riskiness of the decision subject, according to the perceptions that he or she has of the values held by the organisation (Weatherly and Beach, 1996) and the perceptions of organisational practices and norms. When individuals and groups, to which they belong, do not hold common assumptions, instability and anxiety arise (Schein, 1990), and perceived risk increases.

4.3 CEO's Risk Behaviour

There is a considerable amount of academic literature, and popular press, stressing the importance of CEOs for firm performances, for better, or worse.

Agency theory (e.g. Jensen and Meckling, 1976) stresses the importance of top managements in general, and CEOs in particular, considering that CEOs are those, who, primarily, should be aligned with shareholders, showing by this simple fact their importance in organisations.

Upper echelons theory (Hambrick, 2007) posits the importance of top managements and, here again, of CEOs in particular, and says that organisations are reflections of top managements and that the characteristics of CEOs are a determinant of Top Management Teams structures and behaviours.

In addition, strategy management presents CEOs as part of the main drivers of the strategies of firms (e.g. Miller and Toulouse, 1986; Pearce and Robinson, 1987).

Puffer (1990) argues that leadership, namely charismatic leadership, has different components, and that risk-taking is one of them. Furthermore, this author states that decision-making is an important part of a leader's role (Puffer, 1990), and focus on ill-structured, non-programmed and non-routine decisions, which are characteristics of strategic decisions. Puffer (1990) argues also that the decision-making styles, or behaviours, are important to characterise decision-makers, and, more specifically to characterise leaders.

Wang et al. (2011) use traits, or dimensions, of CEOs' behaviours to find causal relationships with employees' attitudes. For example, a dimension 'being creative and risk-taking' results from five questions around risk-taking, innovation and creativity, and entrepreneurship.

Covin and Slevin (1988) use traits or dimensions of top management teams, and of organisational cultures, when looking for the influence that the way organisations are structured have on top management styles.

Tsui et al. (2006), likewise, use dimensions of CEOs and dimensions of organisational culture when unpacking the relationship between the two constructs.

The position assumed in this study is that the relative importance of CEOs is unquestionable (Carpenter et al., 2004), although recognising that each case is a different case, that is, each CEO is a different CEO, organisations have differences among themselves, and individual managers have different characteristics. Many

authors have used traits or dimensional approaches to deal with constructs of interest to them (e.g. Berson et al., 2008; Denison, 1984; Hart and Quinn, 1993; Hofstede et al., 1990; Nadkarni and Herrmann, 2010; O'Reilly et al., 1991; Venkatraman, 1989). The trait, or dimension, approach to study specific characteristics of CEOs, and the relationships between those characteristics with other dimensions of interest to scholars, has been also a common practice among scholars (e.g. Li and Tang, 2010; Peterson et al., 2009). In this study we adopt a similar approach, and use specific dimensions of CEOs, namely their risk behaviour, to find relationships with other constructs of interest retained in this study.

The reasons why CEOs behave in such, or such, way are beyond the scope of this research project. Therefore, literature that addresses the risk behaviour of CEOs, such as the literature on agency theory (e.g. Jensen and Meckling, 1976; Fama, 1980; Fama and Jensen, 1983; Nyberg et al., 2010), or upper echelons (e.g. Hambrick and Mason, 1984; Wowak and Hambrick, 2010), or psychological traits (e.g. Peterson et al., 2009), will not be presented in detail, although some references to that literature may be made. What is important, in the context of this study, is to gather evidence from literature to support, or not, a hypothetical influence of CEOs' behaviours on behaviours of employees, directly or through the cultures of their organisations, and, or, the organisational support that employees perceive to take risks. By employees it is understood, in the context of this study, all those employees who participate in strategic decision-making, that is, those who participate in at least one of the phases of the decision-making processes. Employees may also be referred to as subordinates, followers, etc, being those who are hierarchically below CEOs, which includes top and middle level managers.

Jackofsky et al. (1988: 39) argue that the "*organisation members other than the founders behave in a manner consistent with the value of the 'dominant elites' (the founders or current CEO)*". However, these authors further argue that the behaviours of CEOs, and the behaviour of their organisations, are not identical, in spite of some difficulties to separate what is firm's behaviour from what is CEO's behaviour (Jackofsky et al., 1988). Hambrick and Mason (1984) suggest that organisations reflect their top managers characteristics, while Tsui et al. (2006) argue that there are limits to the influence that top managers have on their organisations' cultures. Whereas

Geletkanycz (1997) and Covin and Slevin (1988) suggest that organisational cultures impact top executives, Lewin and Stephens (1994) propose that CEOs' attitudes determine the designs of organisations in what they are seconded, to a certain extent, by (Miller and Dröge, 1986), who argue that CEOs are one of the determinants of organisations' structures, and by Berson et al. (2008), who have found relationships between CEOs' values and traits of organisational culture, such as innovation, supportive and bureaucracy, which mediate the results of organisational outcomes, such as sales growth and efficiency, and employees' satisfaction.

Tsui et al. (2006), in a study to unpack the relationship between CEOs' leadership behaviour and organisational culture, suggest that, in spite of quite some close relationships between CEOs and organisational cultures, which is not a surprise considering that top managers are creators of culture (Schein, 2010), the influence of CEOs on organisational cultures is limited by their discretionary power, by organisational and environmental characteristics and by aspects related to the individuals, who are part of the organisations. Tsui et al. (2006) make reference to three perspectives, which, according to them, and taken together, make the behaviours of CEOs and their organisations' cultures two different constructs. Those perspectives or viewpoints are the functionalistic, the attribution and the contingency ones. The functionalistic perspective says that organisational culture is very much created by founders and leaders (Pettigrew, 1979; Schein, 2010; Smircich and Morgan, 1982). The attribution perspective, suggests that, on the one hand, employees see leaders with an importance that is overstated or overestimated (Meindl et al., 1985), thus putting them above organisational culture, and, on the other hand, see them as providers of meaning for what the organisations, or the organisational members, do (Kelley, 1973; Pfeffer, 1977; Phillips and Lord, 1981). The contingency perspective says that leaders have limits for what they can do, and that what they do is a function of the general level of discretion that they have (Crossland and Hambrick, 2011; Finkelstein et al., 2009; Finkelstein and Hambrick, 1990; Haleblan and Finkelstein, 1993; Wang et al., 2011), of spot events, such as crisis (Davis and Gardner, 2012; Hunt et al., 1999), that, together with CEO's personal characteristics, lead them to have more or less influence, and of substitutes for leadership (Howell et al., 1990; Howell and Dorfman, 1981; Kerr and Jermier, 1978; Podsakoff et al., 1996; Williams et al., 1988). Substitutes for leadership are features of the organisations and, or, of the organisations' members that, by themselves, replace some of the characteristics of leaders, rendering those

characteristics unnecessary, thus useless, and as if they were non-existent for the organisational members concerned (Kerr and Jermier, 1978).

There is an extensive body of literature focusing on the functionalistic perspective of organisational culture and on CEOs' behaviours (Tsui et al., 2006), that is, on the importance of organisational culture and CEOs' behaviours to the way that organisations are structured and operate, of which Edgar Schein is one of the most preminent authors (Schein, 1984, 1990, 1995, 2010). This literature conveys that founders, and top managers, are creators of culture (Deal and Kennedy, 1982; Hofstede et al., 1990; Pettigrew, 1979), and that organisational culture impacts the performance of firms. However, Wang et al. (2011) draw our attention to the fact that the results of most of the studies that try to link leadership to organisational performance are inconsistent, and, therefore, inconclusive. They argue, in the case of CEOs, that it is not clear which characteristics are important to firm performance, and how those characteristics impact firm performance (Wang et al., 2011), though they suggest that, regardless of his or her characteristics, the greater the discretion a CEO has, the greater should be his or her influence on the organisation. Several studies that have addressed empirically the impact of organisational culture on firm performance (e.g. Denison, 1984; Kuratko et al., 1990), or the impact of CEOs' behaviours on firm performance, mediated by organisational culture (e.g. Berson et al., 2008), concluded that such influence does exist. However, organisations and organisational cultures per se do not make decisions, and do not, objectively, behave. CEOs do make decisions and do behave but, by themselves, there is little they can do alone to gather information, assess situations, and so on, especially in complex environments, firms of substantial size and in the context of strategic decision-making. Therefore, it is expectable that the effects of the cultures of organisations and behaviours of CEOs are reflected on those who participate in strategic decision-making, that is, on all those who are subjected to those effects. Smircich and Morgan (1982: 257) argue that *“successful acts of organisation are often seen to rest in the synchrony between the initiation of action and the appeal for direction; between the actions of the leaders and the receptivity and responsiveness of the followers.”* It is worthwhile noting that this research project is about risk perception by individual managers, in organisational context, in the perspective of strategic decision-making, that is, in a framework of high uncertainty and relatively high internal discretion, which could anticipate a higher relevance of the roles of CEOs (Wang et al., 2011).

According to Calori et al. (1994) the CEO is the one top manager who consolidates the views of the top management team, which “*is responsible for providing organisations’ interpretations of their environment and strategic responses*” (pg. 438), and is also the top decision-maker in his or her organisation (Nadkarni and Herrmann, 2010). Nadkarni and Herrmann (2010) suggest that personal characteristics of CEOs, such as conscientiousness, emotional stability, agreeableness, extraversion and openness to experimentation, impact firm performance through strategic flexibility. Nadkarni and Herrmann (2010) conclude that conscientiousness inhibits strategic flexibility, and thus decreases firm performance, while emotional stability, extraversion, openness to experimentation and reasonable agreeableness increase strategic flexibility and, hence, firm performance. Clearly such impacts on strategic flexibility, and on firm performance, result from the readings that other managers, such as top management peers, middle managers, and employees in general, have of CEOs’ behaviours, keeping in mind that “*employees are responsible for executing the strategy and generating performance*” (Raes et al., 2013: 168). It shall be noted that when Nadkarni and Herrmann (2010) make reference to restrictions of employees’ creativity due to highly conscious CEOs, or to safe atmospheres, and backing for employees in case of failure, by CEOs who are emotionally stable, or yet when those authors note that employees’ creativity and risk-taking are related to strategic flexibility, and depend on reasonable levels of agreeableness by CEOs, those authors imply that the way managers and employees in organisations see CEOs’ behaviours condition their own behaviours. Such importance of the assessment of CEOs’ behaviours made by managers is confirmed by Wang et al. (2011: 94-95), who suggest, first, that “*employees’ attitudes could be affected by a wide variety of factors, including supervisory support, co-worker influences, and the employee’s own personal attributes*” and “*argue that the CEO is another causal agent by inducing positive attitudes among employees (such as perceived organisational support and organisational commitment)*”, and confirm, second, that the reactions, that is, the attitudes, or behaviours, of employees, namely middle managers, to CEOs’ behaviours mediate firm performance (Wang et al., 2011).

In order not to lose perspective, it is important to note that if we assume that there is some level of interaction between CEOs and organisational culture, and between CEOs and the employees of their firms, then on top of studying CEOs, one should study

organisational cultures and employees, otherwise organisational cultures and employees would play a passive role only, which is not the line of research claimed in this study, especially in respect to the role of individual managers (employees). The behavioural influence of CEOs in their organisations, including on employees, has been very much studied under the label of 'leadership'. However, it goes without saying that in order for some to lead some others need to accept, consciously, or unconsciously, to be led. Therefore, as important as the concept of leadership is the concept of followership (Carsten et al., 2010). It shall be kept in mind that if one contends that those who participate in strategic decision-making range, typically, from middle to top management, then, from a relationship perspective in respect to CEOs, important echelons of organisations could be assimilated to putative followers.

The fact that those who may get involved in strategic decision-making range from middle to top managers and are, in general, people with views and aspirations somehow different from those employees at lower hierarchical levels, reinforces the findings of Kerr and Jermier (1978), and others (e.g. Podsakoff et al., 1996), who argue that there are substitutes (and neutralisers) for leadership. Some of the substitutes that have been suggested and or identified by researchers, as related to subordinates in general, are, for example, the independence, and or the knowledge, and or the experience of the individuals who are subordinates (Kerr and Jermier, 1978), making them less dependent on leadership and less dependent on its effects.

Raes et al. (2011) suggest that Top Management Teams (TMT), and, therefore, CEOs, contact middle managers episodically. According to those authors, 'role behaviour' governs the behaviour of TMT and middle managers, especially during the absence of direct contact. There is, however, an asymmetry in terms of power, since TMT have direct hierarchical power over middle managers, while middle managers have no direct power over TMT. Furthermore, Raes et al. (2011) propose that TMTs' behaviours prompt middle level managers to adopt behaviours that match the way that they see TMTs behaving. Wang et al. (2011) make a similar suggestion when they study the reactions of employees, middle level managers essentially, to the behaviours of CEOs.

When talking about strategic leadership theory and of a beginning of social interaction among executives posited by that theory, and when introducing transformational leadership theory, Cannella and Monroe (1997: 223) say that "*little*

work has been done to integrate the social interactions between top managers and followers into the paradigm", and claim that that perspective is missing, thus supporting that a followership perspective is necessary as well. Cannella and Monroe (1997) stress the importance of followers' behaviour, by arguing that followers influence the implementation of strategies set forth by top managers. It is contended herein, however, that followers not only have a role in terms of strategy implementation but also in terms of strategy construction (Guth and Macmillan, 1986; Wooldridge and Floyd, 1990). A number of authors (e.g. Cannella and Monroe, 1997; Ling et al., 2008; Waldman et al., 2001; Wang et al., 2011) suggest that whether CEOs have transformational or transactional leadership characteristics, such characteristics influence behaviour of followers, that is, of all the remaining organisational members, and especially of those who deal with uncertainty and ambiguity involved in strategic decision-making and are, thus, more exposed to CEOs' behaviours. Transformational leaders care with support, consideration and recognition, and make employees want to follow them, and feel good in doing so. Transformational leaders aim at mobilising the human resources of firms in order to achieve organisational goals (Waldman et al., 2001). Transactional leaders, instead, manage under existing cultures (Waldman et al., 2001), and look basically for the implementation and execution of decisions, policies and so forth, doing so through rewards and punishment, in order to align lower organisational levels with top management (Wang et al., 2001).

Transformational leadership has been associated to charisma (Cannella and Monroe, 1997). Charisma is a characteristic of leaders, or rather a link between leaders and followers (Puffer, 1990), which has been suggested as an explanation for the behaviour of followers in organisational settings (Conger and Kanungo, 1987; Finkelstein et al., 2009). However, Schein (2010: 236) argues that there are 'embedding mechanisms' for leaders to "*teach their organisations how to perceive, think, feel, and behave based on their own conscious and unconscious convictions*", without, necessarily, the existence of charismatic links between leader and followers, or subordinates. The leader evidences part of those embedding mechanisms directly, being another part evidenced by their organisations (Schein, 2010), implying that both CEOs and organisational cultures influence individual behaviour. The embedding mechanisms attributed to leaders have direct impacts on employees: reaction of leaders to critical incidents and crises, recruitment, selection and promotion, allocation of rewards and status, allocation of resources and allocation of attention and control on a regular basis (Schein, 2010).

Confirming what is quite explicit by simple observation of behaviours in organisations, Schein (2010) argues that subordinates condition their behaviours according to their perceptions of what they believe that their leaders want. Subordinates are attentive to what leaders value, say and do, and interpret what leaders want. Furthermore, subordinates adapt behaviour to reduce anxiety, particularly following incidents and crisis, and in the presence of uncertainty. The ways leaders allocate resources and rewards, and punishments, affect the behaviours of employees. Typically subordinates will not adopt behaviours that they deem contrary to the perceptions that they have of the leaders' views (Schein, 2010). Clearly, the alignment, or misalignment, of a manager, or any other employee, with his or her leader decreases, or increases, the risk that that manager perceives by being part of a given organisation, regardless of his or her level of involvement.

4.4 Perceived Organisational Support

Some authors suggest that a workplace is a marketplace, in that employees provide their work to his or her organisation in exchange for something (Cropanzano et al., 1997; Randall et al., 1999). Therefore, by being positioned in a marketplace an employee would seek to get something positive out of his or her investment in effort, time, and skills, and so forth (Randall et al., 1999). However, getting something positive does not mean, in general terms, just those things to which employees are entitled to, such as salaries, for example (Aselage and Eisenberger, 2003). What employees get in the workplace in exchange for their work, other than what they are entitled to via their contracts, is a function of the context in the workplace, namely a certain organisational behaviour, including the behaviour of agents acting on the behalf of organisations. And what employees provide to organisations, and to agents acting on the behalf and empowered by organisations, including the way that they provide that, and with what intensity, that is, the way employees behave, is also a function of that same context.

Cropanzano et al. (1997) suggest that there are two specific dimensions of organisational behaviour, that is, organisational support and organisational politics, which establish themselves at the opposite sides of a continuum collaboration and support, on one side, and competition and power, on the other side (Randall et al., 1999), which impact directly, and considerably, the behaviours of employees. Absenteeism, turnover and other withdrawal behaviours, and job satisfaction and

commitment, for example, are some of the behaviours or attitudes that have been related to organisational support, and or to organisational politics (Randall et al., 1999; Rhoades et al., 2001). More importantly, and central to this study, is that employees reciprocate the support that they perceive from their organisations (Eisenberger et al., 2001).

Organisational politics is referred to, in general, as the management of power and influence. Some people would use power and influence with self-serving purposes, while others would not (Gandz and Murray, 1980). Mayes and Allen (1977: 675) define organisational politics as “*the management of influence to obtain ends not sanctioned by the organisation or to obtain sanctioned ends through non-sanctioned influence means.*” However, the definition of Mayes and Allen (1977) has a connotation of illegality, or illegitimacy, which does not always match the evaluations of organisational actors. Drory and Romm (1990; 1148) suggest that “*organisational politics occurs when goal attainment is sought by informal, rather than formal means of influence in the face of potential conflict.*” It is important to retain in the context of this research project that politics is pervasive in all organisations (Allen et al., 1979; Cyert and March, 1992; Ferris and Kacmar, 1992; Gandz and Murray, 1980; March and Simon, 1993; Mintzberg, 1985) and in all non-routine or strategic decision-making (Dean and Sharfman, 1993; Eisenhardt and Bourgeois, 1988; Eisenhardt and Zbaracki, 1992; Gandz and Murray, 1980; Schewnk, 1995).

Organisational politics is a construct of interest for two reasons. First of all, organisational politics may be seen either at the opposite side, with organisational support, in the continuum support-competition, or as two different constructs (Cropanzano et al., 1997; Randall et al., 1999). Regardless of whether we have one construct with two opposite sides, or two constructs, what is relevant here is that organisational support and organisational politics together provide the “*perception of the organisational marketplace as a whole*”, which is held by individuals (Cropanzano et al., 1997: 160). Secondly, organisational support does not address conflict, whereas organisational politics does. Conflict may arise from uncertainty in decision-making processes (Drory and Romm, 1990), and uncertainty, that is, risk, is central to this study. Conflict is also important because we are identifying factors that may make perceptions vary in one direction or another. Decision-making processes of a strategic nature, and naturally made under uncertainty, are fraught with informality, ambiguity,

lack of clarity and subjectivity. Due to all of these characteristics, putative participants in decision-making may think of divergences, potential conflict and power struggles, when assessing their involvement, or even unconsciously, concluding that their participation in decision-making may involve personal risks. According to views based on organisational politics, politics in organisations contribute to withdrawal behaviours, and, in the presence of politics, “*workers should attempt to contribute as little effort to the organisation as it is reasonably possible*” (Randall et al., 1999: 161). Empirical evidence suggests that there is virtually no organisation without ‘politics’, leading us to conclude that, therefore, organisational politics needs to be taken into account in the analyses of individual behaviours in organisational contexts. However, in this study, although the pervasiveness of politics in organisations is recognised, that construct is not taken into account explicitly in the model proposed, but rather assumed to be a construct that is present, transversely, in the perceptions of all the characteristics that are related to the organisational context.

Perceived organisational support refers to the assessments, conscious or unconscious, that employees make of the organisational behaviour, and which fosters their commitment, their engagement, and their risk-taking, including risks felt as personal, on the behalf of those organisations. Wayne et al. (1997: 82) define perceived organisational support as “*exchanges between an employee and an employing organisation.*” While dimensions of organisational culture are relatively static, organisational support is dynamic, and materialises into perceived organisational behaviour that affects employees directly. Eisenberger et al. (1986), drawing from the work of Levinson (1965), suggest that employees see the actions of the agents of organisations, that is, of those empowered to make decisions and take actions, as actions of the organisations themselves, since agents are empowered by organisations or by other agents empowered by the organisations. In other words, employees assign human characteristics to organisations (Levinson, 1965; Rhoades, Eisenberger and Armeli, 2001). “*Because employees personify the organisation, they would view favourable or unfavourable treatment as indicative of the organisation's benevolent or malevolent orientation toward them*” (Rhoades et al., 2001: 825). Furthermore, employees realise that organisations, through their agents, have power over them and that organisations set the rules and norms under which certain behaviours are expected (Eisenberger et al., 1986). Based on these views, “*employees develop global beliefs concerning the extent*

to which the organisation values their contributions and cares about their well-being" (Eisenberger et al., 1986: 501). Those beliefs are used by employees to construct expectations in respect to organisational behaviours, which are related to matters of interest to them, such as, for example, rewarding increased work effort (Rhoades and Eisenberger, 2002), or penalising, or being indifferent to, certain decision-making efforts. Employees classify those expectations positively or negatively, thus anticipating the positive or negative potential consequences that the behaviours of an organisation may have to them.

Rhoades and Eisenberger (2002) suggest that experiences of employees with their organisations determine the organisational support perceived, namely the experiences in terms of fairness of treatment and rewards provided by the organisations, and support provided by the organisations and, or, by supervisors. Furthermore, those authors contend that the strengths of the relationships mentioned here above, and the organisational support perceived, are moderated i) by the status that the supervisors of employees have in their organisations, as perceived by the employees; ii) by the voluntariness of treatment and rewards, rather than by, for example, a contractual obligation to reward; and iii) by employees' personal traits, such as being more or less collectivist.

On top of the relationships with their organisations, it is clear that employees have relationships with their supervisors as well, and may, from time to time, identify their supervisors with the organisations themselves. In those lines, like for organisations, employees perceive levels of support from their direct supervisors. Thus, naturally, the perceived organisational support is related to the perceived supervisor support (Rhoades and Eisenberger, 2002). In a study to test the causality direction between perceived organisational support and perceived supervisory support, and because of the possible effects on that relationship of the level of identification by employees of supervisors with their organisations, Eisenberger et al. (2002) developed a measure of that identification. According to Eisenberger et al. (2002), a supervisor is as much identified with an organisation by an employee, as much as that employee sees that supervisor having autonomy and authority, playing a role in important organisational decision-making, and being positively valued by the organisation. However, it is not that evident, and not clear, that employees see all of their supervisors as agents of the organisation (Rhoades and Eisenberger, 2002), or in other words, as representing the organisation.

Eisenberger et al. (2002) found out that the influence of the perceived supervisor support on the perceived organisational support, depends on the status of supervisors within the organisation, which is assigned to them by their subordinates. The higher the status perceived within the organisation, the higher is the influence of the perceived supervisory support on the perceived organisational support.

It is contended herein that, in the context of a study where employees, managers more specifically, are involved in strategic decision-making, employees may not see the actions of a given supervisor as representative of the risk-taking behaviour of an organisation. Additionally, in the specific case of strategic decision-making, supervisors are not necessarily seen as representing the risk behaviours of organisations, except for top managements teams and CEOs. Undoubtedly, the support provided by a supervisor, whose status in an organisation is perceived by those who are supervised as being low, is of little importance. This also stresses the importance of the leadership roles and positions such as those of CEOs, who, by the very nature of their functions, have, at least, a formal recognition of empowerment and status. Eisenberger et al. (2010) conclude that the identification that an individual makes between his or her leader(s), and the organisation, is related to his or her organisational commitment, thus emphasising the role of leaders and leadership in organisational contexts.

Moreover, fairness of treatment and rewards experienced by employees rely on the human characteristics, which employees assign to their organisations (Levinson, 1965). Organisations have, thus, a collective personality and display a culture, which, to those who are part of the organisations, materialises through an expectable collective behaviour. It is worth noting that reciprocity is magnified by the voluntariness of treatment (Aselage and Eisenberger, 2003). When rewards, or punishment, for example, are seen as the result of management discretion, rather than of organisational rules, reciprocity tends to be inflated.

Perceived organisational support is related to the behaviours of individuals, insofar individuals tend to adapt their behaviours to the way they see their organisations behaving, according to a pattern of reciprocity (Aselage and Eisenberger, 2003; Wayne, Shore and Liden, 1997). Lynch et al. (1999) conclude that employees of organisations consider how their involvement is valued by their organisations, when deciding the level of effort that they should put on their tasks. In addition, Aselage and Eisenberger (2003) argue that employees develop psychological contracts, or links, with their organisations, in the sense that they form expectations about what they are supposed to

provide to their organisations, and, reciprocally, what their organisations are supposed to provide to them, on top of what is 'legally' due, such as salaries. Such psychological contracts result, for example, from observations of organisational behaviour towards any other employees, and from the way other employees behave towards the organisation, and also from what is formal and is deemed to represent the *modus vivendi* of the organisation.

Furthermore, one important determinant of risk-taking activities in organisational context, also related to reciprocation, is trust (Burke et al., 2007). Trust might be seen as a personal trait, as, for example, the propensity to trust (Burke et al., 2007), but it is also a process, that is, trust is something that is fed by acts or behaviours. Trust, as a process, exists at different levels, including the organisational and the leadership levels. The consequences of trust have many impacts among which it is worthwhile noting, in the context of this study, the organisational and goal commitments of individuals.

Organisational support theory, supervisory support theory, psychological contracts theory, trust theory and leader-member exchange theory, all lead or point to the relationships between organisational members and their leaders, and between organisational members and their organisations. All the theories mentioned here above stress the role of reciprocity in those relationships. It seems logical to suppose and suggest that engagement by a manager in strategic decision-making, which is never a written rule or contractual obligation, results from the perception that a certain number of conditions exist to potentiate that engagement, or commitment, and that reciprocity will apply.

Very little is said by literature about the conditions that should exist to foster the engagement of managers in decision-making in organisational contexts. This shortcoming may be addressed, though, by relating the perceived organisational support, and more specifically the interface with the perceived supervisor support, with dimensions of organisational culture and of CEOs' behaviours in terms of risk.

Reciprocation, as is contended in this study, is the key explanation for the engagement of individual managers in strategic decision-making in organisational contexts.

4.5 Summary of Chapter 4

In Chapter 4 we argue that decision-making is not an act but rather a process. The fact that making a decision is a process leads to an assessment of where in the process do perceptions hold by individual managers play their most important roles.

We suggest that from a risk perception perspective managers' perceptions influence the decision-making processes, and, consequently, their outcomes, essentially during the recognition and evaluation phases. These are the phases of the decision-making processes during which personal experience and heuristics are at work.

We present and stress the importance of the organisational dimensions to individual decision-making and risk-taking behaviour. The organisational dimensions considered are the organisational risk culture, the risk behaviour of CEOs and the organisational support provided to managers. We argue throughout the study that the individual level of analysis is the individual manager, since what are at stake are the individual perceptions of a number of organisational dimensions, rather than the dimensions themselves.

We show how organisational culture is built overtime and how it depends on cumulated experience. We suggest links between the organisational cultures and the behaviour of CEOs and organisational support available to members of the organisations.

We stress the importance of leadership and CEOs to firms' performances and to organisational culture and of the role models of CEOs to other organisational members. We argue that CEOs contribute to the organisational support perceived by organisational members due to the very position CEOs have in organisations and also due to their subjacent expertise and apparent behaviour.

Organisational support is presented as a dimension that is related to organisational and contextual factors, including the organisational culture, the behaviours of CEOs and the decision topics considered. It is suggested that the perceived organisational support is seen as a proxy of the behaviours to be adopted by organisational members.

CHAPTER 5. LITERATURE SYNTHESIS AND MODEL DEVELOPMENT, RESEARCH AIMS AND STATED HYPOTHESES

5.1 Introduction

Based on the literature reviewed in the previous chapters, and based on the integration of that same literature provided here below, this chapter presents the framework proposed for this research project, including the research aims, and the set of hypotheses retained according to the research model(s) proposed. Furthermore, this chapter constitutes the basis of Chapter 6 (research methodology), where the selected research design is presented and discussed and Chapter 7 (preliminary studies and preparation of the final empirical study), where constructs are operationalized.

5.2 Synthesis and Integration of the Literature

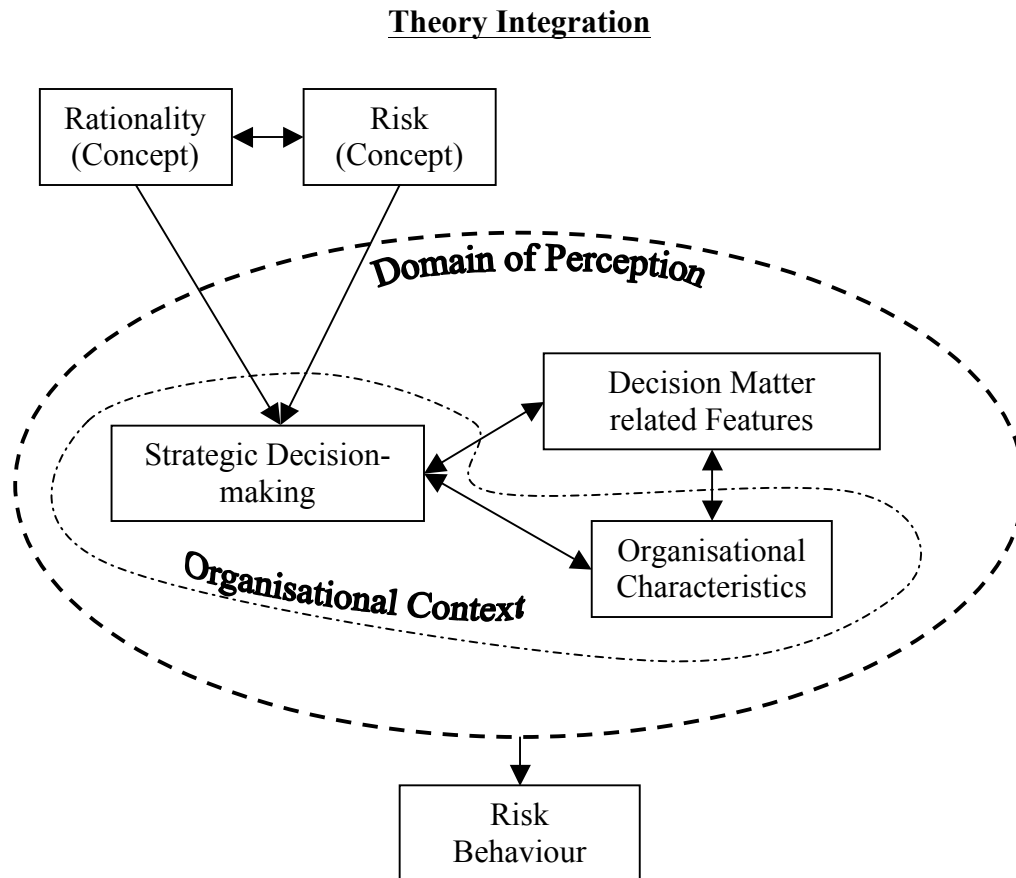
In chapters 2 through 4, the literature considered core to this study is reviewed. In chapter 2 we address risk and rationality, and drawing from different perspectives on rationality, we review decision-making theories of a non-behavioural, and of a behavioural nature, including heuristics and biases, which play a particular role in this project in terms of the constructs retained. Chapter 3 addresses the topic of perception, which, we contend, is the cement that keeps all the pieces together. Chapter 4 reviews the literature related to the variables of interest, which are part of organisational contexts, and presents the importance of the decision-making processes, namely the relationship between the decision-making processes and the perception phenomenon.

This study is about the perceptions that individual managers have of the risks related to their involvement in strategic decision-making, in the context of their organisations, namely the support that they feel that they have from their organisations to engage in risky behaviour. The organisational support perceived is seen, in this study, as a proxy of the individual risk behaviour in strategic decision-making. It is contended herein that, in an organisational context, the perceived support from the organisation is the key for a manager to engage in risk-taking and in risky behaviour. In other words, without organisational support a manager may decide, and most likely will, not to take any sort of risk, or, alternatively, take very limited risks only.

In order to understand the overall interactions, it is of paramount importance to bridge the literature on risk and rationality, and decision theory and risk behaviour, with

the literature on perception and organisational context factors (fig. 5.1), and to introduce some of the research that, in the context of this study, is considered as seminal, or relevant.

Fig. 5.1: How Theories and Concepts fit together - source: the author



In chapter 2 of this study we have seen the different conceptual views of risk, and of rationality¹⁹. We have seen as well why risk is important, and how individuals are expected to behave, according to normative views²⁰, and how they actually behave, according to descriptive views. We have addressed as well the literature on aspects related to individual managers, which are deemed relevant in the context of this study, such as heuristics and biases. We have reviewed the literature on perception, and the relevance of the cognitive aspects on strategic decision-making, and, finally, we have reviewed the literature related to the organisational features, which are retained in this study. Perception, which is a cognitive aspect, is the glue that holds together the different concepts, suggestions and conclusions drawn from literature, and the study.

¹⁹ Behaviour and Rationality are further developed in Annex 5.

²⁰ Normative theories are further developed in Annex 5.

Perception is the key to keep the study at the individual level of analysis, even when organisational variables are considered from a theoretical standpoint. Individual perception of all the parameters involved is the link to individual behaviour.

It shall be noted that the literature aspects retained are those, which, in the views of the author of this study, are the most relevant for the study subject, considering that the domain of the factors that potentially impact risk behaviour is extremely vast. Table 5.1 below provides a non-exhaustive list of elements with the potential to influence risk behaviour.

Table 5.1: Examples of Factors, which impact Risk Behaviour

Factors potentially impacting risk behaviour	Context	Author(s)
Affect	Affect in judgments of risks and benefits Risk as analysis and risk as feelings	Finucane et al. (2000) Slovic et al. (2004)
Anchoring	Heuristics and biases	Tversky and Kahneman (1974)
Availability	Heuristics and biases Behavioural decision theory	Tversky and Kahneman (1974) Slovic et al. (1977)
CEO's	Top Management Top Management Top Management and Organisational Culture	Hambrick and Mason (1984) Hambrick (2007) Tsui et al. (2006)
Controllability	Aspects of risk Strategic risk-taking Perception of risk Risky decision making behaviour	Vlek and Stallen (1980) Baird and Thomas (1985) Slovic (1987) Sitkin and Pablo (1992)
Familiarity	Aspects of Risk Strategic Risk-taking Risk Perception Risky decision making behaviour Risky decision making behaviour Risk Perception	Vlek and Stallen (1980) Baird and Thomas (1985) Slovic (1987) Sitkin and Pablo (1992) Sitkin and Weingart (1995) Weyman and Clarke (2003)
Firms	Type of firm and Entrepreneurship Management of small firms Corporate Performance and Organisational Culture	Miller (1983) Covin and Slevin (1989) Gordon and Ditomaso (1992)
Framing	Prospect theory	Kahneman and Tversky (1979)
Incentives	Risk-taking	March and Shapira (1987)
Industry	Strategic Risk-taking Corporate Risk-taking and Performance Determinants of perceptions of environment	Baird and Thomas (1985) Bromiley (1991) Sutcliffe and Huber (1998)

Factors potentially impacting risk behaviour	Context	Author(s)
Mood	Effects of Mood on Managerial Risk Perceptions	Williams and Voon (1999)
Organisational Culture	Strategic risk-taking Risky decision making behaviour	Baird and Thomas (1985) Sitkin and Pablo (1992)
Overconfidence	Cognitive biases Cognitive biases Cognitive biases	Kahneman and Lovallo (1993) Simon et al. (2000) Simon and Houghton (2003)
Outcome Experience	Risky decision making behaviour Risky decision making behaviour	Sitkin and Pablo (1992) Sitkin and Weingart (1995)
Regret	Regret theory Determinants of risk-taking Controllability, risk perception and regret	Loomes and Sugden (1982) Schoemaker (1993) Nordgren et al. (2007)
Representativeness	Heuristics and Biases,	Tversky and Kahneman (1974)
Risk Perception	Risk perception Risky decision making behaviour Risky decision making behaviour	Slovic (1987) Sitkin and Pablo (1992) Sitkin and Weingart (1995)
Risk Propensity	Risk propensity of entrepreneurs Risky decision making behaviour Risky decision making behaviour	Brockhaus (1980) Sitkin and Pablo (1992) Sitkin and Weingart (1995)
Tenure	Top management	Hambrick and Mason (1984)
Time	Time pressure Time pressure	Svenson et al. (1990) Ordoñez and Benson (1997)
Top Management	Top management	Hambrick and Mason (1984)
Voluntariness	Aspects of risk Risk-taking Risk perception Risky decision making behaviour Risk-taking	Vlek and Stallen (1980) MacCrimmon and Wehrung (1986) Slovic (1987) Sitkin and Pablo (1992) Shapira (1995)

In the synthesis of the review of literature presented in this Chapter, and in the seminal research work reviewed and retained as a foundation of this study, there are references to most of the studies that provide the theoretical skeleton supporting this project (table 5.2).

Table 5.2: Seminal Work providing Theoretical Support for this Research Project

Study or Book Title	Context	Author(s)
Theory of Games and Economic Behavior (3 rd edition)	Game theory - choices	Von Neumann and Morgenstern (1953)
Administrative Behavior (4 th edition)	Organisational behaviour	Simon (1997)
A Behavioral Model of Rational Choice	Decision making	Simon (1955)
Judgment under Uncertainty: Heuristics and Biases	Heuristics and biases in decision making	Kahneman, Slovic and Tversky (1982)
Theories of Decision-Making in Economics and Behavioral Science	Decision making	Simon (1959)
Toward a Contingency Model of Strategic Risk-taking	Strategic risk-taking	Baird and Thomas (1985)
Taking Risks: The Management of Uncertainty	Managerial risk	MacCrimmon and Wehrung (1986)
Managerial Perspectives on Risk and Risk-taking	Managerial risk	March and Shapira (1987)
Perception of Risk	Societal risk	Slovic (1987)
Judgment and Decision Making	Decision making	Yates (1990)
Reconceptualizing the Determinants of Risk Behavior	Managerial risk	Sitkin and Pablo (1992)
Determinants of Risky Decision-Making Behavior: A Test of the Mediating Role of Risk Perceptions and Propensity	Managerial risk	Sitkin and Weingart (1995)
Risk-taking: A Managerial Perspective	Managerial risk	Shapira (1995)

5.2.1 Rationality and Behaviour

Studies on risk behaviour commenced essentially with economists, who were concerned with the behaviour of consumers and of producers of goods and services. The big advance to the formulation of the economic problem, related to the producer/consumer relationship, and which triggered numerous studies on risk-taking, decision-making and, or, risk behaviour, at an individual and, or, organisational levels, occurred with the seminal work of von Neumann and Morgenstern (1953), the Theory of Games and Economic Behavior, where, as a result of the development of Expected Utility Theory (EUT), norms were expressed to define the behaviour of economy agents deemed rational. By the very nature of the mathematical treatment of the norms, or

axioms of EUT, rationality became then the cornerstone of normative decision-making theories, and the main, or one of the main points of discord among scholars interested in decision-making and risk behaviour. The work of von Neumann and Morgenstern (1953) raised support, applause and followers, on the one hand (e.g. Friedman and Savage, 1948), and criticism and adversaries, on the other hand (e.g. Allais, 1953). Expected utility, a set of axioms or postulates related to preferences among alternatives to be chosen in a decision situation (von Neumann and Morgenstern, 1953), has been extensively tested by followers and critics. In the early 1950s several authors, including psychologists (e.g. Edwards, 1954), and followers of von Neumann and Morgenstern (e.g. Savage, 1972), suggested, and proposed, theories to introduce the concept of subjective probability into decision-making theory, and, in the case of Savage (1972), to axiomatise subjective probability and subjective utility together, in what became known as Subjective Expected Utility Theory (SEU). Extensive empirical testing showed several violations of the axioms of both EUT and SEU (e.g. Allais, 1953; Ellsberg, 1961; Tversky and Kahneman, 1974), and led to the identification of several heuristics and biases used or evidenced by decision-makers when making decisions (Hogarth and Makridakis, 1981; Schwenk, 1984; Slovic, Fischhoff and Lichtenstein, 1977; Tversky and Kahneman, 1974). For example, decision-makers do not always have clear preferences, preferences are not always transitive, probabilities of events add up to more than 100%, several biases have been found in respect to the assignment of probabilities to events, and so forth. Some of the axioms of EUT and or SEU do not hold when tested empirically, which led to four types of responses by scholars, as contended by the researcher carrying out this study: i) first of all certain authors (e.g. Savage, 1972) accepted the logic of maximisation of utility behind the theory, but challenged the utilisation of objective probabilities, and proposed their replacement by subjective probabilities, that is, they created an enhancement of EUT, which became known as Subjective Utility Theory (SEU); ii) secondly, certain authors, while challenging some of the axioms, but without challenging the concept of utility maximisation, proposed different axiomatisations (e.g. Bell and Raiffa, 1988; Fishburn, 1988a, 1989b), or alternative theories, such as Prospect Theory (e.g. Kahneman and Tversky, 1979), to accommodate the deviations in behaviours; iii) thirdly, certain authors challenged directly some of the axioms of EUT (e.g. Allais, 1953), and, or, SEU (e.g. Ellsberg, 1961), and indirectly the use of mathematical expectation (probabilities x utilities), and called for dropping maximisation concepts, or to abandon decision-making

methodologies; and iv) fourthly, and finally, some authors simply refused and dismissed the concept of maximisation and any sorts of decision-making methodologies, and proposed alternative behavioural theories, such as bounded rationality (Simon, 1955), including the concept of 'satisficing', as an alternative to the concept of maximisation (Simon, 1959), or naturalistic decision-making (Klein, 2008), which includes several theories of which image theory (Beach and Mitchell, 1987) is one of the main representatives.

The main rift, as far as individual risk behaviour is concerned, other than the differences between 'ought to do' and 'actual' behaviours, is the definition of rationality adopted by those who, on the one hand, postulate that human beings ought to have clear preferences and be 'maximisers' (e.g. Friedman and Savage, 1948; Marschak, 1950, 1951; Savage, 1972; von Neumann and Morgenstern, 1953) and those who, on the other hand, say that human beings are rationally bounded, that is, cannot process all the information available and simply 'satisfice' (Cyert and March, 1992; Einhorn and Hogarth, 1981; March, 1978; March and Simon, 1993; Simon, 1955, 1959, 1979, 1986), or have decision-making mechanisms that, simply, do not conform to behaviours prescribed by maximisation and, or, utility theories (Beach and Connolly, 2005). Einhorn and Hogarth (1988: 114), enlarging the rationality rift, say that "*while it has been argued that the difference between bounded and economic rationality is one of degree, not kind, [they] disagree.*"

It shall be noted, however, that even among those who contend that individuals are not rational, in the way portrayed by supporters of EUT and SEU, and define rationality as a reason, or set of reasons, to do something in a given way, or do something with a certain purpose, within the limitations proper to the decision-makers, there are significant differences in the ways to approach rationality (March, 1978). March (1978) suggests a number of ways to approach rationality, that is, to explain why individuals and or organisations do what they do, and divides rationality according to two main views: purposeful rationality, that is, "*action is presumed to be consequential, to be connected consciously and meaningfully to knowledge about personal goals and future outcomes, to be controlled by personal intention*" (March, 1978: 592) and systemic rationality, that is, "*behaviour is not understood as following from a calculation of consequences in terms of prior objectives*" (March, 1978: 593), but rather as being

evolutionary, and being a function of the knowledge accumulated by individuals and organisations (March, 1978).

Thus, on the one hand, and related to purposeful rationality, i) action or inaction may result from limitations to process information, including the inability to anticipate all the possible outcomes of a choice; ii) choices may result from the context in which decision subjects occur, and may depend on the focus of attention of organisational players, by the time the decision matters present themselves; iii) rationality in organisations could result from the sum of actions of individuals, who pursue individual goals, and team up according to their self-interests; and, finally, iv) processes can be more important than outcomes, meaning that rationality and self-interest is pursued by decision-makers, through their involvement in the decision-making processes, rather than by targeting the best possible outcomes. On the other hand, rationality might be adaptive, that is, i) decisions are made based on a continuum of accumulated experience and knowledge; ii) rationality is based on selection in that the continuum and trend of decisions result from survival and growth, that is, result from past decisions, which aimed at adapting to the business environment; and iii) rationality is seen as a process of adjusting goals to the outcomes of decisions made. As noted by March (1991) it is possible that individuals, or organisations, make decisions not, or not only, with the aim to achieve certain outcomes. For example, decisions might be made in a problem solving logic, that is, in a way that what is important is the process, and the effort, to solve the problem, and not the outcome per se. Decisions might be made as well to follow rules, and, or, to provide meaning, thus, matching behaviours that individuals feel as adequate in their organisations (March, 1997). Such matching of behaviours has clearly a note of self-interest, in the sense that managers behave in ways that allow them to progress, adapt, and, or, survive, in their organisational contexts.

The view adopted in this study is that deviations in actual behaviours from economic rationality, by organisational actors, are too important and frequent not to be considered. Furthermore, the importance and frequency of deviations are such that justifying those deviations with human computational limitations may not be enough (Shafir and LeBoeuf, 2002). This study is about decision-making and risk-taking behaviour, that is, about action, therefore, rationality and action need to be related. In the context of this study, the definition of rationality adopted is the general meaning provided by dictionaries, that is, the feature of having practical and concrete reasons to

do something with a certain purpose. It is worth noting that making a decision with a purpose does not mean necessarily achieving a tangible outcome. A purpose might be, for example, doing something in order to feel part of a group. On the other hand, from an observer's perspective, practical and concrete reasons for someone to do something need not to be practical and concrete for that particular observer, and need not to be consistent and coherent across the board for the choices made.

5.2.2 Risk

Besides the differences in respect to rationality, supporters and adversaries of non-behavioural theories of decision-making differ as well in respect to the definition of risk. In economy science, risk is related to and associated with certainty or uncertainty of alternatives, and, therefore, with certainty, or uncertainty, of outcomes and consequences. Certainty, or uncertainty, materialises through probabilities associated to outcomes, being the probabilities objective or subjective, depending on the theorists' views. The outcomes of choices have utilities, which are the subjective values that something has to someone. The total utility of an alternative is that subjective value multiplied by the probability of occurrence of that alternative, that is, its mathematical expectation (Schoemaker, 1982). Economy science does not bring into the equation any factors related to the individuals, the decision subject, the contexts, etc., except the very definition of utility. At this point, it could be argued that everything that counts to a decision-maker, including any factor of a behavioural nature, should be part, or should be already discounted, in the utilities that that decision-maker assigns to outcomes. However, empirical evidence strongly suggests that not to be the case. Derived from the use of probabilities, and especially from probabilities seen as frequencies, there are measures of risk that are proposed that take into account utilities, and, or, probabilities, such as the variance of probabilities distribution or the variance of the utilities, that is, the variance of the product of probabilities by utilities (Vlek and Stallen, 1980).

In social theory (Renn, 1998) and in business, which includes managers in an organisational context, risk is about losses, whether an exposure to, or a materialisation of those losses (MacCrimmon and Wehrung, 1986; Shapira, 1995; Yates and Stone, 1992), and not about maximisation. Social theories dealing with risk (e.g. Leader-Member Exchange Theory), descriptive theories of risk behaviour (e.g. Image Theory), including certain theories that posit maximisation such as Prospect Theory, all take into

account contextual characteristics, and, or, decision-maker characteristics, and characteristics of the decision subject, in what constitutes the major difference when these last theories are compared to economy theories of utility maximisation. It is worth mentioning, however, that many authors, although not positing utility maximisation, consider, or suggest, that risk is measured by the product of probabilities by utilities, or that risk is a future state to which a probability, or likelihood, is attached (e.g. Edwards, 1954; Lopes, 1987), thus reinforcing the relevance of the probabilistic aspect or, in other words, of the level of uncertainty for the assessment of risk or as a measure of risk. However, Kaplan and Garrick (1981) argue that two given alternatives may have the same calculated utility, that is, the products of outcomes by probabilities may be the same, without those alternatives being necessarily equivalent. Kaplan and Garrick (1981: 13) say that *“in the case of a single scenario the probability times consequence viewpoint would equate a low-probability high-damage scenario with a high-probability low-damage scenario – clearly not the same thing at all.”* MacCrimmon and Wherung (1986), March and Shapira (1987) and Shapira (1995), who have studied managers' behaviours, and compared their findings to what is postulated by theories of choice, corroborate the views of Kaplan and Garrick (1981). Managers focus on big losses, whether related to low or high probabilities (Shapira, 1995). Managers do not mind taking big risks, big from a probabilistic perspective, if the loss is negligible but do mind taking small risks, again from a probabilistic perspective, if what is at stake is important, and, especially, if those losses may jeopardize the future of the firm, and their future as individuals (MacCrimmon and Wehrung, 1986; Shapira, 1995). Furthermore, managers do not gamble, that is, they do not play with probabilities (March and Shapira, 1987; Shapira, 1995), they feel that they exert control over outcomes (Sitkin and Pablo, 1992), and losses are not necessarily evaluated in absolute terms since, managers look for losses compared to targets or references (Kahneman and Tversky, 1979; March and Shapira, 1987).

Yates and Stone (1992) advocate that the definition of risk is not consensual, considering that people refer to risk when they speak of some of the risk elements. In other words, this means that elements of risk are, many times, identified with the risk itself, and that different risk elements, used to define risk, may lead to different definitions of risk.

Risk is a construct with many dimensions. In addition there are different risks in different contexts such as, for example, social, political, business and military (Kaplan

and Garrick, 1981). However, Yates and Stone (1992) say that there are three elements of risk that emerge consistently from all the definitions: i) possibility of losses; ii) magnitude of possible losses; and iii) uncertainty about the occurrence of losses. These three dimensions related to losses are subjective (Yates and Stone, 1992), therefore, make it impossible to separate the individuals experiencing the losses, from their personal evaluations of what those losses are or mean.

Other than in the field of economy, researchers have studied risk mainly in the domain of societal, public hazards. Concerns with the perceptions that people have of risks, are anchored essentially in this latter field, while in the former, certainly because of the rationality paradigm, what is relevant are choices among alternatives seen, at most, as subjective in terms of their probabilities of occurrence. The research approach adopted by the author, follows the line that the way individual managers perceive risks in their business organisations, is similar to the way that risks are perceived by individuals of the public in the case of societal hazards. It is contended here that, in general terms, there should be no sound reasons for behaviours to be different. Furthermore, it is also assumed in this research that perceptions in organisational contexts, like in societal contexts, do count and that behaviour in face of risk is a function of the perceptions of that same risk.

Baird and Thomas (1985), in a study to model strategic risk-taking in business contexts, suggest that risk perception is prominent during the risk identification phase of the model. Likewise, Slovic (1987) suggests that risk perceptions of hazards in the public realm, are the judgments people make, or the opinions that those people express, when asked about those hazards without any further study or evaluation, that is, the opinions expressed during the recognition phase.

Stanley and Garrick (1981) draw attention to the difference, and the connection, between risk and hazard when they say that hazard is not risk, but rather a source of risk that may or may not materialise, and add (pg.12) that "*the ocean can be said to be a hazard*" and that "*if we attempt to cross it in a rowboat we undergo great risk*" but that "*if we use the Queen Elizabeth, the risk is small.*" Baird and Thomas (1985) suggest that variables, which have been assumed as playing a role in risk perception related to societal risk, such as controllability, play a role as well in risk behaviour in strategic decision-making. In the same vein, Sitkin and Pablo (1992) suggest that controllability and familiarity or experience with the decision-making subject, two variables identified

by authors such as Vlek and Stallen (1980) and Slovic (1987) in the domain of public hazards, impact risk behaviour related to decision-making in organisational contexts. It is worth noting that many characteristics of strategic decision-making are similar to those in relevant societal decisions. This is the case of effects delayed in time, of important losses, of high uncertainty and ambiguity, and of unknown outcomes (table 5.3).

Table 5.3: Common Factors, which impact Decisions in Organisational and Societal Contexts

Factor	Decision-making in Organisational Context	Decision-making in Societal Context
	Author(s)	Author(s)
Controllability	Baird and Thomas (1985); Sitkin and Pablo (1992) Weber and Milliman (1997)	Vlek and Stallen (1980); Slovic (1987)
Experience	Sitkin and Pablo (1992); Sitkin and Weingart (1995); Weber and Milliman (1997)	Twigger-Ross and Breakwell (1999); Vlek and Stallen (1980)
Magnitude of Outcome Loss	Baird and Thomas (1985); MacCrimmon and Wehrung (1986); March and Shapira (1987); Shapira (1995)	Slovic (1987); Vlek and Stallen (1980)
Probability vs. magnitude of Outcome Loss Voluntariness	Shapira (1995); Weber and Milliman (1997) Baird and Thomas (1985)	Slovic (1987); Vlek and Stallen (1980) Slovic (1987); Twigger-Ross and Breakwell (1999); Vlek and Stallen (1980)

In the context of this study, risk is defined as the perceived exposure to losses, material or otherwise, of a magnitude that impacts the decision-maker, from his or her perspective, directly or indirectly, in a relevant way.

5.2.3 Decision Theory and Risk Behaviour

Behavioural theories of decision-making blossomed as an effort opposed to theories that do not take behaviour into account. That arousal was based essentially on strong empirical evidence that contradicted 'rationalists' (Lowenstein et al., 2008; Starmer, 2000), rationalists who, based on the assumption that all human beings are, or ought to be, rational, according to the economical characterisation as described above, prescribed recipes to make decisions.

The label 'behavioural theory' is seen, in the framework of this study, as representing all theories that assume that decision-makers do not follow the canons of rationality. In addition, it also does not assume that they should, even if some of those theories keep some concepts of maximisation, and, or, any methodology that provides decision-makers with choice mechanisms. Behavioural theory is thus a label for all theories, whose aims are to propose explanations for the way decision-makers behave, and that take into account individual, situational and organisational factors, and, or, characteristics. For example, there are differences between Prospect and Image theories in the ways that both theories justify how decision-makers make decisions and behave. However, in spite of the differences, none of those theories say that if decision-makers do not follow canons of rationality, they should, as normative theories of decision-making would say. It is argued here that the type of convergence provided here above is more important than any differences between theories, since the most important aspect of that convergence is the acceptance that decision-making and risk behaviours have to be understood, rather than questioned. Having said that, it is also argued in this study that simple description of behaviour is useless, unless it serves, at least, to alert decision-makers to the way they behave, when making decisions and facing risk. As a matter of fact, it is contended herein that the predictive feature of normative theories is the one aspect that makes those theories attractive, in those fields where prediction is important, such as business, economy and finance.

Since the 1950s, several explanations, alone or combined, have been put forward to explain actual behaviour in decision-making. Ambiguity, regret, attention, affect, mood, perception, propensity, risk seeking, risk avoidance, framing, heuristics and biases, decision-maker age, and decision-maker personality traits, are some of the factors that have been associated to the individual decision-maker. Furthermore, aspects related to the decision matter or domain, to contextual factors, including group and organisational factors, to the industry, to national features, and so forth, have been presented. Traditionally, psychologists have seen a separation of the decision-making and risk behaviour fields that materialises into judgment and decision-making (Hastie, 2001; Mellers et al., 1998; Pitz and Sachs, 1984; Weber and Johnson, 2009). According to Hastie (2001), while judgment is concerned with phenomena, such as perception and inference, and prediction, decision-making is concerned with choice. However, it is worthwhile noting that, the development of the judgment branch arises from the

challenges faced to explain choice, from a behavioural standpoint. The thesis supported in this study is that, from an applied management viewpoint, judgment and decision-making, or choice, are different ways to present the same issue. That distinction would make sense only if choice was treated, as it used to be in the 1950s and the 1960s by most of the academics, as a spot action made at a precise point in time, which justified the analogy with gambles. Additionally, in spite of the existence of many studies that are concerned with choice, it is widely recognised that decision-making, and especially strategic decision-making in organisational contexts, is a process. From the moment decision-making is seen as a process, judgment, automatically, is part of the process.

Sitkin and Pablo (1992) propose a model of the determinants of risk behaviour in which individual, situational and organisational aspects are considered together, and mediated by risk perception and risk propensity, and say (pg. 10) that “*prior researchers have suffered from a fragmented, issue-oriented focus that has resulted in overly simplified models in which a variety of individual, organisational, and problem-related characteristics are posited to directly influence individual risk behaviour.*” The view that is advocated in the current study, in line with the views of Sitkin and Pablo (1992), is that risk behaviour of individual managers is determined by a set of numerous constructs related to the individual, to the decision subject and to the context in which the decision-making process occurs. It is argued as well that models shall retain, at least, some of the complexity of the subject. Nonetheless, like Sitkin and Weingart (1995) do when they test part of the model proposed by Sitkin and Pablo (1992), it is recognised in this study that it would be nearly impossible to test a model of risk behaviour with the numerous variables that would need to be considered. Therefore, the necessary approach is to proceed by increments. Sitkin and Pablo (1992: 32) suggest that “*researchers interested in specialised subareas of risk behaviour may wish to focus on smaller sets of variables so as to address the possible interaction effects among them thus adding complexity and richness to the understanding of risk behaviour.*” The position adopted here is that the set of constructs may be smaller, but may as well be somehow different, although being part of the major groups of variables referred herein above. That would be the case, for example, if the organisational support perceived by the individual managers were retained. The context in which a strategic decision-making process develops, includes the organisation where the decision subject is dealt with, but also the business environment, which includes the industry to which the firm

belongs, and the societies where the firm operates (Baird and Thomas, 1985). Additionally, although the study of Sitkin and Pablo (1992) is clear in that risk perceptions and risk behaviours considered are those of individual managers, it raises doubts in respect to who would face the risk perceived by the individual manager: the manager and, or, the firm. MacCrimmon and Wherung (1985) found that the risks that managers take in their firms, and in their personal lives, are different and that higher risks are taken in an organisational context, that is, when playing with the 'house's money'. In this study, all the variables considered are believed to contribute, ultimately, to the perceptions of the risks that individual managers think they would face themselves, should they engage in strategic decision-making. Behaviour of individual managers is contended in this study to be a function of those risk perceptions.

5.2.4 Decision Subject Characteristics and Decision-maker Related Aspects

The decision subject features, or related features, that have been suggested as the most important in respect to risk behaviour of individual managers, are the risks conceptualised by the decision-maker as the possibility and magnitude of losses, potentially resulting from the courses of action available (Yates and Stone, 1992). Clearly, risks, as conceptualised above, may impact the decision-maker, the entity in whose behalf the decision-maker makes decisions, or both.

Studies made by MacCrimmon and Wehrung (1986) and Shapira (1995) show that managers evaluate losses in absolute and relative terms, that magnitude of losses is the most important aspect, and that probabilities may be taken into account, when what is at stake is very important. Furthermore, managers do not calculate expected utilities, and say that risk is much more than just a simple figure. Therefore, the perceptions of the risks associated with the decision subjects, shall result essentially from the assessment of losses, and their likelihood, or, in other words, from what those risks represent to the organisation in terms of losses and opportunities, and how positive or negative the decision subjects may be to the organisation (Sitkin and Weingart, 1995).

Some of the factors inherent to the decision-makers, which relate them with the evaluation of the decision subject, are the familiarity, or experience, that the individual decision-maker has with the subject decision and the results of past decisions (March and Shapira, 1987; Sitkin and Pablo, 1995; Slovic, 1987; Thaler and Johnson, 1990; Twigger-Ross and Breakwell, 1999), and the level of control (illusion of control or

controllability) that the decision-makers think that they may exert over the decision processes, especially the level of control over the outcomes (Langer, 1975; March and Shapira, 1987; Schwenk, 1988; Sitkin and Weingart, 1995; Sutcliffe and Huber, 1998; Vlek and Stallen, 1980).

Familiarity with a given decision subject, includes experience with the outcomes of similar decisions related to that subject, or to a similar one. Outcome experience is related to a general knowledge of the results of decisions made. Sitkin and Weingart (1995: 1576) define outcome experience, or outcome history, "*as the degree to which the decision-maker believes that previous risk-related decisions have resulted in successful or unsuccessful outcomes.*" According to Sitkin and Pablo (1992), since decision-makers see outcomes as the results of decisions made, there is a reinforcement logic that makes decision-makers evaluate new decisions in accordance with past strategies or models. Therefore, it is expected that outcome experience impacts the risks that managers perceive as being associated to the decision subjects under consideration.

On the other hand, Langer (1975) has shown that perceived control is related to skills, and that decision-makers see familiarity as a skill, which, therefore, increases the control over the decision processes, and over the outcomes perceived by decision-makers, whenever they are familiar with the decision subjects. Additionally, Vlek and Stallen (1980: 287) suggest that perceived control of risky situations depends "*upon the amount of prior knowledge about possible consequences*", and March and Shapira (1987) argue that controllability results from managerial experience. Therefore, it is expected that outcome experience impacts the illusions of control held by decision-makers.

Furthermore, experiences shared within a group of organisational members, who have been together long enough to have experiences in common, are one of the pillars of organisational culture (Deal and Kennedy, 1983; Schein, 2010). Hence, it is expected as well that the outcome experience of managers be related with the organisational culture.

Illusion of control is a heuristic that is defined as, "*an expectancy of a personal success probability inappropriately higher than the objective probability would warrant*" (Langer, 1975: 311). Sutcliffe and Huber (1998) define controllability as the level of control that is perceived by managers. Control is related to skills, and resources,

that managers perceive to have available to deal with the decision-making subject considerations, in a way that allow them to contain, correct, or reverse, outcomes (Baird and Thomas, 1985). Illusion of control is suggested to be related to the perceptions that managers have of their own capabilities, and the capabilities of their organisations, to influence the outcomes. Managers believe that risks are controllable, and apply what they see as risk mitigation tactics, such as delaying decisions, getting more information and passing risks on to others, and do not engage in decision-making before looking for those tactics (March and Shapira, 1987). Illusion of control is a factor that has a direct impact on the perceptions that managers have of the risks associated with the decision subjects. As put by March and Shapira (1987: 1411) “*managers accept risks, in part, because they do not expect that they will have to bear them.*”

On the other hand, it is worthwhile noting that illusions of control, though inherent to the decision-makers, do not depend only upon the skills of the manager, his or her knowledge, and his or her experience with outcomes, but also on variables derived from the organisational context, since some of the skills and resources are many times, and especially for complex decisions, such as those of a strategic nature, organisational skills and organisational resources. In that regard the CEOs of organisations play a very important role. Theories of leadership and social theories (Conger et al., 2000; Meindl et al., 1985; Pearce and Robinson, 1987; Puffer, 1990; Smircich and Morgan, 1982) suggest that CEOs have power that is attributed to them by the organisational member, which derives from their expertise, that is, their knowledge and skills (Pearce and Robinson, 1987), regardless of whether that expertise is real or not. The expertise that is attributed to CEOs by organisational members, and the behaviours of CEOs in face of risk and uncertainty, provide, indirectly, illusions of control to those members who see in their CEOs sources of skills and resources (Conger et al., 2000). Consequently, a relationship between CEOs behaviours and perceptions of controllability held by managers is predicted.

5.2.5 Perception

Perception is a cognitive process through which stimuli are dealt with by the organs of sense and filtered and treated through the cognitive system (Gregory, 1974; Neisser, 1967). Perception is also the apprehension of stimuli (Mezias and Starbuck, 2003). Decision-making is a process that starts with stimuli received by individuals, which are

classified in a continuum opportunity-threat (Mintzberg et al., 1976), once and if identified and made sense of by individuals (Starbuck and Milliken, 1988). Stimuli make individuals assess and look for solutions for the decision subject, according to their own frames (Beach and Mitchell, 1996), and within the limits of bounded rationality of individuals (Simon, 2000). Decision-making, being a process made by phases, is subject to the perceptions of the individuals during each one of the phases, but, primarily, during the phases of recognition and evaluation of the decision subject (Hambrick and Mason, 1984; MacCrimmon and Wehrung, 1986). Managers get stimuli from business issues, and also from their interactions with the organisational contexts. Business issues are related to, and depend on, the context in which they are dealt with. Furthermore, such dependence results from the cognitive maps of the individual managers involved in the decision-making process, which depend on the experiences and motivations of individuals (Tolman, 1948), including affect (Finucane, Alhakami, Slovic and Johnson, 2000; Slovic, Finucane, Peters and MacGregor, 2004), on their values, beliefs and motivations (Kitchin, 1994), and on their knowledge of the elements associated with a decision subject and the relationships among them (Beach and Connolly, 2005). On the other hand, action is reflected also in cognitive maps (Fiol and Huff, 1992).

Therefore, perceptions of the risks associated to organisational contexts, and to decision subjects, rather than 'objective realities', are expected to influence the risk behaviour, that is, the actions of individual managers, and for that reason this study, materialised into a questionnaire, is about perceptions of variables rather than about the variables themselves.

5.2.6 Organisational Context

Managers work and make decisions in organisational contexts. "*Empirical research on risk taking indicates that such individual and organisational differences exist [differences between risk aversion and risk seeking], but they account for much less of the variation in risk taking than do situational factors*" (March, 1991: 101). In those organisational contexts managers are subject, but not limited, to social influence (Pfeffer, Salancik, Leblebici, 1976), including perceived organisational support (Eisenberger, Stinglhamber, Vandenberghe, Sucharski and Rhoades, 2002; Randall, Cropanzo, Bormann and Birjulin, 1999; Wayne, Shore and Liden, 1997), power and

politics (Ferris and Kacmar, 1992; Gandz and Murray, 1980; Kacmar and Carlson, 1997; Mayes and Allen, 1977), organisational culture (Denison, 1984; Hofstede, Neuijen, Ohayv and Sanders, 1990; Kuratko, Montagno and Hornsby, 1990; Pettigrew, 1979) and CEOs and top managers (Finkelstein, Hambrick and Cannella, 2009; Hambrick, 2007; Hambrick and Mason, 1984). As a result of their risk behaviour in firms, managers may face a set of consequences, ranging from promotions and rewards to career derailment, and isolation from those who, at a given point in time, count, individually or in group, in an organisation (Kuratko, Ireland, Covin and Hornsby, 2005). Therefore, it is expectable that organisational contexts impact managers' risk behaviours, regardless of the perception that managers have of the decision subjects.

5.2.6.1 Decision-making Processes

Risk and rationality converge in choice or decision-making. In decision-making, behaviour, rational or otherwise, is expressed. Behaviour is conditioned by the characteristics of the decision subject, by contextual characteristics (e.g. organisational characteristics, environmental characteristics, industry characteristics), by the characteristics of the decision-makers, and by the way that all the characteristics or aspects mentioned here above are seen or felt by the individual decision-maker, what, in the context of this study is wrapped up under the label of perception. Decision-making being a process (Beach and Mitchell, 1978; Bourgeois and Eisenhardt, 1988; Eisenhardt and Zbaracki, 1992; Mintzberg, Raisinghani and Théorêt, 1976; Schwenk, 1984; Schwenk, 1995), where cognition plays a role (Ireland, Hitt, Bettis and de Porras, 1987; Schwenk, 1984, 1988), is subject to the perception of those individuals involved in the process (de Carolis and Saporito, 2006; Sitkin and Weingart, 1995). Perceptions by individual managers of organisational and situational characteristics interact with the decision processes and, therefore, with the choices made.

Strategic decisions differ from routine decisions in the sense that they are characterised by uncertainty – other than the fact that there are unknown probabilities some times not all the outcomes may be anticipated - by novelty and “*open-endedness*” (Mintzberg et al., 1976: 250), by important resources committed and infrequency (Eisenhardt and Zbaracki, 1992), and may be seen as unstructured and “*messy*” (Schwenk, 1995: 473), ambiguous (Schwenk, 1984), may “*critically affect organisational health and survival*”, and “*shape the course of a firm*” (Eisenhardt and

Zbaracki, 1992: 17). In this study the words decision and choice are used interchangeably. It is contended herein, however, that whether we speak about choices or decisions we speak about processes, and not about a spot action at a certain point in time in a process, when the decision or choice is consummated, such as, for example, the point in time when a CEO signs a document approving a given decision. Decision-making processes are made of phases that, although differently divided by different authors in a bigger or smaller number of sub-phases, correspond, in general, to the identification of the decision subject, the evaluation of the decision subject, and the choice among alternatives or options (Beach and Mitchell, 1978; Eisenhardt and Zbaracki, 1992; Lang, Dittrich and White, 1978; MacCrimmon and Wehrung, 1986; Mazzolini, 1981; Mintzberg et al., 1976; Saunders and Jones, 1990; Schwenk, 1984, 1985). It shall be noted that some authors (e.g. MacCrimmon and Wehrung, 1986) consider a phase of implementation, and or follow up, in which the perceptions of controllability of variables involved in decision-making by managers play a considerable role (March and Shapira, 1987; Shapira, 1997). Mintzberg et al. (1976) propose a decision-making process with process routines, which suggests that the decision process is dynamic rather than static, that is, that the decision process moves back and forth, and that it is susceptible to influence, interference and adjustments (Saunders and Jones, 1990). Cognitive aspects of the decision-makers influence the positions that those decision-makers take during the decision processes in general, and for each of the decision phases (Schwenk, 1984).

As mentioned above, decision-making is a process but some times is a messy process. The fact that we define decision-making as a process does not mean that we define it as an orderly process. Decision-making is a process in that, from one process to another, similar stages are identified, meaning that there is a structure, regardless of whether the structure is purposeful or not. As stressed by March (1991), a decision process is many times more relevant in terms of the process, than in terms of the outcomes. "*Decision making is an arena for symbolic action and for developing an enjoying an interpretation of life and one's position in it*" (March, 1991: 110). The point being made by the author is that decision-making processes, in organisational contexts, are the realm of cognition, where perceptions and relationships, social interaction at all levels of analyses - between individuals, between groups, between individuals and groups and organisations, groups with organisations, groups with leaders, etc., power

and politics and attribution of characteristics to organisational variables, more than spread sheets and any other sort of 'objective' data, define what is decided, and how it is decided.

5.2.6.2 Organisational Risk Culture

Organisational culture, or corporate culture in the case of business organisations, is a multidimensional construct (Hofstede, 1990). The utilisation of particular organisational culture dimensions, or specific culture traits (Denison and Mishra, 1995), for particular purposes, that is, using one dimension or a limited number of dimensions of a construct to predict other constructs, or dimensions of other constructs, has been defended by authors such as Denison (1984), Denison and Mishra (1995) and Venkatraman (1989), justifying, for example, the use of innovation and risk-taking to predict corporate intrapreneurship (Kuratko et al., 1990). Schein (1990) argues that when culture is surveyed with questionnaires, relevant dimensions of organisational culture have to be known.

Corporate culture "*refers to the set of values, beliefs, and behaviour patterns that form the core identity of an organisation*" (Denison, 1984: 5). Pettigrew (1979) establishes a link between entrepreneurship and organisational culture, by considering that entrepreneurs, or leaders, those who undertake or take actions including making decisions (Antonicic, 2003; Mitchell, Busenitz, Lant, McDougall, Morse and Smith, 2002), are "*creators of symbols, ideologies, languages, beliefs, rituals and myths*" (pg. 574), that is, are creators of values and practices, and promoters of behaviours.

Entrepreneurship, which according to a vast literature (e.g. Burgelman, 1983; Covin and Slevin, 1991; Lumpkin and Dess, 1996; Shane and Venkataraman, 2000) includes corporate entrepreneurship, or intrapreneurship, in spite of some controversy in respect to that inclusion (Busenitz and Barney, 1997), and entrepreneurial orientation of firms have been associated, among other factors, to risk-taking and innovation (Dess, Lumpkin and Covin, 1997; Kuratko et al., 1990; Lumpkin and Dess, 1996; Lyon, Lumpkin and Dess, 2000), autonomy (Lumpkin, Cogliser and Schneider, 2009) and management support (Kuratko, Hornsby and Bishop, 2005; Kuratko, Hornsby and Goldsby, 2004). Not surprisingly, "*risk perception is taken to drive entrepreneurial activities*" (Keh, Foo and Lim, 2002: 127). Furthermore, in spite of some circularity, organisational culture dimensions that have been consistently considered in studies of

terms of risk are those that are related to entrepreneurship, namely organisational culture traits, such as risk-taking and or innovation (Gordon and DiTomaso, 1992).

Organisational risk culture, a dimension of organisational culture, encompasses at the same time the power to absorb individual experiences and knowledge related to decision-making and risk-taking and to transform it into organisational experience. In addition organisational risk cultures set standards to individual members via that absorption and accumulation of experience and knowledge. Therefore, individual organisational members feed and are fed by the cultural system.

Some polemics related to what culture and climate are have crossed the organisational culture field. For example, Schein (1990: 109) states that “*climate is only a surface manifestation of culture*”, while Denison (1996) says that climate is situational or contextual, that is, concerns specific situations, whereas culture is embedded. However, Denison (1996) also says that for managers the discussion is sterile since they cannot differentiate one from another. As far as this study is concerned, that polemic is irrelevant in that what is important is what people see, that is, what they perceive, regardless of whether what they see is superficial or embedded. What is worth retaining is that the work with dimensions of a larger variable or phenomenon is scientifically accepted, and that in the tradition of the field, whether working with organisational culture or with organisational climate, it is accepted to measure individual perceptions of dimensions of a broader phenomenon. Specifically, Denison (1984) and O'Reilly et al. (1981) have considered risk dimensions of organisational culture, or climate, in their research.

Since organisational culture results very much from organisational members' shared and accumulated experiences (Deal and Kennedy, 1982, 1983; Schein, 1984, 1990, 2010), and by the role of leaders (Pettigrew, 1979; Schein, 2010), it is expected to see the perceptions that individual managers have of those two factors influencing the perceived organisational risk culture.

On the other hand, considering that accumulated and shared experiences and knowledge set standards of behaviour for organisational members (Deal and Kennedy, 1982), and that culture and risk acceptance are social constructions (Douglas and Wildavsky, 1982), it is expected that organisational risk culture influences the support that organisational members perceive as getting from their organisations, when, and if,

they engage in risk-taking activities on the behalf of their organisations. Tsui et al. (2006) suggest that organisational culture is related to individual commitment. After all, individual managers assess if their own behaviours match what, in their views, the organisations and their top managements expect from them. In other words, managers try to align their behaviours by those behaviours that they believe are expected by the organisation, namely by their bosses and peers (Harris, 1994), provided individuals' values lines are not crossed.

5.2.6.3 CEO's Risk-taking and Decision-making Behaviour

Behaviour of CEOs in terms of risk-taking, and, or, innovation, is another contextual dimension that has been pointed out as impacting risk behaviour of individual managers, in organisational contexts (Baird and Thomas, 1985; Hambrick and Mason, 1984; Sitkin and Pablo, 1992). Middle level managers see top-level managers' risk behaviours as a strong indicator of what is, and is not, appropriate in terms of risk-taking (Hornsby, Kuratko and Zahra, 2002; Kuratko, Ireland, Covin and Hornsby, 2005; Williams and Narendran, 1999). Therefore, CEOs, although not interacting directly with most of the managers in their organisations, do influence organisational members' behaviours through their own behaviours, and examples. Wang et al. (2011: 94-95) say that individuals' behaviours could result, or be affected, by many factors and argue that "*the CEO is another causal agent by inducing positive attitudes among employees (such as perceived organisational support and organisational commitment).*" They suggest, thus, that CEOs' behaviours contribute to the perceived organisational support.

On the other hand, from a functionalistic perspective (Tsui et al., 2006), CEOs' values and practices, which materialise into behaviours, are recognised as having an effect on the cultures of their organisations (Berson et al., 2008; Hambrick, 2007; Hambrick and Mason, 1984; Lewin and Stephens, 1994). Berson et al. (2008) found out that certain values of CEOs are associated to certain cultural dimensions in their organisations, confirming that CEOs characteristics influence organisational culture, in line with the work of Hambrick and Mason (1984), who propose that upper echelon characteristics influence strategic choices made by organisations. Equally, Hart and Quinn (1993) found evidence of relationships between CEOs' behaviours and firm

performance, implying that the behaviours of CEOs are related to organisational behaviour and culture.

Organisational members attribute qualities and skills to their leaders, in general, and to their CEOs, in particular, a view of the phenomenon referred to by Tsui et al. (2006), as the attribution perspective. Those attributions become a source of power, and, or, legitimacy of CEOs (Pearce and Robinson, 1987). Conger et al. (2000) stress that those attributions are stronger among managers, who have a better appreciation of the work of CEOs, than among non-managerial personnel, which is confirmed in a study made by Puffer (1990). Furthermore, the more the organisational members attribute expertise to their CEOs, the higher the illusions of control over the decision-making processes perceived by those members (Conger et al., 2000), and the higher the levels of trust perceived towards the CEOs (Puffer, 1990). Meindl et al. (1985) suggest that followers, that is, organisational members in general, may overestimate the control that their leaders, in this case their CEOs, have over the events with which they are involved, which could have an effect of self-reinforcing perceptions of control in the followers themselves. This is further argued by Smircich and Morgan (1982), who contend that if a leader is supposed to define a situation, those who are led are supposed to give up their own definition of that situation, should, of course, they trust the leader, thus creating a dependency relationship that may, inclusive, lead to inactions by followers.

Kerr and Jermier (1978) suggest that leaders, that is, in this specific case CEOs, influence organisational culture under some specific conditions only. Under different conditions there are substitutes for leadership. For example, if a subordinate was indifferent towards organisational rewards, or if organisational rewards were not under the control of CEOs, but rather, for example, of committees made by board members, a leadership style based on rewards would have little effect. Tsui et al. (2006) and Wang et al. (2011) stress this point as well, by mentioning that according to a contingency perspective, leadership may have an impact only under conditions that are associated to crisis, or decision-making processes where uncertainty is high, and risks are important.

Considering that the attribution and functionalistic perspectives propose the existence of relationships between CEOs and followers, and between CEOs and organisational cultures, respectively (Tsui et al., 2006), and that the contingency perspective proposes that those relationships exist only in certain cases, which have

similarities to those decisions of a strategic nature, namely the high uncertainty, it is contended in this study that relationships shall be expected between the CEO's risk behaviour and the perception of control over the decision subjects held by individual managers (Conger et al., 2000), between the CEO's risk behaviour and the organisational support perceived by organisational members (Wang et al., 2011), and between the CEO's risk behaviour and the organisational risk culture (Berson et al., 2008; Hart and Quinn, 1993).

5.2.6.4 Organisational Support Perceived by Managers

Individuals, in organisational contexts, provide their services for something in return, which is not limited to pay but also to "*intangible rewards, such as esteem, dignity and personal power*" (Randall et al., 1999: 159-160), and these authors suggest that "*like any investment - the decision to work entails certain risks*" (pg. 160). Organisational support perceived by managers is retained, in the context of this study, as a proxy, or indicator, of the behaviour to be adopted by a decision-maker. In other words, it is contended in this study, although not tested, that unless managers perceive that they are supported in their risk-taking endeavours, on the behalf of their organisations, they may not engage into risky courses of action.

The organisational support that managers perceive is seen as a proxy of the behaviour of those managers in face of risk, based on the notions of reciprocity, loyalty and commitment. Social exchange theory predicts that organisational members reciprocate the type of treatment that they get from their organisations, including from their leaders (Wayne et al., 1997), since that "*would appear to be a reasonable and comparable return*" (Settoon et al., 1996: 220). The social exchanges between organisational members and organisations are the very core of perceived organisational support (Eisenberger et al., 1986; Wayne et al., 1997). Employees who feel that they are treated fairly, pay the organisation, and its leaders, back with commitment and trust (Eisenberger et al., 2001; Rhoades et al., 2001), which leads to stronger participation in organisational life, namely in decision-making.

It is argued in this study that the risks to an organisation, which are perceived by a manager, and are seen by the individual manager as associated to a given decision subject, are merged with the risks that that same manager perceives as being faced by

him or herself, should he or she engage in decision-making related to that decision subject, in that given organisational context.

Perceived organisational support shall be dissociated from perceived supervisory support to risk-taking, and innovation, although it is expected that the support provided by management influences organisational support, since individuals personify the organisations (Eisenberger, Huntington, Hutchison and Sowa, 1986; Rhoades, Eisenberger and Armeli, 2001; Wayne, Shore and Liden, 1997), and generalise behaviours of leaders as behaviours of the organisation. In the same line, Wayne et al. (1997) suggest that the perceived organisational support and the leader-member exchange are different constructs insofar members of the organisations separate their exchanges with organisations from those with their leaders. Nevertheless, it is worthwhile noting that there seems to be a contradiction above, in that organisational members see leaders as representatives of the organisations, and acting on their behalves. Furthermore, Wayne et al. (2002: 596) noted that "*in particular, inclusion and recognition by top management were related to POS*", that is, were related to perceived organisational support, thus reinforcing the contradictory aspect.

Wayne et al. (1997) argue that organisational climate, herein used interchangeably with organisational culture, and perceived organisational support, though concerning both organisational issues, are distinct constructs, since climate is the way an individual perceives organisational features that are seen as independent from the individuals, and that do not necessarily affect them, while perceived organisational support affects the individuals directly. For example, an individual manager may perceive that an organisation is culturally oriented towards risk-taking, but that that same organisation does not reward risk-taking or, worse, punishes in terms of rewards, and, or, career paths, those who fail. In this specific case, the dimension of organisational climate, that is, the risk-taking orientation, contradicts what the manager perceives in terms of organisational support, in that an organisation that promotes risk should not punish those who take risks, even if the results do not correspond to what was expected.

Organisational support, or lack of support, that managers perceive in respect to risk-taking in decision-making, results essentially from CEOs' and organisational behaviours. Nevertheless, the riskiness of the decision subjects is expected to contribute to the level of organisational support perceived, insofar that perceived riskiness depends

on the experiences with outcomes that managers have, which are related to the organisational culture, and depends on the level of control that managers perceive to exert, which is related to the perceived behaviour of CEOs in terms of risk.

5.3 Model Proposed

Drawing from literature and based on empirical evidence, it is proposed in this study that the perceptions of the risks involved in strategic decision-making processes, in organisational contexts, condition the behaviours of individual decision-makers involved in those processes, being the perceived organisational support a predictor of that behaviour. However, this will remain a proposition and will not be tested in this study.

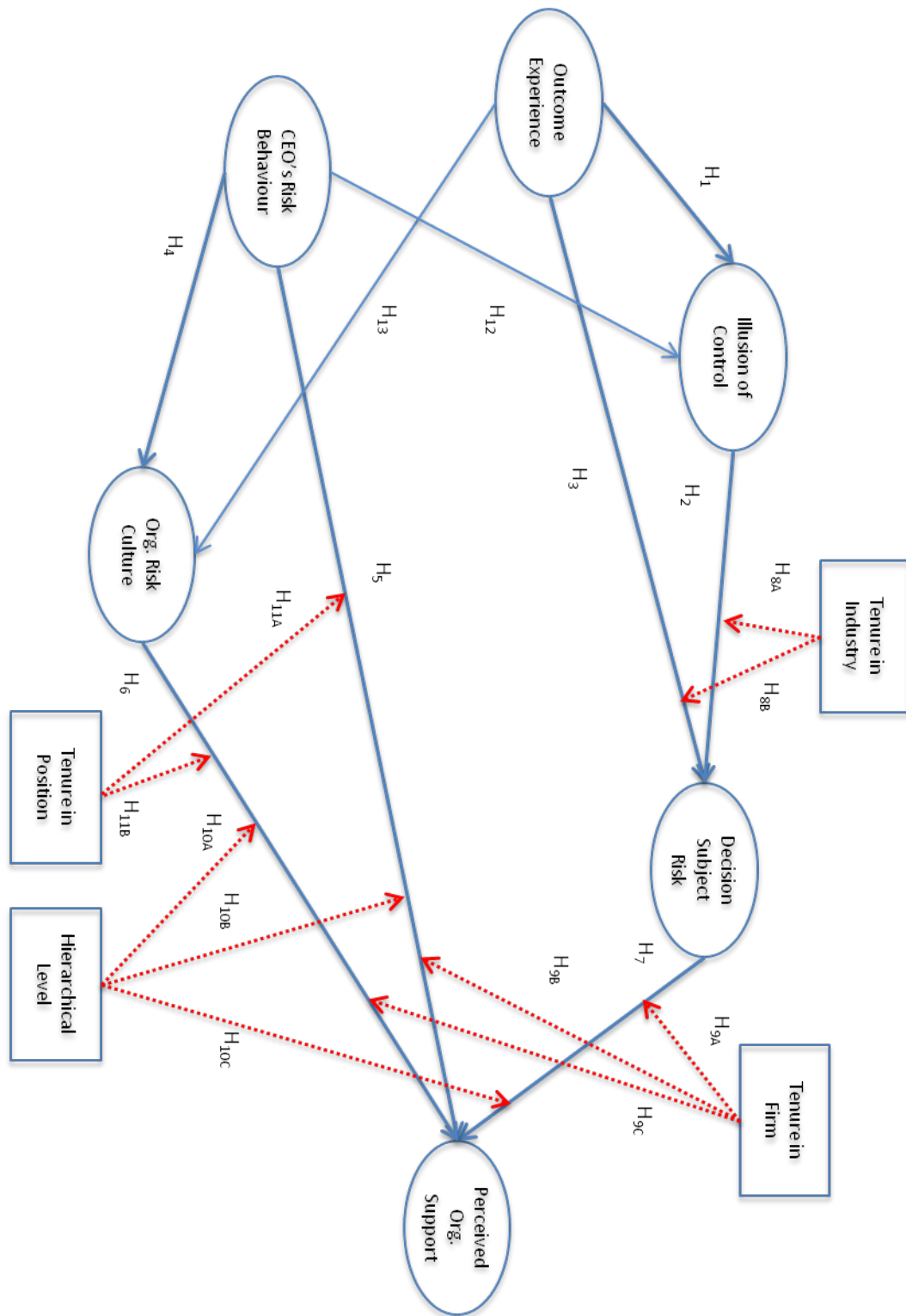
Basically the author considers in this study a model that comprises six constructs in two main blocks:

- i) The first block combines the constructs that are related to the individual decision-maker and to the subject or matter to be decided; and
- ii) The second block contains the constructs that correspond to the perceptions of the dimensions retained that are related to the organisational context.

The position adopted in this study is that the perceptions of the risks related to the involvement by individual managers, in strategic decision-making, stem from the perceptions of the characteristics of the decision subject, the perceptions of the characteristics of the organisational context and decision-making characteristics of the individual managers.

In the model proposed (fig. 5.2), the author posits a number of direct relationships among the constructs retained, the existence of a number of moderation effects resulting from the interaction between measured socio-demographic variables and constructs, and also two mediation effects among constructs.

Fig. 5.2: Base Model of Relationships – source: the author



5.4 Research Aims and Hypothesis

Drawing from the integration of the theories and constructs mentioned above in sections 5.1 and 5.2, which are consubstantiated into the model proposed in section 5.3, the following research aims, which were mentioned in the introductory chapter of this study, are expressed (table 5.4):

Table 5.4: Research Aims

Research Aim 1
Identify determinants, or antecedents, of the organisational support for risk-taking, in the context of strategic decision-making, which is perceived by individual managers in their organisations. Identify relationships between the antecedents and the main construct. Define a model that explains, at least partially, the mechanisms that influence the organisation support for risk-taking, which is perceived by individual managers in the contexts of their organisations.
Research Aim 2
Find relationships among the antecedents of the organisational support. Namely, look for antecedents related to the organisational contexts, on the one hand, and antecedents related to the decision subjects and personal experiences and heuristics of individual managers, on the other hand. Check for cross influences or effects.
Research Aim 3
Replicate and or develop existing studies and or known relationships, looking for mediation effects.
Research Aim 4
Control the effects of demographic variables related to organisational life on relationships among antecedents of the perceived organisational support, and between those antecedents and the main construct, with the purpose of identifying mechanisms that influence the intensity of those relationships.

The research hypotheses contemplated in this study are essentially of two types: direct relationships among constructs and moderating effects. On the one hand, constructs are related among them, that is, elements that are inherent to individual managers, which are referred to in the literature as heuristics, are related with the perceptions that those individual managers have of situational characteristics, and with

perceptions of organisational dimensions. On the other hand, measured characteristics, such as tenure of managers in their current industries, tenure in their current firms and tenure in their current position, and hierarchical level in their current organisations, are postulated as having an effect on the direct relationships among the constructs.

Research aim 1 is addressed mainly via the fit-to-data of the model(s) proposed and through a global balance of all the hypotheses and their contribution to the explanation of the ultimate variable of interest, that is, the organisational support that managers perceive, or not, to engage in risk-taking activities, in their organisational contexts, and in a context of strategic decision-making.

Research Aim 2 is addressed by hypothesis 1, 2 and 3, as far as a sub-model looking for interactions among variables related to heuristics, experience and the specificities of the decision subjects are concerned. For a second sub-model that addresses perceptions of variables related to the organisational contexts, research aim 2 is tackled by hypotheses 4, 5 and 6. Hypothesis 7 plays an important role in addressing the research aim 2, insofar the relationship that is posited links the idiosyncrasies of individuals, with the perceptions that they have of factors embedded in the organisational contexts. Finally, for cross relationships between sub-models, research aim 2 is addressed with hypothesis 12 and 13.

Research aim 3 is dealt with via two mediation effects that are posited to exist, one in each sub-model.

Research aim 4 is further detailed and met by the study of moderating effects suggested by hypotheses 8, 9, 10 and 11.

The research hypotheses retained are:

Hypothesis 1. Illusion of control, or controllability, is related to familiarity or experience. One way to increase perceived control is to make people involved with decision-making more familiar with the decision subjects (Langer, 1975).

Shapira (1995) suggests that managers associate control with judgment and skills, where and when experience of previous outcomes plays a role. Adjusting risks, or gaining control, is a phase in a model of risk management proposed by MacCrimmon and Wehrung (1986), which follows recognition and evaluation of risks, two phases where experience is heavily involved. Adjusting risks, and gaining control, would not be possible if risks were not recognised and evaluated. Schwenk (1984) proposes that

illusion of control is a heuristic, which is present during the evaluation and selection phases, and stress that previous unsatisfactory results, that is, experience, impact perceptions of control. The same author (Schwenk, 1988) further stresses the role of past experience to build present analogies, which may enhance the perceptions of controllability. Hogarth and Makridakis (1981) suggest that planning, an activity, where the part taken by experience is extremely relevant, could prompt illusions of control. Duhaime and Schwenk (1985) concur that there is a relationship between experience and illusion of control, and argue that successful decision-makers may have stronger illusions of control due to their past successful experiences. Drawing from the literature mentioned above it is hypothesised herein in as follows:

H₁ The better the experience with outcomes of an individual manager (the more successful the outcomes and the lower the risk), the higher the illusions of control (the lower the risk perceived) the manager has.

Hypothesis 2. Managers acknowledge the existence of uncertainty. However, managers say that they do not gamble, and say that they exert control (MacCrimmon and Wehrung, 1986; March and Shapira, 1987; Shapira, 1995), even if that might not be the case (Langer, 1975, 1982). Managers feel that they have some level of control over the outcomes, whether individually or collectively, such as in organisational contexts, and, hence, over the consequences of decisions. For managers, risk means losses of some magnitude with the potential to occur (Yates and Stone, 1992). Small losses, even if highly probable, are not seen as risky. However, losses of big magnitude are taken into account, and seen as risky, even if the probability of occurrence is small (March and Shapira, 1987; Shapira, 1995). Langer (1975) suggests that perceptions of control reduce the averseness of a situation or, in other words, fosters its acceptability. Therefore, it is posited herein that:

H₂ The 'risks related to the generality of the strategic decision subjects', which are perceived by an individual manager, in the context of his or her firm, vary positively with the 'controllability', or 'illusion of control', held by the individual manager, that is, the higher the control perceived by the individual manager over the outcomes of the decision-making processes related to the decision subjects, the better the perception (the lower the risk) that that individual manager has of the risks related to those decision subjects, or decision domains.

Hypothesis 3. “*A great deal of learning from experience must involve the learning of action-outcome linkages*” (Einhorn, 1982: 269). Das and Teng (1999) argue that decision-makers bring to the decision-making processes beliefs and hypotheses previously acquired. Furthermore, Schwenk (1988) and Simon and Houghton (2002) stress that decision-makers reason by analogy, that is, by comparing past with present situations, in that they make sense in the present, of outcomes, and consequences, that will happen or materialise in the future. On the other hand, decision-makers tend as well to think of events easier to recall as those that are more frequent, a heuristic labelled ‘availability’ (Tversky and Kahneman, 1974), even when those events are not those with the higher levels of occurrence. If a decision-maker has a very good or very bad outcome that comes easily to his or her mind, that event may become representative of future events. Barnes (1984: 130) argues that the availability heuristics may make a decision-maker overreact in one direction or another, since “*recent knowledge is given more weight.*” Based on the literature reviewed, and empirical evidence, the author of this study postulates that:

H₃ The ‘risks related to the generality of the strategic decision subjects’, which are perceived by an individual manager, vary positively with his or her ‘outcome experience’, that is, the better the past outcomes perceived by the individual manager, the better the perception (the lower the risk) that that individual manager has of the risks related to future decision subjects.

Hypothesis 4. There is a large volume of literature addressing effects of leaders, CEOs and top managers, on organisational culture (e.g. Berson et al., 2008; Finkelstein et al., 2009; Hambrick, 2007; Hambrick and Mason, 1984; Lewin and Stephens, 1994; Schein, 2010), and effects of organisational culture on top managers, including CEOs (e.g. Carpenter et al., 2004; Geletkanycz, 1997; Waldman and Yammarino, 1999). Tsui et al. (2006) unpack the relationship between organisational culture and CEOs’ behaviours, though recognising that there is a strong association between the two variables.

Deal and Kennedy (1982) and Pettigrew (1979) stress the fundamental roles played by chief executive officers (CEOs) in shaping organisational cultures. It is posited herein that there is a relationship between the perceptions that managers have of the risk

behaviours of their CEOs, and the perceptions of certain organisational cultural traits. Therefore, it is hypothesised that:

H₄ The better the perception (the lower the risk) that an individual manager has of the 'CEO's risk behaviour' the better the perception (the lower the risk) that that manager has of his or her 'organisational risk culture'.

Hypothesis 5. Employees develop specific views on the ways organisations value their work and contributions, and their well-being (Eisenberger et al., 1986). Decision-making is pervasive in organisations (MacCrimmon and Wehrung, 1986; Shapira, 1995). Therefore, an important part of the work and contributions provided by managers in their organisations is related to decision-making (Korsgaard, 1995). Leaders are responsible for implementing decisions, and CEOs are considered as the ultimate decision-makers in the case of strategic decision-making (Hitt and Tyler, 1991; Korsgaard, 1995). In this last case, the work and contributions of individual managers become exposed to their peers, supervisors, either top manager or not, and CEO, that is, to the whole organisation. The whole organisation, from a cultural viewpoint, and the CEO, are frequently entangled (Tsui et al., 2006). However, the outcome of the strategic decision-making process is very much conditioned by the behaviour of the CEO, who, thus conditions the behaviour of the individual managers and of the organisation. Considering the weight that CEOs have, in general, in their organisations (Finkelstein et al., 2009; Hambrick and Mason, 1984; Schein, 2010), considering that there are exchanges between employees and organisations, and between employees and leaders (Eisenberger et al., 1986; Settoon et al., 1996; Wayne et al., 1997; Wayne et al., 2002), and considering that managers, in the context of strategic decision-making are subject to both organisational and leadership factors, we hypothesise herein below as follows:

H₅ The better the perception (the lower the risk) that an individual manager has of his or her CEO's risk behaviour, the better the perception (the lower the risk) that that manager has of the support provided to him or her by his or her organisation.

Hypothesis 6. Organisational and leadership values and practices are the main determinants of organisational culture (Denison, 1984; Denison and Mishra, 1995; Hofstede et al., 1990; Schein, 2010). Perceived organisational support has been operationalized, essentially, as organisational practices towards the employee

(Eisenberger et al., 1986). Certain dimensions of organisational culture, such as management, or organisational, support for intrapreneurship, have been noticed as providing support for employees to adopt certain behaviours, namely an entrepreneurial behaviour (Kuratko et al., 1990).

Denison and Mishra (1995: 206) argue that organisational culture can be operationalized in terms of underlying dimensions, or traits, and suggest that those dimensions can be used as variables for particular purposes. Denison (1984: 5) suggests that “*a strong culture that encourages the participation and involvement of an organisation's member appear to be one of its most important assets.*” It is contended herein that an organisation cannot, simultaneously, promote risk-taking and not care about the well-being of those involved in strategic decision-making, nor about their ideas and values. Therefore, it is posited that:

H₆ The better the perception (the lower the risk) that an individual manager has of the ‘organisational culture dimension related to risk-taking’ in his or her organisation, the better the perception (the lower the risk) that that manager has of the ‘support provided to him by his or her organisation’.

Hypothesis 7. Managers have expectations of what their organisations value, and have perceptions of alignment, fit (O'Reilly et al., 1991), and value congruence (Chatman, 1991). Managers are supposed to make decisions that benefit their organisations. If there is a perception that a decision brings positive results to the organisation, then, according to employee-organisation relationship theory and reciprocity (Coyle-Shapiro and Shore, 2007), employees should expect to be supported, and rewarded, and receive fair treatment (Wayne et al., 2002).

However, empirical evidence suggests that rewards, and fair treatment, are not always symmetric with punishment, or penalties, or lack of rewards, and with unfair treatment. This could happen because organisations, and their agents, may consider that when managers are doing something correctly, and or well, such as getting involved in decision-making to bring benefits to the organisation, and to their agents, they are not doing more than what they are expected to do, according to their contracts and professional obligations. Therefore, it is contended herein that perceptions of positive outcomes of strategic decision subjects may correspond to perceptions of positive or

neutral organisational support, while perceptions of negative outcomes will correspond to perceptions of negative organisational support.

H₇ The better the perception (the lower the risk) of the 'risks related to the generality of the strategic decision domain or subject', held by an individual manager in his or her organisation, the better the perception (the bigger the support) of the 'support provided to him or her by his or her organisation'.

Hypothesis 8. Tenure of a manager in a certain organisation becomes a source of identification with that organisation. As time goes by, managers tend to feel comfortable with what they do and, therefore, tend to the status quo. MacCrimmon and Wehrung (1986) contend that managers with larger tenures are less prone to changes, including taking risks. If several risky strategies or decisions, or, oppositely, several conservative strategies or decisions have proved right, the tendency is for managers not to change (Hambrick et al., 1993). Finkelstein et al. (2009: 88) suggest "*that executives tend to become inertial as their tenures mount*", and drawing on the work of Stevens et al. (1978), suggest that after all, one does not change things that have been proved to be valuable. Hambrick et al. (1993) found that the tenure of a manager in an industry is the largest contributor to the commitment to status quo, which led Finkelstein et al. (2009) to propose that tenures in industry, and organisation, have additive effects. Drawing on the work of Finkelstein et al. (2009) and Hambrick et al. (1993) it is hypothesised that:

H_{8A} The longer the 'tenure in his or her current industry', the stronger and the more positive, the relationship between the 'illusion of control' that a manager has, and the perception that he or she has of the risk involved with the generality of the strategic decision subjects, in his or her organisation.

H_{8B} The longer the 'tenure in his or her current industry', the stronger, and the more positive, the relationship between the 'outcome experience' that a manager has, and the perception that he or she has of the risk involved with the generality of the strategic decision subjects, in his or her organisation.

Hypothesis 9. In an empirical study made by Wayne et al. (1997) firm tenure is significantly related to perceived organisational support, with a medium size effect. Those authors see as a limitation of their study the fact that 252 employees had a tenure

of more than 5 years, which, in their views, may bias the level of perceived organisational support, in what we see as an assumption that tenure and perceived organisational support are directly and positively related. Similarly, Chatman (1991) suggests that employees, who feel that their values match the values of the firm, have intentions to stay longer in the firm than those who have opposite feelings. In the same vein, O'Reilly et al. (1991) argue that fit between employees and organisations is a predictor of turnover, or, inversely, a predictor of tenure.

H_{9A} The longer the 'tenure in his or her current organisation', the stronger, and the more positive, the relationship between the perception that a manager has of the risk involved with the generality of the strategic decision subjects, and the perception that he or she has of the organisational support.

H_{9B} The longer the 'tenure in his or her current organisation', the stronger, and the more positive, the relationship between the perception that a manager has of his or her 'CEO's risk behaviour', and the perception that he or she has of the organisational support.

H_{9C} The longer the 'tenure in his or her current organisation', the stronger, and the more positive, the relationship between the perception that a manager has of the organisational risk culture, and the perception that he or she has of the organisational support.

Hypothesis 10. MacCrimmon and Wehrung (1986), in a risk-taking study where the subjects were managers, found that managers with higher authority, that is, at higher organisational levels, take more risks.

On the other hand, managers in higher positions are those managers, who coming from the ranks get promoted, identify themselves, and are identified by others with the predominant culture, or, alternatively, are managers who are contracted based on certain profiles expected to match organisations' requirements, or, yet, more frequently, there is a mix of both situations. Carson et al. (1994) found significant relationships between promotion and turnover, or, in other words, between promotion and tenure, realising that tenure and turnover are the opposite consequences of the same phenomenon: those who leave are those who do not stay and, inversely, those who stay are those who do not leave. Managers at higher organisational levels are relatively more powerful than

managers at lower hierarchical levels, and feel less subjected to organisational constraints. It is hypothesised here below that the perceptions that a manager has of the risks related to a decision domain, and to making decisions in an organisational context, are related to the hierarchical level that that manager has in his or her organisation.

H_{10A} The higher the 'hierarchical level' of an individual manager in his or her organisation, the stronger the relationship between the 'organisational risk culture' perceived by that manager, and the 'perceived organisational support'.

H_{10B} The higher the 'hierarchical level' of an individual manager in his or her organisation, the stronger the relationship between the 'CEO's risk behaviour' perceived by that manager, and the 'perceived organisational support'.

H_{10C} The higher the 'hierarchical level' of an individual manager in his or her organisation, the stronger the relationship between the risks perceived of the generality of the strategic decision subjects by that manager, and the 'perceived organisational support'.

Hypothesis 11. Drawing from the work of Chatman (1991), Finkelstein et al. (2009), (Hambrick et al., 1993) and Wayne et al. (1997), and based on hypotheses 8 and 9 above, it is contended herein that tenure in position is a predictor of the fit of an employee in his or her organisation, and, as such, the higher the tenure in a given position the lower the risks perceived.

H_{11A} The longer the 'tenure in his or her current position', the stronger and the more positive the relationship between the perception that a manager has of his or her CEO's risk behaviour, and the perception that he or she has of the organisational support for engaging in risk-taking activities.

H_{11B} The longer the 'tenure in his or her current position', the stronger, and the more positive, the relationship between the perception that a manager has of the organisational risk culture, and the perception that he or she has of the organisational support for engaging in risk-taking activities.

Hypothesis 12. CEOs exert power in their organisations. Two sources of power that, in the opinion of the author are important for this study are legitimate power

provided by the very hierarchical position, and expertise power, which results from the appreciation that employees, in general, have of the expertise and knowledge of CEOs (Pearce and Robinson, 1987).

Carsten et al. (2010) focus their work on followers, that is, on subordinates rather than on leaders, and suggest that followers tend to have cognitive schemas, which are reinforced by hierarchical relationships, that make them see leaders as people with greater expertise and knowledge. Leadership, in the words of Smircich and Morgan (1982: 258) is a social phenomenon and “*depends on the existence of individuals willing, as a result of inclination or pressure, to surrender, at least in part, the powers to shape and define their own reality.*” Puffer (1990) suggests that followers, that is, people who are led, attribute certain characteristics to leaders, including expertise and risk-taking behaviour, and adds that attributions of expertise and risk-taking develops into trust. Meindl et al. (1985) argue that the way organisational members perceive their leaders is part of a sense-making process related to organisational phenomena. On the other hand, Meindl et al. (1985) suggest that leaders control organisations, and organisational members, through the meaning provided to important events. Schein (1984) argues that leaders provide security to groups, when untested or difficult decisions are needed, and that that reduces group members' anxiety in respect to what is new and unknown.

Drawing from the work of Puffer (1990) who stress the attributions by followers of expertise and risk-taking to leaders, and Conger et al. (2000: 749), who imply that the leader's characteristics in terms of innovation and risk-taking “*heightens follower perceptions of the leader's expertise and follower perception of control over events*”, it is hypothesized as follows:

H₁₂ The better the perception (the lower the risk) of the ‘perceived CEO's risk behaviour’ held by an individual manager in his or her organisation, the higher the illusion of control (the lower the risk) perceived by that manager.

Hypothesis 13. Myths, stories and heroes, referred to as artefacts by Schein (2010), are the visible part of cultures of organisations, although not always decipherable (Schein, 1984). Values of organisations, an element of culture, are not directly observable but are perceived by the organisational members. Values, myths, stories and heroes result from relevant experiences over the years, which are shared and cultivated

among organisational members and are self-reinforcing (Deal and Kennedy, 1982), provided people remain in the organisations long enough (Schein, 2010). Furthermore, Deal and Kennedy (1982: 25) stress that experience results “*from testing what does and doesn't work in the economic environment*”, and Schein (1984: 8) define cultural elements “*as learned solutions to problems.*” Deal and Kennedy (1983) suggest that cultures evolve based on the day-to-day work, and that strategies, actions and decisions that lead to good results, and make organisations successful, are retained, while those that lead to opposite results are rejected.

It is generally accepted that culture results from founders' values and actions, at least in the initial days of an organisation, and leadership values and practices, and from shared experiences and learning of the organisational members (Schein, 1984, 1990). Actions of leaders contribute to culture building, provided that those actions are perceived by the organisation as values and principles for the future. Experience and learning by organisational members play, therefore, an important role, insofar those experiences set the boundaries for what is and is not acceptable. Schein (2010: 18) confirms very much the role of experience and learning, when he says that “*the culture of a group can now be defined as a pattern of shared basic assumptions learned by a group as it solved its problems of external adaptation and internal integration, which has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceived, think, and feel in relation to those problems.*”

Based on work (e.g. Deal and Kennedy, 1982, 1983; Schein, 1984, 1990, 2010) that suggests that organisational culture results also from shared experiences among a group of individuals, we hypothesize as follows:

H₁₃ The better, or more positive, the experiences that managers have with outcomes (the lower the risk), the more favourable the perceptions (the lower the risk) that those managers have of the organisational risk culture in terms of risk-taking.

5.5 Summary of Chapter 5

In Chapter 5 we summarise and integrate the literature reviewed. We suggest how risk and rationality combine in decision theories and how decision theories explain decision-making and risk-taking behaviours. We integrate the decision-making processes with the organisational contexts and suggest that individual perception of organisational factors, combined with characteristics of individuals, is the key factor for individual behaviour.

The viewpoints of the author of the theories, concepts and research problems presented and, mainly, the perspective of the author in respect to the integration of those theories, concepts and problems materialises in a model to be tested, which includes 6 constructs. Three of the constructs represent the individual perceptions that individual managers have of 3 organisational dimensions ('perceived organisational risk culture, 'perceived CEO's risk behaviour' and 'perceived organisational support'), another construct represents the individual perceptions that individual managers have of the strategic decision topics normally dealt with by their organisations, and the remaining constructs represent the 'outcome experience' of individual managers and their individual 'illusion of control', being this last construct the heuristic retained in this study.

In Chapter 5 we present as well the research aims and detail the hypotheses. Four generic research aims are presented and 9 direct relationships and 10 moderation effects are hypothesised. The hypotheses correspond, on the one hand, to the relationships among the constructs in the proposed model and, on the other hand, to the moderation of certain of those relationships by socio-demographic variables.

While the research aims are generic, we suggest theoretical support and justification for each hypothesis based on literature reviewed.

CHAPTER 6. RESEARCH METHODOLOGY

6.1 Introduction

In this chapter we present a discussion on research methodologies commonly used in business and management studies, with the purpose of situating this research project not only in terms of methodology used, and approaches adopted, but also in terms of research philosophy. Furthermore, in this chapter we explain the methodology selected and how that was implemented in order to test the hypotheses subjacent to the model proposed.

The remainder of Chapter 6 is structured as follows:

- Section 6.2 introduces the research philosophy and the approach to methodology selection;
- Section 6.3 presents the research design adopted;
- Section 6.4 provides an overview of the preliminary studies that lead to the final questionnaire;
- Section 6.5 presents the type of scales adopted, the sampling procedure and the data collection and coding;
- Sections 6.6 and 6.7 offer an explanation of the confirmatory factorial analysis and structural equation modelling methodologies, including the testing for moderation and mediation effects. The role of CFA and SEM to validate constructs and hypotheses is presented.
- Section 6.8 summarises the chapter.

6.2 Research Philosophy, Approach to Methodology and Methodology Strategy

Saunders et al. (2007), making reference to Tashakkori and Teddlie (1998), suggest that rather than adopting extreme, or 'box filling', positions, researchers shall adopt strategies that lead them to meet their goals, even if tactical moves, that is, moves to apply the strategy selected, look contradictory from a purist research philosophy standpoint. This implies that it could be acceptable, and logical, to move from the research goal(s) all the way back to data collection techniques, time horizons, methodological choices, research strategies, approaches and philosophies, rather than saying that one has, or stands for, a certain philosophy and, or, paradigm, and, as such, has a research goal compatible with that philosophy or paradigm. In other words, the

author sustains that, rather than having a clear research philosophy, a researcher should have clear research goals, and know how to get there.

Typically, researchers have applied quantitative, or qualitative methodologies, according to certain research paradigms, making sure that they fill into a given categorisation. Several authors, however, defend mixed methods research (e.g. Morgan, 2007; Onwuegbuzie and Leech, 2005; Teddlie and You, 2007) as a way to, pragmatically, make progress, and avoid what could be defined as “*pointless debates*” (Saunders et al., 2007: 110) about philosophical approaches. The very nature of the practical aspects related to research, such as the availability of resources, whether time, money, samples, etc., may lead the researcher to adopt one methodology or another, regardless of the way he or she positions him or herself in respect to epistemological and ontological perspectives, especially in the domain of the social sciences, including business and management, where the nature of things is subjective and directly unobservable, but where quantitative research is widely used. It is worthwhile noting that Hoskisson et al. (1999), in a paper that presents theory and research in strategic management, provide examples that show a certain cyclicity of the research paradigms, and pros and cons for the research methodologies adopted. These authors (Hoskisson et al., 1999: 447) suggest that “*the research question and context should dictate the choice of the appropriate research methods*”, and state that “*in all likelihood, results obtained from different methods have the potential to enrich our understanding of the problems and generate new insights regarding the issues.*” However, logical positivists have a different view, and defend that meaningful theory is the one and only the one that can be tested empirically (Godfrey and Hill, 1995). At this point, it is important to qualify what logical positivists mean by empirical testing. In short, empirical verification is the one that is made through the senses, or through instrumentation. Empirical verification made through the senses is an open door that should be kept open, should one want to include social sciences and related theories in the set of scientific theories, considering the important role that the senses play in those sciences.

6.2.1 Research Philosophy Adopted

The general research aim in this research project is to study perceptions that individual managers, in organisational contexts, have of the risks involved in strategic decision-making. The thinking process behind this general purpose is that individuals, who are part of an organisation, make organisational decisions or participate in organisational decision-making, and that the way they behave counts. Furthermore, those decisions, due to their strategic nature, impact the results of firms, their future and the future of their stakeholders, including their managers at an individual level. In other words, what is subjacent to the study is that the individual behaviour of managers should count, not because of the decision-making processes themselves, but rather because of the consequences of the decisions to their firms and to themselves.

As mentioned above, this study is about perceptions, that is, this is not about absolute realities, but rather about the relative realities of each individual manager, who participates or is a putative participant in strategic decision-making processes, in the context of his or her organisations. There are no facts to observe, and no objective variables to measure. There is not even any type of certainty about the very existence of the variables. One could argue that each person and each organisation are unique because there are no two people or two organisations, which are exactly the same, thus adopting a view in the domain of the interpretivism, and one would be right. One could even go further, and argue that it is impossible to replicate an experiment in a given organisation, without any change whatsoever. People change, time changes, macro and micro aspects of the organisational life, and of their actors, change overtime. Likewise, the environment in which a given organisation is embedded changes permanently. In trying to be accurate, although moving into a corner as far as methodological options are concerned, one could say that longitudinal studies are a fallacy because not absolutely everything is exactly the same at two different points in time. However, if a researcher did not make choices, did not look for a certain balance, and, stubbornly, stuck to extreme positions, especially in the domain of the social sciences, probably that researcher would research things so unique that would interest him or her alone, or would not research anything at all (Godfrey and Hill, 1995). For example, Hoskisson et al. (1999) note that in the early days of the strategic management field, case studies were the flavour of the day, because authors, at that time, considered that it was impossible, and even undesirable, to generalise phenomena that were unique to a given

organisation. However, as Hoskisson et al. (1999: 424) point out “*the heavy emphasis on the case approach and the lack of generalisation did not provide the base necessary for continued advancement of the field.*”

If there are no facts, no objective variables to measure, if organisations and individuals are unique, and if experiments cannot, objectively, be replicated, is there a point in studying phenomena like the one that is the scope of this study, when one could argue that even a case study of a given organisation made today, could not interest that same organisation tomorrow, based on some of the premises mentioned above? The position contended herein, is that there are many sound reasons to carry out studies like this one, taking into account the overwhelming evidence of the existence of phenomena like the one, which is central to this study, perceptions of risks, and that there is no point in trying to fit into research perspectives, or philosophies' boxes, just for the sake of doing that. From an individual perspective, each manager is, certainly, a different manager from his peers, and, on a standalone basis, each manager is in itself a universe. However, in spite of the fact that the level of analysis is the individual manager, the author of this study is neither particularly interested nor concerned, in this specific context, with what manager A or manager B think or do. Likewise, each organisation is unique, but the focus is not organisation C or D. From a knowledge contribution perspective, the view of the author is that what is important, from an applied management perspective, are trends. What matters is that there should be reasonable substantiation in what is concluded, to lead others to replicate studies, test some of the suggestions, or, in other words, to get people, managers and scholars, curious and interested, and make them think and check if what is said could represent, or does represent, a trend or not. Understanding a phenomenon, and suggesting mechanisms to deal with that phenomenon, does not mean necessarily that, at a certain point in time, there are basis for generalisation. This could simply mean that a trend is identified, and that it might be worth another try. Besides, it is clear that people, and organisations, are far too multifaceted, and that people, and organisations, are far too tangled to generalise findings and relationships, in the sense adopted in physical and natural sciences.

So where do we stand? First of all a certain phenomenon of interest is perceived by a researcher. Why is that phenomenon perceived, and not another one, is certainly a reflex of the idiosyncrasies of the researcher. What that researcher sees that draws his or

her interest may not be seen at all, or may not be seen in the same way, by a different researcher. In this respect the researcher departs from a subjectivist perspective, even when the research subject is of an objective nature, which, besides, is not the case for this specific study. Certain research subjects are part of an objective realm, while others are part of a subjective realm. When two researchers look at a table from a certain perspective, and see that the table is squared, even when, in reality, they see it as diamond shaped, they may disagree in respect to what view is objective or subjective, but at least they do not disagree that a table is there. When the author of this study says that there are risk perceptions, other individuals may simply say that such things do not exist, or that they do exist, but that they do not see them where and how the author does.

Likewise, it seems clear that phenomena, whose understandings could be generalised, but which manifest in unique, unrepeatable ways, have peculiarities that are lost through generalisation, or even through trending exercises. However, what could be the purpose, from a knowledge construction perspective, of studying a unique, unrepeatable situation, looking for the specifics and peculiarities, unless there was something to be learned and assumed that learning has a purpose that goes beyond simple curiosity? On the other hand, what is the point in labelling situations that are not objective as objective, or situations that are not subjective as subjective, with the single purpose of applying such or such methodologies?

Clearly, one of the purposes of this study is to find trends, to make inferences, based on real life managers, based on data analysis and based on literature. Clearly, we recognise the uniqueness aspects of individuals and of organisations. Still, in spite of the uniqueness, or precisely because of the uniqueness, it is important to understand the complexity of unique situations, and look for common ground that transforms that uniqueness into knowledge, rather than into simple curiosity about a spot phenomenon.

If we want to study phenomena that not everyone sees, and that those who see may see differently, if we want to identify a trend based on previous studies that explain one part of the story, or based on theories that infer the same or a different part of the story, and on data provided by individual managers, the options are not infinite. The nature of the methodology shall reflect the purpose of the study. If the idea is to have a better understanding of a phenomenon, and draw some conclusions or inferences from a sample of managers to suggest ways to address a particular situation, should that situation arise, then, regardless of the sampling methodology, a method to collect and compare data from a sample that is wished to be as large as possible, shall be used.

Trends are difficult to build without volume of information, and without ways to compare data, which compelled the researcher to use quantitative data, in spite of his recognition that the topic is highly subjective, and that the sample might not be representative, hence inappropriate for generalisations. However, the alternatives looked worse. Spending years in many different organisations, jumping from one to another, watching managers make strategic decision or participating in strategic decision-making, trying to feel how they feel, and interviewing them on the spot in order to understand exactly how they think, was out of question for many sound reasons: time, logistical difficulties, access to a large enough number of organisations, family and professional commitments, and so on. Furthermore, the author has been part of a few organisations for many years, and has participated in strategic decision-making and observed in loco many decision-making processes, and felt that spending years here and there, if at all feasible, would add little to this research and to the knowledge acquired in the field. Instead, the author felt the need to clarify some specifics resulting from his observations, prior to entering into a method to gather an important volume of information, and, for that, found that exploratory interviews with a restricted number of managers would be adequate.

The author draws from several philosophies to build his research approach. If we wanted to fit our position into boxes, then we would say that the author of this study would like, from an epistemology standpoint, every phenomenon, including perception, to be directly measurable in what would be seen as a positivistic approach (Saunders et al., 2007). However the author of this study has a clear understanding that many phenomena of interest, in the domain of business and management, and social sciences in general, are not directly measurable, that many phenomena are of a subjective nature, and that many phenomena are unique. In the case of the phenomenon of risk perception, the author understands that part of its complexity may be lost in generalisation attempts, that people and organisations are unique and that *“the challenge here is to enter the social world of our research subjects and understand their world from their point of view”* (Saunders et al., 2007: 107). This epistemological perspective would situate the author in the domain of interpretivism, while the subjective nature of the reality – perceived reality – would position the same author, from an ontological perspective in the domain of subjectivism (Saunders et al., 2007).

Phenomena such as perception, and more specifically risk perception in decision-making, cannot be understood unless the underlying mechanisms are studied. Perceptions result from multiple interactions among the characteristics of the individuals involved, and of the decision matter, and organisational, environmental and contextual characteristics. Without a deep understanding of the causes, it is difficult to fully appreciate the phenomenon. These views could position the author in the domain of the critical realist epistemology (Saunders et al., 2007).

Nevertheless, if the phenomena are of interest, and if knowledge is supposed to be built and shared, then those phenomena need to be assessed, understood and measured if possible, even if indirectly. Ideally, all the studies should be longitudinal, although for reasons mentioned above, 'real' longitudinal studies may not exist in the eyes of those who stand for uniqueness and, therefore, against generalisations. The author thinks that phenomena that interest a considerable group of people, as is the case of risk perception, risk behaviour and the like, shall be generalised, if possible. If, due to methodological reasons, generalisation is not possible, then studies shall provide evidence that helps define trends.

6.2.2 Research Paradigm Adopted

Saunders et al. (2007), drawing from the work of Burrell and Morgan (1979), suggest four research paradigms for business and management studies:

- Functionalist
- Interpretive
- Radical structuralist
- Radical humanist

Basically, the research paradigms combine the nature of reality, or ontology, with the way that acceptable knowledge, or epistemology, is derived from that reality (Saunders et al., 2007).

The functionalist and interpretive paradigms are of a regulatory nature. The existing states of affairs are accepted, and the researcher looks for explanations of phenomena, followed by suggestions or recommendations for improvement, or change within the existing macro framework. Being functionalist, or interpretive, is a matter of seeing the nature of the phenomena as objective, or subjective, respectively.

On the other hand, the radical structuralist and radical humanist paradigms are based on radical change, that is, on challenges to the very nature of the contexts in which the phenomena materialise. For example, in research somehow related to organisations, the researcher, regardless of his or her ontological views, intends to dig deep into the concepts that sustain the organisations as they are with the purpose of, potentially, leading to new organisational ways, new or different hierarchical levels, and so forth. The radical structuralist paradigm is the one that associates radical change to objective ontological views, while the radical humanist paradigm links radical change to subjective views of reality.

Considering that i) the purpose of this research project is to provide a better understanding of the phenomenon of perceptions, associated to strategic decision-making in organisational contexts, namely the impact that perceptions have on individual behaviour, and that ii) the perception phenomenon, pervasive in organisations, is related to people and social interaction and is not meant to disappear, regardless of the way firms structure themselves, the research paradigm adopted is the interpretive one, inasmuch as the intention is to provide explanations of a subjective phenomenon and, if at all possible, make suggestions or recommendations to address its effects.

6.3 Research Approach and Mixed Research Design Adopted

Several authors suggest that research methods in business, and management, shall be mixed (e.g. Edmondson and McManus, 2007; Fredrickson, 1986; Hoskisson et al., 1999; Morgan, 2007).

Edmondson and McManus (2007: 1155) stress the need to combine research methodologies when doing field research, given the fact that “*achieving fit between the type of data collected in and the theoretical contribution of a given field research project is a dynamic and challenging process.*” However, Edmondson and McManus (2007) stress that such combination of methodologies depends on the stage of maturity of the field. If theories are at a nascent stage, qualitative studies are recommended, if theories are at a mature stage, quantitative studies are suitable, and if theory is at an intermediate stage, then mixed-methods are appropriate (Edmondson and McManus, 2007). Different types of research approaches, and designs, can be used for different stages of theory research.

Das (1983) claims that research on organisational or related to organisational phenomena need not to adopt one methodology in detriment of another. Furthermore, Scandura and Williams (2000) argue that different methods contribute to provide confirming evidence of phenomena, and that such corroboration is essential.

In addition, Jick (1979) argues that triangulation, that is, a combination of methodologies to gather, and or to assess, different types of data, is essential for reliability, cross-validation or convergent validation and holistic interpretation of data. The holistic aspect is further stressed by Das (1983: 303), who, when talking about qualitative research in organisational behaviour, argues that *“several of the organisational researchers of today are interested in understanding the gestalt or the totality of behaviour of the unit under study.”*

This research project has all of the four key elements of a field research project, as defined by Edmondson and McManus (2007), that is:

- i) The research question is such that the topic is narrowed to a manageable size, and in a consequential way;
- ii) The research project is based on prior work, and intends to focus on unasked questions;
- iii) The research project has a research design that sets forth the type of data to be collected, how to collect that data and where; and
- iv) The purpose of the research project is to contribute to refine the understanding of a phenomenon, which is pervasive in organisational contexts, suggest novel relationships among constructs, and draw practical insights from the results of the research.

Yauch and Steudel (2003), in a study of organisational cultures of two small companies, used quantitative and qualitative methods, that is, they used mixed methodology, with results assessed by the authors as beneficial. In line with the observations of Jick (1979), Yauch and Steudel (2003) consider that the utilisation of mixed-methods allowed them to increase validity, and led them to a deeper understanding of the construct. This field research project deals with constructs, whose measurement and interpretation is not easy, and where corroboration and complementarity are important, and even necessary. Therefore, the utilisation of mixed-methods is justified.

Furthermore, using the typology suggested by Edmondson and McManus (2007), the author of this study considers that some of the theories related to the research topic are at an intermediate stage. For example, as far as the author knows, there are no studies that address the perceived organisational support from a strategic decision-making, and risk-taking perspective, and that establish relationships between perceived organisational support and individual perceptions of other variables, in organisational contexts. Staying with the example of perceived organisational support (POS), the author sees a theoretical gap to be filled, since what has been studied is if someone perceives organisational support in general terms, that is, if there are rewards or lack of rewards, if there is care for opinions and well-being or lack of care, and so forth, and what is missing is a better understanding of some of the antecedents of POS or of the 'whys' of POS, in order to understand why there is, or not, POS, thus anticipating, rather than stating, its existence. This gap, which needs to be filled in, strengthens the need for a better understanding of the perceptions that managers have of the issues around their lives in organisations, thus validating the need to employ mixed-methods.

Triangulation contributes to constructs' validity in that it makes researchers gather data via different methodologies, thus contributing to provide external validity, and makes researchers compare data gathered as well via a single methodology, in what is a contribution for reliability or internal consistency (Jick, 1979). However, in the case of this research project, the utilisation of mixed-methods considered more the complementarity and corroboration aspects mentioned above, than triangulation per se. Nevertheless, such triangulation contributes, namely, to content, discriminant and nomological validities, of the constructs retained.

The main purpose of this research project is to find trends, which allow for a better understanding of the perceptions, and behaviours, of individual managers, when facing situations potentially risky in organisational contexts. The bits and pieces that could make the research subject are dispersed through a vast amount of literature, many times with different focus. In order to achieve the purpose of this study, the author uses pieces of research that are available. Therefore, and in that sense, the study is essentially of a deductive nature, based on interpretation of a subjective reality. Basically, the idea is to reshuffle the bits and pieces, and to present them in a way that is innovative. By innovation the author does not mean, necessarily, that theory is built. The author means,

however, that constructs may be presented with different boundaries and connections, bringing fresher views for existing theories and for theory use. The author of this study means as well that deductive work could contribute to theory evolution. Thus, drawing from the work of Hair et al. (2006), who suggest that quantitative methods are appropriate when there is a purpose of generalisation, or of trend definition, and based on the work of Saunders et al. (2007), who suggest that surveys are related to research of a deductive nature, the main strategy retained in this study for data gathering is a survey (questionnaire), and the data used to test hypotheses are of a quantitative nature.

Nevertheless, the author thinks that some of the theoretical fields reviewed in this study, namely those related to the organisation contexts, are at an intermediate stage of development, inasmuch as many relationships among constructs have not been tested, and concepts have not been totally disentangled, which puts this study in the domain of the fieldwork that is prone to mixed methodologies (Edmondson and McManus, 2007).

In spite of the deductive philosophy presented above, due to the kind of the research topic, specifically its subjectivity, and of the literature associated, namely its vastness, which is associated with numerous and different research aims proposed and studied by many authors, there was the need to make sure that the scales adopted from literature sources, or new scales based on literature, were adapted to the purpose of this specific study. In order to do that, the author of this study opted to conduct some qualitative research, that is, a number of semi-structured interviews with, essentially, an explanatory purpose (Saunders et al., 2007). The main purpose of the interviews was not to look for new theory, in spite of the inductive character that such interviews may have, and generally do. Instead, the main purposes were rather to clarify some aspects of the literature, and of observations by the author, with the intent of finding new relationships between constructs that are present in the literature, and to find items that could add value to existing scales, thus contributing to theory development.

Nevertheless, the author had also the intention to propose a scale that, according to the author, could contribute to measure a construct that, although superficially intuited in the literature (Harris, 1994; March, 1991), is not clearly defined. We are speaking about the perception of the risks for the self. In this specific case this research project had a research aim that could be seen as of an inductive nature and the interviews had, although to a minor extent, an exploratory purpose (Saunders et al., 2007). In reality, according to the typology defined by Edmondson and McManus (2007), theory related

to a construct such as the perception of the risks for the self, related to participation or involvement in strategic decision-making, is clearly at a nascent phase and calls for qualitative research.

The questions asked to the interviewees were made in a way to provide them with enough freedom, to talk about the subjects asked without any type of limitations, or interruptions. For example, managers, after being presented with the purpose of the research and of the interviews, were asked to provide examples of strategic decisions with which they were involved, and address the research topics under their views of their involvement in such decision-making processes. The author purposively stimulated interviewees to adopt a narrative approach, and dealt with the results of the interviews in the way of narrative analyses, that is, the contents of the interviews were analysed as a whole rather than through fragmentation (Polkinghorne, 1995; Sandelowski, 1991; Saunders et al., 2007).

In this research project, the author considered that the result of direct observation in organisational settings would be a valuable complement of quantitative data, resulting from a questionnaire, and qualitative data, gathered through semi-structured interviews. The author adopted a role of complete participant, that is, the role of someone who participates in organisational activities as a member of the organisation, and conceals his or her identity as a researcher (Saunders et al., 2007). In that role, the author gathered essentially anecdotal information, and evidence, to support, that is, to help explain the results of quantitative data analysis, and to complement the results of interviews.

Mintzberg (1971) suggests that managers shall be observed *in loco*, as a way to understand and document managerial work and to understand and document managerial behaviour. In that respect, the researcher observed managers also with the intention of assessing how they deal with the risks, which they may incur themselves, when engaging in strategic decision-making, in the contexts of their organisations.

The research design adopted is made up by a central flowchart with several routines (fig. 6.1). Direct observation and literature review, cross the study longitudinally. An initial literature review was required to consolidate some of the initial ideas of the author, resulting from direct observation in organisational settings, to provide elements for the exploratory interviews, and to confirm and or suggest avenues to fine-tune the

research subject. Additional reviews of literature were meant to justify, and, or, provide further substance to the constructs, to defend results, and, or, provide alternatives to the results of the pre-test of the questionnaire, and to explain findings and limitations of the study, and provide suggestions for supplementary research.

After the exploratory interviews, which provided qualitative data, and before sending out the questionnaire to the prospective respondents, a first version of the questionnaire was sent to a panel of experts to assess the links among items and constructs, and, after that, to a different panel of experts, twice, separated by roughly three weeks. Both techniques are used to assess reliability (Saunders et al., 2007).

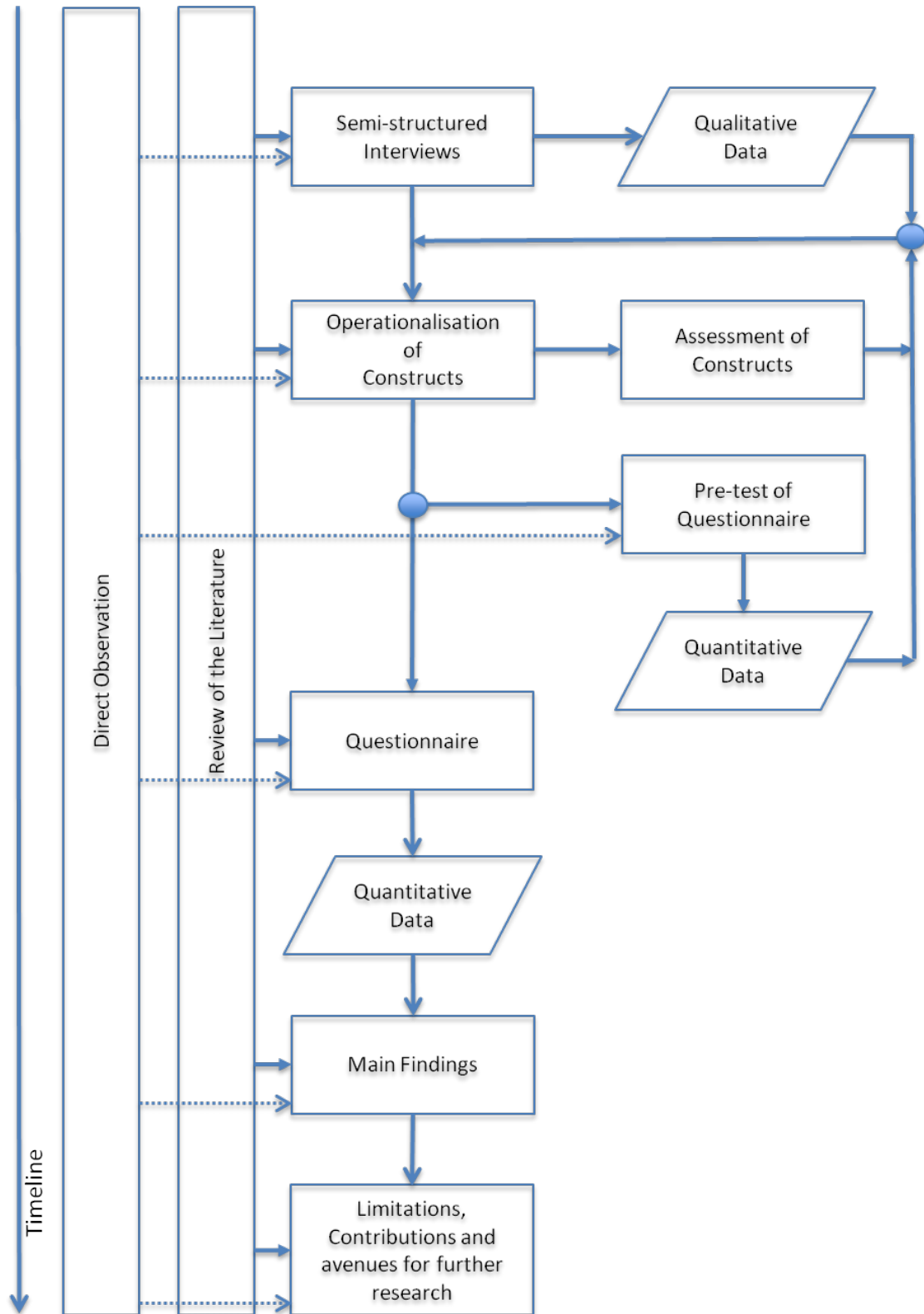
A first version of the questionnaire was sent to a sample of managers, and the respondents produced quantitative data, whose results were used to prepare the final questionnaire. The first version of the questionnaire was used as a pilot-test.

The final questionnaire was sent to another sample of managers and the resulting data was analysed to lead to the main findings of the research project.

Finally contributions, limitations and avenues for future research were drawn from the study.

To summarise, drawing from the work of Edmondson and McManus (2007) and Saunders et al. (2007), the author adopted a research approach that is based substantially on a quantitative study, backed by qualitative research with, essentially, an explanatory purpose for the relationships hypothesized among constructs, and also, secondarily, an exploratory approach in respect to the risks perceived by managers for themselves.

Fig. 6.1: Research Design - source: the author



6.4 Constructs' Content Validity

Cronbach and Meehl (1955: 282) argue that “*content validity is ordinarily to be established deductively, by defining a universe of items and sampling systematically within the universe to establish the test.*” Haynes et al. (1995: 238) define content validity as, “*the degree to which elements of an assessment instrument are relevant to and representative of the targeted construct for a particular assessment purpose.*” In the context of a paper related to construct measurement in organisational strategy research, Venkatraman and Grant (1986: 79) define content validity as “*the extent to which empirical measurement reflects a specific domain of content*”, while Hair et al. (2006: 102), who call it face validity as well, define construct face validity as, the “*assessment of the degree of correspondence between the items selected to constitute a summated scale and its conceptual definition.*” In short, content validity is the correspondence, in terms of theory, between items and the construct that they are supposed to measure (Hair et al., 2006).

Clearly, content validity of constructs requires in a first phase that the constructs are defined and that the indicators proposed to measure the items are anchored in literature, and, or, empirical observation. After a literature review of the domains of interest to the author, in the context of this study, and based also on direct observation of managers, in their organisational settings, and on one-on-one interviews with a number of managers, the author defined the constructs, and prepared a questionnaire, which, following the recommendation of Hair et al. (2006), was presented by the author to a panel of managers, whom were asked to match each question, or item, of the questionnaire to be pre-tested, with each construct, by marking for each question the construct that, in their opinion, it intended to measure, in order to test for content. The constructs were tentatively named ‘manager’s risk perception of the decision subjects’ or RP, ‘manager’s perceived control’ or CTR, ‘manager’s self-interest and politics’ or SI, ‘manager’s working and risk experience’ or WRE, ‘organisational culture related to risk’ or OC, ‘CEO’s risk orientation’ or CEO, ‘perceived organisational support’ or POS and ‘perceived risk for self’ or RPS. The author of this study provided a written description of each construct (table A1.1, Annex 1) to the managers or judges, who were part of the panel, and who were chosen purposely by the author, due to their overall knowledge of strategic decision-making, and organisational life.

In order to increase content validity of the prospective constructs, namely content or face validity (Hair et al., 2006), each item intended to measure a construct resulted from a combination of literature suggestions, existence of scales, direct observation, and interviews with managers.

6.4.1 Qualitative Studies - Direct Observation

Observation can “*add considerably to the richness of... research data*” (Saunders et al., 2007: 282). Mintzberg (1979) suggests that researchers focus too much on getting results statistically significant, and too little on getting direct contact with managers, that is, on getting data with practical significance. He carries on saying that “*detective work*” is required to “*the tracking down of patterns, consistencies*” (Mintzberg, 1979: 584). Research projects, which, ultimately, are about behaviours of individual managers in organisational context, need to be studied in those settings (Gibbert et al., 2008).

Researchers who apply observation methodologies to managerial behaviour embed themselves, and recommend researchers to embed, into the organisations (Mintzberg, 1979). Depending on the research topic, observation shall be more or less structured, including anecdotal information, and anecdotal evidence (Mintzberg, 1970, 1971). Referring to anecdotal data, Mintzberg (1979: 587) says “*we uncover all kinds of relationships in our ‘hard’ data, but it is only through the use of this ‘soft’ data that we are able to ‘explain’ them, and explanation is, of course, the purpose of research.*”

Saunders et al. (2007) suggest a typology for researching roles through observation, where observers play essentially four roles:

- Complete participant
- Participant as observer
- Complete observer
- Observer as participant

The typology proposed by Saunders et al. (2007) is based on four combinations of two aspects, that is, on whether the researchers take part in the activities of the organisations, or not, and on whether the researchers have their identities revealed, or concealed. Complete participant is the researcher who participates, in the case of organisations, in the work to be performed, and does not disclose his or her identity of researcher. Participant as an observer is the one researcher who integrates an organisation as a member, taking part in the activities of interest, and elects to reveal his or her role of researcher. A complete observer is the researcher who does not disclose

his or her role of researcher, and who simply observes the activities of interest without taking part in them. Finally, the observer as participant is the researcher who reveals his or her role of researcher, and observes the activities of interest, without taking part in any activity.

Saunders et al. (2007) suggest that data, resulting from observation, may be made available through a narrative description of what was observed by the researcher. However, they draw attention to the fact that observers' interpretations are involved, and become part of the research project, and that observers need to control 'observer's biases'.

The direct observation methodology was adopted in this research project and the results are presented in Chapter 7.

6.4.2 Qualitative Studies – Semi-Structured Interviews

The use of interviews in business and management research is not uncommon (Yauch and Steudel, 2003), especially when the researchers have concerns of data collection and data usefulness, rather than concerns of research paradigms. *“Outside of introductory textbooks, the only time that we pretend that research can be either purely inductive or deductive is when we write up our work for publication. During the actual design, collection, and analysis of data, however, it is impossible to operate in either an exclusive theory – or data driven fashion”* (Morgan, 2007: 71). Jick (1979) argues that different data collection methodologies, such as interviews and questionnaires, are complementary and may improve the analysis of a given phenomenon. Edmondson and McManus (2007) suggest that interviews are an appropriate methodology to collect data, when theory and research are in nascent or intermediate states. *“Intermediate theory research draws from prior work – often from separate bodies of literature – to propose new constructs and or provisional theoretical relationships”* (Edmondson and McManus, 2007: 1165).

Semi-structured interviews are used essentially when a researcher intends to confirm or expand his or her knowledge of a certain subject, including finding news or fresh views. Ghiglione and Matalon (2005) define semi-structured interviews as being of knowledge verification, or knowledge deepening nature, rather than of an exploration type. Regardless of whether interviews are of an exploratory, or verification nature, or

knowledge expansion, qualitative data such as the one drawn from interviews forms the basis for developing and pre-testing questionnaires (Jick, 1979). Interviews can be used either to complement quantitative data by, for example, providing explanations of statistical relationships (Edmondson, 1999; Yauch and Steudel, 2003), or, oppositely, as the primary data source being complemented by quantitative data (Eisenhardt, 1989; Eisenhardt and Graebner, 2007).

Yauch and Steudel (2003) argue that mixed methods can be used both for triangulation purposes and for complementarity, and that complementarity leads to more robust results. Edmondson and McManus (2007) reinforce the idea of complementarity, when they argue that mixed methods leverage both qualitative and quantitative methods, and that such combination is a powerful tool to justify new relationships among known constructs.

The author used interviews in this research project, with the purpose of looking for more detailed explanations of phenomena, which are pervasive in organisations and could

- i) Either confirm the understandings of the author or open fresh perspectives in respect to constructs and links among them;
- ii) Match literature with practitioners views; and
- iii) Fine-tune the items that would lead to the measurement of some constructs, and to test a theoretical model proposed by the author.

The cut-off method used to select the number of interviewees was the saturation criterion, "*or the point at which no new information or themes are observed in the data*" (Guest et al., 2006: 59). The author of this study reached that point after 7 interviews.

The author prepared a script to, on the one hand, guide the interviewees and, on the other hand, provide them with enough latitude to allow new perspectives of the issues at stake, to pop out. The script concerned generic, rather than specific, issues, related to a number of topics of interest. Each meeting lasted between 1 and 2 hours, and the author met the interviewees in their organisations' facilities. The data generated by the interviews were treated as narrative data (Teddlie and Yu, 2007), that is, the main core ideas and concepts were retained.

Most of the constructs of interest to this research project have been previously studied. However, it is contended herein that the research field is not mature enough,

that the constructs have not been linked in the way proposed by the author of this study, and that theory that explains the behaviours of individual managers in face of risk, in organisational contexts, remain to be proposed, which justifies the need for complementarity between data and methodologies.

The semi-structured interviews methodology was adopted in this study and the results are presented in Chapter 7.

6.4.3 Quantitative Studies – Pilot Questionnaire/Pre-test

Further to the direct observation of managers and the exploratory interviews, and based on the literature reviewed, the author designed a first questionnaire with 58 questions, excluding those of a socio-demographic nature, which would, supposedly, measure eight constructs:

- Perceived Risk of the Decision Subjects;
- Illusion of Control (sometimes referred to as ‘controllability’);
- Outcome Experience (sometimes referred to as ‘familiarity’ or ‘outcome history’ with the decision subjects and their typical outcomes);
- Perceived Organisational Politics and Self-Interest;
- Perceived Organisational Risk Culture;
- Perceived CEO’s Risk Behaviour;
- Perceived Organisational Support; and
- Risk Perceived for the Self

The scales to measure the initial 8 constructs of interest to the author were adapted either from existing scales or from suggestions from literature (table 6.1).

Table 6.1: Sources of the Scales of the Pre-test Questionnaire

Construct	Scales Adapted from	Source Context
Perceived Risk of the Decision Subjects	Simon et al. (1999)	Entrepreneurship (how individuals decide to start companies)
	Sitkin and Pablo (1992)	Risk Perception and Risk Propensity
	Sitkin and Weingart (1995)	Risk Perception and Risk Propensity
	Slovic (1987)	Risk Perception

Construct	Scales Adapted from	Source Context
Illusion of Control	Langer (1975) Sutcliffe and Huber (1998)	Illusion of Control in gambling Firm and Industry determinants of executive perceptions of the environment
Outcome Experience	Sitkin and Weingart (1995)	Risk Perception and Risk Propensity
Perceived Organisational Politics and Self-Interest	Drory and Romm (1990) Kacmar and Carlson (1997) Mayes and Allen (1997)	Organisational Politics Perceptions of Politics Organisational Politics
Perceived Organisational Risk Culture	Kuratko et al. (1990) Venkatraman (1989)	Management support for intrapreneurship Strategic orientation of business enterprises
Perceived CEO's Risk Behaviour	Geletkanycz (1997) Hornsby et al. (2002) Lewis and Stephens (1994) Sitkin and Pablo (1992) Tsui et al. (2006)	Effects of cultural values on top executives commitment to status quo Perception of the internal environment for corporate entrepreneurship CEO attitudes as a determinant of organisation designs Risk Perception Relationship between organisational culture and CEOs' leadership behaviours
Perceived Organisational Support	Eisenberger et al. (1986) Rhoades et al. (2001)	Perceived organisational support Perceived organisational support
Risk Perceived for the Self	Keh et al. (2002) Simon et al. (1999)	The Cognitive processes of entrepreneurs Entrepreneurship (how individuals decide to start companies)

The qualitative results of the pre-test of the questionnaire (pilot questionnaire) are presented in Chapter 7.

6.4.4 Final Questionnaire

The final questionnaire (Annex 2), which followed a test of a pilot questionnaire, included 11 socio-demographic questions and a total of 43 items of which 23 were intended to measure 6 constructs (tables A2.1 to A2.6, Annex 2).

Twenty items were not used to measure the constructs that are part of the proposed model. Those items were included in the final questionnaire for future research work, namely a scale to measure the perceptions of the risks that individual managers feel that they may face directly.

The 23 items mentioned above intended to measure the following constructs:

- Perceived Risk of the Decision Subjects (4 items);
- Illusion of Control (3 items)
- Outcome Experience (3 items)
- Perceived Organisational Risk Culture (4 items);
- Perceived CEO's Risk Behaviour (5 items); and
- Perceived Organisational Support (4 items)

6.5 Survey Design

Once the researcher decided what to measure the following step was how to measure and how to collect and treat data, before applying statistical methodologies to the data gathered.

6.5.1 Types of Scales

Each indicator, in both the test of the pilot questionnaire and the final version of the questionnaire, was measured with either a 5-point Likert or Differential Semantic scales. The researcher adopted an odd number of points in order to present respondents with a mid point, and with a 5 points scale taking into account that 5 points provide enough discrimination or variation (Dawes, 2012; Hinkin, 1995), keeping in mind that the purpose of the study is to provide trends for relationships among constructs, and not to build scales, or to do the measurement per se of latent variables, out of the context of the model proposed. Miller (1994) suggests that, in general terms, human beings cannot discriminate more than seven, plus or minus two, categories of a certain characteristic. Preston and Colman (2000) argue that the popularity of 5 points scales are not strongly justified, and that research results suggest that scales with 7, 9 or 10 points should be

preferred. However, those same authors (Preston and Colman, 2000: 1) say that “*in spite of decades of research, the issue of the optimal number of response categories in rating scales is still unresolved.*” Hinkin (1995), who reviewed 75 articles and scales for 277 measures, suggest that 5-point and 7-point rating scales should be acceptable for most of the measures used in business, and management research. In reality Hinkin (1995) found that in 37 out of the 75 studies, or articles, or 49% of the studies, indicators were measured with 5-points scales, against 30 studies, or 40% of the studies, where 7-point scales were used. Cox (1980), who reviewed 80 years of literature about scales, says that the highest number of studies consulted used scales of 7-points, and states that 5 to 9 categories are indicated in most of the cases. Cox (1980) adds that for scales that are centred on a subject, 5-point scales seem adequate.

After discussions and consultations with managers, the author concluded that more than 5 points could, potentially, lead to a big dispersion of data that could, in turn, lead to inconclusive results. Furthermore, the managers consulted confirmed that scales with five categories were easier to use, and provided enough discrimination. Such discrimination allowed respondents to express their opinions in respect to the subjects dealt with by the questionnaire. Those managers consulted added that more refined scales would have categories that would not be used anyway. Moreira (2009) argues that the utilisation of 5-points scales were generalised by the fact that it is difficult to define a bigger number of points with a small number of words, which seem equidistant. In other words, it is difficult, for example, to populate a scale with a number of points considerably higher than 5, with categories such as strongly agree, agree, neutral, disagree and strongly disagree. The author considers that the 5-point scales used are interval scales, in the sense that each interval has the same range. Each observed variable is assumed to be intrinsically continuous, in spite of being measured with a scale that is categorical, and ordinal, in line with the interval consideration made above. Muthén and Kaplan (1985) suggest that continuous variables, which are measured in a categorical/ordinal way, with five or more categories, introduce only minor biases into the estimation of the parameters of models, via the most common used estimators such as ML, GLS and ADF. Bentler and Chou (1987), and Rigdon and Ferguson (1991), suggest as well that continuous variables measured in a categorical way, with 5 or more categories, do not significantly bias the estimation of the parameters of a model being considered. Johnson and Creech (1983) created a model where latent variables were measured by observed variables of a continuous nature,

measured by ordinal scales with 2, 3, 4, 5, 10, 20 or 36 categories. Parameters' values were defined for λ 's (parameters between latent variables and observed variables) and β 's (parameters between latent variables), and a model was run for a sample size of $N=500$. One of the conclusions of the study is that variables measured with scales with 5 or more categories are relatively immune to categorisation errors. In the words of Johnson and Creech (1983: 398), "*our results indicate that while categorisation error does produce distortions in multiple indicator models, under most of the conditions that we explored, the bias was not sufficient to alter substantive interpretations and the estimates were efficient.*" However, these authors (Johnson and Creech, 1983) caution researchers for the use of 2, 3 and 4 category ordinal indicators, especially for small samples' sizes.

6.5.2 The Sampling Procedure

There are several methods to draw samples. Adams et al. (2007), Saunders et al. (2007), and Short et al. (2002), propose that sampling methods are divided into probability and non-probability, while Teddlie and Yu (2007) classify the methodological division as probability and purposive. Probability sampling is divided into random, stratified, systematic, cluster and multi-stage, while non-probability sampling is divided into purposive, self-selection, snowball, convenience and quota (Saunders et al., 2007). It is worthwhile noting that Adams et al. (2007) divide purposive sampling into judgment and quota sampling, while Saunders et al. (2007) consider that purposive sampling and judgmental sampling are equivalent terms. At this point in time it is worth mentioning that Saunders et al. (2007) denominate probability sampling also as representative sampling.

If a sample is representative, this means that that sample represents a universe, or a population. Therefore, in order for a sample to be representative, even if the sampling method is unattackable, the population needs to be fully known. The easiest way to procure, accurately, a population of managers, from which a probability sample could be drawn, would be by identifying one or a few small companies and getting access to the names of those managers, contacts, and so forth. However, since probability sampling is about representativeness with a purpose of generalisation, problems of generalisation would certainly occur due to sample size, since response rates involving managers are in general low, 10 to 20% according to Saunders et al. (2007). With such a

response rate, in order to get 200 responses or more, the target fixed by the author as a reasonable number, based on the availability of resources and recommendations made in the literature, we would need between 1000 and 2000 managers, who are involved with strategic decision-making, which means that big companies or a big number of small companies would need to be involved. This would again raise problems of identification of the population.

Considering the difficulties mentioned above in respect to probability sampling, the author decided to use purposive sampling methods for both the questionnaire to be pre-tested and the final version of the questionnaire. Saunders et al. (2007) suggest that purposive sampling can be employed when the focus of the research is illustrative, and is presented as a typical case. Furthermore, those authors argue that purposive sampling is used when researchers look either for heterogeneous samples or for homogeneous samples. In the specific case of this study the author intended to check if managers of firms in the energy business present a recognisable trend in terms of perceptions of risks related to strategic decision-making, that is, if the purposive sampling represents a homogeneous group (Teddlie and Yu, 2007), or if the group is heterogeneous to the point that no trends appear. The samples used in this study are of a purposive nature due to resources constraints, mainly time, in order to guarantee the highest possible response rate (Baruch and Holtom, 2008; Cychota and Harrison, 2006), for theoretical reasons (Eisenhardt, 1989), and to meet some of the research objectives (Saunders et al., 2007).

The author decided to confine the research to a certain type of organisations, and industry, where the author knows that strategic decision-making is pervasive and frequent, and where a considerable range of managers (not only top managers) participate in those decision processes (at least during some of the phases). The researcher targeted middle and top managers in firms in sectors where strategic decisions, and large investments, are frequently made, namely the oil & gas and utilities industries, and where the access to those managers was provided via acquaintances of the author, thus increasing the response level. Therefore, the universe of respondents became the middle and top managers of a restrict number of organisations in those industries. Mainly, the respondents work for organisations such as Petrobras, Technip, Siemens, EDP, Vantage, Northern Offshore, Enscó, etc.

The author argues that firms in the energy industry face a number of situations in terms of volume, amounts and uncertainty involved, and newness requiring decisions of a strategic nature, that make firms in that industry a natural setting to study strategic decision-making. In addition, purposive samples are not unusual when the author has a specific industry in mind, when the subjects are managers, given the difficulty to get access to them, and considering the difficulties to get managers attention to surveys and the low response rates. For example, Shapira (1995) worked with a purposive sample for a qualitative study that led to a questionnaire, and later on with another purposive sample for the questionnaire. For both the qualitative and the quantitative studies, the samples used were not random. Shapira (1995) worked with 50 managers during the qualitative phase and with 656 managers for the quantitative study. In the words of Shapira (1995: 36) he wanted to “*assure that the managers participating were involved in decision-making of the kind that would normally be seen as including considerations of risk.*” Likewise, Hornsby et al. (2009) used a purposive sample with the purpose of getting a high response rate and “*the opportunity to guarantee full coverage, completion and return of the survey*” (pg. 240).

The author of this study recognises the limitations, in terms of generalizability of the findings, which derive from the utilisation of purposive samples. However, sampling is part of the research methodology, and not the research methodology per se. “*Any research method chosen will have inherent flaws, and the choice of that method will limit the conclusions that can be drawn. It is therefore essential to obtain corroborating evidence from using a variety of methods*” (Scandura and Williams, 2000: 1249). On the other hand, Gibbert et al. (2008), in an analysis of case studies, argue that generalisations of an analytic nature are acceptable, in that the researcher makes generalisations by linking the empirical findings to theory, rather than by generalising the findings to a population. In the same vein, Hinkin (1995) stresses the importance of recognising the difference between statistical significance and concrete importance, and Scandura and Williams (2000) suggest that contextual realism may be as important, or more important, than statistical significance. Furthermore, it is worthwhile noting that Short et al. (2002) report the results of a study that they have carried out, related to sampling in strategic management research related to performance, where the large majority of the researchers used purposive sampling. Out of 437 studies, 206 studies or 47% used purposive sampling, while, more astonishingly, 183 studies or 42% of the

total used convenience sampling bringing the total of non-probability sampling to 89% of the studies analysed by Short et al. (2002).

The author used his best endeavours to minimise the potential problems raised by purposive samples, by using precautionary measures that promoted triangulation, that is, by combining methodologies to study the research subject, and by collecting data from different sources (Jick, 1979; Saunders, 2007; Scandura and Williams, 2000), with the purpose of looking for alternate (Adams et al., 2007), or complementary explanations and for data accuracy (Adams et al., 2007). In that respect the author used a purposive sample for the qualitative part of the study (semi-structured interviews), a second purposive sample for the first version of the survey instrument (questionnaire), and a third purposive sample for the final version of the survey instrument. The subjects of the sample that were used in the qualitative study came from two organisations, the subjects of the sample used to pre-test the first version of the questionnaire were from a third different organisation, and the subjects of the sample used to answer the final version of the questionnaire were from organisations all different from those used in the qualitative study and pre-test.

One of the ways to improve response rates is through “*sponsorship by an organization or person in the executive's social networks*” (Cycyota and Harrison, 2006: 133), which was the approach used by the author of this study. One of the problems of this type of sampling strategy is that, other than the representativeness of the sample employed, it is difficult to know exactly how many managers had access to the questionnaire. It is estimated, however, based on discussions with the sponsors, that the questionnaire was submitted to a total of 380 managers, of which 296, 77.9%, replied. However, only 216 provided fully utilisable responses, corresponding to a net response rate of 56.8%, since 80 managers replied to the demographic part of the questionnaire only. Following the experience gained with the pre-test, the definitive questionnaire was administered in such a way that made respondents either abandon the questionnaires, after the demographic questions were answered, or respond in full. Therefore, the 80 questionnaires that provided demographic data only, were not retained for this study.

In the context of the statistical methodology adopted, which will be presented later on in this Chapter 6, guidance in respect to the ideal number of respondents for a survey

is somehow disparate, as are disparate the aspects that matter to get to that ideal number of respondents.

For example, Guadagnoli and Velicer (1988) report that some authors recommend a number of respondents per item, while others recommend a number of respondents per construct. Hinkin (1995) informs that some authors recommend item-to-response ratios of 1:4, while others recommend at least 1:10, whereas MacCallum et al. (1999) provide examples of authors recommending ratios between the number of subjects and the number of indicators of 3 to 6, 5 and 10.

MacCallum et al. (1996) suggest that in order to achieve powerful tests of models' fit, and if the degrees of freedom are large (for example 100 or larger), sample sizes could be lower than 200, provided the sample size is higher than the number of indicators. It is worthwhile noting that the sample size depends as well on the statistical analyses to be conducted.

However, Velicer and Fava (1998), and MacCallum et al. (1999), argue that rules of thumb that establish minimum ratios of sample size to the number of measured variables are inappropriate. Factor loading, variables per construct, sample size, and number of constructs, are the variables that contribute to representativeness of a population by a sample. In other words, the "*misconception is that the minimum level of N (or the minimum N:p ratio) to achieve adequate stability and recovery of population factors is invariant across studies*" (MacCallum et al., 1999: 86), where N is the sample size, and p the number of measured variables.

Guadagnoli and Velicer (1988), and Velicer and Fava (1998), suggest that sample sizes are less important, and may be smaller, when and if factor loadings are relatively important, that is, when loadings are 0.6 or higher.

MacCallum et al. (1999), on the one hand, stress that many relevant studies provide no guidance whatsoever for the ratio between sample size and number of measured variables, and on the other hand, present examples of ratios between sample size and number of measured variables of 3.0, 3.9, 1.3 and 1.2, where subsamples represent very well the population (a biggest sample) from which they were drawn.

Hinkin (1998) suggests that a sample size of 150 observations should be enough for factor analysis, provided that the correlations among items are reasonably strong, and proposes that for confirmatory factor analysis samples of a size of a minimum of 200 observations are retained.

Ding et al. (1995) studied the effects of estimation methods, number of indicators per construct, and sample size, on structural equation modelling fit indices, and concluded that above 100 observations, and for constructs measured with 3 indicators, sample size produced no effect on comparative fit index, nonnormed fit index and relative noncentrality index.

Considering that all the measured variables were expected to have loadings in their respective constructs above 0.6, that the scales used were adapted from existing scales, being assumed as theoretically robust, and that the minimum number of indicators per construct was 3, as suggested by Ding et al. (1995), the author targeted a sample of at least 200 subjects (Hinkin, 1998).

6.5.3 Data Collection and Coding Procedures

The questionnaires were originally prepared in the English language, taking into account that this study is presented in English, and that the very large majority of the literature available in the domain of business and management, is written in English as well. Since the author decided to propose the questionnaire to a multinational sample of managers, and in order to minimise error related to translations, the author of this study decided to ask different professional translators to translate and back translate the questionnaire, in order to avoid interpretation biases, and distortions in meaning. Thus, professional translators translated the questionnaires into French and Portuguese versions, which, later on, were back translated into English by other professional translators. The author used a Portuguese translator to translate from English into European Portuguese, and a Brazilian translator to translate from English into Brazilian Portuguese, a French translator to translate from English into French, and English translators to translate from all the other languages mentioned back into English. No significant changes were found between translations and back-translations, therefore, the author decided not to change the wording, and semantics, of the original questionnaire in English.

For practical reasons such as distance, costs and administration, the author decided to use electronic means to administer the questionnaire. The questionnaire was placed on a website (surveymonkey.com) and Internet links to the questionnaire in three different languages, as mentioned above, were made available to respondents. The links remained open for 60 days. The secretary of the person who sponsored the questionnaire within his or her organisation, was instructed to send an email to the

prospective respondents providing the links and the purpose of the questionnaire, followed by a reminder 15 days after the first email and by a second reminder 15 days after the second reminder. The results were downloaded in excel format and loaded into SPSS. An SPSS database was, afterwards, imported into LISREL 8.80.

Since all the scales are meant to measure perceptions related to risk, the responses' values were coded from 1 (least risk) to 5 (most risk). For example the indicator 'my organisation cares about my opinions and ideas' was measured with a 5-point Likert scale ranging from strongly agree to strongly disagree, passing by agree, neutral and disagree. The author assumes for the particular statement above, given as an example, that strongly agree is the position in the scale that corresponds to the perception with the least risk, thus coded as '1' and that strongly disagree corresponds to the perception with the most risk, hence coded as '5'.

The quantitative data was downloaded from the Survey Monkey website in Excel. After coding the data in an Excel file, it was imported to SPSS 17 first, and from SPSS to LISREL 8.80, second.

6.6 Statistical Data Analysis

In the context of this research project, the data are analysed in three steps. In the first step the data are coded. In the second step the data are described in statistical terms with the utilisation of Excel and SPSS, and, finally, in the third step the data are analysed with multivariate statistical techniques, namely confirmatory factorial analysis, and structural equation modelling.

6.6.1 Why SEM?

The methodology retained in this study to analyse the quantitative data resulting from the administration of the final questionnaire is structural equation modelling (SEM), that is, the combination of confirmatory factor analysis (CFA) and simultaneous structural equations. In the words of Hair et al. (2006: 703) SEM "*is the best multivariate procedure for testing both the construct validity and theoretical relationships among a set of concepts represented by multiple measured variables*" and "*is the dominant multivariate technique*" (pg.724). In the same vein, Fornell and Larcker (1981) stress the importance of a methodology, which allows for testing

relationships among unobservable variables, to test theory, and see SEM as a fundamental tool.

SEM is used to test relatively complex models where a researcher establishes relationships among variables, often unobserved or latent variables, based on literature review and theoretical knowledge of the research subject, to be expressions or manifestations of certain unobservable constructs. In general terms, two main decisions have to be made: first of all the researcher needs to define which indicators are related to which latent variable and, secondly, the researcher needs to establish the relationships among the latent or unobserved variables. Basically, the researcher needs to specify a model. Specification, in the words of Hoyle (1995: 2), "*is the exercise of formally stating a model.*"

SEM has been presented as a data-analytic approach with several strengths (Tomarken and Waller, 2005):

- i) SEM allows researchers to specify a measurement model and a structural model (Anderson and Gerbing, 1988);
- ii) SEM provides researchers with measures of global fit, that is, fit for the whole model and for submodels, while competing techniques provide tests per equation, one at a time; and
- iii) To the contrary of traditional tests of hypotheses where the null hypothesis is in general the opposite of what the researcher hypothesizes, in SEM the null hypothesis, which states that there is no difference between the model proposed and 'reality', is, in general, what the researcher is looking for (Tomarken and Waller, 2005).

It is worthwhile noting that the use of SEM has been growing since the 1980s, and that it is used in most of the social sciences, including management, marketing, political science, consumer behaviour, sociology and psychology (Breckler, 1990), and also in biology, medicine and economy (Raykov and Marcoulides, 2006).

6.6.2 The Properties of the Measurement and of the Structural Models

CFA is a data-analysis technique of a confirmatory nature, and can be seen as part of the overall structural equations model (Salgueiro, 2012). Based on theory, pre-existing structures, and relationships between measured indicators, or proxies, and latent

variables, are measured and tested via CFA (Raykov and Marcoulides, 2006). However, in CFA directional relationships among constructs are not stipulated. Instead only correlations among constructs shall be considered (Raykov and Marcoulides, 2006). Shook et al. (2004) suggest that SEM, that is, CFA, should be used to assess constructs' reliabilities and validities. Among several possible utilisations, such as construct validation and scale refinement, measurement invariance and multitrait-multimethod validation (MacCallum and Austin, 2000), CFA is used in the context of this study to:

- i) Validate the relationships between latent variables and their indicators (MacCallum and Austin, 2000), that is, to test the measurement model (Hair et al., 2006; Fornell and Larcker, 1981; Weston and Gore, 2006) or, in other words, to assess reliability, a necessary but not sufficient condition of validity;
- ii) Assess construct unidimensionality (Bagozzi and Yi, 1988; Gerbing and Anderson, 1988);
- iii) Assess convergent and discriminant validity (Anderson and Gerbing, 1988; Bagozzi et al., 1991; Fornell and Larcker, 1981; Hair et al., 2006); and
- iv) Assess model versus data fit (Anderson and Gerbing, 1988; Bagozzi and Yi, 1988; Hair et al., 2006; Hoyle, 1995).

Bagozzi et al. (1991) make a strong case for CFA as a methodology to assess construct validity, when they say that CFA “*provides more diagnostic information about reliability and validity than Campbell and Fiske's criteria*” (pg. 429), considering that the widely cited paper of Campbell and Fiske (1959), and the methodology there described, multitrait-multimethod matrix, is usually seen as one of the standards to assess construct validity. Fornell and Larcker (1981: 45) say that “*before testing for a significant relationship in the structural model, one must demonstrate that the measurement model has a satisfactory level of validity and reliability*”, and suggest to use SEM, that is, CFA in this specific case, to assess reliability through composite reliability, and average variance extracted. Construct validation shall apply whenever a researcher thinks that based on theory, a given scale reproduces a given construct, and intends to test the subjacent theoretical hypotheses (Cronbach and Meehl, 1955). Typically, construct validation involves assessments of reliability, and unidimensionality, and of convergent and discriminant validities, being the whole, that is, the relations among the parts, or the nomological network, the essence of

nomological validity. Venkatraman and Grant (1986) suggest that 5 components to assess construct's validity are necessary:

- i) Content or face validity;
- ii) Internal consistency, which comprise unidimensionality and reliability;
- iii) Convergent validity;
- iv) Discriminant validity; and
- v) Nomological validity

However, while content validity, internal consistency, and convergent validity of a construct, can be, and are, assessed for a construct on a standalone basis, independently of its position in a multi-construct model, discriminant validity concerns the comparative measurement of two or more constructs, that is, how different two constructs are, and nomological validity is of an external nature. Nomological validity is based on the relationships among constructs in a given model, that is, is based on the structural model (Anderson and Gerbing, 1988), and also on the relationships among indicators of each construct and the construct itself (Peter, 1981).

Unidimensionality, reliability, convergent and discriminant validities, are assessed in this study with CFA, that is, through the analysis of the measurement models, while the structural model (SEM) assesses nomological validity, through the validation of the relationships hypothesised²¹.

6.6.3 Model Specification/Model Estimation

Once a researcher defines a model, he or she sets relationships among variables. Besides, if that model includes latent variables, the researcher, on the one hand, defines each indicator, or observed variable, as related to, or as a manifestation of, a given latent variable, and, on the other hand, posits relationships among those latent variables. Each relationship that is set between observed and unobservable variables, between observed variables and their respective measurement errors, and among unobservable variables, becomes a free parameter in the measurement, or structural models, unless otherwise decided by the researcher. Those are the parameters, that is, the relationships that are believed by the researcher to be different from zero, and, which, therefore, are calculated by SEM software (Hair et al., 2006). Parameters that automatically, that is,

²¹ Further detail on Unidimensionality, Reliability, Validity, Convergent Validity, Discriminant Validity and Nomological Validity is presented in Annex 4.

by default, are set to zero, unless the researcher decides otherwise, are those that for the researcher do not exist, that is, for which relationships are not hypothesised. Those parameters are called fixed parameters (Hoyle, 1995).

For a given model, the total number of free parameters equates the sum of the number of indicators, with the number of respective measurement errors, and with the number of relationships among constructs.

A model, in order to be estimated, needs to be identified. Identification is the mathematical relation between the number of parameters to be estimated, and the number of covariances and variances among the observed variables, which is known as degrees of freedom ($df = \frac{1}{2}[p(p+1)] - k$, where p is the number of indicators or

observed variables and k is the number of free parameters). If $\frac{1}{2}[p(p+1)] < k$ the model is under identified, and, therefore, cannot be estimated. For a model to be estimated, the number of degrees of freedom (df) needs to be ≥ 0 , that is, a condition that is named as the rank condition by Schumacker and Lomax (2004), needs to be met. A model can be under identified, just identified or over identified (Chou and Bentler, 1995). A model under identified has more variables than the number of equations, which allows the calculation the values of those variables. A model that is just identified has a number of variables, and, or, unknown parameters, that equates the number of equations allowing their calculation. A model just identified allows for a unique solution, that is, allows for unique values for the variables being calculated. A model over identified has more equations than the number of variables, and, as such, does not allow an exact or unique solution to emerge. Over identification is, in the words of Chou and Bentler (1995: 41), a “*blessing*”, insofar that it allows for different models of the same data to be tested and compared.

Model estimation consists in determining values for the free parameters of the model, and assessing fit (Chou and Bentler, 1995). “*Different estimation methods in SEM have different distributional assumptions and have different discrepancy functions to be minimised*” (Chou and Bentler, 1995: 45). The type of estimators used, and the characteristics of data, are related and have a paramount importance on fit evaluation, and values of model parameters. Hu et al. (1992), in a study where the behaviour of several estimators is assessed as a function of sample size, and data distribution, namely

kurtosis influence, say that “*scientific conclusions based on models may be distorted when researchers violate sample size, variate independence, and distributional assumptions*” (pg. 351). Estimators used, and results of estimations, depend on sample size (Bentler, 1990; Bentler and Dudgeon, 1996; Hu et al., 1992; MacCallum et al., 1996; Marsh et al., 1988; Satorra, 1990), under-parameterised models (Hu and Bentler, 1998), type of variables (Browne and Shapiro, 1988; Muthén and Kaplan, 1985), and data distribution (Browne, 1987; Flora and Curran, 2004; Hu et al., 1992; Kano et al., 1990; Muthén and Kaplan, 1985; Satorra, 1990). Many of the estimation methods commonly used by the software packages available assume that data have normal and continuous distributions, and that all the estimators are asymptotic in the sense that the estimations that they provide assume samples are “*arbitrarily large*” (Bentler and Dudgeon, 1996: 571). Lei and Lomax (2005: 2) inform, and confirm, the importance of sample size, when they say that “*studies found that under nonnormal conditions larger sample sizes tend to produce more precise parameter estimates than smaller sample sizes.*” However, data gathered for research in the realm of the social sciences is many times non-normal and ordinal (Flora and Curran, 2004), and samples are often small (Curran et al., 1996), in spite of the fact that researchers, quite often, treat ordinal variables as if they were continuous (Johnson and Creech, 1983), and use estimators based on normal distributions, such as Maximum Likelihood (ML), and Generalised Least Squares (GLS), to deal with categorical and non-normal data, and with small samples. Such utilisation of ML and or GLS estimation for categorical, and or non-normal data, is supported by several studies (e.g. Browne and Shapiro, 1988 and Muthén and Kaplan, 1985, for categorical and non-normal data; Browne, 1987, Lei and Lomax, 2005, and Olsson et al., 2000, for non-normal data), and is recommended by Bentler and Chou (1987), who see the adoption of such practices, that is, the utilisation of categorical variables as if they were continuous, as a positive trade-off, provided that a variable has 4 or more categories. Muthén and Kaplan (1985), for example, argue that ML and GLS estimators are robust for continuous observed variables, which are measured by scales with 5 or more categories, and evidence low values of skewness and kurtosis. Bentler and Chou (1987), nevertheless, recommend the use of polychoric correlations for categorical variables, whenever those variables are in reality continuous and categories are just a matter of measurement. Polychoric correlations are established between variables that are measured with categorical scales, but have subjacent continuous distributions. Nonetheless, in order to deal with non-normality, asymptotic

distribution free (ADF) estimators were developed (Browne, 1984). ADF estimators do not require multivariate normality, or any other specific type of distribution (Kaplan, 2000; Salgueiro, 2012, Satorra and Bentler, 2001). However, as pointed out by Hu et al. (1992), and Kaplan (2000), among other authors, ADF methods work well only with very large samples, and small models (Muthén and Kaplan, 1992), which creates severe restrictions for research in the domain of the social sciences, since, very often, researchers work with small, or medium size, samples, and models of a reasonable size with a few tens of indicators. These limitations of the ADF methods lead researchers to keep a strong focus on traditional estimators, such as ML and GLS, with the purpose of making them evolve to respond to a broader range of problems and challenges (Muthén and Kaplan, 1985).

Estimation of structural equation models is typically performed with one of four main estimation methods²² (Raykov and Marcoulides, 2006; Salgueiro, 2012):

- i) Unweighted Least Squares (ULS)
- ii) Maximum Likelihood (ML);
- iii) Generalised Least Squares (GLS); and
- iv) Asymptotically Distribution Free (ADF) or Weighted Least Squares (WLS)

In a study where several estimation methods were compared for different sample sizes and models misspecifications, Hu et al. (1992) concluded that the scaled Satorra-Bentler statistic, based on the maximum likelihood statistic, was the best overall performer, in spite of some over rejection for small sized samples. The SB scaled test statistic was compared to ML, GLS and ADF estimators, and also to estimators based on elliptical distribution, and heterogeneous kurtosis. Curran et al. (1996) concluded that, overall, the SB χ^2 performed significantly better than the ML χ^2 and ADF χ^2 , with samples sizes of N=100, N=200, N=500 and N=1000, and models properly specified and misspecified under conditions of normality, moderate nonnormality and severe nonnormality data distribution. For sample sizes of N=100 and N=200, which are common sizes for studies in the domain of the social sciences, SB scaled estimation performed better than ML and ADF estimators, for moderately nonnormal and severely nonnormal data distributions, and for well specified and misspecified models (Curran et al., 1996). These authors (Curran et al., 1996), however, stress that for nonnormal data

²² In annex 4 an overview of estimators is presented with greater detail.

distribution and misspecified models, a lower SB χ^2 scaled, compared to a χ^2_{ML} , may not mean better fit, but rather lower ability to detect misspecification. Curran et al. (1996), therefore, recommend that researchers report both the χ^2_{ML} and χ^2_{SB} . Chou and Bentler (1995) studied as well a sample size of $N=200$, a “*small but practically reasonable sample size*” (pg. 47), under different levels of data distribution in terms of normality, and for a model with most of its parameters set to be free, and another model with some of its parameters set to be fixed. Chou and Bentler (1995) concluded that when data in nonnormal, scaled estimators outperform traditional estimators, such as ML, GLS and ADF. Scaled estimators are presented as well by West et al. (1995) as an alternative when data in nonnormally distributed. Furthermore, Bentler and Dudgeon (1996: 585) argue that “*only the Satorra-Bentler scaled statistic is known to behave well empirically under a wide variety of distributional misspecifications.*”

Considering that

- i) In this study the observed variables are measured with Likert, and, or, differential semantic type, 5 categories scales, being, thus, ordinal, regardless of the fact that the author does assume the categories' intervals as having the same size;
- ii) Muthén and Kaplan (1985) suggest that working with Pearson correlations may not be appropriated for ordinal variables, and considering as well that some authors recommend the utilisation of polychoric correlations when working with ordinal variables (Anderson and Gerbing, 1988; Rigdon and Ferguson, 1991; Salgueiro, 2012);
- iii) The author of this study expects the different indicators, of the different variables, to be nonnormal, with some level of skewness and kurtosis, although not censored in the sense defined by Muthén and Kaplan (1985), that is, not with data stacked in one of the extreme categories;
- iv) The data is not expected to be multivariate normal;
- v) The sample size is expected to be small (≈ 200);
- vi) Estimators based on normality, such as ML and GLS, although robust for some non-normal distributions, where skewness and kurtosis are not severe, lead to model rejection too frequently - very high χ^2 - when samples are small and variables are ordinal (Muthén and Kaplan, 1985), or when samples are small and nonnormality increases, even with continuous variables (Boomsma, 1983; Curran et al., 1996; Hu et al., 1992);

- vii) Regardless of their independence from data distribution, asymptotically free distribution estimators require too large samples, and work very poorly with small ones, and with non severe nonnormality (Boomsma and Hoogland, 2001; Curran et al., 1996);
- viii) Measuring continuous variables in a categorised way may impact free parameters estimates, such as error variance, although it seems not to impact the free parameters linking latent variables (Muthén and Kaplan, 1985); and
- ix) The estimation method elected by a researcher shall be a function of the type of data, continuous or discrete for example, of distribution of data, that is, normal or non-normal and if non-normal how far from normality is that data as assessed by skewness and kurtosis, but also of sample size (Hu et al., 1992; Tomarken and Waller, 2005),

the author decided that polychoric correlations should be used, and that the model fit and model parameters should be estimated using the Robust ML estimator, and fit assessed by a scaled Satorra-Bentler χ^2 .

6.6.4 Measures of Model-data Fit

For a given model, software such as AMOS, EQS and or LISREL, for instances, calculate first the covariance matrix of all the indicators indicated by the researcher. Then, based on the model designed by the software user, that is, based on the way that unobserved variables are measured by their observable manifestations, the software calculates, iteratively, the free parameters, in a way that minimises the differences between the implied²³ covariance matrix (also called reproduced covariance matrix by Raykov and Marcoulides, 2006) and the original one, the observed covariance matrix, that results from the observed data, without the restrictions set by the researcher²⁴ (Hoyle, 1995). The observed covariance matrix results from the raw data provided to the software, not from estimation or from the model proposed by the researcher (Hair et al., 2006). According to Hair et al. (2006: 718), “*if the proposed model properly estimates all of the substantive relationships between constructs and the measurement model adequately defines the constructs, then it should be possible to estimate a*

²³ Covariance matrix that is implied by the model specified.

²⁴ The restrictions set by the researcher are those that result from the model specification.

covariance matrix between measured variables that closely matches the observed covariance matrix.”

The level of matching between the implied covariance matrix²⁵, and the observed covariance matrix²⁶, that is, the level of similarity (Hair et al., 2006), or the distance between matrices (Raykov and Marcoulides, 2006), provides the level of fit. Fit means, therefore, how a model proposed by a researcher fits, that is, compares to the relationships present among the raw data, gathered through, for example, a questionnaire (Breckler, 1990). It shall be noted that the comparison, or difference, between the observed matrix and the implied matrix, is the matrix of residuals. Therefore, minimising the difference between the observed and the implied matrices is equivalent to minimising the matrix of the residuals (Hoyle, 1995).

“The various indexes of model adequacy, particularly the χ^2 goodness-of-fit test, indicate the degree to which the pattern of fixed and free parameters specified in a model is consistent with the pattern of variances and covariances from a set of observed data” (Hoyle, 1995: 3). However, Hu and Bentler (1998) challenge the utilisation of the χ^2 statistic, by saying that being models proposed by researchers approximations of reality, it is unrealistic to test if those models match that same reality of which they are mere approximations. Furthermore, Lei and Lomax (2005) do not recommend the utilisation of the χ^2 statistic when samples are small (< 500), and observed variables are non-normal. Additionally, and in spite of the fact that residuals are the difference between the observed and the implied matrices, it shall be noted that Browne et al. (2002) draw the attention of researchers to the fact that low residuals are not always a guarantee of good fit. According to Browne et al. (2002: 417), *“incompatibility between residuals and chi-square-based fit indices can be expected in the presence of manifest variables with excellent measurement properties.”*

Considering that model fit, as described above, is essentially a comparison, or an assessment of the level of similarity, between the covariance matrix that results from imposing certain relationships on data, and the covariance matrix of the data that results from the relationships naturally present in that data, which are independent from the researcher (Chou and Bentler, 1995), the way the covariance matrix based on the model is estimated, or determined, the characteristics of the data, e.g. normality or lack of normality, sample size, type of observed variable - ordinal, continuous – number of

²⁵ Covariance matrix based on the model specifications provided by the researcher applied to the data.

²⁶ Covariance matrix calculated based on the relationships existing in the raw data.

degrees of freedom, and the way the differences between matrices is calculated, impact that fit (Muthén and Kaplan 1985; Salgueiro, 2012).

Several indices provide measurement of model fitting to data. However, there is disagreement among authors in respect to the best way to assess (Salgueiro, 2012), and report fit (Hair et al., 2006), and that it is common to see authors challenging and contradicting previous research (e.g. Marsh et al., 1988), considering that, as clearly put by Hair et al. (2006: 752), *“a simple rule for index values that distinguishes good models from poor models across all situations cannot be offered.”* In reality indices depend, for example, on sample sizes (Bollen, 1990; Breckler, 1990; Marsh et al., 1988), normality vs. nonnormality of data (Lei and Lomax, 2005), and under-parameterised misspecification (Hu and Bentler, 1998; Olsson et al., 2000), and, on the other hand, alternative models may have equivalent fit (Bentler and Chou, 1987; Schumacker and Lomax, 2004), meaning that good fit, relatively to the benchmarks suggest by the specialised literature, is not a guarantee of having the right model, and that poor fit alone, also relatively to the benchmarks used, is not necessarily a reason to reject a model (Hair et al., 2006; Raykov and Marcoulides, 2006).

Many authors (e.g. Bagozzi and Yi, 1988; Breckler, 1990; Hair et al., 2006; Salgueiro, 2012) suggest that, on top of fit measures, several other aspects related to the model(s) have to be considered. One of those aspects, as mentioned above, is construct reliability and validity. Another aspect is theoretical soundness (Hair et al., 2006; Salgueiro, 2012), that is, statistical fit is useless if, for example, constructs themselves do not make sense in that their indicators are not manifestations of the constructs (Bentler and Chou, 1987), or relationships among constructs are not supported by theory. As put by Salgueiro (2012: 102-103) *“if a model makes little sense from a theoretical viewpoint, it will be difficult to justify it, even if the statistical fit is excellent.”*

Submodels within a general model, fit of individual relationships (R^2 and t-values), loading of indicators, and so forth, are some of the methodological aspects that need to be addressed (Hair et al., 2006; Salgueiro, 2012).

As for fit, Breckler (1990), Hair et al. (2006), Salgueiro (2012), and Schumacker and Lomax (2004), among others, recommend that researchers do not stick to a single index and, instead, use multiple fit criteria. For example, Hair et al. (2006) recommend that 3 to 4 indices are reported, and Salgueiro (2012) suggests that the best way to

justify fit is through a strong theoretical background, and the utilisation of indices of different types. Bentler and Chou (1987) argue that if a researcher uses fit indices together with statistical criteria, that is, with the χ^2 , then the conclusions reached by the author should be reliable, meaning that at least trends should be identified. Furthermore, Salgueiro (2012) argues that the differences of viewpoints in respect to the best indices to use, is part of a larger discussion that is related to the best way to measure fit. The main types of indices to assess fit²⁷ are:

- 1) Absolute fit measures (examples: χ^2 , GFI, RMSEA, RMSR, SRMR);
- 2) Incremental fit measures (examples: CFI, NFI, TLI, RFI, IFI); and
- 3) Parsimony fit measures (PI, AGFI, PNFI, PGFI, AIC)

Based on the wide debate in respect to which measures are the best measures, Hair et al. (2006) recommend that the χ^2 statistic and the degrees of freedom are reported, and that one index of absolute fit, preferentially of badness-of-fit such as RMSEA, or RMSR, is used, together with an incremental fit index, such as CFI. Nevertheless, based on research where simulations are made with samples with several problems, such as size, nonnormality and misspecification, Hu and Bentler (1998) recommend for researchers what they call a “*two-index presentation strategy*” (pg. 447), that is, the use of SRMR (a badness-of-fit index) and another index such as CFI, TLI, RNI or RMSEA. It is worthwhile noting, however, that Hu and Bentler (1998) do not recommend the utilisation of RMSEA, and TLI, for samples smaller than 250. Furthermore, in spite of recommendations for the utilisation of the scaled Satorra-Bentler χ^2 , Hu and Bentler (1998) make a call not to use χ^2 statistics, likely supported by MacCallum and Austin (2000). Curran et al. (1996) argue that that statistic may over reject models for which small samples are used. It shall be mentioned as well, that for SEM purposes, and in broad terms, samples up to 250 subjects are small (Hair et al., 2006; Hu and Bentler, 1998), and that for some authors (e.g. Lei and Lomax, 2005) fit indices are robust enough only for samples above 500. Should models be compared, Hair et al. (2006) recommend as well that parsimony fit indices such as PNFI are used. Salgueiro (2012) stresses that, besides the fit of the general, or overall, model, and the theoretical soundness, fit shall be assessed as well for the different components of the model.

²⁷ More detail is provided in Annex 4.

In spite of some controversy around what is an appropriated index to be used, due to issues such as sample size, variables' distributions, degrees of freedom and so forth, and about the range of values deemed acceptable for those measures, some of the indices (or calculations) usually reported, and ranges of values seen as reasonable, or recommended, are presented in table 6.2 below:

Table 6.2: Example of Fit Measures – Recommended Ranges of Values

Index	Range	Source
χ^2	As small as possible with p-value ≥ 0.05	Hair et al. (2006)
	Small χ^2 or not rejecting the null hypothesis (p-value ≥ 0.05)	Breckler (1990)
	Index not recommended for small samples and nonnormal data	Lei and Lomax (2005); Hu and Bentler (1998)
χ^2/df	≤ 3	Hair et al. (2006)
GFI, AGFI	> 0.9	Hair et al. (2006); Hu and Bentler (1998)
	≥ 0.95	Raykov and Marcoulides (2006); Schumacker and Lomax (2004)
SRMR	≤ 0.08	Hair et al. (2006); Hu and Bentler (1998)
RMSEA	≤ 0.07 (samples ≥ 250) ≤ 0.06 (samples ≥ 250)	Hair et al. (2006); Hu and Bentler (1998)
	≤ 0.06	Raykov and Marcoulides (2006)
	≤ 0.05	Schumacker and Lomax (2004)
CFI	≥ 0.95	Hair et al. (2006)
NFI, NNFI	≥ 0.95	Hair et al. (2006); Raykov and Marcoulides (2006); Schumacker and Lomax (2004)

It is worthwhile noting, though, that Hu and Bentler (1995: 95) argue that “*the rule of thumb to consider models acceptable if a fit index exceeds 0.90 is clearly an inadequate rule. It does not work equally well with various types of fit indexes, sample*

sizes, estimators, or distributions.” Basically, each case is a different case, and models shall not be assessed based on fit indices only.

6.6.5 Testing for Moderation Effects

Upper echelons theory (Finkelstein et al., 2009; Hambrick, 2007; Hambrick and Mason, 1984) suggests that the preferences, the behaviours and the cognitive aspects of individuals in organisations, are related to tenure in positions, in organisations and in industries. Furthermore, and as a general rule, hierarchical levels or echelons are related to tenure. Finkelstein et al. (2009) suggest as well that what they call ‘observable experiences’, such as tenure, education and functional experience, are related to psychological factors, such as, for example, commitment to status quo, values and cognitive styles, which, in turn, are related to strategic choices or decisions, and to performance. Although Finkelstein et al. (2009) draw general conclusions in respect to the relationship between tenure and cycles of changes in organisations, including a tendency to conservatism that increases with tenure (Finkelstein and Hambrick, 1990), much less is said in respect to the direct impact that tenure and hierarchical levels have on particular constructs.

Drawing essentially from the work of Hambrick and Mason (1984), and Finkelstein et al. (2009), the author decided to test the effects that tenure and hierarchical levels have on some of the relationships between some of the constructs retained in this study, and hypothesized that tenure and hierarchical levels exert moderator influences. “*A moderating effect occurs when a third variable or construct changes the relationship between two related variables/constructs. A moderator means that the relationship between two variables changes with the level of another variable/construct*” (Hair et al., 2006: 870). Furthermore, the moderator variable is considered an independent variable in the model where it is included (Baron and Kenny, 1986). In spite of the fact that the word moderation may signal balance or restriction, in the specific case of relationships among variables a moderator effect can either increase or decrease the strength of a relationship (Baron and Kenny, 1986; Kenny, 2013), and, or, the direction of the causal relationship (Baron and Kenny, 1986).

One of the main reasons for the utilisation of multi-group techniques is to compare a given relationship between two variables for, for example, two groups of individuals in

a given sample, and test the difference between the strengths of the relationship (Baron and Kenny, 1986). The purpose is to see if there are, or not, differences among groups for that specific relationship (Salgueiro, 2012). However, differences among groups can be evaluated for numerous aspects such as cross validation of models among different samples of the same population, factor loading equivalence, factor structure equivalence, and so forth (Hair et al., 2006; Kaplan, 2000; Salgueiro, 2012). In the specific case of this study, what is at stake is the hypothetical influence of some variables, namely demographic variables, on some relationships between constructs.

Some authors (e.g. Bollen and Hoyle, 1990; Byrne, 2008; Hoyle and Smith, 1994; Jap and Anderson, 2003) suggest that testing for multi-group interactions, or moderation, are multi-step processes that move from a general to a specific perspective, that is, move from testing if the fit of an overall model is invariant across two or more groups, to testing if a specific parameters is invariant across two or more groups, “*in a logically ordered and increasingly restrictive fashion*” (Byrne, 2008: 872). Byrne (2008), focusing on measurement models – measurement invariance across groups - rather than structural models, argues that measurement models shall be defined independently for the different groups of interest and assessed for fit. Byrne (2008) argues that unless the measurement models are invariant for the groups considered, it makes little sense to test invariance for the structural model, and or for any of the relationships of the structural model.

In a first phase the measurement models are tested together considering the existence of different groups, all the relationships in the models are freely estimated simultaneously for the different groups, and the resulting overall fit is evaluated. This overall model is said to be the base model, and the resulting χ^2 is the base χ^2 against which new χ^2 , obtained from variations in constraints applied to the model, are going to be compared. A third step is to set restrictions to all the relationships between a given variable and a set of other variables, by equalising those parameters in all the groups of interest (Jap and Anderson, 2003). Finally, a fourth and last step would be to specifically test the invariance of a given relationship between two variables, by, again, making that relationship equal among the groups of interest.

6.6.6 Testing for Mediation Effects

Baron and Kenny (1986) exemplify the role of mediation with an organism that gets stimuli and transforms that into responses or, in other words, an organism that transforms inputs into outputs. Little et al. (2007: 207) think of a mediator “*as the carrier or transporter of information along the causal chain of effects*”, while, to put things into perspective, they say that “*a moderator, on the other hand, is the changer of a relationship in a system.*” Hair et al. (2006), see a mediator as a variable that is interposed between two other variables, that is, a variable that explains effects in a chain. This does not mean that a mediator does not moderate, in the sense of reducing, the relationship between two other variables. It does in the case of partial mediation, and it reduces that relationship to zero, as far as effects are concerned, in the case of full mediation. In that case the mediator would be caused by the independent variable and would cause the dependent one, although, as pointed out by Holmbeck (1997), the relationships may not be causal, but rather influential.

The traditional way to assess the existence of mediation effects, of which Baron and Kenny (1986) are most likely the more famous proponents, checks the sizes and significances of the effects between

- i) An independent variable or predictor and a dependent variable, in a model with just those two variables;
- ii) An independent variable and the mediator, and between the mediator and the dependent variable, in a three variable model; and
- iii) An independent variable and the mediator, between the mediator and the dependent variable and between the independent and dependent variables, in a three variable model.

Not only ought the relationships to be significant from a statistical viewpoint but also the relationship effects need to be practically significant (Baron and Kenny, 1986).

When in the presence of a mediator the relationship between the independent and dependent variables does not exist, because the effect size of the relationship is zero, we speak about perfect mediation (Baron and Kenny, 1986), or full mediation (Hair et al., 2006). If the size effect of that relationship decreases in the presence of a mediator, although remaining statistically significant, the mediation is partial (Hair et al., 2006).

Another way to evaluate mediation is through a combination of sizes and significance of effects between variables, coupled with model fit (Holmbeck, 1997; Wei et al., 2003). In this case, besides the effects' sizes and significance, fit is compared among three models in a sequential order.

First of all a model considering the independent and dependent variables is assessed for fit. In order to go to the second step and, thus, move towards the existence of potential mediators, the effect of a relationship between an independent variable and a dependent variable needs to be significant (Wei et al., 2003). Obviously it would make no sense to look for a mediator of a relationship, which, by its non-significance, would not be taken into account. Holmbeck (1997: 600) says that "*also critical is the prerequisite that there be a significant association between the independent and the dependent variable before testing for a mediated effect.*"

A second step is the assessment of a model that is said to be partially mediated (Wei et al., 2003), which takes into account the three variables, that is, the independent and dependent variables and the mediator, and considers three relationships: a relationship between the independent variable and the mediator, a relationship between the mediator and the dependent variable and, finally, a relationship between the independent and the dependent variables.

The third and final step is to transform the partially mediated model into a fully mediated model, by constraining the relationship between the independent and dependent variables to value 0, and by comparing the fit of the two models.

Hair et al. (2006) suggest that researchers may approach mediation through several angles, though, they agree very much with the methodology proposed by Baron and Kenny (1986). As far as mediation is concerned, and from a model fit perspective, Hair et al. (2006) bring the case of a relationship, which is expected to be fully mediated, and suggest that when moving from a fully mediated model, that is, a model that has two relationships only (relationships between the independent variable and the mediator and between the mediator and the dependent variable), to a model including three relationships, that is, a model that includes as well, on top of the other two, a direct relationship between the independent and dependent variables, if the fit is significantly improved mediation is not supported. It shall be noted, however, that that is not the case of this study, where, based on theory, the author expects some relationships to be partially mediated.

6.6.7 SEM – Methodology Checklist

Drawing from the work of several authors (e.g. Anderson and Gerbing, 1988; Bagozzi et al., 1991; Bagozzi and Yi, 1988; Bollen and Lennox, 1991; Fornell and Larcker, 1981; Hair et al., 2006; Peter, 1979, 1981; Salgueiro, 2012; Schumacker and Lomax, 2004), and considering as mentioned above that models' assessments shall not rely on fit indices only, the methodological approach used in this study is:

- 1) Check for data distribution. If data is nonnormal try to transform data using some of the techniques recommended in the literature such as logarithmic transformation, power transformations (square root for instances) and reciprocal transformation (Field, 2005; Hair et al., 2006; Raykov and Marcoulides, 2006).
- 2) Make final decision in respect to the model to be tested taking into account the ratio between the sample size and the number of indicators. Note: some authors consider the ratio between the sample size and the number of free parameters of the model (e.g. Bagozzi and Yi, 1988).
- 3) Select the estimation method in accordance with the distribution of the data, and sample size (Hu et al., 1992).
- 4) Check if the model is identified, by ensuring that the sum of the variances and covariances among the number of indicators or manifested or observed variables (p) is bigger than the number of free parameters to be estimated (Hair et al., 2006; Hoyle, 1995).
- 5) Check indicators' loadings on constructs. Pay attention to loadings < 0.7 (Hair et al., 2006) and loadings > 0.95 (Bagozzi and Yi, 1988). Check if factor loadings are statistically significant (Hair et al., 2006).
- 6) Check for unidimensionality (Gerbing and Anderson, 1988; Hair et al., 2006).
- 7) Assess construct reliability
 - a. Measure Cronbach alpha; and
 - b. Composite reliability (Fornell and Larcker, 1981; Hair et al., 2006; Salgueiro, 2012). Bagozzi and Yi (1998) suggest that composite reliability be ≥ 0.6 , while Hair et al. (2006) suggest composite reliability to be ≥ 0.7 .
- 8) Assess construct validity

- a. Assess average variance extracted (AVE) (Fornell and Larcker, 1981; Hair et al., 2006; Salgueiro, 2012). AVE to be ≥ 0.5 according to Fornell and Larcker (1988), otherwise, variance due to measurement error would be higher than AVE, what would challenge the validity of the construct (Fornell and Larcker, 1988).
- b. Compare average variance extracted of pairs of constructs, with the square of the correlations between each pair of those constructs.
- 9) Assess magnitude of parameters' estimates and direction (Hair et al., 2006; Schumacker and Lomax, 2004). For a given parameter different from zero direction is assessed by checking if it is positive (for a positive relationship), or negative (for a negative relationship).
- 10) Assess if individual estimates for each free parameters are statistically significant (t value ≥ 1.96 for p -value ≤ 0.05) (Bagozzi and Yi, 1988; Fornell and Larcker, 1988; Schumacker and Lomax, 2004).
- 11) Assess fit with different indices of different type (Hair et al., 2006; Salgueiro, 2012) and consider sample size, estimation method, data distribution and other model characteristics when evaluating fit (Hair et al., 2006). Lei and Lomax (2005) suggest that the chi-square test is less robust for nonnormality than the normed fit index, the nonnormed fit index and the comparative fit index,
 - a. Assess goodness-of-fit
 - b. Assess badness-of-it
 - c. Assess incremental fit
- 12) Evaluate modification indices (Hair et al., 2006; Salgueiro, 2012)
- 13) Evaluate residuals (Browne et al., 2002; Hair et al., 2006)
- 14) Compare nested models with the overall model, and calculate $\Delta\chi^2$
- 15) Report a representative selection of
 - a. Construct reliability – Cronbach alpha and composite reliability
 - b. Average variance extracted
 - c. χ^2 statistic, degrees of freedom (df) and p -value
 - d. Free parameter estimates and t -values (MacCallum and Austin, 2000)
 - e. Goodness-of-fit indices (Hair et al., 2006)
 - f. Badness-of-fit index (Hair et al., 2006)
 - g. Incremental fit index (Hair et al., 2006)

- h. Parsimony fit index (Hair et al., 2006)
- i. Residual variances for endogenous variables (MacCallum and Austin, 2000)
- j. Viewpoint that even if the model fits, the model is just one of the models, which fit, and not the only model (MacCallum and Austin, 2000)

6.7 Structural Equation Modelling – Constructs' Validity and Hypotheses Testing

A number of actions follow the specification of a model. Number one, the researcher needs to make sure that the constructs are properly measured and that they measure only what they intend to measure and nothing else. Here we speak about unidimensionality, reliability and construct validity, which are further developed below, and enter the realm of the measurement model. Number two, the researcher needs to assess if the model specified fits the data gathered via the survey instrument. And, number three, the researcher needs to test if the relationships hypothesised among the variables of interest to him or her are confirmed or not, that is, if the relationships' effects among constructs are practically relevant (moderate or large), and statistically significant (as provided by *t*-values).

A very important part of the research work, which is intimately related to the methodological aspects and practices, is to provide evidence of construct validity, including nomological validity. Construct validity is related to all methodological aspects, including those that lead to the operationalization of each construct, such as the indicators proposed, where do they come from, and how are they related to the construct, and more general aspects, such as scales, sampling and sample sizes. These former aspects provide content validity, and were presented in sections 6.4 and 6.5, while nomological validity is dealt with within this section 6.7²⁸.

Constructs' validities result from the tests performed on the specifications of the model, that is, if the latent variables are properly related to their indicators, or observed variables, and if the individual models, which are behind each one of the latent variables fit the empirical data available. Bagozzi and Phillips (1982: 459) argue that "*the*

²⁸ Nomological validity is further developed in Annex 4.

linkages between theoretical concepts and their measurement are often left unspecified or else are stipulated in loose, unverifiable ways” and add that “this failure to represent explicitly the degree of correspondence between measurements and concepts undermines the test of theory.”

On the other hand, the central part of the research work, which is the test of the relationships among the latent variables themselves, as hypothesised by the researcher, provides evidence of nomological validity.

Anderson and Gerbing (1988), seconded by Hair et al. (2006), and Hoyle (1995), among others, suggest that a theoretical model that is proposed to explain certain relationships among certain constructs can be specified through a measurement model, and through a structural model. While the measurement model is concerned with the relationships between the manifestations of the latent variables and the latent variables themselves (Anderson and Gerbing, 1982; Anderson and Gerbing, 1988), the structural model is concerned with the relationships among latent variables (Hoyle, 1995). Furthermore, as put by Anderson and Gerbing (1982: 453), *“proper specification of the measurement model is necessary before meaning can be assigned to the analysis of the structural model.”*

Considering that the hypothesised dependence relationships among latent variables or constructs, that is, among theoretical concepts, are meant to be simultaneously tested, and that due to the fact that each one of those constructs eventually results from measured variables or indicators, the researcher needs to assess as well how well represented are those constructs. In that respect, the most suitable multivariate techniques are confirmatory factor analysis for the measurement model, and structural equations for the structural model, that is, structural equation modelling (SEM) as an overall tool (Hair et al., 2006).

In spite of the fact that the designation of one of the multivariate techniques is used broadly to name a whole set of techniques, in reality the designation ‘structural equation modelling’ encloses several techniques, including confirmatory factor analysis (CFA), simultaneous multivariate linear regression equations, and structural equations (Salgueiro, 2012).

Several authors (e.g. Hox and Bechger, 1998; Weston and Gore, 2006) suggest that the overall SEM techniques are a combination of factor analysis and path analysis, or

that factor analysis and path analysis contributed to the development of structural equation modelling (Salgueiro, 2012). Weston and Gore (2006) argue that SEM is somehow comparable to classical factor analysis, in that SEM, like factor analysis, has a parsimony aim (reduction of the number of variables), and comparable to path analysis, insofar SEM tests relationships among latent variables.

6.8 Summary of Chapter 6

In Chapter 6 the author develops the research philosophy adopted. Basically, mixed methods are used in the preliminary studies, while statistical analyses of quantitative data collected via a questionnaire is used as the final and decisive study instrument.

In spite of some exploratory work, due to the fact that the way the author integrates the theories and associates the constructs is not at a mature stage, and need for interpretation, this research project is very much of an explanatory nature, thus the utilisation of quantitative surveys and numerical models. The very existence of the research topic is not challenged, although the author sees the topic as being subjective and requiring further explanation.

Also in this chapter, the qualitative and quantitative studies are presented from a methodological standpoint.

The design of the survey is developed, including the type of scale adopted, the sampling procedure and the data collection and coding procedures.

In this chapter we present the methodologies adopted to test moderator and mediating effects.

Finally, in this chapter, the statistical methodology adopted, SEM, is explained. Reasons for the utilisation of SEM are provided and the measurements of constructs and models are explained. An overview of the measures of model-data fit is offered and a SEM methodology checklist is presented.

CHAPTER 7. RESULTS OF THE PRELIMINARY STUDIES AND PREPARATION OF THE FINAL EMPIRICAL STUDY

7.1 Introduction

As mentioned in the previous chapter, the final empirical study was preceded by interviews of a semi-structured format, and by the pre-test of an initial, pilot, questionnaire, complemented by observation of the phenomenon in natural settings. In this chapter we present the results of the preliminary studies that were made and how those results led to the final empirical study.

The first draft of the questionnaire, and also the final version, was prepared based on literature review, on semi-structured exploratory interviews, and on the observation of the participation of managers in strategic decision-making. One of the concerns of the author was methodology triangulation, that is, the utilisation of more than one methodology to gather and analyse data, considering that the author made a choice in respect to sampling – purposive sampling - that raises representativeness concerns, though the main objective of the author is not the one of generalising findings, but rather the one of researching a real applied management issue, and of identifying trends related to that issue.

The author of this study researched a topic that came to his attention due to his work as a manager, and for which he had gathered information based on observation and direct participation. That observation of managerial life led to certain literature review, followed by interviews with mixed purposes, that is, explanatory and exploratory purposes, since the author felt the need to double check some of his literature readings and of his own observation. Observation, literature review, and interviews, led then to a questionnaire draft that was pre-tested with a non-probability, purposive sample of managers of an organisation, deemed by the author as representative of industries where many strategic decisions are made, and where middle and top managers are, in general, active participants.

The purpose of the preliminary studies was to fine-tune existing scales to measure the variables involved in the phenomenon of interest, confirm or not trends and understandings provided by the literature, find evidence of relationships among constructs that could support the model that the author had in mind, and find signs of

the existence of items that could lead to a scale to measure a construct of interest to the author: the perceived risk for the self.

The samples selected for the preliminary studies, like the sample for the main study, were all of a non-probability nature. The author used his own judgment to select the samples, hence using purposive samples (Saunders et al., 2007).

7.2 Direct Observation of Managers

In the specific case of this research project, the author played a role of complete participant (Saunders et al., 2007), that is, not only did the researcher participate in strategic decision-making on the behalf of organisations, but he also did not disclose his parallel role of researcher. It is worthwhile noting that the author feels that there were no problems of an ethical nature, insofar he was an employee of the organisations and was, therefore, remunerated to perform his scope of work, and, on the other hand, any anecdotal materials are not disclosed in this study.

7.2.1 Conclusions Drawn from the Direct Observation of Managers

The conclusions drawn from observation of managers in their natural operating settings, that is, in organisations, supported by anecdotal evidence, such as emails and presentations, are as follows:

- The only decisions that are criticisable and subject to analyses are those that are made. Decisions not made, regardless of whether they should have been made, are in general unknown and, therefore, not analysed. Thus, and in general, risk is higher for those who decide to do, than for those who decide to preserve the status quo.
- Managers integrate risk considerations in strategic decision-making. Opportunities, or the search for opportunities, are more structured processes, while threats, or unexpected events, are dealt with in less formatted ways. For opportunities, pros and cons are defined and analysed, and uncertainties listed. Sometimes uncertainties are assessed in terms of subjective probabilities of occurrence, with P90 (90% probability), P50 (50% probability) and P10 (10% probability), for example, being defined. Potential risks for the organisations are transferred, whenever possible, to clients, and, or, suppliers, via written contracts.
- Risk is generally perceived as the existence of some potential for losses of an important magnitude, whether the loss is absolute, or relative to some pre-defined target, being magnitude something of a subjective nature. Managers consider the

amounts involved and the consequences for the organisation when making decisions.

- Managers evaluate the risks for themselves. Anecdotal information suggests, for example, that managers do not take certain actions of a risky nature if they feel that their bonuses or stock awards may be compromised. Anecdotal evidence shows that sometimes goals are set in ways that make them as the facto pre-achieved. Anecdotal evidence shows as well that managers, in general, go with the flow, adapting to organisational practices, rules and procedures, avoiding conflict with their hierarchy, protecting their self-interests.
- Managers' experiences play a role in the evaluation of the decision subjects, and of the decision processes. 'Repeat business' is a motto in some organisations. Familiarity with decision subjects, and with outcomes and consequences, is of paramount importance. Decisions that turn out to be good decisions are easily repeated. On the opposite side, decisions that turned out badly are not good candidates for repetition.
- Controllability of situations and processes is related to managers' experiences (posteriori evidence). In general good outcomes and consequences are, to the eyes of managers, the result of control exerted and skills, while bad consequences are the result of lack of control, but not of poor skills!
- Managers tend to conform to organisational practices, regardless of whether they espouse the values of the organisations, or not. Organisational values become important only, if reflected into practices that are not acceptable to managers. Managers see general organisational practices as guidelines for acceptable behaviour. Anecdotal evidence shows that simple aspects, though of relevance for managers and organisations, such as expenses incurred by managers on the behalf of and when representing organisations, vary depending on how managers see, and, or, anticipate organisational reactions, based on observed, or, perceived practices. Anecdotal evidence suggests as well that managers adapt their expectations, including business expectations, to what they perceive as being the organisational practices. For example, managers working for companies seen as more aggressive in terms of prices for certain services (companies practicing lower prices, and, or, accepting worse commercial and contractual conditions than some of its competitors) become themselves more aggressive, while managers of companies that tend to have higher prices, look themselves for higher prices. Managers see

rewards and recognition, as something that is part of the organisational processes and standards.

- CEOs observed imposed the decision-making and management styles. CEOs who look for consensus have the entire organisational departments involved in decision-making with equal weight. Decisions are very structured and take a considerable amount of time to be made, or not made. Managers in the organisation feel lots of scrutiny, and risk perceived is high. All the decision subjects seem risky, and participation in the decision-making processes seems risky as well. On the other hand, CEOs with directive styles gather information and make decisions in small groups. Decisions are fast, there is considerably less scrutiny, and there is a perception that those CEOs know what they want and take risks.
- The main difference between CEOs and organisations is that CEOs set the tone for what decision subjects are characterised as important and strategic, which subjects are urgent and not urgent, and where the organisations ought to go in strategic terms, while organisations are seen as rules and standards holders, which provide frames for acceptable behaviour and recognition and rewards, disseminating information, providing resources, and so on.
- Managers look for support from their bosses and peers, either other managers or boards of directors, and not only for simple approval. Managers want to feel comfortable. In order to achieve that, they need to make sure that everybody 'is on the same page'. If not everybody is on the same page, and some of those who are not on the same page have important organisational roles, then the support perceived from the organisation weakens.

7.3 Semi-Structured Interviews

Drawing from the work of Churchill (1979), who suggests that it is worth getting the contribution of people with knowledge of the research topic, seven face-to face interviews were conducted during the second half of 2009 with middle and top managers, of 5 different nationalities, in three firms, being one a Portuguese affiliated of a German multinational, the second one a French affiliated of an American company, and the third one the parent company of the French affiliated. The aim was to collect qualitative data with a threefold purpose: confirm constructs drawn from existing literature, fine tune any specific aspects related to those constructs, and highlight any new or unexpected aspects. The threshold or cut-off criterion for the number of

interviews was related to the newness of what the last interviewee had to say. Considering that the sixth and seventh persons interviewed had nothing really new to say, or relevant to add, the author decided not to conduct more interviews.

The interviews, of a semi-structured nature, were conducted as one of the pre-requisites for the preparation of a questionnaire and a pillar of a triangulation effort. Each interview, one-on-one, took around two hours. The interviewees worked for firms in the energy business, which was the main industry targeted by the author. The author of this study prepared a script, to which the interviewees had no access, with the purpose of guiding the interviewees to the topics of interest to the researcher, although providing them with enough latitude to allow the outcome of the interviews to have an explanatory character, and also, if possible, to bring something new, that is, to present an exploratory facet. The purpose of the research project was briefly explained, and a definition and a characterisation of a strategic decision were provided to the interviewees. Then, questions were asked to assess what was the meaning of risk to the interviewees, how the interviewees managed risk, if they saw risk for themselves and for the firms as different things, and which are, in their views, the main determinants of the risk perceptions that managers, like them, have of strategic decisions or of strategic decision-making.

Interviewees were told that the purpose of the project was the study of the perception that managers, individually and in organisational contexts, have of the risks associated to strategic decision-making, that is, the risks for firms and for managers, and to fine-tune or determine the factors, or some of the factors, that contribute to that perception. The author characterised strategic decisions as

- Having a strong/considerable/important impact on the firm;
- Complex and allowing multiple evaluations;
- Being made in a context of high uncertainty;
- Requiring important levels of resources – financial, human, other;
- Uncertain in terms of outcomes and consequences (in terms of probabilities, in terms of the outcomes themselves, in terms of time to see the results materialising)
- Having the potential for losses that could, inclusively, jeopardise the future of the firm; and
- Being made within a limited amount of time.

The author mentioned to each one of the interviewees that there were no right or wrong answers, ensured confidentiality, and asked the managers interviewed to be straightforward, and express their very personal views, opinions, and practices.

First of all, the author wanted to make sure that interviewees had strategic decision-making experience. The first question asked, which was part of the script prepared, was thus:

Have you ever made or be part of a team making a decision with characteristics similar to those described to you during our conversation? Could you please describe in a summarised way the subject of that decision, and what was at stake?

The second question aimed at getting from interviewees their definitions of risk, and evaluating if risk for the firm and risk for themselves were the same or different concepts. Thus, the second question asked was:

In general terms what represents to you the risk associated to the outcome of a strategic decision-making from both a firm and an individual perspective?

One of the main points of interest to the author and to this research project was the list of constructs, which, supposedly, impact perceived risk. Therefore, the third question asked by the author was:

Which factors may contribute to increase/decrease the risk associated to the outcome of a strategic decision?

Literature is quite extensive as far as risk and uncertainty is concerned. There is, however, a considerable difference between literature, especially the one of an economic nature, and day-to-day usage of the words risk and uncertainty. This point, being very important in terms of risk theory, led the author to ask a rather lengthy question with 'whys' and 'how', to make interviewees speak and develop their ideas. The idea was to capture opinions in respect to probabilities/likelihoods, their objectivity, or subjectivity, gambling versus managerial decision-making, gut feeling versus decision-making methodologies, and so on. The fourth question asked was:

Some people identify Risk with Uncertainty. In your opinion what's the relationship between Risk and Uncertainty? Do you think that Risk and Uncertainty are similar concepts? Would you mind developing your ideas? Would you compare making a strategic decision to gambling (lotteries, dices, flipping coins)? Why? When you make or contribute to strategic decision-making do you assign probabilities to different outcomes and/or to different options? Do you apply any methodology to evaluate the risk? Would you mind developing your ideas? Do you think that it is possible to

calculate the risk associated to a decision? How? Do you do that often? Do you think that there is subjectivity when evaluating risk in strategic decision-making?

With the fifth question the author intended to calibrate what risk meant in practical terms to interviewees. Therefore, some clues were provided during the discussion around the fifth question, such as if missing a goal was a risk, how managers positioned themselves vis-à-vis absolute losses versus relative losses, and so forth. The question asked was:

Which outcomes, resulting from strategic decision-making, would you consider risky from a firm and from a personal perspective?

An aspect that is mentioned essentially in literature related to societal risk-taking, and that has been superficially treated in business and management literature, is the control that individuals believe that they exert over decision subjects, decision-making processes, outcomes, and consequences. Since that level of control, also called controllability or illusion of control, is very relevant in societal risk-taking, and there were calls by business and management researchers to further study the construct, the author asked the following question:

Do you think that it is possible to reduce or control risks associated to the outcomes of strategic decisions made? How? Could you please develop your ideas?

With the seventh question the author intended to get an overview of what contributes to behaviour. During the discussion around the question, the author provided several clues to make interviewees express their opinions. The conversation was about topics, such as different experiences, and different knowledge, different goals, different personal agendas, organisational cultures, top managers and CEOs. The question asked by the author was:

When you make or contribute to strategic decision-making do you often realise that there are different views/opinions in respect to the decisions to be made? Which factors may contribute to having different people with views/opinions/perceptions that are diversified and/or different and/or divergent? With different people surrounding you (and probably in a different organisation), would you consider making different decisions? Why? Could you develop your ideas?

Another topic of interest to the researcher was the role of intuition in decision-making. Therefore, the author decided to ask the following question:

Do you think that intuition plays a role in risk assessment and decision-making? How? Which factors, if any, do, in your opinion, influence intuition?

And, finally, an important topic to the author was the status quo. Therefore, the author intended to get the opinions of managers about the subject. The question asked was:

In general terms, do you think that there are differences between deciding to do, and deciding not to do? Would you mind developing your ideas?

The main findings and conclusions that result from the semi-structured interviews are:

- Risk means for the managers interviewed a loss, or the potential for a loss, of a reasonable magnitude, thus confirming what is mentioned in the literature (e.g. MacCrimmon and Wehrung, 1986; Shapira, 1995; Yates and Stone, 1992). Losses can be of many natures: financial, market share, loss of opportunities, loss of credibility, loss of status, etc. Some of the interviewees mentioned as well that risk is also the failure to meet expectations, which has also been suggested, for example, by March and Shapira (1987), and Shapira (1995). One manager said that the only risk not to take is the one that jeopardises the survival of the firm.
- Most of the managers said that there is personal risk involved in strategic decision-making. Decision-makers face personal risks and think about their own risk. Some of the managers interviewed provided examples of people who were fired because some projects failed. As put by one of the managers, if decisions are of a strategic nature they will impact all the stakeholders, including the managers of the firm. Managers acknowledged the existence of self-interest and politics in their organisations.
- As for the notion of uncertainty, some of the interviewees stressed that uncertainty is related to the lack of knowledge, or lack of information, as some others noted. Uncertainty opens the door for multiple interpretations, or forecasts, and to internal politics. If uncertainty is high, people tend to the status quo. If decision-makers choose the status quo, they do not expose themselves and do not lose, and if the firm eventually loses due to inaction, that is not 'observable' by others, thus contributing even more for the status quo.

Some of the managers interviewed do not equate uncertainty to risk. Risk is something controllable for most of them, while uncertainty is more related to the prediction of elements required to the decision-making process, which they do not

control, such as, for example, the weather and macro factors such as inflation, GDP growth, oil barrel price and so forth.

- All the interviewees clearly separate risk-taking in an organisational context from gambling, thus confirming the results presented by Shapira (1995). Strategic decisions, in an organisational context, are made if the probability (subjective) is favourable to the organisation, which is not the case in gambling, where the probabilities are always against the gambler. One of the managers interviewed said that in gambling the odds are against us. On the other hand, managers exert control: managers have information, managers assess the situations and managers study the topics. One manager said that in gambling outcomes are mutually exclusive and become known almost instantaneously, which is not the case in managerial decisions. Information and experience of those involved in decision-making were said to play a fundamental role in risk mitigation, and in the perceptions of the risks involved.
- Risk can be mitigated, or otherwise increased, with information, experience, commitment or engagement, and with time to gather more information, for instances. One manager said that people learn only through experience. Most of the managers pointed out that when someone is not on board with a decision path forward, that increases the risk, thus indicating the need to seek consensus and support.
- Decision aids and methodologies to help decision-making are important, but do not replace the experience, the knowledge and the intuition. As mentioned by a manager, people provide the inputs to the models, while another said that there is no model that includes all the variables playing a role in strategic decision-making.
- Intuition is a 'confirmatory approach' in respect to something logical. Intuition comes from knowledge, from empathy with others and with situations. Intuition is a recollection of experiences. Intuition is experience and specific knowledge. Intuition arises automatically and is related very much to building scenarios.
- Decision-makers have different perceptions of the situations, because they have different experiences, different specific goals, different priorities and agendas, and they are part of organisations with certain cultures and with certain top managements. The managers interviewed consider that the same decision subject may be decided differently, depending on the cultural organisation, and on the top management involved, and that CEOs are fundamental to organisations.

- Perception of risks involved in strategic decision-making is undeniably a topic of relevance for the managerial community.
- The perceptions that managers have of risks are clearly related to the effects of controllability, or illusion of control.
- Being experienced, being informed and being knowledgeable crossed transversally all the answers provided by managers.
- Organisational context plays a role in strategic decision-making, with managers interviewed admitting that they could have made different decisions should they have been with different CEOs and different organisations.
- Managers in organisational contexts do not look only for the risks for their firms. They consider as well the risks that they incur themselves, when participating in strategic decision-making.

7.4 Pre-Test of Questionnaire (Pilot Questionnaire)

The initial questionnaire that was meant to be pre-tested was prepared while direct observation continued, while literature was being reviewed, and while the exploratory interviews were carried out. The main purpose of the pre-test was essentially the assessment of the quality of the questions and an analysis of the observed correlation structure and reliabilities, keeping in mind that the results of pre-tests allow researchers to fine-tune, or change, if needed, their final instrument surveys.

7.4.1 Pre-Test Sample

The pre-test was done with a purposive sample in a company in the drilling industry (oil and gas wells). It shall be noted that, while this project was being carried out, that drilling contractor was acquired by another company and does not exist anymore. We think that it is important to qualify what is meant here by purposive. The company was selected because of its appurtenance to the energy industry, and for convenience reasons considering that its CEO made himself available to sponsor the questionnaire, within his organisation. However, there was not any obligation to provide answers, there was an absolute anonymity, and all the managers of the company were invited to answer the questionnaire, that is, there was no selection for convenience among the managers. Furthermore, no managers, other than the CEO, were aware of who was the author of the questionnaire. The main advantage of the purposive sampling is that the rate of responses was around 38%, while in most of the studies with managers the rates of

responses are considerably below that figure. On the other hand, the author deemed this sample representative of the universe of managers, who, typically participate in strategic decision-making, insofar the drilling contractor chosen and its managers were regularly involved with decisions characterised as strategic, as defined in this study, thus making sure that the conclusions of the pre-test could be 'extrapolated' to the final questionnaire.

The questionnaire was placed in a website (surveymonkey.com) and Internet links to the questionnaire in three different languages (English, French and Portuguese, this last language in two versions, European and Brazilian) were sent by the secretary of the CEO of the company mentioned above to 121 managers. 65 managers replied, that is, a rate of 53.7%. However, the results showed that some of the managers who replied (19 managers) provided answers to the demographic questions only, and did not reply to the remaining questions. In reality 46 exploitable answers were obtained, that is, an effective response rate of 38%, which, in spite of all the adversity, is roughly the double of the usual response rate obtained with managers. The fact that some managers elected not to reply to most of the questions led the author of this study to take an 'all or nothing' approach for the final and definitive version of the questionnaire. Respondents would need to answer the questionnaire completely or abandon it, since partial answers would not allow the questionnaire to close, thus forcing the respondents to respond the questionnaire completely, or, alternatively, forcing them to drop it without answering any of the questions related to items measuring constructs in the proposed model.

7.4.2 Contents of the Questionnaire for Pre-Test

After the exploratory interviews, and reviews by the panels of managers, or judges, who assessed the matching between the items and the definitions of the constructs and tested the questionnaire for reliability, the author of this study decided to add 15 questions to the very first draft of the questionnaire, which had been built based on results from direct observation and literature review, thus bringing the total of questions to 58. The logic behind this addition of items is that it is better to drop items, than realising, at a too later stage, that there are indicators missing (Clark and Watson, 1995). All the items in the questionnaire that was pre-tested, are a mix of items from scales that were adapted from literature, items suggested by literature but not part of any scales, at least as far as the author is aware of, items suggested by the exploratory interviews and items suggested by direct observation. The author hoped that, among other constructs,

the pre-test evidenced a variable that measured self-interest together with perceptions of organisational politics, and a variable that measured the risks that managers perceive for themselves. Thus, on top of the 11 demographic questions, 58 items or questions were presented to the managers invited to answer the questionnaire.

For the questionnaire to be pre-tested, the approach was to include indicators that the author of this study assumed to be related to the following constructs of interest:

- Perceived risk of the decision subject (risks intrinsic to the decision subjects, as perceived by the manager) – 10 items;
- Outcome experience of the manager (generalisation of the perception that a manager has of the outcomes of the strategic decisions that he experienced or witnessed or is familiar with) – 4 items;
- Controllability or Illusion of control (the views of the manager in respect to the control that he or she and his or her organisation have over the outcomes and consequences of the decision-making processes) – 6 items;
- Self-interest and Politics (the union of the personal interests of the decision-maker with the perceptions that he or she has of the role played by politics in the organisation) – 9 items
- Organisational risk culture perceived by the manager (how a manager relates the organisational behaviour to risk-taking or to the promotion of risk-taking, including the guidelines under which risk-taking is acceptable) – 7 items;
- Perceived risk behaviour of the manager's CEO (how a manager perceives his or her CEO behaving in respect to risk) – 6 items;
- Organisational support perceived by the manager (how a manager perceives that his or her contributions are valued and reciprocated by the organisation) – 4 items.
- Risk perceived for the self, that is, what is the perception that a manager has of the risks that he or she may incur when participating in strategic decision-making in organisational contexts – 12 items.

Drawing from the work of several scholars (e.g. Ding et al., 1995; Hair et al., 2006) the author used his best endeavours to have a minimum of 3 indicators per construct, or, if possible, 4 or more.

Six out of the eight constructs had been measured before in the literature, though not necessarily in the same context:

- Perceived risk of the decision subject (Sitkin and Weingart, 1995);

- Outcome experience of the manager (Sitkin and Weingart, 1995);
- Controllability or Illusion of control (Sutcliffe and Huber, 1998);
- Perceived organisational risk culture (Hofstede et al., 1990; Hornsby et al., 2002; Kuratko et al., 1990; Naman and Slevin, 1993; O'Reilly et al., 1991; Venkatraman, 1989)
- Perceived risk behaviour of CEO (Geletkanycz, 1997; Tsui et al., 2006); and
- Perceived organisational support (Rhoades et al., 2001)

Despite the existence of existing scales in the literature, the approach adopted by the author was somehow exploratory. The author some times adapted the scales, or items of the scales, and some other times added items with the intention to complement the scales, or find unobservable variables for which scales do not exist or are not clear. For example, in spite of the existence of scales for 'organisational politics' (Kacmar and Carlson, 1997), and notwithstanding the pervasiveness of politics in organisations, including its impact on perceived organisational support to a point that Randal et al. (1999) question if perceived organisational politics and perceived organisational support are not the same construct, the author did not want to consider that construct in his model. Drawing on Ganz and Murray (1980), the author preferred rather to see if items supposed to measure self-interest and items supposed to measure organisational politics aggregated around one same factor. Therefore, a mix of items was included into the questionnaire to be pre-tested. Discussions with managers, from middle level positions to top management, confirm the pervasiveness of politics in organisations. What changes is essentially the definition of 'politics', and, consequently, its impact, and who and or what is impacted. As said by Mayes and Allen (1977: 672) "*what is termed political by one observer may not be viewed as political by another*". Further to a review of literature available at that time, Gandz and Murray (1980) concluded that politics is studied according to two different views, which, themselves, are subdivided: on one hand, there are those who define politics as the power of influence and its utilisation, and, on the other hand, those who see politics as "self-serving" behaviours of others. This justified, in the opinion of the author, the inclusion of items, which lead to building bridges between self-interest and politics.

In a different vein, the 'risk perceived for the self' is a construct that, apparently, is inexistent in the literature reviewed, in spite of many references to the behaviours of managers, mainly top managers, in respect to risk bearing and risk-taking in agency

theory (e.g. Wiseman and Gomez-Mejia, 1998), to self-interest, mainly as far as middle-level managers are concerned (e.g. Guth and MacMillan, 1986; Huy, 2011; Raes et al., 2011), and to the 'right' internal environment that managers need to perceive in order to take actions, that is, to make decisions (e.g. Hornsby et al., 2002; Kuratko, Hornsby and Bishop, 2005; Kuratko et al., 2005). In order to measure the risks perceived for the self, the author gathered several items suggested from literature related to voluntariness and equitability (Slovic, 1987; Vlek and Stallen, 1980) and to losses and uncertainty (MacCrimmon and Wehrung, 1986; March and Shapira, 1987; Shapira, 1995; Sitkin and Pablo, 1992). The items meant to measure the risks perceived for the self (with 5 points Likert or Differential Semantic scales) are:

At a personal level do you perceive to be potentially exposed if things go wrong, when you make or contribute to strategic decision-making in the context of your firm?

How would you rate the personal risk you take when you make or contribute to strategic decision-making in your firm, in terms of potential for negative outcomes to you?

When, in your firm, you make or contribute to strategic decision-making do you perceive your participation more like an opportunity or more like a threat to yourself?

When, in your firm, you make or contribute to strategic decision-making do you perceive your participation more like a potential source of satisfaction or more like a potential source of annoyance or trouble to yourself?

What is the likelihood that your participation in strategic decision-making in your firm brings negative consequences to you?

Do you feel compensated when you get involved in strategic decision-making in the context of your firm?

Have you already felt negatively perceived as a result of your participation in strategic decision-making in your firm?

Please rate the following statement: In my firm, and so far, senior management has 'bought-in' into most of the projects and ideas I have been involved in.

Please rate the following statement: I think that in my firm there is an equitable distribution of risks and benefits related to my engagement on strategic decision-making – the higher the risks I take the higher the benefits I get.

How would you rate your personal influence on strategic decision-making in your

firm?

Please rate the following statement: In my firm I'm able to raise issues related to strategic decision-making and secure serious attention to those issues.

Please rate the following statement: Irrespective of my current position I would volunteer to be involved in strategic decision-making in the context of my firm.

In spite of the number of items, 58, and of the reduced number of managers who replied to the questionnaire in full, 46, the author decided to run an exploratory factor analysis, to allow him to have a better feeling of the data. The author checked as well for correlations among indicators, and assessed the existence of trends based on those correlations and based on literature.

7.4.3 Conclusions drawn from the Questionnaire Pre-Test

The evaluation of the results of the pre-test evidenced some hypothetical constructs, made the author rearrange some scales, and, on the other hand, made the author drop several indicators, since the results did not look convincing, and the total number of indicators was too large comparatively to the expectations of the author in terms of the final sample size. First of all the items that the author expected to measure self-interest and politics together did not work, since they did not aggregate around a single factor. Secondly, the items that supposedly contributed to measure the risks perceived for the self, loaded along several factors, being thus inconclusive. Thirdly, some of the scales adapted from literature, such as the one to measure the perception that managers have of the organisational culture in respect to risk-taking, showed Cronbach's alphas very close to the acceptable limits, that is, barely above 0.60, with items loading in other factors. For example, two indicators used as part of a potential scale to measure perceptions of organisational culture loaded around a factor, which, potentially is related to perceived organisational support. Fourthly, the inclusion of items suggested by literature that were not part of original scales, such as, for example, voluntariness and equitability of risks, did not work well. As another example, the scale to measure controllability, which used items suggested by the literature and also by direct observation and interviews evidenced problems around those new items. Finally, some expected factors were evidenced with Cronbach's alphas clearly in line with previous studies, in spite of the small sample size. That is the case, for example, of the perceived

risk of the decision subject, of the outcome experience, of the perceived CEO's risk behaviour and of the perceived organisational support.

Based on the results of the pre-test of the questionnaire the author decided to use existing scales whenever possible. To complement the analysis previously made in chapter 6, and summarise the evolution from the initial to the final versions of the questionnaire, the decisions made for the final questionnaire were:

- Give another try to the 'perceived risk for the self' construct by including into the final questionnaire a number of items expected to measure that construct, although reworded and in a considerably small number – 4 items. However, at a later stage, the author decided to remove the construct from the model to be tested, and deal with the scale for the perceived risk for the self in future work. Therefore, that construct is not treated in this study;
- Remove from the questionnaire all the items that intended to combine and measure a hypothetical self-interest and politics construct, given their failure to combine in a single factor;
- Include in the questionnaire items to measure the managers' exchange ideology, which, according to Eisenberger et al. (1986) may moderate the perceived organisational support, and is a concept that moderates the effects of reciprocity. In respect to the exchange ideology items, it is worthwhile noting that the author decided to include the items without having decided if those would be of use or not. Due to methodological reasons of parsimony, and to the number of items versus the number of respondents, the inclusion of a new construct could be an issue according to the SEM methodology used to analyse the data. Eventually, the author decided not to work with the items expected to measure exchange ideology.
- Keep in the questionnaire the items related to the perceived risk of the decision subjects, to the outcome experience and to the perceived CEO's risk behaviour.
- Use part of an existing scale to measure the illusion of control.

7.5 Final Version of the Questionnaire

Further to the pre-test and the resulting changes, the model proposed and thought to be tested through the responses to the final questionnaire, incorporates all the relationships hypothesised in chapter 5 and tested in chapter 8.

As a result of the pre-test, the initial questionnaire of 58 items was re-arranged to include a total of 43 items, excluding the 11 demographic questions. Based on the results of the pre-test the main changes from the questionnaire pre-tested to the final questionnaire were:

- The 9 items supposed to measure the construct 'perceived organisational politics and self-interest' were removed from the final questionnaire, based on poor results;
- The number of the items supposed to measure the construct 'risk perceived for the self' was reduced from 12 to 4, matching, basically, the number, and the wording, of the items of the 'perceived risk of the decision subjects';
- The number of items to measure the 'perceived risk of the decision subjects' was reduced from 10 to 4;
- 'Organisational risk culture' was operationalized with 4 items, rather than with the 7 items that were used in the questionnaire that was subjected to a pre-test;
- 'Illusion of control' or 'controllability' was measured with 3 items, rather than with 5 items, as in the case of the pre-test; and
- The addition of a scale supposed to measure 'exchange ideology', with a total of 5 items, insofar exchange ideology is said to moderate the relationship between organisational support perceived and felt obligation (Eisenberger et al., 2001).

The author of this study decided that, depending on the number of total respondents, secondary research aims, such as creating a scale to measure the 'risk perceived for the self', would be dropped and constructs not thought to be part of the proposed model that the author had in mind would not be considered.

From the 43 items that made up the final questionnaire, the author decided to work with 23. That decision allowed the author to keep the integrity of the original scales, when applicable, and get a ratio between respondents and indicators of around 8. In order to get a ratio seen as reasonable the author decided not to consider for analysis in this study the items related to the constructs 'exchange ideology' and 'risk perceived for self'.

7.5.1 Constructs' Scales

As far as the author knows, 'perceived organisational politics and self-interest', and 'risk perceived for the self', have not been dealt with by the literature available, and scales to measure them are also unknown to the author of this study.

Perceived organisational politics is a multi-dimension construct that has been operationalized (e.g. Ferris and Kacmar, 1992; Kacmar and Carlson, 1998), but not in a way that reflects the self-interest of those who are involved, or who refuse to get involved, in organisational politics, in spite of some indications in the direction of self-interest, such as the study of relationship with supervisors, and opportunities for promotion (Ferris and Kacmar, 1992), and discussions on the topic of self-interest (Mayes and Allen, 1977).

On the other hand, in spite of indications in the literature that managers have perceptions of the contextual situations impacting them directly, which condition their behaviours (e.g. Harris, 1994; March and Shapira, 1987; Mayer et al., 1995), and notwithstanding strong evidence that, in society, individuals behave according to the perceptions that they have of the risks for themselves (Slovic, 1987), much less is known in respect to the perceptions that managers have of the personal risks that they may incur. This is due to their involvement in the organisational contexts, namely their involvement in strategic decision-making, since operationalization of risk perception has concerned, in the opinion of the author, the perceptions that individual managers have of the risks for their employers, or firms, rather than the perceptions of the risks for themselves.

For the constructs 'perceived organisational politics and self-interest' and 'risk perceived for the self' the scales proposed for the pre-questionnaire were based, essentially, on suggestions made by the literature reviewed, by direct observation, and by the managers interviewed. Since those constructs were not retained in the proposed model, their formation and compositions are not described here below.

Perceived Risk of the Decision Subjects. One of the associations of items that looked clear, and was retained to be part of the definitive version of the questionnaire, is what the author decided to label after Keh et al. (2002), Simon et al. (1999), and Sitkin and Weingart (1995), as the 'perceived risk of the decision subjects' (table A2.1, Annex 2). Keh et al. (2002:129) define risk perception as "*the subjective judgment of the amount of risk inherent in the situation*", that is, inherent in the decision subject, while drawing from the work of Slovic (1987), risk perceptions, which were studied by that author in the context of societal risk, can be seen as intuitive risk judgments for decisions, whose consequences are delayed and cannot be learned by trial and error.

The scale used in the pre-test, which became part of the final version of the questionnaire used to test the model proposed in this research, and the subjacent hypotheses, is an adaptation of a scale proposed by Sitkin and Weingart (1995), substantiated by the work of Baird and Thomas (1985), Simon et al. (1999), Sitkin and Pablo (1992), and Slovic (1987).

Several authors (e.g. MacCrimmon and Wehrung, 1986; March and Shapira, 1987; Shapira, 1995; Sitkin and Pablo, 1992; Yates and Stone, 1992) suggest that managers see risk as losses of an important magnitude, and potential for the existence or materialisation of those losses, that is, likelihood of occurrence. Furthermore, gains or losses are carried by opportunities, or threats, being the situations positive, or negative. Literature posits that managers have different reactions in face of opportunities and threats, and that managers 'catalogue' the situations according to their perceptions of certain characteristics of the decision subjects (Jackson and Dutton, 1988).

The way managers define risk, which is described and stressed by the literature, was confirmed by direct observation and by interviews with managers. Therefore the items of the scale focus on the characterisation of risk in terms of the opportunity-threat continuum, in terms of potential for losses versus gains, in terms of positiveness of situations, and, finally, in terms of likelihood of success. One item, which comes from a scale to measure risk perception proposed by Simon et al. (1999) that evaluates uncertainty, was retained considering that the author of this study has doubts that the scale of Sitkin and Weingart (1995) makes a clear reference to uncertainty, in spite of the fact that it mentions likelihood. Whereas Sitkin and Weingart (1995), and Simon et al. (1999), proposed scales to test risk perceptions of specific decision subjects, the author of this study decided to generalise the questions to generic decisions, thus appealing to the experiences of the managers invited to participate in the study. In total 4 items were retained to measure the construct.

Outcome Experience. Another association of items that became apparent with the pre-test of the questionnaire, was the outcome experience, or, as referred to by Sitkin and Weingart (1995), 'outcome history'. The 'outcome experience' is proposed in this study as an antecedent of the 'perceived risk of the decision subjects'.

Literature concerning societal risk stresses the role of familiarity with decision subjects and decision outcomes as a determinant of risk perception (Slovic, 1987; Vlek

and Stallen, 1980). Experience, according to Tesluk and Jacobs (1998), results from quantity, that is, and for example, tenure and number of times an operation is performed, and quality, that is, the intensity of the experiences. Those authors (Tesluk and Jacobs, 1998) suggest that experience shall be domain specific. Discussions with managers confirm that familiarity with decision subjects, and, therefore, with their outcomes, contribute to framing the views that managers have of the risks involved.

Outcome experience was posited by March and Shapira (1987) and by Sitkin and Pablo (1992), as having an impact on risk behaviour. Sitkin and Weingart (1995), drawing from the work of Sitkin and Pablo (1992), tested the relationship between outcome history and risk propensity. However, the study of Sitkin and Weingart (1995) shows that risk perception, not risk propensity, mediates risk behaviour, thus challenging the ideas of Sitkin and Pablo (1992). These findings are confirmed by the work of Weber et al. (2002) and Weber and Milliman (1997), who argue that risk propensities are stable while risk perceptions are contextual.

The scale used by Sitkin and Weingart (1995) was retained with minor adaptations of a format nature, and integrated into the final version of the questionnaire (table A2.2, Annex 2). 3 items were retained in this research project to measure the construct. The items considered intend to measure different aspects of experience: one of the items asks managers their perception of the correctness of the generality of the strategic decisions made, while a second item purposely separates correctness from success, by asking managers their perceptions in terms of success of most of the decisions made. A third item focuses on intensity of experience, by asking managers to recall significantly bad outcomes.

Illusion of Control. One construct of particular importance for this study, which the author tried to measure, is controllability (Sutcliffe and Huber, 1998), or illusion of control (Keh et al., 2002; Simon et al., 2000) or illusion of manageability (Kas and Teng, 1999), that is, the perception that managers have that through their personal characteristics, effort and skills, and, or, through the organisational skills and resources, they manage the risks associated to strategic decision-making, and that, therefore, they have control over the outcomes, and consequences, of the decisions to be made (March and Shapira, 1987, Shapira, 1995; Sutcliffe and Huber, 1998).

Managers make judgements in respect to uncertainties, by assessing likelihoods of events (Barnes, 1984). Those judgments take a central part when planning and forecasting business, insofar managers not only have to make predictions of uncertain events, as they have to provide inputs for forecasting models (Hogarth and Makrikadis, 1981). In the presence of skill related factors, such as familiarity and involvement, confidence of individuals in the outcomes, and consequences, of decision-making increases (Langer, 1975). Barnes (1984) argues that managers have a desire for certainty, and, therefore, engage in planning and forecasting. By planning and forecasting, managers bring to decision-making factors that are related to skill, thus increasing the illusion of control, regardless of whether, in reality, they are in the domain of chance (Langer and Roth, 1975). Koehler et al. (1994) suggest that illusions of control are more likely to take place, when decision-makers face one-time decisions, when probabilistic perspectives on outcomes are not of a frequentist nature. However, Lang and Roth (1975) suggest that a sequence of positive outcomes induces in the decision-maker, when the decision-maker is directly involved, the notion that skills are implicated, thus leading to an illusion of control even for chance tasks. Therefore, whenever managers think that skills are involved in decision-making, illusions of control appear, and risks may be inaccurately assessed when, and if, the decision-makers do not control parts of the inputs, which are to a certain extent the product of chance (Langer, 1975).

In spite of many mentions in the literature to illusion of control related to risk-taking and decision-making, in the context of societal risk and entrepreneurship (e.g. Keh et al., 2002; Simon et al., 2000), only a few studies (e.g. Sutcliffe and Huber, 1998) address illusion of control in connection with decisions made in the context of mature business firms. The studies of Keh et al. (2002) and Simon et al. (2000), consider illusion of control as an antecedent of risk perception, or, in other words, consider that risk perception mediates opportunity evaluation and decisions to start ventures, respectively. However, both authors use an illusion of control scale that is related essentially to the positions adopted by the respondents in respect to their own skills, while the scale used by Sutcliffe and Huber (1998) takes into account the organisational context. Individual managers assess the controllability of decision-making in an organisational context, according to the way they see their organisations having, or not, control. That is, their own control is diluted into the organisational control. This last

view is, in the opinion of the author of this study, more appropriate because no individual manager alone makes a strategic decision in the context of his or her firm, and, naturally, control is exerted by the manager and by the firm. Furthermore, the model proposed by the author includes the perceptions that managers have of contextual variables, such as the perceived organisational risk culture and the perceived CEO's risk behaviour. Thus, a scale that provides the perceptions of individuals in respect to the control exerted by the organisation over the decision-making subject, and respective outcomes and consequences, seemed a better fit into a model that, besides, intends to hypothesise relationships that ultimately impact a construct, which is present in organisational contexts, such as the perceived organisational support.

Therefore, the scale adopted in the final version of the questionnaire was the one of Sutcliffe and Huber (1998), who built their scale based on the work of Thomas and McDaniel (1990), with a few minor changes of form, rather than semantic, nature (table A2.3, Annex 2). The items used to measure the construct are those related to the illusion of control in organisational contexts, that is, 3 items. The items concern the availability of resources to resolve most of the situations, the competence or skills of those resources, and how the organisation positions itself in terms of leading versus reacting to situations.

Perceived Organisational Risk Culture. Considering that there is a multitude of organisational culture dimensions (Hofstede et al., 1990) the author focused on a scale proposed by Kuratko et al. (1990), which is intended to measure the management support for intrapreneurship.

A vast literature on corporate entrepreneurship, corporate venturing or intrapreneurship (Kuratko et al., 2004), supports the idea that certain organisational dimensions promote certain individual behaviours. From a deductive point of view, it seems sound to say that certain behaviours are promoted, while others are refrained. For example, Hornsby et al. (1999) provide evidence that an innovative climate in American organisations, promote innovative behaviours of their managers at an individual level. Hornsby et al. (1993) suggest that a predisposition for risk-taking at an organisational level, promotes entrepreneurial behaviour at an individual level. In the same vein, Hornsby et al. (2002) suggest that organisational risk-taking and tolerance for failure encourage individual risk-taking. Covin and Slevin (1991) make similar suggestions when they say that organisational culture may, or may not, support risk-taking.

Intrapreneurship, or corporate entrepreneurship, has been related to the promotion and acceptance of risk-taking in organisations. Managers in firms are potential corporate entrepreneurs. Entrepreneurs engage in decision-making and take risks. In organisational contexts, the strategic decisions are of a nature similar to those decisions made by entrepreneurs. On the other hand, top management is identified by the literature with corporate culture and with entrepreneurship (Schein, 2010). Therefore, the corporate environment for decision-making and risk-taking influences the decision-making and risk behaviour of individual managers.

It was decided to measure the construct with 4 items adapted from a scale proposed originally by Kuratko et al. (1990) to measure the management support for intrapreneurship. Drawing from the work of Covin and Slevin (1991) and Hornsby et al. (2002), the author deemed the 4 items to be related to a dimension of organisational culture, which is related to risk-taking in decision-making. The 4 items retained (table A2.4, Annex 2) are related to decision-making power (Covin and Slevin, 1991; Kuratko et al., 1990), a culture of support for entrepreneurial actions (Kuratko et al., 2004), and tolerance for experimentation and innovation (Hornsby et al., 2002; Kuratko et al., 1990).

Perceived CEO's Risk Behaviour. CEOs have been studied mainly under the following research topics: upper echelons theory (e.g. Hambrick, 2007; Hambrick and Mason, 1984), leadership theory (Conger et al., 2000; Wang et al., 2011), strategy (e.g. O'Reilly et al., 2010), organisations (Hart and Quinn, 1993; Lewin and Stephens, 1994) and organisational culture theory (e.g. Schein, 2010).

Characteristics of leaders, namely CEOs, and their day-to-day practices, have an impact on their organisations and their members. Organisational members construct meanings of the behaviours of their leaders, and their interpretations of those behaviours are the basis for their own actions (Smircich and Morgan, 1982). Therefore, behaviours of CEOs have a clear impact on behaviours of organisational members. This is confirmed by a study of Wang et al. (2011), who linked CEOs behaviours to organisational performance and to the attitudes of employees – mid level managers. Smircich and Morgan (1982) further suggest that meaning assigned, or attributed (Puffer, 1990), by employees to behaviours of their CEOs, depends on the situations in which they occur. CEOs may have several roles in their organisations, however those

roles materialise through symbols, and other cultural artefacts, but also through personal example, that is, through behaviour (Hart and Quinn, 1993). Puffer (1990: 179) suggests that decision-making behaviours of CEOs are important especially for “*nonroutine, ill-structured, nonprogrammed decisions...because they give the leader an opportunity to take risks, demonstrate expertise, and exercise judgment in situations that have uncertain outcomes*”, since those decisions are the most important, as far as the attribution of meaning by organisational members is concerned (Puffer, 1990).

In order to use established scales 5 items adapted from the scale adopted by Tsui et al. (2006) to measure the risk-taking dimension of the leadership attributes were retained to measure the construct (table A2.5, Annex 2). The items concern behaviours of CEOs, which are related to dimensions that are related to risk-taking in organisational contexts. That is the case of innovation, creativeness, experimentation and entrepreneurship, and that is the case as well of dealing with uncertainty, delegation of authority, and willingness to take risks.

Perceived Organisational Support. In the perspective of this study, strategic decisions are made in organisational contexts and influence the lives of the organisations, and of their stakeholders, including employees, regardless of the levels that employees have in their organisations.

Organisational members attribute human qualities to their organisations, since they see the actions of representatives of organisations as actions of the organisations themselves (Eisenberger et al., 1986). In the same vein, individuals realise that the organisations exert power over them through their representatives (Eisenberger et al., 1986). Considering that organisational members see the power of an organisation being exerted by its representatives, it is expected that those members have feelings towards organisations, as they have towards people (Rhoades et al., 2001). As they would most likely do with people, organisational members reciprocate the treatment that they perceive as being provided to them by their organisations, or by the agents representing their organisations (Eisenberger et al., 2001; Settoon et al., 1996).

Empirical evidence, including observation of life in organisations, strongly suggests that decision-makers adopt behaviours that fit into what they see as the expected behaviours. Say, as an example, that in a given industry there are several business segments. Let's assume that a manager identifies what he or she believes to be an

opportunity in a business segment, which for him or her is a business segment to be in, but for which the dominant current of thought, in his or her organisation, is not favourable, in the opinion of the manager. In spite of the fact that the decision subject might be sound, and assuming that the manager believes in the business segment in which the opportunity materialises, field observation suggests that a manager will not behave in the same way if he or she feels support, or not, from the organisation and if the manager fits, or not, into the main behavioural stream.

Eisenberger et al. (2002) suggest that supervisory support contributes to organisational support, in that supervisors, to the eyes of their subordinates, represent the organisation. However, it is contended in this study that the supervisory support perceived by the managers targeted by this research project is not as important as would be the case should the managers be at lower levels in their organisations, and be employees without managerial roles and without involvement in strategic decisions. Nevertheless, in order to make sure that a potential effect of the perceived supervisory support is minimised in this study, it was decided to adopt a scale with 4 items (table A2.6, Annex 2) that have been used not only to measure a risk dimension of the 'perceived supervisory support', but also to measure a risk dimension of the 'perceived organisational support' (Rhoades et al., 2001). The 4 items selected match the discussions that the author had with managers during the semi-structured interviews, and also the observations of the author in organisational settings. Basically, the items measure individual perceptions of organisational attitudes towards the individuals, which are expected to trigger reciprocation feelings, and which the author expects to be related to situations, where the engagement of individual managers is important, and where they have something to lose.

Further to the methodological aspects developed in Chapter 6 and based on

- i) The content validation guidelines suggested by Haynes et al. (1995), who call for detailed reviews of literature, clear definitions of constructs (Churchill, 1979; Clark and Watson, 1995), a balanced number of non-redundant items with large correlation effects (Churchill, 1979; Field, 2005; Hair et al., 2006; Peter, 1981), and the evaluation of constructs, items and measurement instruments by experts (Hair et al., 2006; Saunders et al., 2007),

- ii) Complemented by the fact that most of the items were adapted from existing scales, combined with semi-structured interviews, which helped define the constructs, initial exploratory factor analysis of the results of the pre-test, and Cronbach' alphas for the constructs retained (Churchill, 1979),

the author is led to conclude that the six constructs retained have content validity.

7.5.2 Response Bias

Considering that with the purpose of obtaining a reasonable number of respondents a purposive sample was used, and that the questionnaire had a mechanism to force respondents to reply in full, or to drop the questionnaire after the socio-demographic questions had been answered, the degree of response bias that could be evaluated was the one between those who replied in full to the questionnaire, and those who replied only to the socio-demographic questions, and were forced to drop the questionnaire since they had no intention of replying to the remaining questions. Besides, considering that the respondents were ensured full anonymity, the only response bias that could be evaluated regards the socio-demographic variables, such as tenure, hierarchical level and functional area, for those who replied to the whole questionnaire (216) and those who replied only to the socio-demographic questions (80).

Mann-Whitney tests were run to compare the distribution of the responses in the two groups, and showed that for none of the socio-demographic variables there were significant differences between the group of individuals who responded to the questionnaire in full, and the group of individuals who responded to the socio-demographic questions only. Therefore, it is concluded that there was no response bias between respondents who had the intention to respond, and did respond, and non-respondents who had the intention to respond, but did not respond.

7.6 Summary of Chapter 7

In Chapter 7 we present the main qualitative results of the preliminary studies carried out in this research project, that is, the direct observation of and semi-structured interviews with managers, and the pre-test of the questionnaire, and drew conclusions for the final questionnaire.

Conclusions drawn are related essentially to the constructs to be measured and how to measure them, that is, which scales should be retained.

On the one hand, support is provided for the choice of 6 constructs, that is, the 'outcome experience', the 'illusion of control', the 'perceived risks of the decision subjects', the 'perceived organisational risk culture', the 'perceived CEO's risk behaviour' and the 'perceived organisational support'.

On the other hand, items to measure the constructs are fine-tuned based on the results provided in this chapter.

In this Chapter 7 we suggest that the results of the preliminary studies are showed to contribute to content validity of the constructs and we provide further detail of the 6 constructs measured by the final questionnaire, which resulted or were confirmed by the results of the preliminary studies.

Finally, we concluded that there was no response bias between respondents who elected to reply to the questionnaire in full and respondents who decided to respond to the socio-demographic questions only, based on Mann-Whitney tests that were run to compare the distribution of the responses in the two groups.

CHAPTER 8. DATA ANALYSIS AND STUDY MAIN FINDINGS

8.1 Introduction

The purpose of this chapter is to present the empirical findings of the quantitative part of this research project, namely the data gathered via the responses to the final version of the survey instrument, that is, the final version of the questionnaire.

In section 8.2 we present descriptive statistics of the sample employed and also descriptive statistics of the variables measuring the constructs retained in this study.

In Section 8.3 the measurement models for the individual constructs and for the overall model are presented and the results discussed. Section 8.4 deals with the proposed structural model and the relationships hypothesised.

In sections 8.5 and 8.6, respectively, the moderator effects of some socio-demographic variables on the relationships between some constructs and the mediating effects of some constructs on the relationships between other constructs are tested in accordance with the methodology set forth in Chapter 6 and the hypotheses defined in Chapter 5.

Finally, section 8.7 wraps up and summarises the chapter, including the main findings.

8.2 Characteristics of the Sample – Descriptive Statistics

The questions, which make up the whole questionnaire, are of two sorts: socio-demographic characteristics and items used to measure the constructs of the model proposed (fig. 5.2, Chapter 5).

8.2.1 Socio-demographic Characteristics

A total of 296 people, out of 380, apparently had the intention to answer the survey instrument, what is evidenced by the fact that all those 296 people responded to the demographic questions. However, as mentioned before, the questionnaire was prepared in such a way that it did not allow respondents to provide partial answers to the indicators supposed to measure the constructs. Therefore, 216 questionnaires were fully usable, while 80 questionnaires got answers for the socio-demographic questions only. Thus, the sample under analyses includes 216 respondents.

One of the aims of this research project is the study of moderation effects on some relationships. In order to assess those moderation effects we used a multi-group strategy (Baron and Kenny, 1986), that is, we divided the sample into groups according to certain criteria. The descriptive statistics presented take into account the way the groups were established, but also other partitions of the data that, in the views of the author, correspond to natural divisions. The questionnaire had 11 demographic variables (table 8.1) of which 6 are statistically described below, although only 4 were used in connection with the model proposed in this study. The demographic variables used in the model, drawing from the work of Finkelstein et al. (2009), and Hambrick and Mason (1984), are the 'number of years in current position', the 'number of years in current firm', the 'number of years in current industry' and the 'hierarchical level', being this last variable measured in terms of distance, or levels, from the CEO. The variables not described and not used in the model are part of the questionnaire, just in case the author decides, sometime in the future, and independently of this research project, to further analyse the data.

Table 8.1: Socio-demographic Characteristics considered in the Study

Variable	Descriptive Statistics	Utilisation in the Study
Age	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Gender	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Education	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Tenure in current position (years)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Tenure in current firm (years)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Tenure in current industry (years)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Total work experience (years)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Number of years in other management positions	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Functional area where most of the career time was spent	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Current position in the organisation	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Hierarchical distance from CEO	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

The age of the respondents is relatively well distributed, with more than 64% of the managers with ages between 35 and 54 years old, with 103 subjects with ages up to 45 years old and 113 subjects older than 45 years old (table 8.2).

Table 8.2: Age of Respondents

Age	Nbr of Subjects	% of Subjects	Statistics	Value
Up to 34 years old	37	17.1	Mean	45.0
35 up to 44	66	30.6	Median	45.0
45 up to 54	73	33.8	Mode	42
55 years old or older	40	18.5		

As for the gender, women are 19.6% of the sample, while men are 80.4%. It is worthwhile noting that, as far as gender is concerned, there might be a bias in that women are a minority in the oil and gas business in all the positions, including the managerial ones. The author has no information that allows him to make any other type of conclusions. As indicated above, gender was not used as a control or as a group variable.

In terms of education, 95.8% of the sample subjects have university studies, with the predominance of post-grades/specialisations and master degrees (table 8.3).

Table 8.3: Education Level of Respondents

Education	Nbr of Subjects	% of Subjects
High School	9	4.2
BS/BA	45	20.8
Post-grade/specialisation	74	34.3
Master degree	71	32.9
Doctorate	17	7.9

As for the variable 'number of years in current position', referred to as well as 'tenure in position' (table 8.4), which is one of the variables that was tested for moderation effects, we realise that a large part of the sample elements have up to 5 years in their current positions – 152 out of 216 people, with 190 people, or 92.2% of the sample, with up to 10 years in their current positions. It is not a surprise to the author, in spite of the fact that the distribution of the ages of the sample elements is well balanced, since in the energy business people tend to change positions quite often. A given criterion was applied to this variable to split the sample into two groups of relatively similar sizes. The criterion was a number of years in the current position of up to 3 years, including 3 years, and a number of years in the current position of more than 3 years. The number of people in the sample with up to 3 years in their current position was 115, while the number of people with more than 3 years in their current position was 101.

Table 8.4: Tenure in Position of Respondents

Tenure in Position	Nbr of Subjects	% of Subjects
Up to 2 years	79	36.6%
3 up to 5 years	73	33.8%
6 up to 10 years	38	17.6%
11 up to 15 years	14	6.5%
16 up to 24 years	7	3.2%
25 years or more	5	2.3%

The distribution of the 216 respondents in respect to the variable 'number of years in current firm' is well balanced, without any partition over-representing the sample (table 8.5), contrasting with the variable 'tenure in position'. Apparently people stay in their firms, although they change positions often.

Table 8.5: Tenure in Firm of Respondents

Tenure in Firm	Nbr of Subjects	% of Subjects
Up to 2 years	31	14.4%
3 up to 5 years	45	20.8%
6 up to 10 years	41	19.0%
11 up to 15 years	30	13.9%
16 up to 24 years	33	15.3%
25 years or more	36	16.7%

The variable 'number of years in current firm' or 'tenure in firm' is later tested as a moderator of certain relationships among latent variables. Taking into account the small dimension of the sample, it was decided to use the median as a criterion to split the sample in two groups of roughly identical dimension. It was decided to use 9 years of firm as the threshold to make the groups. According to this criterion, we got 109 subjects with up to 9 years of tenure in firm, and 107 subjects with 10 or more years of employment in their current firms.

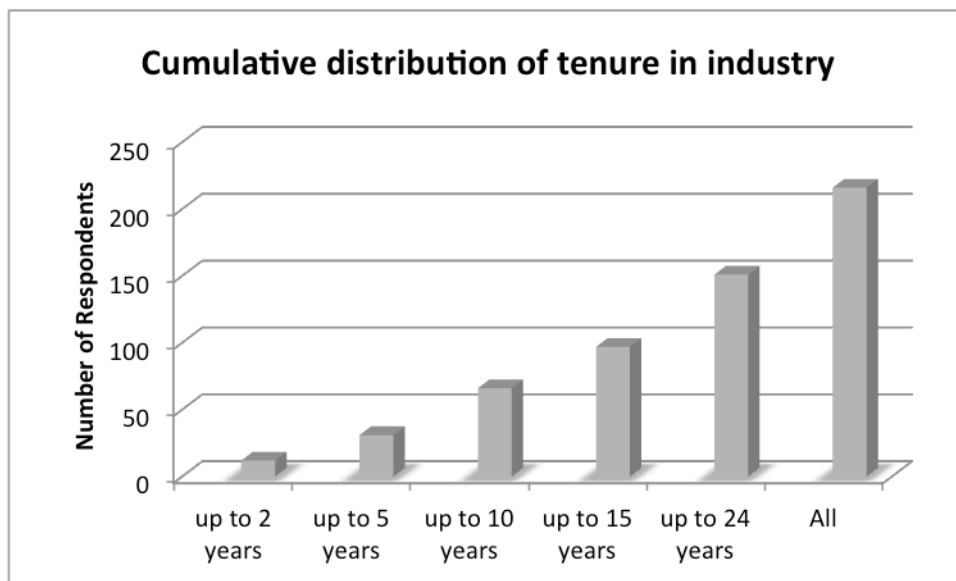
Another demographic variable that is used in this study to test moderator effects, is the 'number of years in the industry' or simply 'tenure in industry'. Differently from the tenure in firm, the distribution of the respondents is clearly skewed towards the higher tenure, indicating that managers tend to remain in the same industry, in spite of some apparent mobility intra-industry, that is, in spite of changes from one firm to another within the same industry (table 8.6).

Table 8.6: Tenure in Industry of Respondents

Tenure in Industry	Nbr of Subjects	% of Subjects
Up to 2 years	12	5.6%
3 up to 5 years	19	8.8%
6 up to 10 years	35	16.2%
11 up to 15 years	31	14.4%
16 up to 24 years	54	25.0%
25 years or more	65	30.1%

As indicated by figure 8.1 below, the cumulative distribution of the ‘tenure in industry’ frequencies is considerably steep, showing that a considerable part of the sample (close to 70%) has more than 10 years in the industry considered.

Fig. 8.1: Tenure in Industry



Tenure in industry is tested as a moderator using a multi-group strategy (two groups). The sample was divided using the criterion of up to 18 years of tenure in industry and the criterion of 19 or more years in industry, totalling 106 and 110 subjects, respectively.

The last variable that is described is the ‘hierarchical level’ (table 8.7). The hierarchical levels were measured against the CEO position. For example, level 0 means that respondents are part of top management teams, that is, are CEOs or report directly to CEOs, while level 1 report directly to members of the top management teams. Respondents at level 2, or lower, are either senior or middle level managers, such as

business unit leaders or vice-presidents at n-2 levels, or middle level managers, who report within business units, or to vice-presidents, who are at n-2 level.

Table 8.7: Hierarchical Level of Respondents

Hierarchical Levels	Nbr of Subjects	% of Subjects
0 level	38	17.6%
1 level	65	30.1%
2 level	52	24.1%
3 level	32	14.8%
4 level	21	9.7%
5 level	8	3.7%

For moderation effects purposes the variable 'hierarchical level' was split by considering levels 0 and 1 together in one group, and all the other levels, that is, levels 2, 3, 4 and 5 in a second group. The group with the levels 0 and 1 is made up of 103 subjects, whereas the second group is made up of 113 respondents.

8.2.2 Latent Variables Measuring the Constructs

The model proposed includes 6 constructs, which were measured by six latent variables:

- Illusion of Control
- Outcome Experience
- Perceived Risk of Decision Subjects
- Perceived Organisational Risk Culture
- Perceived CEO's Risk Behaviour
- Perceived Organisational Support

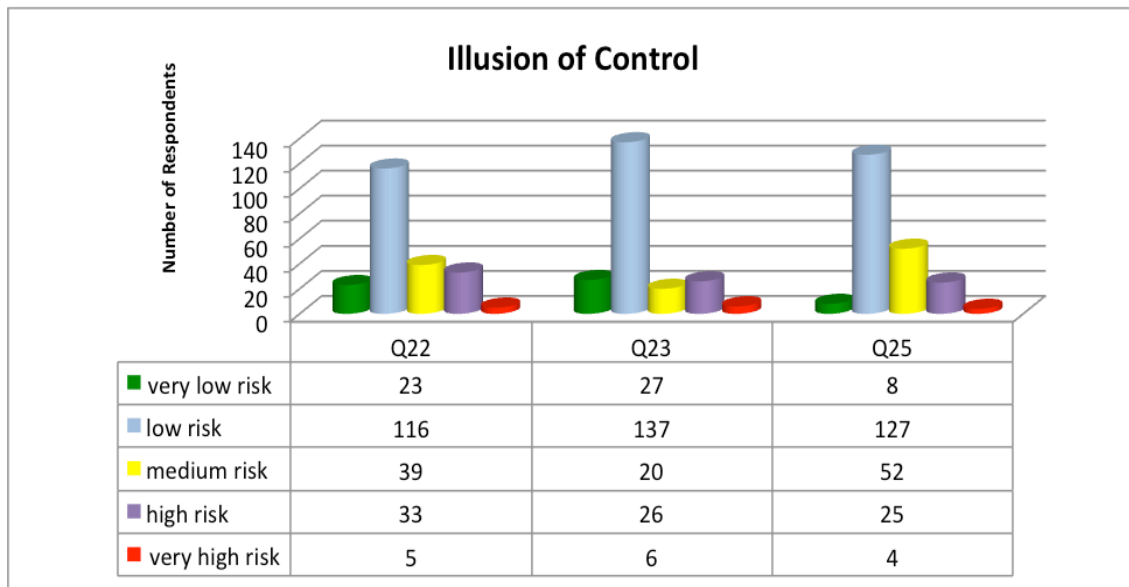
All the indicators of the latent variables were coded in terms of level of risk, since the purpose of the study is to measure risk perceptions. All the indicators are in an ordinal scale, since all the items were measured with five-point Likert scales or five-points semantic differential scales, being the lowest point of the scale 1, the central point 3 and the highest point 5.

Illusion of Control. Illusion of Control measures the control that a manager thinks or believes that he or she has over a decision-making process, including the inputs and outputs. In the specific case of this study, the intention was to measure the controllability in respect to the decision subject. Illusion of control is measured by three

indicators (Q22, Q23 and Q25), and the scale has a Cronbach's α of 0.883 (table A3.1, Annex 3).

Figure 8.2 below suggests that a large majority of the respondents believe that they have a degree of control over the decision subjects such that it makes the risk for all the three indicators to be low or very low.

Fig. 8.2: Illusion of Control – Distribution of the Indicators

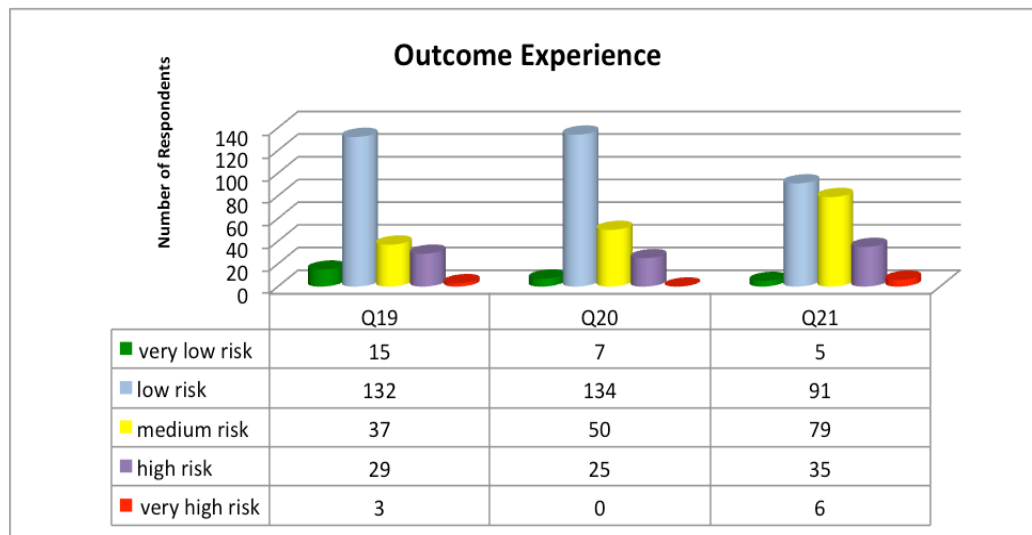


Outcome Experience. Outcome experience measures the perceptions that managers have of the outcomes of the generic strategic decision subjects that have been made by their organisations. Basically, what is measured is how managers evaluate the success of previous decision-making, assuming that outcome success leads to lower risks. This construct was measured by three indicators (Q19, Q20 and Q21), with a Cronbach's α of 0.824 (table A3.2, Annex 3).

In spite of a general trend indicating low risk, meaning that the respondents considered that most of the decisions made were, in general terms, successful and correctly analysed, figure 8.3 below shows that Q21 – some of the strategic decisions made led to significantly bad outcomes – raised some doubts in some of the respondents, with 79 out of 216 saying that outcomes were not bad but were not good either, assuming a neutral position that we coded as medium risk. Furthermore, it shall be noted that Q21 was intended to complement Q20 – most of the strategic decisions made were successful. It appears that some of the respondents who think that most of

the decisions made were successful, also think that there were a few decisions with bad outcomes. For future studies, items assessing how severe were those bad outcomes, and how badly they influenced perceived risk, should be considered. Q21 is also the only indicator of the 'outcome experience' construct that, if deleted, would improve the Cronbach's alpha.

Fig. 8.3: Outcome Experience – Distribution of the Indicators

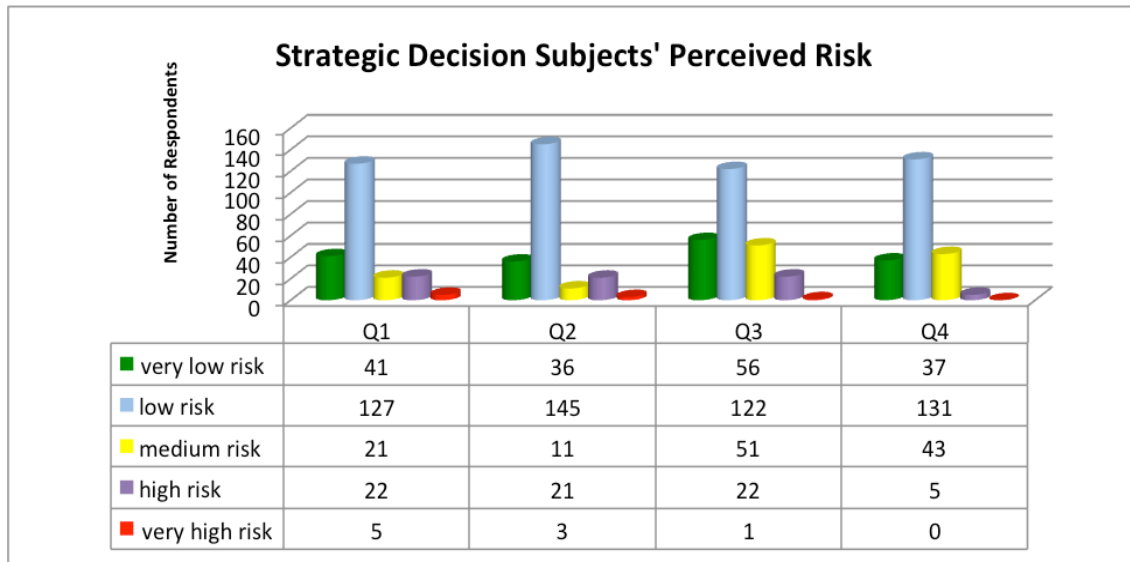


Perceived Risk of the Decision Subjects. The 'perceived risk of the decision subjects' intends to measure the risk perceptions that managers have in respect to the typical strategic decision subjects that are handled by their organisations. Four indicators were used to measure this construct (Q1, Q2, Q3 and Q4) and the scale has a Cronbach's α of 0.802 (table A3.3, Annex 3).

Although all the indicators show clearly that most of the respondents perceive low, or very low, risk in respect to the generality of the strategic decision subjects encountered by their organisations, figure 8.4 below indicates that Q1 and Q2 show similar trends, while Q3 and Q4 are somehow different from Q1 and Q2, but quite similar between themselves. This could be because Q3 – how would you characterise in terms of the risks involved to your organisation most of the strategic decisions it faces (from a positiveness / negativeness standpoint) – and Q4 – in your opinion what is the likelihood of your organisation succeeding when making most of its strategic decision – deal with generic evaluation of risk such as success and positiveness, while Q1 - how would you characterise in terms of the risks involved to your organisation most of the strategic decisions it faces (from an opportunity / threat viewpoint) – and Q2 - how

would you characterise in terms of the risks involved to your organisation most of the strategic decisions it faces (from a gain / loss perspective) – deal with more objective and tangible aspects.

Fig. 8.4: Perceived Risk of Decision Subjects – Distribution of the Indicators

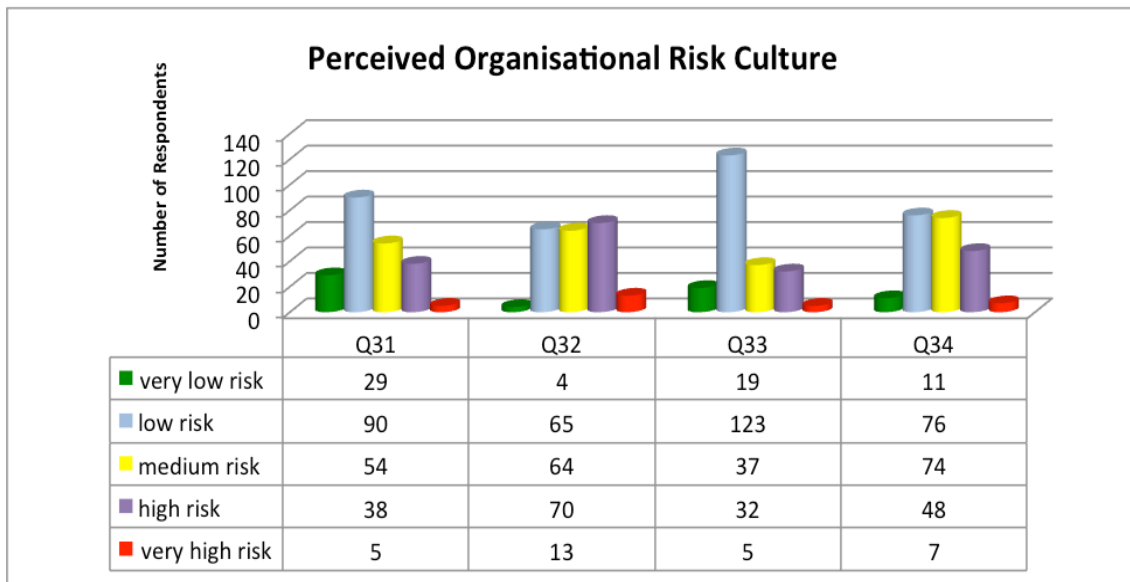


Perceived Organisational Risk Culture. Organisational Risk Culture is one of the three constructs related to the organisational context, in which managers operate, which is retained in this study. This variable is measured with 4 indicators (Q31, Q32, Q33 and Q34) with a Cronbach's α of 0.800 (table A3.4, Annex 3).

This construct is a dimension of organisational culture. Organisational culture is entangled with CEO's characteristics and leadership (Tsui et al., 2006), and with top management teams (Finkelstein et al., 2009; Schein, 2010). The indicators used result from the pre-test of the first version of the questionnaire, and to a great extent intend to measure sponsorship by the organisation of risk-taking. While Q31 – my top management does not sponsor risk takers and Q33 – in my organisation there is encouragement for calculated risk-taking - refer to the way managers see their organisations promoting risk-taking, Q32 – in my organisation risk takers are often recognised whether successful or not - and Q34 – in my organisation risk taker is considered a positive attribute – concern the way that managers see the organisation evaluating risk-takers. The trends showed by the dyads Q31/Q33 and Q32/Q34 may indicate that managers see differences between generic intentions towards hypothetical behaviour, and specific reactions in respect to actual behaviour. While the dyad

Q31/Q33 clearly indicates that the intention by organisations to sponsor risk is perceived by managers as leading to a reduction in the level of perceived risk, the duo Q32/Q34 indicates that managers doubt of the actual reactions of their organisations and that that leads to an increase in the risk perceived. Furthermore, while all the other indicators have means below the neutral or medium risk level, Q32 shows that respondents are rather in the high-risk side, and do not think that recognition of risk-takers is a given (fig. 8.5).

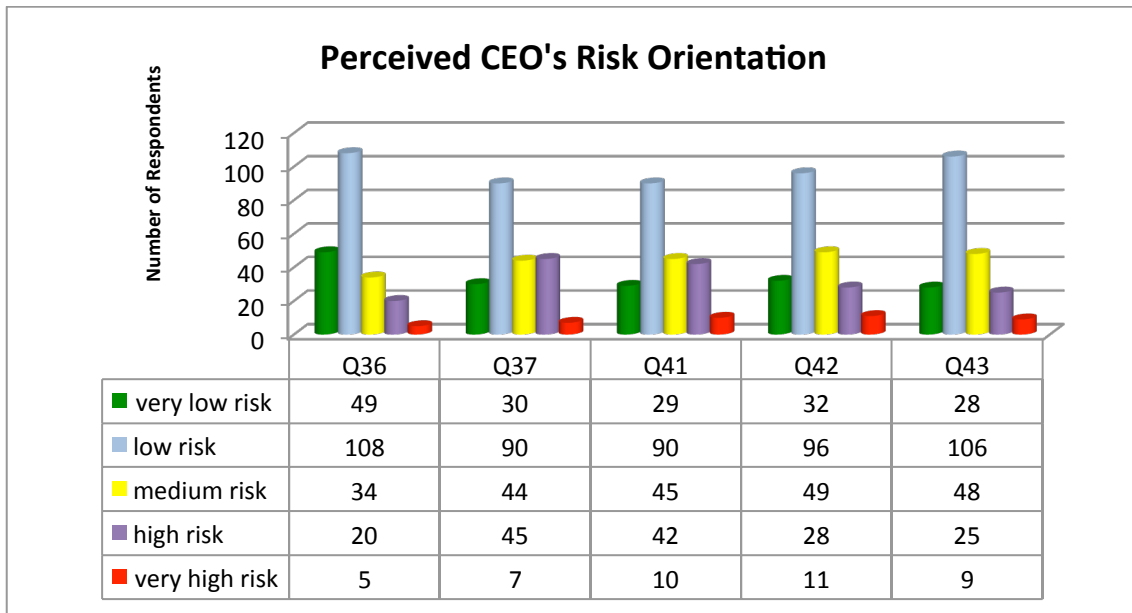
Fig. 8.5: Perceived Organisational Risk Culture – Distribution of the Indicators



Perceived CEO's Risk Behaviour. A total of 5 indicators (Q36, Q37, Q41, Q42 and Q43) are used to measure the perception that managers have of the behaviour towards risk of their CEOs. The scale adopted has a Cronbach's α of 0.874 (table A3.5, Annex 3).

All the indicators are homogeneous. The majority of the respondents evidence very low or low risk perception (fig. 8.6).

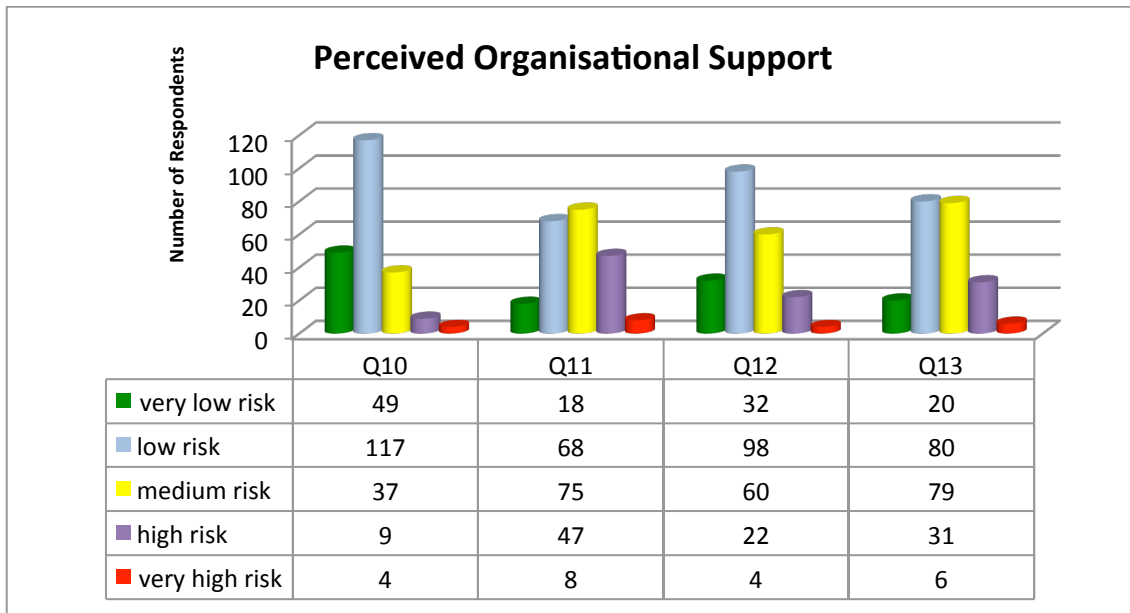
Fig. 8.6: Perceived CEO's Risk Behaviour – Distribution of the Indicators



Perceived Organisational Support. Finally, the last construct descriptively analysed is the ‘perceived organisational support’. Four indicators are used to measure the construct. The scale proposed has a Cronbach’s α of 0.833 (table A3.6, Annex 3).

As can be observed in figure 8.7, Q11 - my organisation takes into account the impact that decision-making may have on my personal situation: bonus, salary, promotions, etc - and Q13 – my organisation strongly considers my goals and values – show a different trend from the rest of the indicators of the construct. Here again, like for the organisational risk culture construct above, the two indicators that show a trend slightly different, in spite of the predominance of low and very low risk similarly to the remaining four indicators, are those that deal with specifics, rather than with generic things. It appears that the managers of this sample are more conservative and perceive more risk when they feel that they are dealing with specific actions that affect them, than when they evaluate generic statements, even if those statements concern them as well.

Fig. 8.7: Perceived Organisational Support – Distribution of the Indicators



8.3 Measurement Models for the Constructs

Drawing from the work of Anderson and Gerbing (1988), Hair et al. (2006) and Salgueiro (2012), the author decided to follow a two-step approach in respect to the analysis of the model(s) proposed. In the current section, the initial model proposed is analysed under a confirmatory factorial analysis perspective. The author checks for constructs' indicators reliabilities, for the significance of relationships through the analysis of *t*-values, for constructs reliabilities and validities, for unidimensionality, and for model fit. Secondly, in section 8.4, the author looks for the validation, or otherwise, of the hypothesised relationships among constructs, and also for model fit. The author decided to try alternative, nested, models as suggested by several authors (e.g. MacCallum and Austin, 2000; Smith and Langfield-Smith, 2004), although keeping the same theoretical framework.

In the current section and as part of the two-step approach mentioned above, the author of this study proceeded with the first step of the analysis of the model initially proposed - the confirmatory factor analysis approach.

In sub-section 8.3.1 six separate single-factor models are tested in order to assess for validity and reliability of the constructs.

In sub-section 8.3.2 the CFA proposed to measure the six constructs simultaneously is presented and compared to a single-factor model and to a two-factor model.

8.3.1 Constructs' Reliabilities, Validities and Single-factor CFA Models

Construct reliability and validity are assessed by the loadings of individual manifest variables, by the value of the average variance extracted (AVE) and the construct composite reliability (CR) and by the theoretical sense made by the individual items.

Outcome Experience. Outcome experience is a construct, whose manifestations are the evaluations that each subject makes of the success or failure of past decisions. This construct was measured with a scale adapted from Sitkin and Weingart (1995). The construct was measured by 3 indicators: Q19, Q20 and Q21.

Correlations among the indicators of the construct, which are presented in table 8.8, are large ranging from 0.65 to 0.84.

When a single-factor CFA model is considered, that is, when the construct is taken in isolation all the factor loadings are above 0.70, making each individual indicator reliable as indicated by the squared factor loading (Field, 2005; Hair et al., 2006) or by the reliability index (Fornell and Larcker, 1981). Individual factor loadings above 0.7 provide evidence of construct's internal consistency.

Moreover, all the loadings are significant at $p < 0.001$ as evidenced by the large t -values. Furthermore, the construct's composite reliability (CR), 0.889, and the construct's average variance extracted (AVE), 0.730, are well above the thresholds recommended in literature, that is, 0.7 and 0.5, respectively (e.g. Hair et al., 2006).

Table 8.8: Polychoric Correlations

	Q1	Q2	Q3	Q4	Q10	Q11	Q12	Q13	Q19	Q20	Q21	Q22	Q23	Q25	Q31	Q32	Q33	Q34	Q36	Q37	Q41	Q42	Q43
Q1	1.00																						
Q2	0.71	1.00																					
Q3	0.58	0.57	1.00																				
Q4	0.67	0.48	0.54	1.00																			
Q10	0.23	0.21	0.29	0.34	1.00																		
Q11	0.19	0.18	0.17	0.27	0.58	1.00																	
Q12	0.25	0.19	0.20	0.35	0.66	0.55	1.00																
Q13	0.24	0.18	0.21	0.31	0.68	0.65	0.68	1.00															
Q19	0.36	0.32	0.34	0.33	0.37	0.22	0.37	0.34	1.00														
Q20	0.30	0.35	0.30	0.38	0.26	0.24	0.38	0.34	0.84	1.00													
Q21	0.21	0.19	0.28	0.25	0.16	0.19	0.27	0.10	0.66	0.65	1.00												
Q22	0.26	0.17	0.30	0.23	0.22	0.19	0.26	0.25	0.40	0.32	0.25	1.00											
Q23	0.36	0.28	0.38	0.41	0.33	0.25	0.32	0.27	0.53	0.39	0.35	0.85	1.00										
Q25	0.34	0.22	0.28	0.39	0.34	0.24	0.41	0.36	0.53	0.49	0.30	0.69	0.77	1.00									
Q31	0.16	0.20	0.16	0.14	0.38	0.31	0.39	0.42	0.24	0.17	0.05	0.12	0.24	0.20	1.00								
Q32	0.17	0.15	0.18	0.18	0.43	0.22	0.28	0.36	0.23	0.27	0.17	0.13	0.24	0.21	0.43	1.00							
Q33	0.26	0.26	0.12	0.20	0.49	0.39	0.43	0.48	0.36	0.27	0.12	0.21	0.32	0.38	0.55	0.50	1.00						
Q34	0.24	0.22	0.17	0.10	0.53	0.35	0.38	0.43	0.30	0.24	0.09	0.23	0.31	0.25	0.63	0.59	0.72	1.00					
Q36	0.23	0.28	0.19	0.28	0.53	0.43	0.46	0.53	0.31	0.29	0.08	0.25	0.35	0.31	0.49	0.37	0.55	0.44	1.00				
Q37	0.13	0.21	0.06	0.24	0.36	0.24	0.39	0.38	0.19	0.12	0.03	0.12	0.18	0.19	0.55	0.40	0.52	0.49	0.62	1.00			
Q41	0.16	0.11	0.14	0.25	0.42	0.29	0.42	0.44	0.28	0.23	0.16	0.21	0.27	0.28	0.47	0.34	0.53	0.39	0.66	0.61	1.00		
Q42	0.12	0.15	0.11	0.21	0.43	0.27	0.44	0.48	0.24	0.13	0.03	0.21	0.30	0.24	0.52	0.30	0.53	0.45	0.66	0.65	0.77	1.00	
Q43	0.21	0.17	0.24	0.24	0.54	0.30	0.47	0.49	0.23	0.13	0.00	0.15	0.22	0.23	0.58	0.41	0.57	0.50	0.68	0.62	0.66	0.67	1.00

The results mentioned above and in table 8.9 provide evidence of internal consistency, reliability and convergent validity of the 'outcome experience' latent variable.

Table 8.9: Outcome Experience – Construct Measurement

Indicator	Factor Loading	Squared Factor Loading	<i>t</i> -values	Error Variance	CR	AVE
Q19	0.930	0.865	21.35	0.135	0.889	0.730
Q20	0.903	0.815	21.93	0.185		
Q21	0.714	0.510	15.98	0.490		

Illusion of Control. Illusion of control or controllability's indicators (Q22, Q23 and Q25) are those manifestations of the presence, or inexistence, of skills and or resources to address situations, and also of being in control, that is, anticipating, rather than simply responding, or reacting, to situations. This construct is measured with a scale adapted from Sutcliffe and Huber (1998).

Correlations among the indicators of the construct 'illusion of control' are large ranging from 0.69 to 0.85 (table 8.8). As for the individual indicators, or manifestations of the construct 'illusion of control', their loadings are all above 0.7, they are all significant with $p < 0.001$ as evidenced by the *t*-values, and they all have reliabilities or squared factor loadings above 0.5 (table 8.10).

As for the construct, it has a composite reliability (CR) above 0.7 and an average variance extracted (AVE) above 0.5 (table 8.10).

The author concludes that the construct 'illusion of control' is reliable, and evidences convergent validity and internal consistency.

Table 8.10: Illusion of Control - Construct Measurement

Indicator	Factor Loading	Squared Factor Loading	<i>t</i> -values	Error Variance	CR	AVE
Q22	0.874	0.763	19.06	0.237	0.913	0.780
Q23	0.977	0.954	15.63	0.046		
Q25	0.789	0.623	14.27	0.377		

Perceived Risk of the Decision Subjects. This construct is measured with a scale adapted from Sitkin and Weingart (1995). Four indicators measure the risks related to the decisions made by organisations, which are perceived by each individual manager.

Correlations among indicators Q1, Q2, Q3 and Q4 range from 0.48 to 0.71 (table 8.8). Table 8.11 below indicates that one of the indicators, Q3, has a loading lower than 0.7, and, consequently, a squared loading lower than 0.5, both the thresholds recommended by the literature (e.g. Field, 2005; Hair et al., 2006). However, Hair et al. (2006: 128) suggest that loadings greater than ± 0.5 “are considered practically significant.” Considering that the factor loading of Q3 is statistically significant, as expressed by the respective *t*-value, that that indicator is part of a scale that was tested empirically (Sitkin and Weingart, 1995), that the scale having 4 indicators is close to the minimum number of indicators recommended, which is 3, and that the construct presents a composite reliability considerably higher than 0.7 and an average variance extracted higher than 0.5 (table 8.11), the author decided to retain the indicator in the scale. All the indicators have loadings statistically significant with $p < 0.001$.

The construct's measurement model evidences reasonable fit according to the fit metrics provided (table 8.11).

Based on the measures of the individual indicators' reliabilities and inter-items correlations, construct composite reliability and average variance extracted, and shared variances with the other constructs of the overall model, we conclude that the unobserved variable 'perceived risk of the decision subjects' is unidimensional, reliable and exhibits convergent and discriminant validities.

Table 8.11: Perceived Risk of Decision Subjects - Construct Measurement and Fit

Indicator	Factor Loading	Squared Factor Loading	<i>t</i> -values	Error Variance	CR	AVE
Q1	0.912	0.833	24.06	0.167	0.856	0.600
Q2	0.770	0.592	9.07	0.408		
Q3	0.674	0.454	10.78	0.546		
Q4	0.723	0.522	12.41	0.478		
Fit Measures						
$SB\chi^2$	df	GFI	CFI	SRMR		
4.702, p=0.095	2	0.967	0.994	0.036		

Perceived CEO's Risk Behaviour. This construct is measured with a scale adapted from Tsui et al. (2006). Polychoric correlations among the five indicators – Q36, Q37, Q41, Q42 and Q43 - have in general large effects ranging from 0.61 to 0.77 (table 8.8). As indicated in table 8.12 by the respective *t*-values, all the loadings are statistically significant with $p < 0.001$.

The construct presents a high composite reliability (0.906) and an average variance extracted of 0.659, well above the 0.5 threshold. The model fits reasonably well the data according to the fit measures displayed in table 8.12.

Table 8.12: Perceived CEO's Risk Behaviour - Construct Measurement and Fit

Indicator	Factor Loading	Squared Factor Loading	t-values	Error Variance	CR	AVE
Q36	0.791	0.625	16.62	0.375	0.906	0.659
Q37	0.752	0.566	16.96	0.434		
Q41	0.847	0.717	22.34	0.283		
Q42	0.867	0.752	24.85	0.248		
Q43	0.797	0.635	16.83	0.365		
Fit Measures						
SB χ^2	df	GFI	CFI	SRMR		
4.572, p=0.470	5	0.974	0.999	0.022		

Considering that the construct 'perceived CEO's risk behaviour' presents an AVE higher than 0.5 and has a composite reliability considerably larger than 0.7, and that all the factor loadings are larger than 0.7 and statistically significant, we conclude that the construct is reliable and shows internal consistency and convergent validity.

Perceived Organisational Risk Culture. Standards, rules, norms, stories, in organisations, set the stage for acceptable behaviour, namely in terms of decision-making and risk-taking. This construct was measured with a scale adapted from Kuratko et al. (1990), which considers the perceptions held by individual managers of a dimension of organisational culture related to decision-making and risk-taking.

The correlations among Q31, Q32, Q33 and Q34, the manifestations of the latent variable 'perceived organisational risk culture', are all, but one, large (table 8.8). The correlation between Q31 and Q32, which are the ones with the lowest factor loadings with 0.690 and 0.639, respectively, is of a medium to large size effect. The loadings are all statistically significant with $p < 0.001$.

As provided in table 8.13, Q31 and Q32 present reliabilities below 0.5, being thus potential candidates for deletion. However, considering the composite reliability of the construct, 0.847, and the fact that the construct has a reduced number of indicators, it was decided to keep the indicators. Overall the construct presents a composite reliability clearly above 0.7, and an average variance extracted above 0.5.

The construct's measurement model provides reasonable fit as determined by the fit measures shown in table 8.13.

Based on construct's reliability exceeding 0.7, AVE higher than 0.5, and factor loadings practically and statistically significant, in spite of two factor loadings that are lower than 0.7, it is concluded that the construct is reliable and presents internal consistency and convergent validities.

Table 8.13: Perceived Organisational Risk Culture – Construct Measurement and Fit

Indicator	Factor Loading	Squared Factor Loading	t-values	Error Variance	CR	AVE
Q31	0.690	0.476	10.27	0.524	0.847	0.586
Q32	0.639	0.408	9.05	0.592		
Q33	0.783	0.614	15.35	0.386		
Q34	0.919	0.845	23.48	0.155		

Fit Measures				
SB χ^2	df	GFI	CFI	SRMR
0.119				
p=0.942	2	0.999	0.999	0.005

It is worthwhile noting that Tsui et al. (2006) suggest that organisational risk culture and CEOs' characteristics have to be disentangled. Further to the recommendation of those authors, the researcher decided to confirm such disentanglement in section 8.3.2 by comparing a single-factor model, where both the 'perceived organisational risk culture' and the 'perceived CEO's risk behaviour' merge into a single factor, with a two-factor model, where both variables remain isolated.

Perceived Organisational Support. This construct was measured with a dimension of a scale adapted from Rhoades et al. (2001).

The correlations among the indicators of the construct 'perceived organisational support' for risk-taking activities are all of a large size effect, ranging from 0.55 to 0.68 (table 8.8).

All factor loadings are larger than 0.5 and are statistically significant ($p < 0.001$).

The construct's measurement model provides reasonable fit as determined by the fit measures shown in table 8.14.

Table 8.14: Perceived Organisational Support – Construct Measurement and Fit

Indicator	Factor Loading	Squared Factor Loading	<i>t</i> -values	Error Variance	CR	AVE
Q10	0.800	0.640	18.98	0.360	0.874	0.636
Q11	0.732	0.536	14.76	0.464		
Q12	0.790	0.624	17.65	0.376		
Q13	0.863	0.744	21.91	0.256		

Fit Measures				
$SB\chi^2$	df	GFI	CFI	SRMR
1.476				
p=0.478	2	0.993	0.999	0.014

Based on the reliabilities of the indicators and associated *t*-values, construct's composite reliability, 0.874, and average variance extracted, 0.636, it is concluded that the construct evidences internal consistency, reliability and convergent validity.

Summary and Conclusions. Evaluation of individual constructs shows that composite reliabilities (CR) and average variances extracted (AVE) for each one of them are within the thresholds recommended by literature (Bagozzi and Yi, 1988; Fornell and Larcker, 1981; Hair et al., 2006), insofar CR's are larger than 0.7 and AVE are larger than 0.5 for all the constructs.

In brief: we found evidence of the existence of six constructs measured by a total of 23 items. The combined measurement model is analysed in the next section.

8.3.2 Proposed Measurement Model

After considering separate single-factor models for each construct in the previous section, a CFA with 6 latent variables measured by a total of 23 indicators is now considered. The measurement of the model with 6 factors complemented with the average variances extracted for each construct included in the overall model is provided in table 8.15.

Table 8.15: Estimates and *t*-values of a six-factor Measurement Model

Indicator	Loadings on constructs (standardised)	<i>t</i> -value	Error Variance	Construct	CR	AVE
Q22	0.87	21.95***	0.25	Illusion of Control	0.913	0.780
Q23	0.98	18.97***	0.04			
Q25	0.79	14.38***	0.38			
Q19	0.96	31.36***	0.08	Outcome Experience	0.886	0.725
Q20	0.87	25.28***	0.24			
Q21	0.70	15.65***	0.51			
Q01	0.89	27.42***	0.20	Perceived Risk of the Decision Subjects	0.858	0.603
Q02	0.77	8.99***	0.41			
Q03	0.69	11.50***	0.52			
Q04	0.74	13.49***	0.45			
Q36	0.81	17.57***	0.35	Perceived CEO's Risk Behaviour	0.907	0.660
Q37	0.76	17.97***	0.42			
Q41	0.83	21.16***	0.31			
Q42	0.85	25.17***	0.28			
Q43	0.82	19.38***	0.34			
Q31	0.72	10.69***	0.48	Perceived Organisational Risk Culture	0.848	0.585
Q32	0.64	9.23***	0.60			
Q33	0.83	18.71***	0.31			
Q34	0.85	22.88***	0.27			
Q10	0.82	21.23***	0.33	Perceived Organisational Support	0.874	0.634
Q11	0.71	14.09***	0.49			
Q12	0.80	18.69***	0.37			
Q13	0.86	23.22***	0.27			

*** $p < 0.001$

One of the concerns of the author are the potential high correlations among the latent variables, which are related to the organisational contexts, and the potential dimensionality and discriminant validity issues related to those constructs. Based on the literature reviewed, the author expects the constructs, which encompass the perceptions that individual managers held of dimensions of organisational contexts, to be highly correlated. Therefore the author decided to compare a single-factor model where all the 23 indicators loading into a single factor (table A3.7, Annex 3), a two-factor model (table A3.8, Annex 3), where one of the factors includes all the indicators of the

'perceived CEO's risk behaviour', of the 'perceived organisational risk culture' and of the 'perceived organisational support' and the other factor includes the remaining indicators, and a six-factor model (table 8.15), where each one of the six latent variables is measured by the corresponding indicators as presented in section 8.3.1. Furthermore, in line with what is mentioned in section 8.3.1 the author tested the entanglement of the 'perceived organisational risk culture' and the 'perceived CEO' risk behaviour'.

As depicted in table 8.16, the fit measures presented and the AIC, an index which is used to compare models directly, clearly indicate that a six-factor model is better than a two-factor model and better than a single-factor model. This contributes to confirm the unidimensionality of the constructs considered in this study.

Table 8.16: Confirmatory Factor Analysis – Fit Comparison of Models with Different Number of Factors – Models' Measurement

Fit Measures	One-factor model	Two-factor model	Six-factor model
$SB\chi^2$ Scaled	1183.838	802.948	287.738
df	230	229	215
$SB\chi^2/df$	5.147	3.506	1.338
CFI	0.872	0.923	0.990
GFI	0.503	0.600	0.823
RMSEA	0.195	0.167	0.098
SRMR	0.144	0.105	0.061
AIC	3395.198	2876.506	1965.123

According to the methodology presented in Chapter 6, in order to assess the discriminant validities of the constructs retained, and confirm the unidimensionality of each construct, the average variance extracted of each latent variable included and measured in the overall model shall be compared to the correlations between each one of the latent variables and the other five remaining latent variables (table 8.17).

Table 8.17: Correlations and Shared Variances among Constructs - Six-factor Measurement Model

Correlation R ² (<i>t</i> -value)	Outcome Exp.	Illusion of Control	Perceived Risk of Decision Subject	Perceived CEO Risk Behaviour	Perceived Org. Risk Culture	Perceived Org. Support
OE	1					
IC	0.537 0.288 6.61***	1				
PRDS	0.440 0.194 5.44***	0.436 0.190 4.40***	1			
PCRB	0.295 0.087 3.51***	0.340 0.116 4.34***	0.270 0.073 3.13**	1		
PORC	0.371 0.138 3.97***	0.369 0.136 4.20***	0.306 0.094 3.24**	0.740 0.548 15.92***	1	
POS	0.426 0.181 4.95***	0.376 0.141 4.52***	0.362 0.131 3.60***	0.656 0.430 12.09***	0.651 0.424 10.61***	1

** p<0.01 *** p<0.001

The combined analysis of tables 8.15 and 8.17 shows that for any specific duo of constructs the average variances extracted (AVE) for each one of those constructs within the overall model are larger than the shared variance between the constructs as measured by R². Therefore, it is concluded that all the constructs exhibit discriminant validity and are unidimensional.

Although this may be seen as a redundant operation, since both AVE's of both the 'perceived CEO's risk behaviour' and 'perceived organisational risk culture', 0.660 and 0.585, respectively, are larger than the shared variance between the two constructs, 0.548, the author decided, regardless and as proposed in section 8.3.1, to reconfirm discriminant validity through a comparison between a one-factor model, that is, the two constructs combined into a single factor, and a two-factor model, that is, a model where the two constructs are correlated in the model.

The disentanglement study provides evidence that the two-factor model fits the data better than the one-factor model (table 8.18), since all the measures without exception, are better for a two-factor model.

Table 8.18: Disentangling the 'Perceived CEO's Risk Behaviour' and the 'Perceived Organisational Risk Culture' Constructs

Fit Measures	Unidimensional – two factors combined	Two Factors separated
SB χ^2 Scaled	91.772	35.211
df	27	26
SB χ^2 /df	3.399	1.354
CFI	0.972	0.996
GFI	0.813	0.931
RMSEA	0.167	0.093
SRMR	0.077	0.051
AIC	948.334	835.759

Having confirmed that all the constructs present content validity (Chapter 7), are reliable and exhibit internal consistency and convergent validity (section 8.3.1) and are unidimensional and demonstrate discriminant validity (section 8.3.2), and having assessed the overall measurement model and concluded that the fit for the model proposed is reasonable, the author considered that the measurement model is adjusted, and is one of the potential models that fit reasonably the data. The researcher moved then to the analysis of the structural model.

8.4 Proposed Structural Models

As developed in the previous chapters, where literature was reviewed and results of direct observation, semi-structured interviews and questionnaire pre-test were discussed, the organisational support perceived by managers for engaging in risk-taking activities, the leadership aspects, namely the role and impact of CEOs in their organisations, and organisational risk culture, as perceived by managers, are different dimensions of the same views that managers have of organisational life and, as such, it is expected that those dimensions correlate. On the other hand, based also on the review of literature, and observation and discussions with managers, complemented with the analysis of the data provided by the pre-test of the questionnaire, it is expected to see some level of correlations among the experiences of managers with outcomes, the control that they feel that they have over the matters that are subjected to decision-making, and the risks perceived, which are inherent to the decisions' subjects.

Therefore, the author decided to treat, in a first phase, the two sets of unobserved variables mentioned above as two different sub-models, which are part of a more

general model. The two sub-models come together to make an overall model through a relationship posited as existent between the perceived risk of the decision subject and the perceived organisational support. Furthermore, it is expected to be seen as well some other cross influences between the two sub-models, namely the impact that the experiences that managers have with outcomes have on the way that those managers perceive their organisations' risk culture, and the way that the perceived CEO risk behaviour impacts the control that managers feel over the decision subjects. Accordingly, a total of four models will be assessed: the two sub-models mentioned above, an overall model where the two sub-models are connected via a single relationship and an alternative overall model where the two sub-models are connected via multiple relationships.

8.4.1 Structural Sub-Models

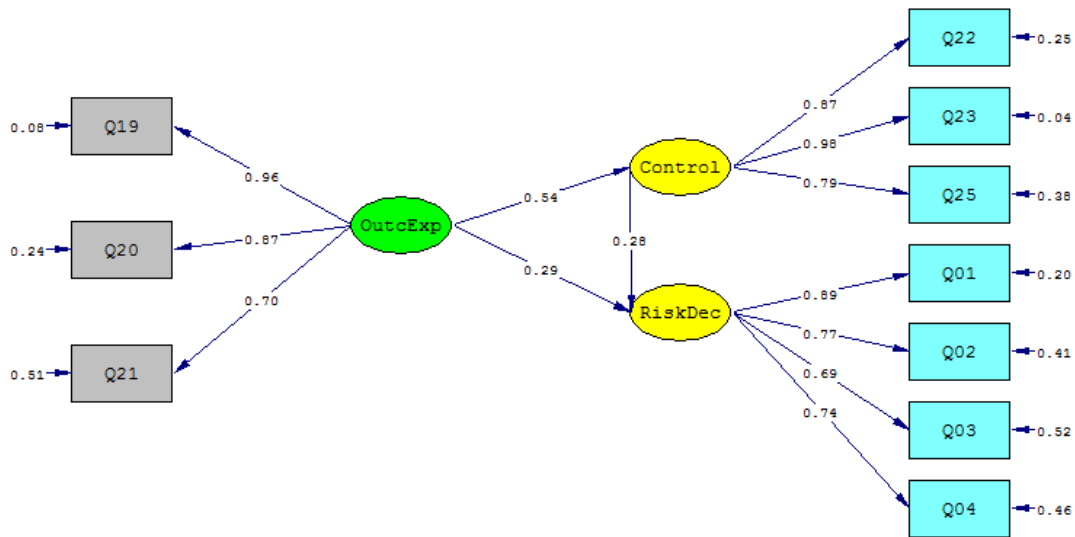
Sub-model 1 includes the latent variables 'outcome experience', 'illusion of control' and 'perceived risk of the decision subjects', while sub-model 2 includes the latent variables 'perceived CEO's risk behaviour', 'perceived organisational risk culture' and 'perceived organisational support'.

Sub-model 1. For sub-model 1 theory predicts the existence of relationships among the three constructs (Baird and Thomas, 1985; Sitkin and Pablo, 1992; Sitkin and Weingart, 1995).

Based on the literature reviewed, on discussions with managers, and observation of organisational life, the author expected relationships with practical and statistical significance to materialise among the constructs, as depicted in fig. 8.8, namely that the 'outcome experience' influences the 'illusions of control', which, in turn, influences the 'perceived risk of the decision subjects'.

Furthermore, it is expected as well that the construct 'outcome experience' influences the construct 'perceived risk of the decision subjects' directly.

Fig. 8.8: Sub-model 1 – Estimates - Standardised Solution



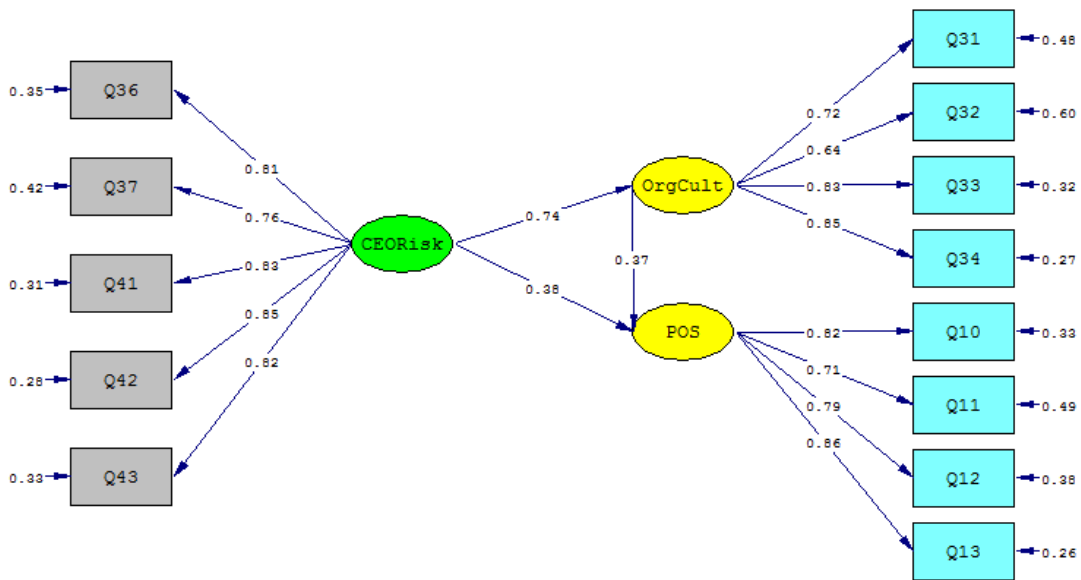
Fit measures (table A3.9, Annex 3) show acceptable model-data fit.

Sub-model 2. On the one hand, literature predicts strong relationships between leadership and organisational culture, and also between this former variable and CEOs and or top management teams. On the other hand, literature suggests the existence of relationships between leadership and organisational culture with the support that managers perceive they get from their organisations.

Literature suggests that the organisational support that individuals perceive in their organisations depends on organisational behaviours, although, to the knowledge of the author, individual perceptions of the factors behind those organisational behaviours have not been considered as determinants of perceived organisational support.

The author expected that the perceptions that managers, individually, have of all the contextual factors were related as displayed in fig. 8.9.

Fig. 8.9: Sub-model 2 – Estimates – Standardised Solution



Fit measures (table A3.10, Annex 3) show acceptable model-data fit.

8.4.2 Main Structural Model and Testing of Hypotheses

The diagram of the proposed structural model and the research hypotheses are presented in fig. 5.2 in Chapter 5 and are reproduced in fig. 8.10 with the estimated values of the parameters.

The original structural model considered by the author included the two sub-models mentioned in section 8.4.1 linked by a relationship between the ‘perceived risk of the decision subjects’ and the ‘perceived organisational support’. However, within the same theoretical framework, and for the same precise six constructs, there are indications that suggest the existence of other relationships between constructs of the two sub-models.

For example, Slovic (1987) and Vlek and Stallen (1980) suggest that the risk perceived depends on the characteristics of the situations faced, and on social factors, that is, on relationships and behaviour in the organisational context, and in the level of confidence in experts, that is, in this case, senior managers. The illusion of control factor depends, therefore, not only on previous knowledge, drawn many times from previous experience, but also on the confidence that people making decisions have on those leading them. Douglas and Wildavsky (1982) stress the social aspect of risk perception, by suggesting that risks perceived, and risk-taking, are related to the confidence on those leading a group, and to social behaviour related to that level of

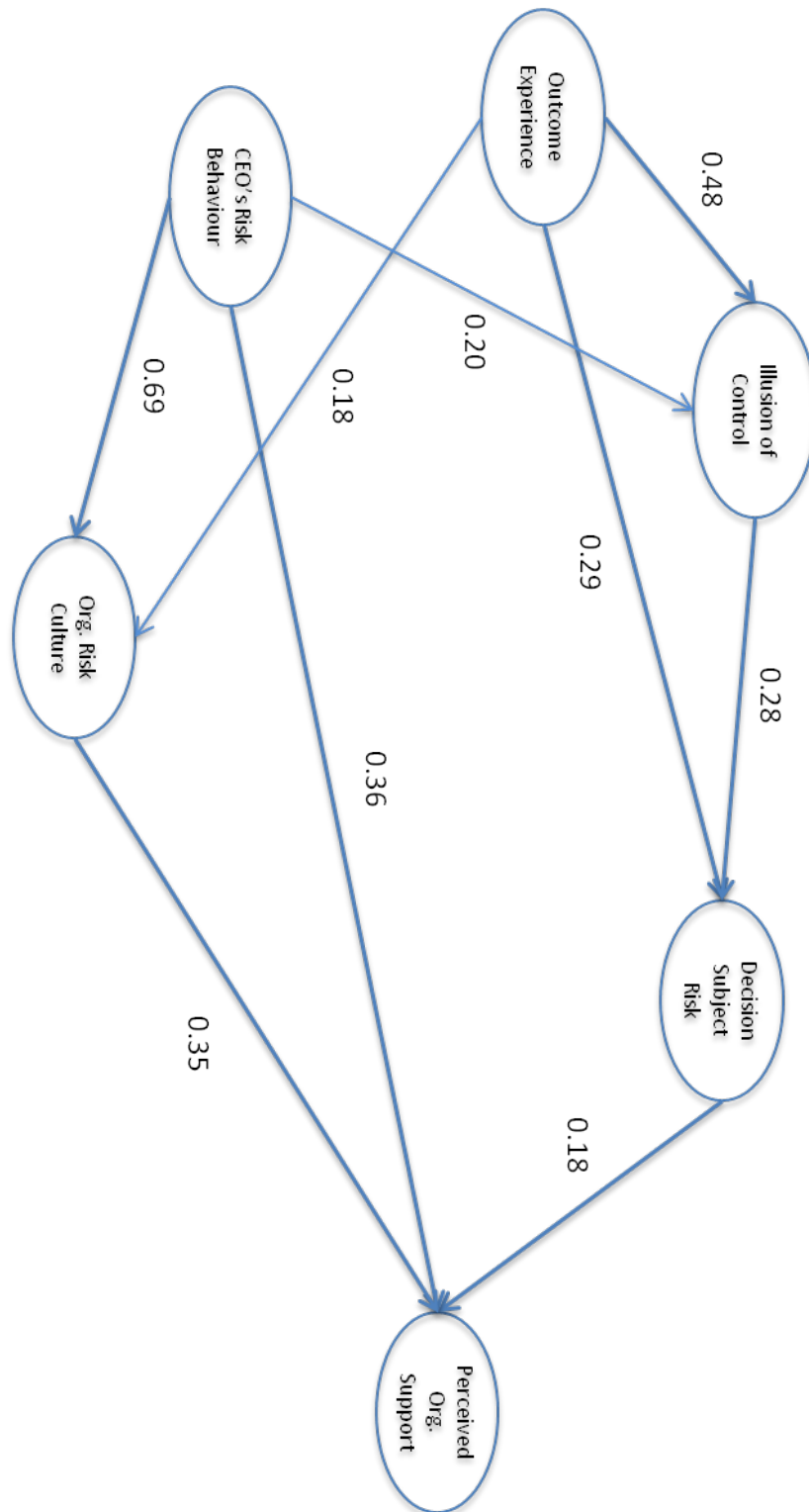
confidence. Langer (1975) carried out a series of studies, which show that experience plays a role in the control that subjects believe to have in respect to the decisions made. Schwenk (1984) makes reference to a study that shows that managers with unsatisfactory experiences feel less control. March and Shapira (1987: 1411) say that “*managerial confidence in the possibilities for post-decision reduction in risk comes from an interpretation of managerial experience.*” It is expected based on leadership and followership theories (e.g. Conger et al., 2000; Puffer, 1990) that managers incorporate in their perceptions of control, the power that they feel powerful individuals such as CEOs have.

In a different vein, Pettigrew (1979) and Smircich (1983) suggest that cultures result from an accumulation of experience that is framed in a given way. Likewise, Deal and Kennedy (2000) advocate that culture is built by trial and error, and stories, that is, experiences feed cultural values. Since an important part of organisational cultures is related to the roles played by heroes, myths and the like, and considering that myths and heroes result very much from experiences in the organisational contexts, it is anticipated that ‘outcome experience’ has an effect on the ‘perceived organisational risk culture’.

The structural model proposed presents a number of fit indices with values that are reasonable according to literature (table A3.11, Annex 3), especially bearing in mind that the model is relatively big, given the small sample size. Furthermore, the relationships that were posited are supported or suggested by the literature reviewed. Therefore, the author considers that this model is part of the group of models that reasonably fit the data provided by the sample considered. Hair et al. (2006) suggest that one absolute fit index, one incremental fit index and the χ^2 statistic (SB scaled χ^2 , in this case) are used in a combined way to assess fit. Likewise Salgueiro (2012) proposes that several fit measures of several different types shall be used to evaluate a model. In this study, the author adopted the approaches suggested by Hair et al. (2006) and Salgueiro (2012), and used different measures of fit. Systematically, the author used a panoply of indices, which cover the recommendations for indices of different types, such as absolute, including of goodness (SB scaled χ^2 and GFI) and badness of fit (SRMR and RMSEA), incremental fit (CFI) and parsimony (χ^2/df). It is worthwhile noting that the author reports the RMSEA, since that index is very common. However, Hu and Bentler (1998) do not recommend the utilisation of that index for samples smaller than $N=250$, which is corroborated by Hair et al. (2006).

In addition, the relationships hypothesized in the model proposed exist and show evidence of medium to large effects (fig. 8.10).

Fig. 8.10: Estimates of Relationships – Standardised Solution



The squared multiple correlations for the structural equations of the structural model show that close to 33% of the variance of the latent variable 'illusion of control' is explained by the combined effects of the constructs 'outcome experience' and 'perceived CEO's risk behaviour'.

On the other hand, the constructs 'outcome experience' and 'illusion of control' contribute to explain close to 26% of the variance of the construct 'perceived risk of the decision subjects'.

As far as the construct 'perceived organisational risk culture' is concerned, close to 58% of its variance is explained by the combination of the constructs 'outcome experience' and 'perceived CEO's risk behaviour'.

Finally, 51% of the variance of the construct 'perceived organisational support' is explained by the combined effects of the 'perceived risk of the decision subjects', 'perceived organisational risk culture' and 'perceived CEO's risk behaviour' (table 8.19).

Table 8.19: Squared Multiple Correlations for Structural Equations - Overall Model

Construct	IC	PRDS	PORC	POS
R²	0.329	0.256	0.578	0.514

Furthermore, the structural model tests and confirms the support for all the direct relationships hypothesised (table 8.20), and provides nomological validity to the constructs and to the model.

Table 8.20: Results of Relationships Hypothesised

Hypotheses / Relationships	Estimates of Parameters (Standardised)			Conclusion	
	Parameter and Estimated Value		t-value		
H ₁	Outcome Experience (OE) → Illusion of Control (IC)	γ_{11}	0.48	4.18***	Hypothesis supported
H ₂	Illusion of Control (IC) → Perceived Risk of Decision Subjects (PRDS)	β_{21}	0.28	2.15*	Hypothesis supported
H ₃	Outcome Experience (OE) → Perceived Risk of Decision Subjects (PRDS)	γ_{21}	0.29	2.64**	Hypothesis supported
H ₄	Perceived CEO's Risk Behaviour (PCRB) → Perceived Organisational Risk Culture (PORC)	γ_{32}	0.69	6.67***	Hypothesis supported
H ₅	Perceived CEO's Risk Behaviour (PCRB) → Perceived Organisational Support (POS)	γ_{42}	0.36	3.51***	Hypothesis supported
H ₆	Perceived Organisational Risk Culture (PORC) → Perceived Organisational Support (POS)	β_{43}	0.35	2.86**	Hypothesis supported
H ₇	Perceived Risk of Decision Subjects (PRDS) → Perceived Organisational Support (POS)	β_{42}	0.18	2.01*	Hypothesis supported
H ₁₂	Perceived CEO's Risk Behaviour (PCRB) → Illusion of Control (IC)	γ_{12}	0.20	2.28*	Hypothesis supported
H ₁₃	Outcome Experience (OE) → Perceived Organisational Risk Culture (PORC)	γ_{31}	0.18	2.18*	Hypothesis supported

* p<0.05 ** p<0.01 *** p<0.001

The structural equations are given by:

- i) **POS** = 0.35 x PORC + 0.36 x PCRB + 0.18 x PRDS
- ii) **PORC** = 0.18 x OE + 0.69 x PCRB
- iii) **PRDS** = 0.29 x OE + 0.28 x IC
- iv) **IC** = 0.48 x OE + 0.20 x PCRB

It is worthwhile noting that standardised residuals and modifications indices were analysed by the author as suggested by Hair et al. (2006).

In spite of the fact that some residuals are greater than |2.5|, and a few are greater than |4.0| (table A3.15, Annex3) the author considers that i) the vast majority of the measured variables have loadings larger than 0.7, with the exception of indicators Q03 (0.69) and Q32 (0.64), and all the loadings are statistically significant – and practically and theoretically significant, ii) all the constructs exhibit composite reliabilities and average variances extracted considerably better than the lower limits acceptable, and iii) there are no sound theoretical reasons to make any other changes.

As for the modifications indices (table A3.16, Annex3) several authors (e.g. Hair et al., 2006; MacCallum et al., 1992; Saris et al., 1987) suggest that no modifications should be made based on the indices alone, and that modifications should be driven by theory. In reality the author did not find evidence of theoretical support for new relationships in the model proposed, therefore, did not incorporate any new relationships in the structural model.

However, there is a large number of constructs not considered, which, potentially, may impact the constructs retained in this study. Therefore, the author cannot exclude the possibility that some of the measured variables measure as well, at least partially, other constructs in the same or in different contexts. Nevertheless, as mentioned above, the author sees no grounds to make further changes, therefore, the structural model was analysed with six factors, a total of 23 indicators and a total of 9 relationships.

8.5 Moderation Effects

Moderator effects can be tested using multi-group techniques (Baron and Kenny, 1986; Hair et al., 2006; Salgueiro, 2012), including when the moderator variable is a dichotomy or is dichotomised, as explained in section 6.6.5.

Given the sample size of this study (N=216), the size of the retained model (6 latent variables with a total of 23 observed variables and a total of 56 parameters) and the ordinal nature of the data, multi-group analysis is problematic, since there is a potential

for important differences in fit. Therefore, the author decided to skip the initial step proposed, for example, by Byrne (2008) and Jap and Anderson (2003), and assumed that the model proposed fits equally well the groups of interest considered. Thus, the methodology employed in this study, drawing from Hair et al. (2006), consists of estimating the difference between the χ^2 of the baseline or base model, where all the parameters are freely estimated for the various groups, and the χ^2 of the same model, where the relationship of interest is made equal for both groups. This allows testing for the null hypothesis that there is no difference between i) the model fit-to-data for a certain model and a certain group and for a given relationship and ii) the same model fit-to-data considering a different group, within the same sample. If the difference in the χ^2 values, known as $\Delta\chi^2$, is larger than the chi-square function value for the difference of degrees of freedom, then the null hypothesis (of invariance between groups) is rejected.

In the case of this study, several variables, which are not part of the measurement and structural models, including demographic variables were measured. That is the case of the tenure, in years, of the respondents in their current positions, as well the case of the tenure in the current firm or organisation and the case of the tenure in the current industry. Furthermore, the author measured as well the hierarchical level of the respondents as compared to the level of CEOs, being CEOs at the level 0 and non CEOs at levels 1 or 2 or 3, etc. Drawing from upper echelons theory (Hambrick and Mason, 1984), the 3 types of tenure mentioned here above and the hierarchical level of the respondents are hypothesised to moderate the perceptions and behaviours of the elements of the sample retained in this study. Thus, to apply the methodology mentioned above, suggested by Hair et al. (2006), the author decided to proceed as follows:

- i) Get baseline models for each one of the prospective moderator variables, considering two groups for each one of them, and respective χ^2 , using the proposed structural model presented in fig. 5.2, Chapter 5.
- ii) Force relationships among constructs to be equal for both groups of the prospective moderator variable concerned.
- iii) Compare the χ^2 of the proposed model with all the parameters freely estimated with the χ^2 of the proposed model where the parameters of the structural relationships are forced to be equal for the two groups of the moderator variable.

If the differences between the χ^2 lead the author to conclude that invariance between groups shall be rejected, then invariance for each specific relationship shall be investigated, by forcing each specific relationship to be invariant between groups, and by analysing differences between χ^2 of the baseline model and of the model where a specific relationship is constrained.

Considering that the sample size of this study is small (N=216), the author used criteria that allowed him to split the sample into groups of roughly equivalent sizes (table 8.21). The author recognises that the criteria used do not allow a clear cut, that is, a clear separation between the groups is not achieved. Ideally, the central part of the sample around the median should be removed, in order to provide that clear separation between groups mentioned above. However, the author thinks that this has the merit to identify some trends, which may be further developed by future research, which in a study in the applied management field is relevant.

Table 8.21: Groups and Group Selection Criteria for Moderator Variables

Hypothetical Moderator Variable	Group Size	Group Nbr	Criterion
Tenure in current position (D04)	115	1	≤ 3 years
	101	2	> 3 years
Tenure in current firm (D05)	109	1	≤ 9 years
	107	2	> 9 years
Tenure in current industry (D06)	106	1	≤ 18 years
	110	2	> 18 years
Hierarchical level (D11)	103	1	≤ 1 level from CEO
	113	2	> 1 level from CEO

Further to the methodology described above, and as provided in table A3.12 (Annex 3), the only demographic variable that evidences moderator effects at the model level is the hierarchical level. The difference between the values of the χ^2 between the baseline model and the model with the relationships constrained ($\Delta\chi^2=21.76$, $\Delta df=9$), is statistically significant ($p<0.01$), thus leading us to reject the null hypothesis that the proposed model is invariant for the groups considered. For all the tenures, based on the differences in χ^2 and the differences in degrees of freedom, the invariance between

groups is not rejected leading us not to further investigate in detail the hypotheses 8, 9 and 11.

As the differences in the χ^2 presented in table 8.22 suggest, the hierarchical level moderates the structural relationships between the risks perceived of the decision subjects and the perceived organisational support (parameter β_{42}) and the perceived organisational risk culture and the perceived organisational support (parameter β_{43}).

Table 8.22: Multi-group Effect Analysis – Hierarchical Level

Relationship Constrained		χ^2 for constrained model ^a	$\Delta\chi^2$	Conclusion on Invariance	Hypotheses and Conclusions
β_{43}	PORC→POS	1212.63	5.70*	Invariance rejected	H _{10a} – Moderation supported
γ_{42}	PCRB→POS	1209.75	2.82	Invariance not rejected	H _{10b} – Moderation not supported
β_{42}	PRDS→POS	1211.51	4.58*	Invariance rejected	H _{10c} – Moderation supported

^a χ^2 for the baseline model = 1206.93 ($\Delta df=1$) * $p < 0.05$

We thus conclude that the socio-demographic variable ‘hierarchical level’ moderates two relationships out of the three that had been hypothesised. The moderation of the relationship PCRB→POS might not be supported because of the mediation effects of the ‘perceived organisational risk culture’, which are studied in the next section. In other words, moderation effects of the ‘hierarchical level’ might be dispersed by the effects that the ‘perceived CEO’s risk behaviour’ has on the ‘perceived organisational risk culture’. Another possible explanation is the lack of clear discrimination between groups, as mentioned above in this section.

It is worthwhile noting that the ‘hierarchical level’ moderates as well a relation that had not been considered. The relationship that had not been considered as potentially moderated by the hierarchical level, is the interaction between the perceived CEO’s risk behaviour and the perceived organisational risk culture (parameter γ_{32}). For group 1 (hierarchical level distance from CEO \leq one level) the estimate of the parameter γ_{32} is 0.427 ($p < 0.001$), while for group 2 (hierarchical level distance from CEO > 1 one level) the estimate of the parameter γ_{32} is 0.895 ($p < 0.001$). The analysis of these results shows that those in lower levels in organisations perceive a larger influence of CEOs’ risk

behaviours in the organisations' risk cultures than those in higher levels. This could be because top-level managers confound themselves with the prevalent organisational cultures and do not notice their own influence in organisations, while those in lower levels and who have smaller impacts in the cultures of their organisations notice the influence that top managers, namely CEOs, have in shaping organisational cultures.

Table 8.22 suggests that the hierarchical level moderates two of the structural relationships in the model proposed, as hypothesised. However, in order to provide evidence that supports, or not, the hypotheses, which assumed directions of the moderator effects, estimates of parameters and *t*-values have to be evaluated (table 8.23).

Table 8.23: Moderator Effects of the Hierarchical Level by Group

Structural Relationship		Group 1		Group 2		Conclusion
		Higher hierarchical level		Lower hierarchical level		
Hypothesis / Relationship	Parameter	Estimate	<i>t</i> -value	Estimate	<i>t</i> -value	
H _{10A} PORC → POS	β ₄₃	0.554	3.51***	0.003	-0.01	Hypothesis supported
H _{10C} PRDS → POS	β ₄₂	0.38	2.62**	0.095	-0.81	Hypothesis supported

** p<0.01

*** p<0.001

As hypothesised, and as clearly evidenced by the differences in the parameters' estimates in a common metric completely standardised solution for both groups 1 and 2, i) the higher the hierarchical level (group 1) the stronger the relationship between the 'perceived organisational risk culture' and the 'perceived organisational support' (H_{10A}), and ii) the higher the hierarchical level (group 1) the stronger the relationship between the 'perceived risk of the decision subjects' and the 'perceived organisational support'.

Table 8.24 presents the set of hypotheses related to moderating effects that were proposed in this study and the findings.

Table 8.24: Results of the Hypotheses related to the Moderating Variables

Hypotheses / Moderation of Relationships			Conclusion
H _{8A}	Tenure in Current Industry moderates	Illusion of Control (IC) → Perceived Risk of Decision Subjects (PRDS)	Hypothesis rejected
H _{8B}		Outcome Experience (OE) → Perceived Risk of Decision Subjects (PRDS)	Hypothesis rejected
H _{9A}	Tenure in Current Organisation moderates	Perceived Risk of Decision Subjects (PRDS) → Perceived Organisational Support (POS)	Hypothesis rejected
H _{9B}		Perceived CEO's Risk Behaviour (PCRB) → Perceived Organisational Support (POS)	Hypothesis rejected
H _{9C}		Perceived Organisational Risk Culture (PORC) → Perceived Organisational Support (POS)	Hypothesis rejected
H _{10A}	Hierarchical Level moderates	Perceived Organisational Risk Culture (PORC) → Perceived Organisational Support (POS)	<u>Hypothesis supported</u>
H _{10B}		Perceived CEO's Risk Behaviour (PCRB) → Perceived Organisational Support (POS)	Hypothesis rejected
H _{10C}		Perceived Risk of Decision Subjects (PRDS) → Perceived Organisational Support (POS)	<u>Hypothesis supported</u>
H _{11A}	Tenure in Current Position moderates	Perceived CEO's Risk Behaviour (PCRB) → Perceived Organisational Support (POS)	Hypothesis rejected
H _{11B}		Perceived Organisational Risk Culture (PORC) → Perceived Organisational Support (POS)	Hypothesis rejected

8.6 Mediation Effects

In this study we have postulated the existence of two possible partial mediators: the 'illusion of control', or 'controllability', and the 'perceived organisational risk culture'.

As represented in fig. 8.8 in section 8.4.1, submodel 1 postulates that the 'illusion of control' partially mediates the relationship between the experience and familiarity with outcomes, or 'outcome experience', and the risks that are perceived as being directly related to the decision topics or subjects, that is, the 'perceived risk of the decision subjects'.

Submodel 2 (fig. 8.9), in section 8.4.1, suggests that the ‘perceived organisational risk culture’ partially mediates the relationship between the ‘perceived CEO’s risk behaviour’ and the ‘perceived organisational support’ for risk-taking.

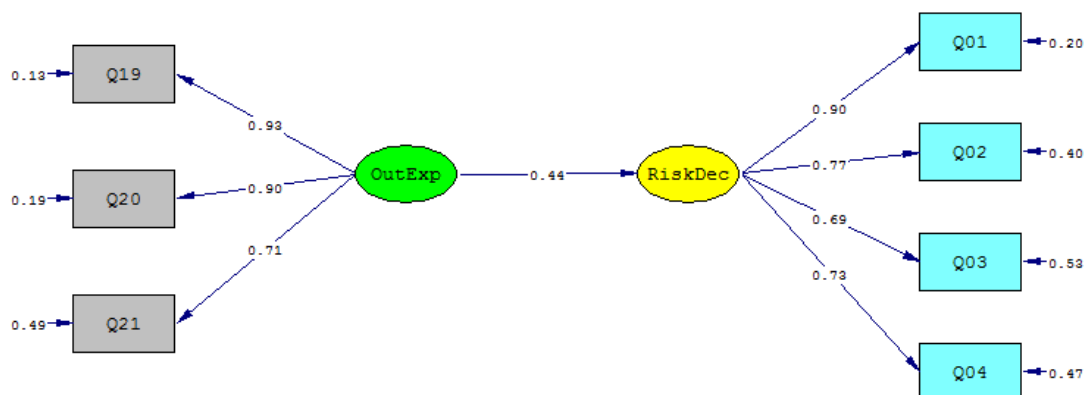
Drawing from the work of Baron and Kenny (1986), Hair et al. (2006), Holmbeck (1997) and Wei et al. (2003), the approach to study any mediation effects will be based on significance and changes in size effect of relationships, and also on model fit. The test for improvement in fit will be performed through a difference of χ^2 , as recommended by Hair et al. (2006) and Holmbeck (1997).

8.6.1 Mediating Effect of the Latent Variable ‘Illusion of Control’

Based on the procedure described in Chapter 6, a model with a single relationship between the independent latent variable, ‘outcome experience’, and the dependent latent variable, ‘perceived risk of the decision subjects’, was estimated (fig. 8.11).

It is worthwhile noting that, in spite of the mentions to independent and dependent variables, there is no purpose whatsoever to establish causality. The reference to independent and dependent variables is made just for a matter of simplicity and to use terms that are current in the literature.

Fig. 8.11: Direct Effect Relationship Model (No Mediation Effect of Illusion of Control)



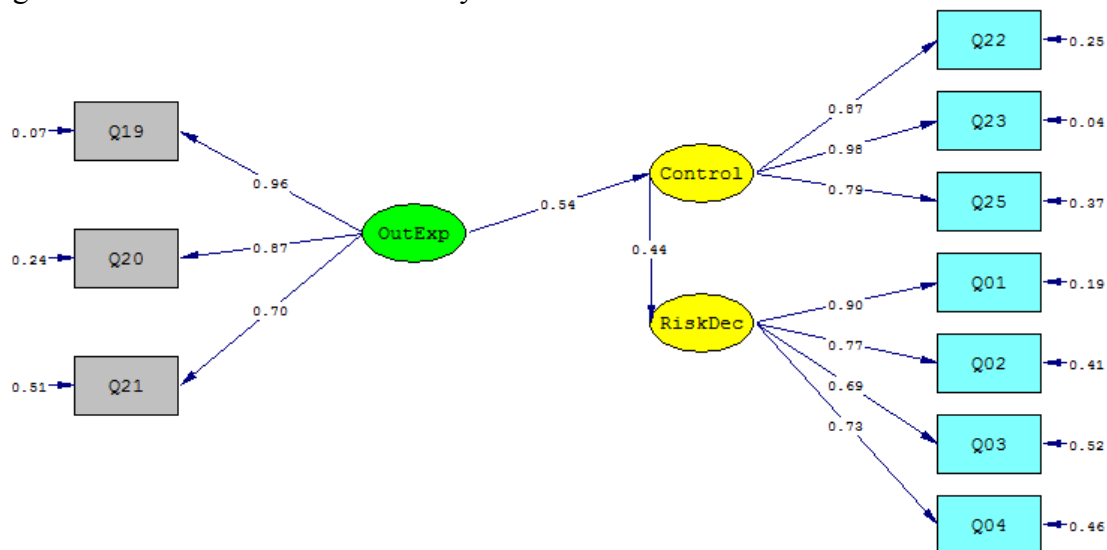
The relationship between the two latent variables in the model showing the direct effect (fig. 8.11) has a medium to large size effect (0.44), and is significant with a *t*-value of 4.29 ($p < 0.01$).

The sub-model, which includes all the three variables including the mediator and all the three respective relationships (sub-model 1, fig. 8.8, section 8.4.1), shows that all

the relationships are significant and have medium or large size effects. The relationship between the independent and the dependent variable has a t -value of 2.56 ($p < 0.05$), while the relationships between the independent variable and the mediator and between the mediator and the dependent variable have t -values of 4.69 ($p < 0.001$) and 2.12 ($p < 0.05$), respectively. Furthermore, the model presents a reasonable fit as provided by several fit indices, in spite of a poor RMSEA.

Finally, the model, which represents full mediation (fig. 8.12), and which is obtained by constraining the relationship between the independent and the dependent variable to value zero, evidences relatively large size effects for the two relationships of the model, that is, for the relationship between the 'outcome experience' and the 'illusion of control' (0.54) and for the relationship between the 'illusion of control' and the 'perceived risk of the decision subjects' (0.44), being both relationships statistically significant. The relationship between the independent variable and the mediator has a t -value of 4.73 ($p < 0.001$), while the relationship between the mediator and the dependent variable has a t -value of 3.80 ($p < 0.001$). The model intended to represent full mediation has a reasonable fit, although with a poor RMSEA.

Fig. 8.12: Model of Full Mediation by Illusion of Control



The fit of the model intended to represent partial mediation ($SB\chi^2=47.923$; GFI=0.901; CFI=0.992; SRMR=0.055, AIC=827.089) is slightly better than the fit of the model, which represents full mediation ($SB\chi^2=52.818$; GFI=0.889; CFI=0.990; SRMR=0.087; AIC=837.717), as evidenced by the comparison of a number of fit indices (table A3.13, Annex 3).

Considering that

- i) The direct effect between the independent and the dependent variable is statistically significant;
- ii) The size of the direct effect is reduced when the mediator is added to the model and that that direct effect remains statistically significant;
- iii) The other relationships in the model are statistically and practically significant as evidenced by the t-values and size effects; and
- iv) The model that represents the partial mediation has a better fit than the model that represents full mediation, as corroborated by the fit indices and the difference in χ^2 , which is significant for the difference in degrees of freedom of the models,

it is concluded that the latent variable 'illusion of control' partially mediates the relationship between the variables 'outcome experience' and 'perceived risk of the decision subjects'. The author argues, however, that since causality cannot be proved, in spite of grounds to think that illusions of control grow with experience, rather than the other way around, it would be possible and reasonable to say that the 'outcome experience' partially mediates the relationship between the 'illusions of control' and the 'perceived risks of the decision subjects'.

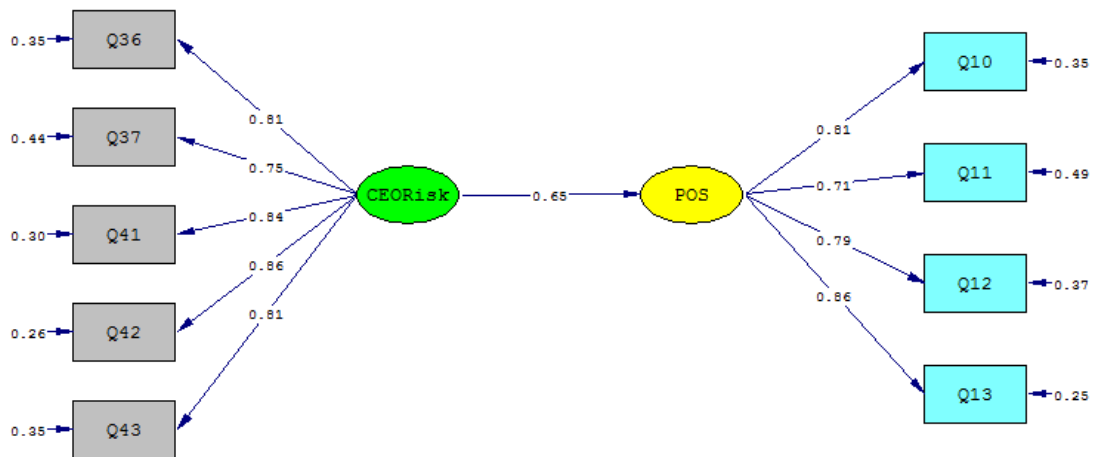
8.6.2 Mediating Effect of the Latent Variable 'Perceived Organisational Risk Culture'

The second mediating effect that is expected in this study, is the one provided by the 'perceived organisational risk culture'. It is expected that the perceptions of the organisational risk culture mediate the relationship between the perceptions that individual managers in their organisational contexts have of the risk behaviours of their CEOs and of the perceived organisational support for risk-taking behaviours by those same individuals, as postulated in submodel 2 in section 8.4.1 (fig. 8.9).

The first step of the methodological approach, as described below, is to confirm if the direct relationship between the independent and the dependent variable (fig. 8.13) is practically and statistically significant. Furthermore, as noted above, the use of the words 'independent' and 'dependent' to make reference to certain variables in the context of this study of mediation, has a mere purpose of simplicity.

The relationship between the 'perceived CEO's risk behaviour' and the 'perceived organisational support' for risk-taking has a large size effect of 0.65 (fig. 8.13). Moreover, that relationship is significant with a *t*-value of 6.90 ($p < 0.001$).

Fig. 8.13: Direct Effect Relationship Model (No Mediation Effect of Perceived Organisational Risk Culture)



When the mediator variable, 'perceived organisational risk culture', is added to the model and relationships among the three variables are defined to get a model of partial mediation, as in sub-model 2 in section 8.4.1 (fig. 8.9), as a second step to test mediation, we realise that the direct effect drops from 0.65 to 0.38. However, the relationship remains statistically significant with a *t*-value of 3.66 ($p < 0.001$). Furthermore, the two new relationships, that is, the relationships between the independent variable and the mediator and between the mediator and the dependent variable are practically and statistically significant, with regression coefficients of 0.74 and 0.37 (fig. 8.12), and *t*-values of 7.22 ($p < 0.001$) and 2.90 ($p < 0.01$), respectively.

The model of partial mediation by the latent variable perceived organisational risk culture presents a reasonable fit ($SB\chi^2=79.875$; $GFI=0.907$; $CFI=0.996$; $SRMR=0.051$; $AIC=1178.904$) with most of the indices, which are typically used to assess fit, within acceptable limits.

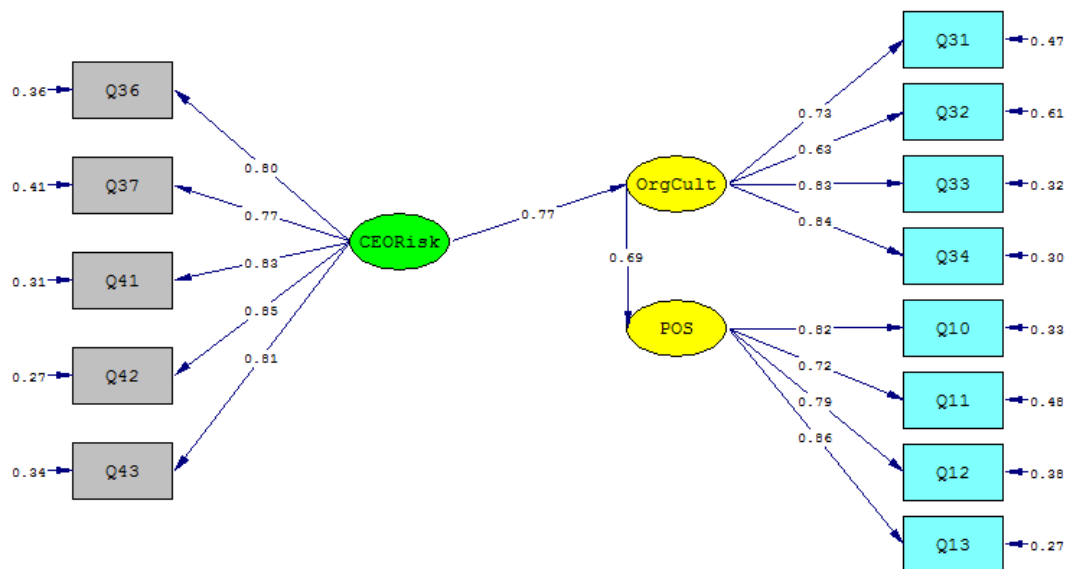
In order to compare fit between the partial and full mediation models, in what is the third step of the methodology adopted, the direct effect relationship between the independent and dependent variable is constrained to value zero (fig. 8.14).

With that constraint the regression coefficients of the remaining relationships, change slightly in the case of the relationship between the independent variable and the

mediator (from 0.74 to 0.77), and considerably between the mediator and the dependent variable (from 0.37 to 0.69). Both relationships are statistically significant with *t*-values of 7.14 ($p < 0.001$) and 6.13 ($p < 0.001$), respectively.

As for fit, the model representing a hypothetical situation of full mediation presents a reasonable fit ($SB\chi^2 = 87.525$; GFI=0.899; CFI=0.994; SRMR=0.062; AIC=1190.269), although worse than the fit evidenced by the model with partial mediation. A comparison between the models with partial and full mediation is provided in table A3.14 (Annex 3).

Fig. 8.14: Model of Full Mediation by the Perceived Organisational Risk Culture



Based on the methodology adopted, the conclusions drawn are

- i) The direct effect between the independent and the dependent variable is statistically significant as recommended by Baron and Kenny (1986);
- ii) The size of the direct effect is reduced when the mediator is added to the model and the direct effect remains statistically significant, a condition to have partial mediation;
- iii) The other relationships in the model are statistically and practically significant as evidenced by the *t*-values and size effects; and
- iv) The model that represents the partial mediation has a better fit than the model that represents full mediation, as supported by the fit indices and the difference in χ^2 , which is significant for the difference in degrees of freedom of the models,

therefore, the latent variable 'perceived organisational risk culture' partially mediates the relationship between the latent variables 'perceived CEO's risk culture' and 'perceived organisational support'. Here again, as for the precedent case of partial mediation, the author of this study contends that in the absence of evidence of causality, it could be argued that in the sub-model presented, any of the latent variables could be a mediator depending on the causality direction. It is argued, however, that there is clear evidence of mediation effects.

8.7 Summary of Chapter 8

In section 2 of this Chapter 8, socio-demographic variables are described and the distributions of the constructs' indicators are presented. Cronbach's alphas for the 6 constructs retained in this study are provided, showing evidence of acceptable reliabilities of the constructs considered (all the Cronbach's alphas are larger than 0.7).

In section 3, confirmatory factorial analysis provides further confirmation of constructs' acceptable reliabilities and internal consistencies and provides as well evidence of constructs' acceptable convergent validities. In that section the measurement model proposed is tested and the results, which are acceptable according to a mix of fit measures, constructs' reliabilities and average variances extracted, and individual loadings with statistical significance, suggest that the model proposed, measured with 6 constructs and a total of 23 measured variables, is one of the potential models that fits the data reasonably.

In section 4 the proposed structural model is assessed, including two nested sub-models, the squared multiple correlations for the structural equations are presented for the overall model and the relationships hypothesised are tested. The structural model provides support for the relationships hypothesised and, consequently, to the nomological validities of the overall structural model and of the individual constructs.

In section 5 moderator effects of socio-demographic variables are studied. The hierarchical level of managers moderates two out of three relationships hypothesised. However, contrarily to what had been hypothesised, tenure does not moderate any relationship, at least in the context of the sample used in this study.

Finally, in section 6 we provide evidence of partial mediating effects of two of the latent variables: the illusion of control, which partially mediates the relationship between the outcome experience of each individual manager and the perception that each manager has of the risks related to the decision subject, and the perceived

organisational risk culture, which partially mediates the relationship between the perceptions that each individual manager has of the risk behaviour of his or her CEO and the perceptions of the risk culture of his or her organisation.

CHAPTER 9. RESEARCH CONCLUSIONS – CONTRIBUTIONS, LIMITATIONS AND SUGGESTIONS FOR FURTHER RESEARCH

9.1 Introduction

In this chapter we synthesise and present the main conclusions of this research project. We pay special attention to the results of the relationships hypothesised, explain how the research aims are addressed, and stress the importance of the results to the field of the applied management, in general, and to the risk behaviour of individual managers related to strategic decision-making, in particular.

In Section 9.2 we summarise the main conclusions. In section 9.3 we discuss the contributions that the author sees as relevant for theory and applied management. Section 9.4 addresses the limitations of this study, while section 9.5 deals with suggestions made by the author for additional research. Finally, section 9.6 summarises the chapter and concludes the study.

9.2 Summary of Main Conclusions

What intrigued the author, and led him to undertake this study, are the different decision-making and risk-taking behaviours evidenced by people, who, in a given business environment, are exposed to the same factors and contexts. Being impossible to control for contexts by changing people from one context to another, and considering that the differences in viewpoints are difficult to separate from the individuals expressing those viewpoints, the author decided to study different people in their different contexts. It was assumed that if risk propensities are mediated by risk perceptions (Sitkin and Weingart, 1995), and risk propensities, by being stable, are less important to risk behaviour than risk perceptions (Weber and Milliman, 1997), then rather than changing individuals from one context to another, in order to see if the reason is the context, the individual, or both, it would be simpler to get the perceptions of different individuals in the different contexts in which they operate, studying the same set of variables.

The study was designed with the purpose of finding or identifying trends. Like in the example of the glass, which is half full or half empty, depending on the viewpoint, although, objectively, the glass has a content of 50% of its volume, the starting point of

the author was that what is different among individuals, in the specific case of this research project, are the viewpoints of certain dimensions, rather than the dimensions themselves. The author was not, and is not, concerned by the measurements of objective dimensions, but rather about measurements of viewpoints, or perceptions, that individuals have of certain dimensions, hoping that the perceptions of the dimensions selected provided support for the existence of a number of relationships that helped in explaining and anticipating, or predicting, risk behaviour. In other words, the constructs are the perceptions of the dimensions and not the dimensions per se.

Four research aims were defined, all around the purpose of gaining a better understanding of the mechanisms, or some of the mechanisms, that lead to risk behaviour in the context of strategic decision-making in organisational contexts.

9.2.1 Research Aim 1

The goal of research aim 1 (presented in Chapter 5, section 5.4) was to look for some degree of evidence that the perceptions that individual managers have of contextual factors, associated to other cognitive aspects, such as their experiences and their subjective analyses of the decision subjects, impact the ways they behave. Having realised during the course of this study, that measuring, or assessing, in any form specific behaviour of managers, would be a nearly impossible task, the author decided instead to stop at the perception that the managers have of the support that they perceive as provided to them by their respective organisations, and see that support as a proxy for the ways they behave. What is behind this thinking process is that higher organisational support for risk-taking, in the context of strategic decision-making, should encourage managers to take risks, while the opposite would have the opposite effects. Therefore, in practice, the main research aim was to look for a model that made theoretical and practical sense, and could explain, at least in part, those differences of behaviour, which intrigued the author.

The author claims that the reasonable fit-to-data of the overall model proposed, shows that that model is one of the possible models that explain the data gathered with the specific set of respondents, who replied to the final survey instrument. The measures of fit obtained, together with the relevant theoretical contributions made by numerous scholars, provide reasonable support to the model, that is, to the relationships hypothesised and to the individual constructs, including the way they were measured.

Furthermore, all the constructs proposed and the relationships hypothesised contribute, directly or indirectly, to the explanation of the construct that the author sees as a proxy, or predictor, of the behaviour of individual managers when facing risk-taking situations in the context of strategic decision-making. Therefore, the author concludes that research aim 1 was achieved.

9.2.2 Research Aim 2

Drawing from research aim 1, which has essentially a nomological sense (Cronbach and Meehl, 1955), in that it relates individuals to items, items to constructs, and constructs to constructs, explaining and measuring how all that work, makes sense and fits together, other research aims were defined.

Research aim 2 is concerned with specific relationships among constructs, and not with the behaviour of the model as a whole, and led to a set of hypotheses that were established among the latent variables, which comprise the overall model retained (fig. 5.2, Chapter 5). The literature review conducted allowed the author to propose a number of constructs to be part of a given model, and suggested certain relationships among those constructs. Those suggestions were transformed into hypotheses that were tested. However, differently from research aim 1, research aim 2 had no nomological purpose. Here the purpose was to identify relationships among constructs even if those relationships did not contribute to the success of the overall model. A total of 9 relationships among constructs were hypothesised. All the 9 hypotheses were supported by the results of the structural equation modelling, as presented in chapter 8 above:

- The experiences that managers have with the outcomes of previous strategic decisions made, or 'outcome experience' and the perceptions that they have of the risks inherent to the decision subjects that are part of strategic decision-making (hypothesis H₁, parameter γ_{11}) are related by an estimated standardised coefficient of 0.29, which is seen as a medium size effect, and a *t*-value of 2.64 ($p < 0.01$), confirming that the relationship is statistically significant. In a study where outcome experience was related to risk perception, Sitkin and Weingart (1995) found a direct effect of 0.37 ($p < 0.05$), which became 0.21 and non-significant when risk propensity, a variable not considered in this research project, was added to their model.

- The level of control that managers feel that they have over the situations that they face has been suggested as a variable that influences the perception of the risks that managers have of the decision subjects, or domains (Baird and Thomas, 1985; March and Shapira, 1987; Sitkin and Pablo, 1992). Such level of control has been referred to as illusory or as an illusion (Langer, 1975). A relationship was posited to exist between the 'illusion of control' and the 'perceptions of the risks that are related to a specific decision subject', or domain (hypothesis H₂, parameter β_{21}). Structural equation modelling provides support for the hypothesis showing an estimated standardised coefficient of 0.28 with a *t*-value of 2.15 ($p < 0.05$).
- The author hypothesised that illusions of control and experience with outcomes are related, drawing from the work of authors (e.g. Simon and Houghton, 2002; Tversky and Kahneman, 1974), who suggest that some events are easier to recall than others, for example, bad outcomes, and that people make analogies when making decisions. That relationship does exist (hypothesis H₃, parameter γ_{21}), at least in the sample considered, with an estimated standardised coefficient of 0.48 and a *t*-value of 4.18 ($p < 0.001$).
- A relationship that was hypothesised as well is the one between the 'perceived CEO's risk behaviour' and the 'perceived organisational risk culture' (hypothesis H₄, parameter γ_{32}). A large body of research regarding leadership and organisational culture (e.g. Schein, 2010; Tsui et al., 2006) suggests the existence of such a relationship. The results of the structural model adopted show an estimated standardised coefficient of 0.69 and a *t*-value of 6.67 ($p < 0.001$), between the two latent variables, thus confirming the existence of the relationship in the sample considered.
- 'Perceived organisational support' is a construct that has an underlying notion of reciprocity by the part of those who feel organisationally supported, or not (Eisenberger et al., 1986). In the context of this study the construct of interest to the author was the organisational support for risk-taking in the context of strategic decision-making. On the other hand upper echelons theory (Hambrick and Mason, 1984) stresses the role and the importance of CEOs in corporate life, namely in strategic decision-making, and other authors (e.g., Wayne et al., 2002) emphasise the role of leaders in their organisations, including CEOs. Therefore, the author considered and posited that the perceived organisational support for risk-taking and

the behaviour of CEOs in terms of risk-taking ought to be related (hypothesis H₅, parameter γ_{42}). In reality, given the sample considered and the model adopted, an estimated standardised coefficient of 0.36 relating the two variables was obtained with a *t*-value of 3.51 ($p < 0.001$).

- The author considers that an organisation that promotes risk-taking, in the context of strategic decision-making, should support those who engage, on the behalf of the organisation, in risk-taking activities aimed at making the best possible strategic decisions. Furthermore, organisational support is manifested through practices (Eisenberger et al., 1986), which are, or become, part of the culture of the organisation (Hofstede et al., 1990). Therefore, the author posited that the organisational risk culture as seen by managers is related to the organisational support that they perceive when facing risk-taking decisions (hypothesis H₆, parameter β_{43}). In fact that relationship does exist, with an estimated standardised coefficient value of 0.35 and a *t*-value of 2.86 ($p < 0.01$).
- A very important relationship in the context of this research project is the one between the risks that managers perceive as being related to a specific decision subject, and the organisational support that they perceive to deal with that decision subject, from a risk-taking perspective. As shown throughout the study, the author considers that there are variables that are intrinsic to the managers, or decision-makers, such as their own experiences and their personal heuristics, features that are intrinsic to the decision subjects themselves, and characteristics intrinsic to the organisational contexts. When a decision is made, or supposed to be made, that decision is about something, about a subject, or a domain. The author posited that the decision subject is the link between the idiosyncrasies of the individual managers and the support that they perceive as emanating from their organisations. In other words, the riskiness of the decision subject in the eyes of the individual managers, as influenced by their own characteristics, is a determinant of the support that they perceive from their organisations. An estimated standardised coefficient of 0.18 relates the 'perceived risk of the decision subject' to the 'perceived organisational support' (hypothesis H₇, parameter β_{42}), with a *t*-value of 2.01 ($p < 0.05$).
- One of the relationships that were also hypothesised in this study, and that bridges the individual features and the perceptions of contextual variables, concerns the

perceptions that managers have of the risk behaviours of their CEOs and the illusions of control that they have in respect to the decision-making subjects. Leadership and followership theories (Smircich and Morgan, 1982) suggest that individuals attribute to others, leaders for instances, certain characteristics, including expertise and power. Therefore, those who see, or perceive, their CEOs taking risks and responsibilities in strategic decision-making perceive themselves as being empowered and in control, in respect to the very same topics. Consequently, the author posited that there is a relationship between the perceptions that managers have of the risk behaviour of their CEOs as far as strategic decision-making is concerned and the level of control they feel over the decision-making processes (hypothesis H_{12} , parameter γ_{12}). The estimated standardised coefficient between the two constructs is 0.20 with a t -value of 2.28 ($p < 0.05$), for the relationship hypothesised.

- Finally, another relationship bridging the characteristics of individual managers and the perceptions that they have of variables related to the organisational contexts in which they work, and make, or participate, in strategic decision-making, which was posited to exist, is the one between the experiences that managers have with outcomes and the organisational risk culture in which they are inserted (hypothesis H_{13} , parameter γ_{31}). Events in organisational contexts contribute to the culture of organisations (Schein, 2010). Outcomes of decisions result from testing and experience (Deal and Kennedy, 1982). Outcomes and experiences and people experiencing, are part of the stories and heroes mentioned by Hofstede (1990), and Schein (2010), which contribute to the culture of organisations. The structural model adopted provides an estimated standardised coefficient of 0.18 and a t -value of 2.18 ($p < 0.05$) for the relationship hypothesised.

As proposed by research aim 2, determinants of the 'perceived organisational support' were identified and relationships among them posited. The structural model adopted supports all the relationships hypothesised, thus contributing to accomplish the research aim.

9.2.3 Research Aim 3

Given that the author sees the overall model proposed as the result of a combination of two sub-models, which, on the one hand, encompass the variables that are either features of the individual managers or of the decision subjects, and, on the other hand, includes the perceptions that managers have of the variables related to the organisational contexts in which the decisions are made, the purpose of research aim 3 was the study of the relationships at a sub-model level, namely the existence of mediation effects.

In the proposed structural model, two sub-models made, each one, by three latent variables were considered (section 8.4.1). Sub-model 1 includes the 'outcome experience', the 'illusion of control' and the 'perceived risk of the decision subjects' made one of those sub-models, while the 'perceived CEO's risk behaviour', the 'perceived organisational risk culture' and the 'perceived organisational support' are part of sub-model 2.

The results of the structural equation conducted, based on the methodology proposed by Baron and Kenny (1986) and Hair et al. (2006), show that there are partial mediation effects in both sub-models, hence contributing to clarify the complexity of the relationships involving the type of variables considered. The relationships concerned are those defined as hypotheses H₁, H₂ and H₃ and hypotheses H₄, H₅ and H₆.

Since this study is cross sectional and, as such, the effect of time is not taken into account, causality cannot be defined (MacCallum and Austin, 2000). However, in the case of 'illusion of control', it would be natural to assume that illusions of control result from accumulated experiences, rather than the other way around. Therefore, the author sustains that the illusions of control partially mediate the relationship between the experiences with outcomes and the risks related to the decision subjects, which are perceived by individual managers. As for the second sub-model, a conclusion is considerably harder to reach. It is reasonable to assume that behaviours of CEOs and organisational cultures precede the organisational support, that is, organisational support results from those two factors among, possibly, a number of other factors not considered in this study. However, it is not that obvious to assume that behaviours of CEOs mediate organisational cultures or vice-versa, especially if organisations are mature. Nevertheless, organisational culture theory and entrepreneurship theory show

that organisations result from people's actions. Organisational cultures result as well from people's actions. That is why myths, stories and heroes are seen as the cement of organisational culture. Therefore, in spite of the uncertainty around the subject, it might be reasonable to assume that, in fine, the behaviour of CEOs is an antecedent of organisational culture and that this latter construct partially mediates the former one.

The author sustains that the mediator effects found provide an important contribution to the explanation of the phenomena involved in decision-making in organisational contexts, and that, in that respect, research aim 3 is achieved.

9.2.4 Research Aim 4

The last research aim of this project concerns the roles, or effects, of some of the socio-demographic variables of the study on the relationships hypothesised. The socio-demographic variables that were targeted by the author are part of those, which are central for the upper echelons theory (Hambrick and Mason, 1984). We are making reference to tenure, in position, in firm and in industry, and to the hierarchical level.

Research aim 4 was the evaluation of the moderator effects of the four socio-demographic variables retained on some selected relationships. This research aim was particularly important, in the sense that variables, such as those considered, provide the best opportunity for organisations to influence the decision-making processes via, for example, recruiting processes that look for certain lengths of tenure, and certain hierarchical levels, and, or, choices of those who should participate or not in the decision-making processes.

The study of the moderator effects revealed that, given the sample considered, only the hierarchical level plays a moderator role on the model as a whole and, therefore, on some relationships. Managers in higher positions perceive higher contributions of the 'perceived risk of the decision subjects' and of the 'perceived organisational risk culture' to the 'organisational support perceived'. Symptomatically, the hierarchical level moderates the relationship between the 'perceived CEO's risk behaviour' and the 'perceived organisational risk culture', but not the relationship between the 'perceived CEO's risk behaviour' and the 'perceived organisational support', indicating that managers of all levels may see the relationships between the behaviours of CEOs in terms of risk-taking and the organisational risk cultures and between the organisational risk cultures and the organisational support for risk-taking as more obvious, or direct,

than the relationship between the behaviours of CEOs and the organisational support perceived for risk-taking.

In spite of the non-significant moderator effects evidenced by the three variables related to the 'tenures' of managers, which may result from the small sample size, and from the fact that the sample size did not allow for clear discrimination between groups in these tenure variables, the author considers that the research aim 4 was achieved and provides an important contribution to the understanding of the mechanisms that control the strengths of the relationships hypothesised.

9.3 Research Contributions

This study provides a number of theoretical contributions to the fields of the applied management and managerial science. Conclusions that contribute to a better understanding of the behaviours of managers are drawn from this study, thus allowing organisations to make decisions less prone to the effects caused by variables that are exogenous to the decision subjects, and by playing with factors that impact individual behaviour. This research project confirms trends evidenced by existing theories and literature, and, above all, promotes the integration of theories and of constructs that had not been necessarily related, as developed below.

9.3.1 Theoretical Contribution

This study contributes to the literature on decision-making in organisational contexts, namely the risk-taking behaviour of individual managers. On top of the general contribution to advancing the understanding of risk-taking and decision-making behaviour in organisational contexts, the main theoretical contributions made by this research project are i) the introduction of constructs in managerial research related to risk-taking, which have been suggested but, which, to the knowledge of the author, have not been operationalized, and ii) the identification of antecedents of the 'perceived organisational support' construct, such as the organisational [risk] culture, the CEO's [risk] behaviour and the features of the situations [risky decision-making], or domains, for which organisational support is sought, which have neither been proposed nor tested for this specific purpose.

9.3.1.1 Integration of Constructs in Research on Managerial Risk-Taking and Decision-Making

Sitkin and Pablo (1992) suggest that decision-making and risk-taking involve the characteristics of the individual decision-maker, the characteristics of the contexts in which the decisions are made, and the characteristics of the subject to be decided upon. Baird and Thomas (1985) go a little further and suggest that, besides the sets of factors mentioned by Sitkin and Pablo (1992), there are also industry characteristics and the external environment that shall be taken into account.

Sitkin and Weingart (1995) tested empirically part of the model suggested by Sitkin and Pablo (1992). However, they have addressed the risk perceptions and risk propensities of individuals, isolated from any organisational context. Besides, in the study made by Sitkin and Weingart (1995), and in the model proposed by Sitkin and Pablo (1992), it is not clear who is the party facing the risk. In other words, it is not clear if those facing the risks are the decision-makers, or the party in whose behalf the decision-makers decide. The author of this study argues that this is a fundamental question. In this research project, it is clear that the research topic concerns the risk that the managers feel that they face themselves, by engaging in organisational decision-making. The author considers this an important contribution from an explicatory viewpoint. Furthermore, in spite of calls for the integration of sets of factors, or variables (e.g. Baird and Thomas, 1985; Sitkin and Pablo, 1992; Sitkin and Weingart, 1995), researchers, with the exception of the field of entrepreneurship and corporate entrepreneurship (e.g. Hornsby et al., 1993), seem to have preferred, so far, not to mix characteristics of variables that, generally speaking, are dealt with at different levels of analysis. However, the author of this study circumvents that problem by using the perceptions that individual managers have of factors that are, for example, of an organisational nature or related to organisational contexts. The author did not measure and never intended to measure, for example, the risk culture of organisations. What is measured is the perception that each manager of the sample, who kindly replied to the survey instrument, has of the way that each organisation to which each manager belongs behaves, and reacts to the behaviours that those individuals may evidence.

This study provides a reasonable, and successfully tested, level of integration of constructs, within the limitations of the study, by considering individual characteristics, such as the experience with outcomes and the illusion of control, decision

characteristics, as perceived by the individual managers, and organisational features, also as perceived by the individual managers, such as the perceived CEO's risk behaviour, the perceived organisational risk culture and the perceived organisational support for risk-taking, as suggested by Sitkin and Pablo (1992), thus providing a theoretical contribution to managerial research.

Additionally, this study brings to managerial research on risk-taking, and decision-making, two constructs that, although not new, have not been included, at least to the knowledge of the author, in research dealing with risk-taking and decision-making in organisational contexts. Illusion of control or controllability is a construct that is often mentioned in the societal risk literature, and, to a lesser extent, in the managerial literature, as a variable impacting risk-taking. The construct has been proposed as an important variable in terms of societal risk (e.g. Slovic, 1987, Vlek and Stallen, 1980). In managerial literature, controllability has been suggested as a potential influence on risk-taking (e.g. March and Shapira, 1987, Shapira, 1995). Sutcliffe and Huber (1998) used the perception that executives have of the controllability of their business environments, as a dependent variable that results from the firms and industries in which the executives are embedded, while in this study controllability, or illusion of control, is a variable depending on and mediating the experiences that managers have with outcomes, and impacting the perceptions of the risks related to the decision-making subjects, as suggested by Sitkin and Pablo (1992). As for the perceived organisational support, it is a construct based on a premise of reciprocity and exchange, which is maintained in this study. In other words, the author of this study, drawing from the work of Eisenberger et al. (1986), Eisenberger et al. (2001), Eisenberger et al. (2002), Rhoades et al. (2001) and Wayne et al. (1997), sees reciprocity and exchange as the key factors that explain behaviour, and sees the 'perceived organisational support' construct as a proxy of the risk-taking behaviour of individual managers. Although the perceived organisational support has been considered for aspects related to risk-taking, such as the perception that employees confer to risk-taking, and, or, decision-making responsibilities provided by organisations to its managers (Eisenberger et al., 2002), little is said about the relationships between organisational support and other variables that impact the perceptions of the risks involved in decision-making. In addition, in this study the author expands the concept of perceived organisational support, by suggesting and testing antecedents of that construct that were not present in the literature consulted.

9.3.1.2 Antecedents of Perceived Organisational Support

Most studies of perceived organisational support consider this construct as the resultant, or as being a full mediator, of contributions by constructs, which represent organisational behaviours towards individuals. For example Rhoades et al. (2001) propose and test the perceived organisational support as a full mediator, in regards to a construct defined as the affective commitment to the organisation, of dimensions such as organisational rewards, procedural justice and supervisor support.

The antecedents of the 'perceived organisational support' that are proposed and tested in this study are considered through a different approach. First of all, the 'perceived risk of the decision subjects', which does not represent an organisational manifestation of behaviour towards individual managers is introduced by this study as an antecedent of, or a contributor to, the 'perceived organisational support'. In other words, the 'perceived organisational support' may result from contributions of variables that are not necessarily perceived as support of any sort. It is valid to suggest that if a manager sees a given decision subject in a way that, according to his or her perception, is not compatible or aligned with the way he or she sees the organisation behaving, that same manager may anticipate a certain level of organisational support, or lack of support, in what is an anticipation of organisational behaviour, rather than a demonstration of organisational behaviour. Secondly, when we take the latent variable that we decided to call the 'perceived CEO's risk behaviour' and we compare that construct to the 'supervisory support', a construct that has been studied very much in connection with the studies of perceived organisational support (e.g. Rhoades et al., 2001), we realise that while the latter construct is measured by the observations of the supervisors' supportive behaviours towards those who perceive that support, or lack of support, the former construct is defined by the observations made by managers of the manifestations of the behaviours of CEOs towards situations, choices and the like, but not necessarily measured by the manifestations of the behaviours of the CEOs towards the managers. Finally, a third construct that is taken as a contributor to the 'perceived organisational support' for risk-taking is the 'perceived organisational risk culture'. In this specific case, what the author intended to measure is a mix of the perceptions that individual managers have of the organisational behaviour in respect to certain specific topics, and of the behaviour that the organisation manifests towards that specific individual.

The new approach adopted in relation to the construct 'perceived organisational support', and its antecedents or determinants, is different from what is current in organisational support theory. It is different not only in terms of determinants, but also in terms of the position of the construct in models and of the qualification of the construct as a proxy of the risk behaviour of individual managers. The empirical evidence provided of the relationships among constructs, within the limitations of the study, contribute to broaden the organisational support theory, including its role as a potential predictor of individual risk behaviour.

9.3.2 Managerial Contribution

7 to 8 years, roughly, have passed since the author noticed certain organisational and individuals' behaviours in the firm where the author was working at that time, what, as mentioned in section 1.2.1, provided the background for this research project. The author of this study thinks that it is the appropriated time to close the loop and present the current situation of the offshore drilling industry, thus reinforcing the importance of the research topic for the life of firms.

The firm for which the author worked in 2005/2006 does not exist anymore. The company, which was the fourth or fifth largest drilling contractor, depending on the metrics, was acquired in 2011 by a competitor that was smaller according to some metrics and present in a business segment less prestigious. While the company where the author worked up to 2011 (Pride International) adopted a conservative approach during the growth cycle, which started in 2005, the company that acquired Pride International adopted an aggressive growth approach and became the 2nd largest company in the world in terms of the number of drilling units. To the knowledge of the author of this study 5 out of the 6 top managers of Pride International do not work anymore in the drilling business. Not surprisingly, in line with the results of this research project and according to the expectations of the author expressed in section 1.2.1, managers, who while working for Pride International from 2005 to 2011, adopted bearish behaviours, adopted bullish behaviours after the acquisition of the company. Decisions that took months to be made in the former organisation are made now in a few days. Decisions that were made by the executive committee of the former firm and scrutinized by the whole organisation are now made basically by one person and are

known by a very restrict inner circle. Departments that had equal decision power are now simple providers of services to the operations group.

The author can think of, at least, four companies that were inexistent in 2005 and have, nowadays, assets worth more than US\$ 5 billion (thousands of millions) each.

A company that had a small size back in 2005 became the third largest company in terms of number of assets and the largest in terms of market capitalisation.

Pride International, as an organisation, adopted a very conservative behaviour, in line with the conservative behaviour of its CEO and other top management members. Decision subjects were seen in the organisation as highly complex and extremely uncertain matters. Conservative behaviour in terms of risk-taking and decision-making cascaded down to all the managerial levels of the organisation.

In the last 20 years the author was given the opportunity to see in loco and work in a relatively close way with 4 CEOs and a relatively high number of COOs, CFOs, etc. The author thinks that the main reason why his former organisation, which was active back in 2005/2006 and was acquired in 2011, did not survive is because of the way top management perceived risks and the way those perceptions cascaded down in the organisation.

Perceptions of risks held by top managers, who had very low illusions of control over the decision-making subjects and little experience with the offshore drilling business, led them to see each decision subject as something highly complex and risky. Behaviour of top managers led as well to an organisational culture that was not supportive of engagement in decision-making.

The organisational culture combined with the risk behaviour of the CEO and the perceptions of the decision matters led to a very low perceived support for risk-taking in strategic decision-making by most of the managers in the organisation. In reality, each strategic decision meant a burden for those who wanted or pushed to do something rather than a driver and something pleasant and personally and professionally motivating.

In the organisations where the author worked where risk behaviour was not extremely conservative, managers exhibited relatively high illusions of control over the decision situations and over the decision-making processes and were very experienced. They looked for the foreseeable future but did not look beyond that. CEOs showed the

way forward and the organisation promoted reasonable risk-taking. Consequently, under those circumstances, managers felt entitled and empowered to make decisions.

Decision-making is about decision subjects, topics, or situations, but it is also, and above all, about perceptions, viewpoints, understandings and so forth of decision-makers in respect to the decision matters, and in respect to the contexts in which the decisions are made. Furthermore, since decision-making is a process, many people get involved at different stages of that process, meaning that the final decision-makers evaluate most of the time information that has been filtered, twisted, treated, and so on, that is, information that results from perceptions, viewpoints and understandings of other participants in the decision-making processes. Having a good understanding of how managers perceive is fundamental to understand, and, essentially, anticipate how managers behave. Behaviour may, for example, lead to good projects not being pursued.

Considering that propensities to take risks are stable, and that what leads people to a given risk behaviour are the perceptions of the risk involved (Weber and Milliman, 1997), this study provides a managerial contribution insofar it provides theoretical and empirical evidence, using managers as subjects, that decision-making is more, much more, than the decision topic, or subject, alone. For managers, who are in positions that allow them to make decisions in respect to the decision-making processes, this study shows that there are factors, which are, at least, equally important as the decision topic itself, and which need to be addressed in order to make the best possible decisions. Based on the findings of this study, in spite of its limitations, there is little point in having, for example, a sound business opportunity if the managers dealing with that opportunity had bad experiences in the past with opportunities that they see in a similar way, and do not manage to overcome those past experiences, or if those managers perceive, for example, that their new CEO is someone who does not seem to go for that type of opportunities, without knowing exactly why that CEO behaves the way he does.

This study provides awareness of phenomena, which are pervasive in organisations, and, ultimately, affect their performances. It is generally accepted in organisations that there is an organisational culture, that people have experiences and tenures, that there are CEOs and top management styles. However, it is less obvious whether there is an understanding of the practical consequences of those phenomena. This study provides some evidence of empirical interactions and practical consequences, considering that

the 'perceived organisational support', a key construct in this study, is, most likely, a predictor of individual behaviour.

It is worthwhile noting that, in spite of the limitations related to the sample, limitations that are mentioned below in this chapter, the sample units are managers. There are very few studies that deal with risk-taking behaviour of managers, in which managers are used as subjects, being MacCrimmon and Wherung (1986) and Shapira (1995) two of the most notable exceptions. However, studies dealing with perceptions of risks, and with factors that influence risk behaviour using managers as subjects, are almost inexistent. A study of the nature of this research project, which uses managers as subjects, provides clear managerial (and theoretical) contributions.

The findings of this research project are not of an immediate application and are not tailor-made to solve a given managerial or firm problem, since the managerial topic itself is generic rather than specific. However, the research topic is of interest to all the firms in all industries and the findings can be adapted to each organisation to address its decision-making processes and individual risk-taking behaviours. Decision-making and risk-taking behaviours in organisational contexts are clearly managerial topics and support to engage in decision-making processes and take risks is a managerial topic.

Mota and Gonçalves (2007) suggest that researchers in the field of the applied management present new interpretations of managerial issues or present a new line of research for a known managerial area, or design a new model to explain a given managerial topic or develop empirical studies in a given organisation or industry, among other alternatives. Furthermore, these authors advocate that the academic community sees consensually new lines of research related to managerial topics and empirical work in organisations or industries as contributions to best management practices. This research project represents an empirical work in organisations and provides an innovative explanation of a managerial topic, that is, the perceptions hold by individual managers of organisational support.

The main contributions of this study from a managerial and generic standpoint are:

- i) **Managerial Awareness of the Decision-making Processes** - Raising awareness of managers, and practitioners, of the fact that decisions are processes, and that processes need to be understood and controlled;

- ii) **Managerial Awareness of Factors Involved in Decision-making** - Raising awareness of managers, and practitioners, of factors that are involved in the decision-making processes, which are not necessarily and not only related to the subject or topic being decided, but which are equally important or even more important than the topic itself;
- iii) **Design of Programmes to Improve Decision-making** - Suggesting that managers may work on, and influence the factors, which contribute to risk-taking behaviour. For example, organisations can implement programmes to make managers aware of the factors playing a role in the decision-making processes. Organisations can define procedures that minimise the impact of those factors, which are pervasive in decision-making, to make sure that perceptions are not the factor that ultimately defines the courses of action. Organisations can explain and debrief decisions made, and respective outcomes, to provide common and unifying explanations, thus avoiding the development of individual perceptions that may work against the best interest of organisations;
- iv) **Top Management Awareness of Role played in Decision-making** - Suggesting that, since the hierarchical level moderates some important relationships, top management plays an extremely important role in terms of setting the tone, and proposing and explaining parameters used in decision-making.

In conclusion, organisations that have better controls in terms of the decision-making processes, and have systems in place to avoid or mitigate noise created by perceptions that individual managers have of certain variables, which are part of the organisational contexts, may make better decisions and thus perform better. Furthermore, organisations that use experiences of managers in a neutral and 'objective' way, and control for managers' illusions of control, by challenging those illusions, should also make better decisions and perform better.

Further to the suggestions made by Mota and Gonçalves (2007) this research project focused on organisational processes (decision-making) and on people (individual managers). Therefore, the specific managerial contributions are:

- v) **Outcome Experience** – 'Outcome experience' influences directly the 'illusion of control' and the 'perceived organisational risk culture' and directly and indirectly the 'perceived risk of the decision subjects'. Furthermore, the 'outcome experience'

contributes through the 'perceived risk of the decision subjects' and through the 'perceived organisational risk culture' to the 'perceived organisational support'.

Strategic decisions made and resulting outcomes shall be fully debriefed. Firms shall adopt clear and unequivocal positions in respect to the outcomes of the strategic decisions made in order to avoid personal interpretations. This would contribute to align the opinions of the individuals with the opinions conveyed by the representatives of the organisation, thus contributing to align experiences and contribute to a shared culture.

On the other hand, by debriefing all the strategic decisions made, firms would contribute to minimise the illusions of control by presenting a 'rational' view of the events or of the succession of events.

- vi) **Illusion of Control** – Illusions of control influence directly the 'perceived risk of the decision subjects' and, indirectly, through the 'perceived risk of the decision subjects', the 'perceived organisational support'.

For a given organisation, inputs to strategic decision-making, which cannot be controlled by decision-makers, should be standardised and or presented as a given in order to avoid to have decision-makers 'betting' on certain parameters according to their illusions of control. For example, decision-makers should not bet on inflation, on GDP growth rate, on price of energy, etc., unless they really want to bet and that is part of the business model. Furthermore, the decision-making processes should be broke down as much as possible in order to allow decision-makers, at all levels, to separate skills and knowledge from bets and illusion of control.

- vii) **Perceived CEO's Risk Behaviour** – CEOs play a determinant role in their organisations. They are leaders, they play role models and they are empowered to make decisions, at least to the eyes of the other organisational members. What CEOs think and do need to be known and should not be subjected to interpretation by organisational members.

The 'perceived CEO's risk behaviour' influences directly the 'illusion of control', the 'perceived organisational risk culture' and the 'perceived organisational support'. CEOs impact individuals directly and impact individuals indirectly as well, through the 'perceived organisational risk culture' and through the 'perceived organisational support'. Clear guidance needs to be provided by CEOs to the organisational members. What is allowed and not allowed, what is expected and not

expected, what is important and not important, what is relevant and not relevant, what is strategic and not strategic needs to be clearly and properly communicated. CEOs shall behave according in accordance with the messages they convey to the organisation and they should convey messages often. CEOs shall communicate regularly with organisational members to provide strategic guidance and shall display a clear and unequivocal role model.

- viii) **Perceived Organisational Risk Culture** – The organisational support that is perceived by the individual organisational members is influenced by the ‘perceived organisational risk culture’. That influence comes essentially from the power of the organisation to reward and punish organisational members, in general and simple terms, regardless of whether those rewards or punishments are material or not. Rules and standards in terms of strategic decision-making should exist, be simple and clear. Organisational members should know their scopes of work and scopes of responsibilities. Organisational members should know what is expected from them, their roles in the decision-making processes, their limits of authority and the consequences to themselves, if any, in case decisions made have positive or negative consequences.

9.4 Research Limitations

This study has five main limitations. The first limitation concerns the sample, the second limitation is related to the nature of the model, the third derives from the data and data analysis methodology employed, the fourth limitation is the impossibility to define directions of causality and the fifth limitation is related to the generalisation of the findings.

9.4.1 Limitations Related to the Sample

Samples are used whenever it is impossible, or becomes impossible, to survey the entire population. In the case of this study the targeted respondents are those who participate in strategic decision-making processes. Basically, this would mean all the managers, who all over the world, in all industries, are involved with strategic decision-making. Obviously it would be impossible to identify the entire population, and even if that was possible it would be highly impracticable, not to say impossible, to select a sample based on probability sampling techniques. Furthermore, being aware of the low

response rates in most of the studies that deal with respondents who are managers, being 35% a good rate (Saunders et al., 2007), the author preferred not to set many restrictions, and find a way to get the largest possible sample, within the constraints that the author had. In addition the author focused in sectors that he knows relatively well, and where risky strategic decisions are made regularly, which adds to the overall value of this research project.

Based on the natural constraints that a population, which, in practice, is infinite, imposes on probability sampling, considering the usual response rates when managers are the subjects responding to surveys, and the fact that certain sectors were better targets than others for illustrative purposes, the solution adopted by the author was to use a non-probability, or judgmental sampling technique (Saunders et al., 2007). The author worked with a purposive sample considering that that methodology is appropriate when the intention is to illustrate key issues, that is, when the intention is to provide, or evidence, trends, and there are important constraints to get a representative probability sample. However, by definition, a purposive sample creates problems of generalisability.

9.4.2 Limitations Related to the Model Proposed

The number of variables that may impact the risk behaviour of managers when participating in, or making strategic decisions in organisational contexts, is abundant. As mentioned elsewhere in this study some authors (e.g. Baird and Thomas, 1985) have suggested that risk behaviour is determined by the characteristics of the individual manager, of the specific decision subject, of the organisational context in which the decision is made, of the industry in which the organisation, or firm, is inserted, and by the business environment characteristics. Each one of the sets of characteristics mentioned above has numerous variables, dimensions and sub-dimensions. A researcher could be tempted to build a model as complete as possible. However, that researcher would always face the risk of missing something, no matter how big and complete his or her model was, and would face methodological issues, such as sample sizes, especially if managers were used as subjects. Therefore, choices need to be made, which, by definition, set restrictions and limit the study, despite the intention, achieved, to have in the model characteristics of the decision-maker, of the decision subject and of the organisational context, as suggested by Sitkin and Pablo (1992). On the other hand,

the model proposed stops at the perceptions that managers have of the support that they have, or do not have, to engage in risk-taking behaviour. That perception of support should translate into an overall perception that the manager would have of the risks that he, personally, would face by engaging in strategic decision-making, and that overall perception should determine the behaviour of that manager. Nevertheless, in spite of the assumption that the perceived organisational support is a proxy of the risk perceived for the self, and that the perceived organisational support predicts the risk behaviour of the manager, truth is that the perceptions of the risk for the self and the risk behaviour were not included and not operationalised in this study. There was an attempt to build a scale to measure the risk perceived for the self, which failed.

9.4.3 Limitations Related to the Data and to the Methodology Adopted

The methodology adopted, structural equation modelling, is adequate essentially for large samples, and for data normally distributed. For example Tomarken and Waller (2005) suggest that samples' sizes should be at least 200 for small models with two factors and 3 or 4 indicators per factor, and considerably bigger, although those authors do not specify how bigger, for more complex models with multivariate data non-normally distributed. It is worthwhile mentioning, however, that some methodologies have been adopted to deal with those two aspects, such as, for example, the Satorra-Bentler scaled chi-square, which seems particularly adequate for small samples and non-normal distributed data (Hu et al., 1992; Satorra and Bentler, 2001).

In spite of the effort made by the author to get the largest possible sample, truth is that the sample of this study has a size of $N=216$ making it a relatively small sample size, especially taking into account the number of observed variables used (23), the number of latent variables (6) and the number of parameters to be estimated (55), and the ordinal nature of the data.

Drawing from the work of Tomarken and Waller (2005), another limitation of this study shall be pointed out. As mentioned in 9.4.2 above many more variables could have certainly been included in the model increasing its complexity and, most likely, improving fit. However, SEM methodologies are 'blind' as far as the models' designs are concerned, in the sense that they do not know if variables are missing or not and do not know if the variables considered, or omitted, are the appropriate ones.

Another limitation related to the data is that the variables are ordinal. Polychoric correlations were used (Jöreskog, 2005) to mitigate the problem, although some authors consider that variables measured by Likert, or differential semantic scales, with 5 or more points may be assumed as continuous (Bollen and Barb, 1981). The fact that variables are ordinal, although having subjacent continuous variables, added to non-normally distributed data, creates additional problems of interpretation of statistics and fit model-to-data indices (Flora and Curran, 2004). However, this also happens in all studies that use SEM and ordinal variables.

It is important to note that, in spite of the reasonable model fit evidenced by most of the fit model-to-data indices considered, the model proposed is just one in the set of potential models, which may fit the data as well, as always happen within the SEM framework.

Finally, it is worthwhile mentioning that the way groups were defined to test the moderation effects of the socio-demographic variables considered, by cutting the sample into two samples of roughly an equivalent size, did not allow for full discrimination between the groups. Ideally, the author of this study should have eliminated from one group the upper quartile and from the other group the lower quartile, for example, thus eliminating the subjects located in the centre and increasing discriminatory power. However, that was not done considering the relatively small sample size.

9.4.4 Causality

This study has a cross-sectional design, that is, answers to the questionnaire were provided at a certain point in time, and time lag effects could not be measured.

Although the relationships in the model proposed in this study were assumed to have given directions, that is, given influences or causalities, and in spite of some logical explanations that may provide some justification for the directions of the relationships hypothesised (McDonald and Ho, 2002), without a longitudinal study causality cannot be properly assessed (MacCallum and Austin, 2000). However, MacCallum and Austin (2000) also suggest that researchers may justify causality in cross-sectional studies, by adopting a position where they consider either that time plays no role in the relationships among variables, or a position where they say that the effects of time are instantaneous. The position adopted in this study is that there is a sequence,

or order, of events, observations, learning processes and experiences, and, as such, time plays a role. Nevertheless, the author sustains that every time something is learned, or experienced, in respect to a certain variable, the effects are immediate on any other variable related to the variable concerned. For example, in the case of this study the author suggests that illusions of control result from something, namely from experience and from the perceptions of the risk behaviour of CEOs. If experience with outcomes and perceptions of CEO's risk behaviour do not change, there is no reason, still in the context of this study, to have the illusions of control changing. If and when experience with outcomes and, or, perceptions of CEO's risk behaviour change, then it is contended herein that illusions of control should change immediately. Regardless, the simultaneity mentioned above was not tested, thus the limitation remains. This limitation is, however, an opportunity for future research.

9.4.5 Generalisability of the Findings

Although the author of this study does not make any claims of generalisation throughout the study, and simply points out possible trends, which are evidenced by the findings, it is important, nevertheless, to stress that the findings are not subject to generalisation by this single research project.

Anticipating the difficulties to get managers to reply to the questionnaire, the author preferred not to restrict the population of the respondents very much because, in one way, or another, this would always limit the generalisation of the findings. The population of the firms where strategic decisions are made is difficult to determine, and is considered by the author as infinite, as far as the time span to get access to all the firm names is concerned. If the population of the firms is infinite, the population of the managers is even more difficult to determine. The author could have limited the study to a sector, and, or, to a country, etc. That was done somehow, but not in a rigorous way. Basically, the respondents work for firms in the energy sector, going from the oil sector to the utilities sector, and are part of an 'international sample', which, supposedly has a number of Americans, Brazilians, English, French, Portuguese and, marginally, a few other nationalities.

In addition, the scales used to measure the constructs of interest represent themselves limitations to findings' generalisability (MacCallum and Austin, 2000), in that any generalisability shall be limited to the constructs as defined and measured in

this study, and not to constructs that although having, potentially, the same meaning are measured in different ways.

In spite of the limitation that results from the lack of generalisation, the author draws from the findings conclusions in terms of trends, and avenues for future research of practical, rather than statistical, significance.

9.5 Directions for Future Research

This study advances the literature by focusing on the perceptions of some determinants of risk-taking, associated to decision-making, by real managers in their organisational contexts, by using a descriptive rather than normative approach, although with a clear predictive purpose. Perceptions of determinants related to the organisational context, to the decision-maker and to the decision matter, or subject, are considered, which contributes to the literature. Nonetheless, actual behaviour is not tested, since the study stops at a variable, which, it is posited by the author, is a predictor of risk perception, and, through risk perception, is a predictor of risk behaviour. What is at stake in this research project is how perceptions lead to intentions of engagement, by managers, in risky decision-making processes.

The suggestions, or directions, for future research are related to the different aspects considered in this research project: the decision-maker or participant in decision-making, the decision matters, and the contexts in which decisions are made, or not made.

One first suggestion for future research is to extend the model proposed by adding a latent variable measuring the perceptions of the risks that managers have for themselves, when engaging in strategic decision-making in organisational contexts, and checking if the perceptions of organisational support for risk-taking in strategic decision-making fully, or partially, mediate that new variable. This presupposes the development of a scale that measures those perceptions of the risk for the self. Psychometric studies of societal risks are relatively common (e.g. Fischhoff et al. 1978; McDaniels et al., 1995; Sjöberg, 2000; Slovic et al., 1986). Psychometric studies with individuals in their day-to-day lives are less common but exist (e.g. Weber et al., 2002). However, studies with managers are practically inexistent. Pennings and Smidts (2000) performed a study with owners and managers of hog farms in the Netherlands. Nonetheless, in spite of the fact that it is acceptable to assume that risks that owners

face in their businesses are personal risks, those authors measured risk attitudes rather than risk perceptions, and, besides, no contexts whatsoever were taken into account. Considering that risk perception mediates risk behaviour (Sitkin and Weingart, 1995; Weber and Milliman, 1997), a scale that measured the perceptions that managers have of the risks that they may personally face by engaging in strategic decision-making, in their organisational contexts, would be a very valuable step in behaviour prediction. In a study that assesses the contexts for selling issues by middle managers to top managers, Dutton et al. (1997) indicate that selling, that is, communicating and pushing for ideas, and so forth, depends on the risks that managers feel that they may face by doing so, or, as put by Dutton et al. (1997), depends on contexts being favourable, or unfavourable.

A second suggestion for future research is the inclusion of the perceptions of determinants related to the business environment, such as market risks, competitiveness, rivalry among firms in a given industry, and so forth, in the model proposed in this research project. This suggestion is not new, has been made by Baird and Thomas (1985) and Sitkin and Pablo (1992), who have called for the inclusion of factors related to the contexts in which firms are involved, in models of risk-taking and decision-making. However, certainly due to the complexity of the subject, and of the numerous factors that could potentially be considered, this has not been put into practice. We specifically suggest that the perception that individual managers have of the position of their firms relatively to their market competitors, be added to the model proposed in this research project.

A third proposal, or possibility, of research concerns the differences, if any, between perceptions of opportunities and perceptions of threats (Dutton and Jackson, 1987; Jackson and Dutton, 1988; Miller et al., 1998), or differences in perception between strengths and weaknesses of organisations (Ireland et al., 1987), and is thus related to the decision subjects, or matters. Ireland et al. (1987) consider that strategic decision-making is directly related to firm performance, and suggest that perceptions of strengths and weaknesses are related to the hierarchical levels of managers. It would be important to see, for example, how the determinants of the perceptions of opportunities and, or, threats and, or, weaknesses and, or, strengths impact the risks perceived in respect to the decision-making subject.

Drawing from the work of Jackson and Dutton (1988), Ireland et al. (1987) and Miller et al. (1998), it is suggested that the model proposed in this research project is

assessed for decision matters qualified as opportunities and to decision matters qualified as threats, and that the results are compared.

A fourth avenue for research is related to the roles played by the specific perceptions of middle level managers in strategic decision-making. In this research project, all managers playing a role in strategic decision-making were considered. Besides, the difficulties to get respondents made the author enlarge as much as possible the hierarchical levels, knowing, anyhow, that middle level managers contribute heavily to strategic decision-making. Many actions, or inactions, and initiatives, including the identification of opportunities and, or, threats, start with middle level managers (Dutton et al., 1997). For example, Floyd and Wooldridge (1992), who developed a typology of middle managers' involvement in strategy definition, suggest that there is a relationship between middle level management involvement with strategic matters, and firms' performances. Furthermore, Guth and MacMillan (1986) suggest that middle managers influence strategic decisions to meet their self-interests. In this study, for the sample considered and for the latent variables retained, measured by the indicators proposed, the hierarchical level has a moderator effect on some of the relationships considered. A study with middle level managers only, would contribute to risk-taking and decision-making literature, by isolating or controlling a factor that, most likely, influences the relationships among the determinants, or some of the determinants, or antecedents, of the perceived organisational support for risk-taking in strategic decision-making.

A fifth suggestion for research concerns the issue of causality. Although the direction of causality seems obvious, for most of the relationships hypothesised in the overall model proposed in this study, based on theoretical grounds and deduction, longitudinal studies would allow the confirmation of such directions beyond any doubts.

A sixth and final direction for research concerns the roles of socio-demographic variables. Upper echelons theory (Finkelstein and Hambrick, 1990; Hambrick, 2007; Hambrick and Mason, 1984) suggests that socio-demographic variables, mainly tenure, influence the behaviours of top managers. It is suggested herein, and that approach has been adopted in this research project, that there are no sound reasons not to extend that to all managerial positions, regardless of the hierarchical level. Tenures in the current position of the manager, in the current firm and in the current industry, were tested for moderation effects. The results are somehow mixed in the sense that there are differences in the strengths of relationships, but most of the time without statistical significance. As mentioned above, this could be because the sample used in this study is

small, and the groups were not significantly different from a practical standpoint. However, rather than testing the moderation effects of tenure, it would be worth testing its direct effects on most, if not all, the latent variables. Likewise, the functional background of a manager is suggested to be a determinant of his or her strategic orientation (Chaganti and Sambharya, 1987). Strategic orientation leads to an orientation towards certain courses of action, and, therefore, it is reasonable to suggest that functional backgrounds lead to certain perceptions in respect to the risks to be, and not to be, taken. Functional background could be tested for direct, or indirect, effects on all the relationships hypothesised by the model.

9.6 Summary of Chapter 9

Decision-making is pervasive in all sorts of organisations. Strategic decisions, a special type of decision given the resources employed and the consequences to organisations and individuals, although less common than routine decisions, are by their nature and implications more important to organisations and have different antecedents and determinants. The strategic decisions of interest in this study are those made in organisational contexts. However, in spite of the fact that strategic decisions are, most of the time, made collectively, individual decision-making behaviour is of paramount importance, because without individual involvement organisational decisions would not be possible.

Risk-taking is pervasive in organisational strategic decision-making. Middle-level and top managers, whether participating in decision-making or being the final decision-makers, are deeply involved with strategic decision-making, and their risk-taking behaviours are important for the performances of their organisations. This research project proposes that risk-taking related to strategic decision-making in organisational contexts, is dealt with at the individual manager level of analysis through the perceptions that managers have of the factors involved. Therefore, perceptions are in this study the unifying factor that allows all the variables to be treated at the individual level of analysis.

Perceptions play a role, essentially during the first phases of the decision-making processes, when recognition and evaluation of the decision matters are considered. During those phases not only top managers are involved in the processes. Middle-level

managers play very important roles in the identification of opportunities, recognition of threats, and so forth.

Managers have experiences with decision-making processes, including outcomes, and have opinions in respect to what they control and do not control in the processes. They have perceptions of the risks inherent to the decision matters, and they have perceptions of the variables that are related or are part of the contexts in which decisions are made. Managers seek to assess the decision matters that they face, and the organisational contexts in which they are embedded, and look for organisational support as a condition to engage in risk-taking behaviour in the context of their managerial duties.

This study proposes that strategic decision-making in organisational contexts is not normative in nature, that is, decision-making in organisational contexts does not result from maximisation, but rather from interactions among factors of different natures, which converge in the assessments that decision-makers make of the support that they get to engage in risk-taking behaviour. Basically, this study suggests that the main role in decision-making and risk-taking is played by cognition. In spite of its descriptive nature, this study suggests, however, that there are solid grounds to seek behaviour prediction in organisational contexts. The author of this study sustains that mere descriptions of behaviours are not enough, especially in for profit organisations. The key is to modify behaviours, if necessary, by working on its determinants.

This thesis integrates several theories and or fields: choice, judgement and decision-making, rationality, heuristics and biases, risk, decisions as processes, organisational culture, top management teams, entrepreneurship and organisational support are some of the theories, or topics, integrated under the umbrella of cognition, which includes perception. This thesis works with managers as subjects. It provides evidence of trends and relationships among variables that are pervasive in organisational contexts, and in individual decision-makers, thus providing managers with an understanding of the mechanisms that may lead, at least partially, to their involvement in decision-making. It allows managers, who are in positions that allow them to frame and guide their organisations, to influence the determinants of the perceived organisational support and other determinants of behaviour to enhance that support thus leading to a greater and better involvement of managers in strategic decision-making, and, consequently, to better decision-making, better decisions and better performances of their organisations.

This study is about perception. The intention is to know how individuals perceive and relate perceptions of several constructs. However, what really matters is behaviour, that is, what people do with their perceptions or as a result of what they perceive. Therefore, other than the hypotheses proposed and tested above in this study, it is important as well to make a proposition to be tested at a later stage. The proposition is that favourable perceptions of organisational support lead to higher risk-taking behaviour, and necessarily lead to higher involvement in strategic decision-making.

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ANNEX 1. DEFINITION OF CONSTRUCTS – QUESTIONNAIRE BUILDING

Table A1.1: Definition of the Constructs for questionnaire building purposes (Pilot and Final Questionnaires)

Construct	Definition
Manager's Risk Perception of the Decision Subjects ("RP")	Risk Perceptions of the Decision Subjects are individual judgments, or assessments, or conceptualisations (Baird and Thomas, 1985), that a manager makes of the risks inherent in the strategic situations, or subjects, being exposed to a decision process (Sitkin and Pablo, 1992; Sitkin and Weingart, 1995), which are to be faced ultimately by the organisation, being strategic decisions those for which the most harmful consequences are rare and often delayed, hence difficult to assess by statistical analysis, and that are not well suited for trial-and-error learning (Slovic, 1987).
Manager's Perceived Control (Controllability or Illusion of Control) ("CTR")	Controllability, or Illusion of Control, means, for the purpose of this study, the characterisation of the environment where the decision process takes place in terms of the influence and, or, power over the inputs and outputs of a decision, which a manager perceives to have, whether that influence and, or, power is exercised ex ante or ex post decision, which reduces or eliminates, in the manager's perspective, the incidence and, or, severity of undesired consequences. (De Carolis and Saporito, 2006; Langer, 1975; March and Shapira, 1987; Sutcliffe and Huber, 1998; Vlek and Stallen, 1980)
Manager's Self-Interest and Politics ("SI")	In the context of this study, Self-Interest is defined as the actions taken by managers to achieve their own goals. It is the level of effort that managers apply to the satisfaction of their own goals vs. the satisfaction of organisational goals. It assumes that managers' individual goals take priority over firms' goals, unless managers' goals and firms' goals are aligned.
Manager's Working and Risk Experience ("WRE")	Managers' Experience is seen as the exposure of managers to different situations – industries, firms, positions, different levels of intensity – situations more risky vs. situations less risky, situations more stressful vs. situations less stressful, more situations experienced vs. less situations experienced, and exposure to different types of outcomes, information and knowledge.

Construct	Definition
Organisational Culture Related to Risk ("OC")	Organisational culture as it pertains to decision-making and risk-taking is defined here as the " <i>organisation's propensity to take risks as perceived by the managers of the organisation</i> " (Bozeman and Kingsley, 1998: 111).
CEO's Risk Orientation ("CEO")	CEO's Risk Orientation is the set of attributes and, or, behaviours of the CEO related to risk-taking, in strategic decision-making, as perceived by the individual managers who contribute to the decision-making processes.
Perceived Organisational Support ("POS")	POS is the perceptions that managers have of the level of importance that organisations credit to their inputs, such as opinions and ideas, to their goals and values, and to what they may have at stake due to their involvement in the organisations. POS is defined as the " <i>global beliefs [formed by employees] concerning the extent to which the organisation values their contributions and cares about their well-being</i> " (Eisenberger et al., 1986: 500).
Risk perceived for Self ("RPS")	<p>Risk perceived for the self is the perception that a manager has of the existence of potential personal losses of a magnitude relevant to the manager, whichever the nature of those losses, due to his or her participation in strategic decision-making.</p> <p>This risk results from managers' interactions with their organisations and leaders and depends as well, from a manager's point of view, on the topics being decided.</p>

ANNEX 2. SCALES OF CONSTRUCTS AND FINAL VERSION OF THE QUESTIONNAIRE

A2.1 Scales of Constructs

Table A2.1: Indicators of 'Perceived Risk of the Decision Subjects'

#	Question	Adapted from	Source / Context
Q1	How would you characterise in terms of the risk involved to the organisation most of the strategic decisions faced by your business unit or affiliate or firm (as applicable)? 1 – Significant opportunities to 5 – Significant Threats	Sitkin and Weingart, 1995 Baird and Thomas, 1985 Sitkin and Pablo, 1992 Slovic, 1987	Determinants of risky decision-making behaviour: a test of the mediating role of risk perception and propensity. Strategic risk-taking. Perception of risk – characterisation and evaluation of hazardous activities, substances and technologies.
Q2	How would you characterise in terms of the risk involved to the organisation most of the strategic decisions faced by your business unit or affiliate or firm (as applicable)? 1 – High potential for gains to 5 – High potential for losses	Sitkin and Weingart, 1995 Baird and Thomas, 1985 Sitkin and Pablo, 1992 Slovic, 1987	Determinants of risky decision-making behaviour: a test of the mediating role of risk perception and propensity. Strategic risk-taking. Perception of risk – characterisation and evaluation of hazardous activities, substances and technologies.
Q3	How would you characterise in terms of the risk involved to the organisation most of the strategic decisions faced by your business	Sitkin and Weingart, 1995	Determinants of risky decision-making behaviour: a test of the

#	Question	Adapted from	Source / Context
	<p>unit or affiliate or firm (as applicable)?</p> <p>1 – Very positive situations to 5 – Very negative situations</p>	<p>Baird and Thomas, 1985</p> <p>Sitkin and Pablo, 1992</p> <p>Slovic, 1987</p>	<p>mediating role of risk perception and propensity.</p> <p>Strategic risk-taking.</p> <p>Perception of risk – characterisation and evaluation of hazardous activities, substances and technologies.</p>
Q4	<p>What is the likelihood of your business unit or affiliate or firm (as applicable) succeeding when making most of its strategic decisions?</p> <p>1 – Very likely to 5 – Very unlikely</p>	<p>Sitkin and Weingart, 1995</p> <p>Baird and Thomas, 1985</p> <p>Sitkin and Pablo, 1992</p> <p>Slovic, 1987</p>	<p>Determinants of risky decision-making behaviour: a test of the mediating role of risk perception and propensity.</p> <p>Strategic risk-taking.</p> <p>Perception of risk – characterisation and evaluation of hazardous activities, substances and technologies.</p>

Table A2.2: Indicators of 'Outcome Experience'

#	Question	Adapted from	Source / Context
Q19	Most of the strategic decisions made were correctly analysed by the decision-makers in charge 1 – Strongly agree to 5 – Strongly disagree	Sitkin and Weingart, 1995	Determinants of risky decision-making behaviour: a test of the mediating role of risk perception and propensity.
Q20	Most of the strategic decisions made were successful 1 – Strongly agree to 5 – Strongly disagree	Sitkin and Weingart, 1995	Determinants of risky decision-making behaviour: a test of the mediating role of risk perception and propensity.
Q21	Some of the strategic decisions made led to significant bad outcomes 5 – Strongly disagree to 1 – Strongly agree	Sitkin and Weingart, 1995	Determinants of risky decision-making behaviour: a test of the mediating role of risk perception and propensity.

Table A2.3: Indicators of 'Illusion of Control'

#	Question	Adapted from	Source / Context
Q22	Resources are available to resolve most situations 1 – Strongly Agree to 5 – Strongly Disagree	Sutcliffe and Huber, 1998 Strategic Management Journal, Vol.19	Firm and industry determinants of executive perceptions of the environment
Q23	My organisation has the competence to address most situations 1 – Strongly Agree to 5 – Strongly Disagree	Slovic, 1985 Science, Vol.236 Sutcliffe and Huber, 1998 Strategic Management Journal, Vol.19	Perception of Risk – characterisation and evaluation of hazardous activities and technologies Firm and industry determinants of executive perceptions of the environment
Q25	My organisation manages most situations instead of situations managing it 1 – Strongly Agree to 5 – Strongly Disagree	Sutcliffe and Huber, 1998 Strategic Management Journal, Vol.19	Firm and industry determinants of executive perceptions of the environment

Table A2.4: Indicators of 'Perceived Organisational Risk Culture'

#	Question	Adapted from	Source / Context
Q31	My top management does not sponsor risk-takers 5 – Strongly Agree to 1 – Strongly Disagree	Kuratko, Montagno and Hornsby (1990)	Management support for intrapreneurship
Q32	Individual risk-takers are often recognised whether eventually successful or not 1 – Strongly Agree to 5 – Strongly Disagree	Ditto	Ditto
Q33	Encouragement for calculated risks 1 – Strongly Agree to 5 – Strongly Disagree	Ditto	Ditto
Q34	"Risk-taker" is considered a positive attribute 1 – Strongly Agree to 5 – Strongly Disagree	Ditto	Ditto

Table A2.5: Indicators of 'Perceived CEO's Risk Behaviour'

#	Question	Adapted from	Source / Context
Q36	Please rate the following statement: "My CEO has a rich entrepreneurial spirit." 1 – Strongly Agree to 5 – Strongly Disagree	Tsui et al. The Leadership Quarterly, Vol.17, 2006	Relationship between Organisational Culture and CEO's leadership behaviours
Q37	Please rate the following statement: "My CEO is not willing to take risks." 5 – Strongly Agree to 1 – Strongly Disagree	Lewin and Stephens (1994) Tsui et al. (2006)	CEO attitudes as a determinants of organisation design Relationship between Organisational Culture and CEO's leadership behaviours
Q41	Please rate the following statement: "My CEO is not bold with innovation." 5 – Strongly Agree to 1 – Strongly Disagree	Tsui et al. (2006)	Relationship between Organisational Culture and CEO's leadership behaviours
Q42	Please rate the following statement: "My CEO is not a very creative person." 5 – Strongly Agree to 1 – Strongly Disagree	Tsui et al. (2006)	Relationship between Organisational Culture and CEO's leadership behaviours
Q43	Please rate the following statement: "My CEO is very willing to try new projects and ideas." 1 – Strongly Agree to 5 – Strongly Disagree	Tsui et al. 2006 Hornsby et al. (2002)	Relationship between Organisational Culture and CEO's leadership behaviours Perception of the internal environment for corporate entrepreneurship

Table A2.6: Indicators of 'Perceived Organisational Support'

#	Question/Indicator	Adapted from	Source / Context
Q10	<p>Please rate the following statement: "My organisation cares about my opinions and ideas."</p> <p>1 – Strongly Agree to 5 – Strongly Disagree</p>	<p>Eisenberger et al JAP, Vol.71, Nr.3, 1986</p> <p>Rhoades, Eisenberger and Armeli JAP, Vol.86, Nr.5, 2001</p>	<p>Perceived Organisational Support</p> <p>Contributions of Perceived Organisational Support</p>
Q11	<p>Please rate the following statement: "My organisation takes into account the impact that decision-making may have on my personal situation – bonus, salary, promotions, etc."</p> <p>1 – Strongly Agree to 5 – Strongly Disagree</p>	Ditto	Ditto
Q12	<p>Please rate the following statement: "My organisation shows very little concern for me."</p> <p>5 – Strongly Agree to 1 – Strongly Disagree</p>	Ditto	Ditto
Q13	<p>Please rate the following statement: "My organisation strongly considers my goals and values."</p> <p>1 – Strongly Agree to 5 – Strongly Disagree</p>	Ditto	Ditto

A2.2 Final Version of the Questionnaire

1. QUESTIONNAIRE - INSTRUCTIONS/INFORMATION

- 1) This questionnaire should not take more than 15 to 20 minutes of your time.
- 2) Your answers are confidential. Since you are replying through a website link there is no way, nor any interest, to track you.
- 3) Your answers will not be analysed individually. Instead they will be analysed collectively. The purpose of this questionnaire is to test a model in the context of research for a doctorate project.
- 4) Most of the questions require an answer, since an incomplete questionnaire would not be useful - it would not be possible to find relationships and, consequently, would not be possible to test the model.
- 5) When replying please situate yourself in the context of your business unit or affiliate or firm as you deem applicable.

Thank you very much for your help.

Should you have any questions and or should you want to receive an executive summary with the conclusions of the study please send an email to nunoamcorreia@hotmail.com

2. PART I of Questionnaire

1. Demographics
Age

2. Demographics
Sex

***3. Education**
Highest grade completed

***4. Experience**

Number of years in current position	<input type="text"/>
Number of years in current firm	<input type="text"/>
Number of years in current industry	<input type="text"/>
Number of years of total work experience	<input type="text"/>
Number of years in other management positions, whether in your current firm or not	<input type="text"/>

***5. Experience**
In what functional area of the business have you spent most of your career?

***6. Current Position in your Organisation**
What is your current position in your organisation

***7. Current Position in your Organisation**
How many hierarchical levels separate you from your CEO?

3. PART II of Questionnaire					
*1. of Part II					
	Significant Opportunities	Opportunities	Neutral	Threats	Significant Threats
How would you characterise in terms of the risks involved to your organisation most of the strategic decisions it faces?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
*2. of Part II					
	High potential for gains	Potential for gains	Neutral	Potential for losses	High potential for losses
How would you characterise in terms of the risks involved to your organisation most of the strategic decisions it faces?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
*3. of Part II					
	Very positive situations	Positive situations	Neutral	Negative situations	Very negative situations
How would you characterise in terms of the risks involved to your organisation most of the strategic decisions it faces?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
*4. of Part II					
	Very likely	Likely	Neutral	Unlikely	Very unlikely
In your opinion what is the likelihood of your organisation succeeding when making most of its strategic decisions?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
*5. of Part II					
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Please rate the following statement: "There is great uncertainty when predicting how well my organisation will do when making strategic decisions."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
*6. of Part II					
In the context of strategic decision-making by your organisation, please rate the following statements, which concern the risks you perceive that you may incur when you participate in said decision-making processes:					
	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
"The overall risk I personally face from my participation in strategic decision-making is low."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
"I stand to lose a lot financially – bonus, stock, promotions, losing my job – as a result of my participation in strategic decision-making."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
"There is a lot of uncertainty when predicting how good/bad to me outcomes resulting from my participation in strategic decision-making will be."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
"The likelihood that my participation in strategic decision-making brings me significant losses is low."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

***7. of Part II**

In the context of your participation in strategic decision-making, please rate the following statements, which regard your perception of the way your organisation cares or not about the impact that strategic decision-making may have on you:

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
"My organisation cares about my opinions and ideas."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
"My organisation takes into account the impact that decision-making may have on my personal situation - bonus, salary, promotions, etc."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
"My organisation shows very little concern for me."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
"My organisation strongly considers my goals and values."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

***8. of Part II**

Please rate the following statements:

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
"An employee's work effort should depend partly on how well the organisation deals with his or her desires and concerns."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
"An employee who is treated badly by the organisation should lower his or her work effort."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
"How hard an employee works should not be affected by how well the organisation treats him or her."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
"An employee's work effort should have nothing to do with the fairness of his or her compensation."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
"The failure of the organisation to appreciate an employee's contribution should not affect how hard he or she works."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

***9. of Part II**

According to your work experience and in the context of strategic decision-making, please rate the following statements related to the outcomes of strategic decisions that you have experienced and or witnessed in your current and or past organisation(s):

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
"Most of the strategic decisions made were correctly analysed by the decision-makers in charge."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
"Most of the strategic decisions made were successful."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
"Some of the strategic decisions made led to significantly bad outcomes."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

***10. of Part II**

In the context of the strategic decisions faced by your organisation and the level of control it has or not over the outcomes of the decisions it makes, how strongly do you agree or disagree with the following statements?

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Resources are available to resolve most situations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation has the competence to address most situations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Most situations cannot be controlled	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation manages most situations instead of situations managing it	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation responses are constrained largely by the actions of other organisations, groups or individuals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

***11. of Part II**

Please rate the following statements, which intend to measure the way you generally perceive the encouragement and support provided to you by your organisation in respect to risk-taking related to strategic decision-making:

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
"My organisation does not encourage me to take risks in the context of my job."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
"My organisation provides me with decision-making power."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
"My Senior Management encourages lower level management to bending rules."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
"My Top Management is known by fostering innovation."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
"My Top Management does not sponsor risk-takers."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
"In my organisation individual risk-takers are often recognised whether successful or not."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
"In my organisation there is encouragement for calculated risk-taking."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
"In my organisation 'Risk-taker' is considered a positive attribute."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
"In my organisation small and experimental projects are supported."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

***12. of Part II**

Please rate the following statements, which are related to the way you may perceive the risk behaviour of your CEO:

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
"My CEO has a rich entrepreneurial spirit."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
"My CEO is not willing to take risks."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
"My CEO is very tolerant to conditions not predictable or uncertain."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
"My CEO promotes calculated risk-taking."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
"My CEO delegates risk-taking authority to his officers and takes responsibility for the decisions they make."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
"My CEO is not bold with Innovation."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
"My CEO is not a very creative person."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
"My CEO is very willing to try new projects and ideas."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

ANNEX 3. COMPLEMENT OF THE ANALYSIS OF THE RESULTS OF THE DATA COLLECTED THROUGH THE FINAL QUESTIONNAIRE

A3.1 Constructs' Statistics

The scales that measure the constructs in this study are ordinal. We use a robust maximum likelihood estimator and work with polychoric correlations. Polychoric correlations are calculated using a continuous distribution, which is subjacent to the distribution of the ordinal indicators. Skewness and kurtosis have been calculated considering the scales as continuous to give some sensitivity to the author and are left in the study for information purposes.

Table A3.1: Construct 'Illusion of Control' – Statistics

Cronbach's $\alpha = 0.883$

Item	Mean	Corrected Item-Total Correlation	Range	Skewness	Kurtosis	Cronbach's Alpha if Item Deleted
Q22	2.449	0.758	1 - 5	0.716	-0.077	0.850
Q23	2.292	0.836	1 - 5	1.128	0.928	0.775
Q25	2.491	0.736	1 - 5	0.981	0.569	0.869

Table A3.2: Construct 'Outcome Experience' - Statistics

Cronbach's $\alpha = 0.824$

Item	Mean	Corrected Item-Total Correlation	Range	Skewness	Kurtosis	Cronbach's Alpha if Item Deleted
Q19	2.412	0.720	1 - 5	0.922	0.369	0.716
Q20	2.430	0.724	1 - 5	0.874	0.042	0.724
Q21	2.750	0.610	1 - 5	0.550	-0.197	0.830

Table A3.3: Construct 'Perceived Risk of Decision Subjects' - Statistics

Cronbach's $\alpha = 0.802$

Item	Mean	Corrected Item-Total Correlation	Range	Skewness	Kurtosis	Cronbach's Alpha if Item Deleted
Q1	2.181	0.718	1 - 5	1.079	1.002	0.699
Q2	2.120	0.622	1 - 5	1.288	1.859	0.750
Q3	2.361	0.567	1 - 5	0.647	0.196	0.776
Q4	2.074	0.581	1 - 5	0.361	0.346	0.773

Table A3.4: Construct 'Perceived Organisational Risk Culture' - Statistics

Cronbach's $\alpha = 0.800$

Item	Mean	Corrected Item-Total Correlation	Range	Skewness	Kurtosis	Cronbach's Alpha if Item Deleted
Q31	2.537	0.573	1 - 5	0.368	-0.571	0.771
Q32	3.106	0.531	1 - 5	0.066	-0.910	0.789
Q33	2.449	0.630	1 - 5	0.818	0.102	0.742
Q34	2.833	0.728	1 - 5	0.203	-0.567	0.693

Table A3.5: Construct 'Perceived CEO's Risk Behaviour' - Statistics

Cronbach's $\alpha = 0.874$

Item	Mean	Corrected Item-Total Correlation	Range	Skewness	Kurtosis	Cronbach's Alpha if Item Deleted
Q36	2.185	0.722	1 - 5	0.871	0.489	0.848
Q37	2.579	0.685	1 - 5	0.373	-0.745	0.861
Q41	2.602	0.681	1 - 5	0.427	-0.656	0.843
Q42	2.491	0.699	1 - 5	0.634	-0.170	0.837
Q43	2.449	0.739	1 - 5	0.740	0.151	0.847

Table A3.6: Construct 'Perceived Organisational Support' - Statistics

Cronbach's $\alpha = 0.833$

Item	Mean	Corrected Item-Total Correlation	Range	Skewness	Kurtosis	Cronbach's Alpha if Item Deleted
Q10	2.0833	0.746	1 - 5	0.973	1.512	0.789
Q11	2.810	0.585	1 - 5	0.100	-0.560	0.813
Q12	2.389	0.659	1 - 5	0.509	0.009	0.792
Q13	2.644	0.735	1 - 5	0.284	-0.208	0.762

A3.2 CFA and SEM – Information Complement

CFA

Table A3.7: CFA – One-factor Model – 23 indicators – Standardised Loadings and *t*-values

Error	Indicator	Loadings on constructs (standardised)	<i>t</i> -value	Construct
0.85	Q22	0.39	5.59***	One-Factor Model
0.74	Q23	0.51	7.28***	
0.69	Q25	0.55	8.57***	
0.74	Q19	0.51	6.73***	
0.81	Q20	0.44	5.33***	
0.94	Q21	0.25	3.67***	
0.85	Q01	0.38	4.72***	
0.87	Q02	0.36	4.09***	
0.88	Q03	0.34	4.31***	
0.81	Q04	0.43	5.69***	
0.40	Q36	0.77	18.26***	
0.56	Q37	0.66	13.59***	
0.49	Q41	0.72	15.50***	
0.47	Q42	0.72	16.70***	
0.44	Q43	0.75	17.87***	
0.59	Q31	0.64	9.23***	
0.71	Q32	0.54	7.77***	
0.46	Q33	0.72	15.66***	
0.55	Q34	0.67	14.74***	
0.49	Q10	0.71	16.38***	
0.70	Q11	0.54	9.30***	
0.54	Q12	0.68	13.76***	
0.50	Q13	0.71	15.49***	

*** $p < 0.001$

Table A3.8: CFA – Two-factor Model – 23 indicators – Standardised Loadings and *t*-values

Error	Indicator	Loadings on constructs (standardised)	<i>t</i> -value	Construct
0.42	Q22	0.76	18.30***	Individual Managers and Decision Subjects
0.25	Q23	0.87	22.26***	
0.33	Q25	0.82	17.41***	
0.51	Q19	0.70	12.24***	
0.62	Q20	0.62	8.87***	
0.76	Q21	0.48	7.94***	
0.74	Q01	0.51	7.23***	
0.82	Q02	0.42	4.74***	
0.76	Q03	0.49	6.52***	
0.71	Q04	0.53	7.55***	
0.37	Q36	0.79	17.87***	Organisational Context
0.48	Q37	0.72	16.75***	
0.43	Q41	0.75	17.33***	
0.40	Q42	0.78	20.92***	
0.36	Q43	0.80	21.50***	
0.54	Q31	0.68	10.31***	
0.71	Q32	0.54	7.76***	
0.45	Q33	0.74	16.71***	
0.53	Q34	0.68	15.28***	
0.52	Q10	0.69	14.47***	
0.73	Q11	0.52	8.64***	
0.59	Q12	0.64	12.15***	
0.52	Q13	0.69	14.11***	

*** $p < 0.001$

SEM

Table A3.9: Fit of the Structural Sub-model 1

Fit Measures	Sub-model 1
SB χ^2 scaled	47.923
df	32
SB χ^2 scaled/df	1.498
CFI	0.992
GFI	0.901
RMSEA	0.130
SRMR	0.055

Table A3.10: Fit of the Structural Sub-model 2

Fit Measures	Sub-model 2
SB χ^2 scaled	79.875
df	32
SB χ^2 scaled/df	2.496
CFI	0.996
GFI	0.907
RMSEA	0.082
SRMR	0.051

Table A3.11: Fit of the Structural Overall Model

Fit Measures	Overall Model
SB χ^2 scaled	292.870
df	220
SB χ^2 scaled/df	1.331
CFI	0.990
GFI	0.819
RMSEA	0.098
SRMR	0.068

MODERATION

Table A3.12: Moderator Effects of the Socio-demographic Variables Retained

Prospective Moderator	χ^2 for baseline model	χ^2 of model with constraints^a	$\Delta\chi^2$	Conclusion on Invariance	Conclusion for the Study
Tenure in Position	1026.26	1035.26	8.999	Invariance not rejected	Not a moderator
Tenure in Firm	736.94	751.96	15.024	Invariance not rejected	Not a moderator
Tenure in Industry	758.83	763.22	4.388	Invariance not rejected	Not a moderator
Hierarchical Level	1206.93	1228.70	21.762**	<u>Invariance rejected</u>	<u>Moderator</u>

^a Constraints of models being compared – each relationship between each pair of latent variables is equalised for both groups $\Delta df=9$ ** $p<0.01$

MEDIATION

Table A3.13: Mediation Models – Mediation role of the Construct 'Illusion of Control'

Fit Measures	Model with Partial Mediation	Model with Full Mediation
$SB\chi^2$	47.923	52.818
df	32	33
$SB\chi^2/df$	1.498	1.601
CFI	0.992	0.990
NFI	0.976	0.973
NNFI	0.988	0.986
GFI	0.901	0.889
SRMR	0.055	0.087
RMSEA	0.130	0.135
AIC	827.089	837.717

Table A3.14: Mediation Models – Mediation role of the Construct 'Perceived Organisational Risk Culture'

Fit Measures	Model with Partial Mediation	Model with Full Mediation
SB χ^2	79.875	87.525
df	62	63
SB χ^2 /df	1.288	1.389
CFI	0.996	0.994
NFI	0.981	0.979
NNFI	0.995	0.993
GFI	0.907	0.899
SRMR	0.051	0.062
RMSEA	0.082	0.086
AIC	1178.904	1190.269

RESIDUALS AND MODIFICATION INDICES

Table A3.15: SEM – Six-factor Model - 9 relationships among Latent Variables - Largest standardised Residuals ($\geq |2.5|$)

Pairs of Variables	Standardised Residuals
Q33 and Q32	-12.671
Q12 and Q34	-6.737
Q19 and Q25	4.120
Q36 and Q25	3.975
Q31 and Q37	3.926
Q12 and Q25	3.330
Q43 and Q13	3.228
Q11 and Q37	-2.844
Q42 and Q31	2.825
Q42 and Q21	-2.755
Q42 and Q11	-6.672

Table A3.16: SEM – Six-factor Model –9 relationships among Latent Variables – Largest Modification Indices (MI) and Expected Changes (EC)

		OE	IC	PRDS	PCRB	PORC	POS
OE	MI					1.500	
	EC					0.132	
IC	MI						0.085
	EC						0.027
PRDS	MI				2.325	2.477	0.599
	EC				0.14	0.098	0.132
PCRB	MI						
	EC						
PORC	MI		1.045	1.018			0.137
	EC		0.092	0.094			-0.033
POS	MI	6.802	1.501				
	EC	0.279	0.103				

According to Hair et al. (2006), only modification indices above 4.0 should be evaluated. In table A3.16 above, only one modification index is larger than 4. Retrospectively, it is reasonable to assume that the perceived organisational support impacts the recollection that individual managers have of their experiences related to the outcomes of strategic decision-making. However, based on relatively poor theoretical evidence the author decided not to estimate a free parameter between the outcome experience and the perceived organisational support in this study.

The author checked, however, how a new relationship would affect the model. The author found out that a new relationship between the outcome experience and the perceived organisational support would not be statistically significant and, on the other hand, would make the relationship between the perceived risk of the decision subjects and the perceived organisational support non-significant as well. It is proposed that the study of a relationship between the experience with outcomes and the perceived organisational support for risk-taking be an avenue for future research.

It is worthwhile noting that modification indices among covariance errors were not considered. Hair et al. (2006: 814) state that they *“do not recommend freeing error covariance terms because it violates the principles of good measurement.”*

ANNEX 4. METHODOLOGY

A4.1 Estimation Methods – Estimators

The different estimation methods have different estimation functions, ‘discrepancy functions’ as named by Chou and Bentler (1995), or ‘loss functions’ according to Bentler and Bonett (1980), whose purpose is to minimise the differences between the sample covariance matrix (observed covariance matrix) and the covariance matrix resulting from the application to the data of the model suggested by the researcher (reproduced covariance matrix).

As put by Satorra (1990: 371) in respect to the minimisation of the differences between matrices and estimation methods, “*different metrics for measuring ‘closeness’ will yield alternative parameter estimates*” and “*the quality of these alternative estimates can vary.*” Furthermore, different estimation methods may have as well different data distribution assumptions (Chou and Bentler, 1995; Hair et al., 2006; Salgueiro, 2012).

It is worthwhile noting that some of estimation methods become robust, or are said to be robust, when their functions are modified to deal with aspects for which the initial function was not designed to, or when evidence shows that estimation with those methods provide good or acceptable results under conditions which are not those for which the discrepancy functions were proposed. That is the case, for example, of the Robust ML and the scaled Santorra-Bentler χ^2 statistic (Bentler and Dudgeon, 1996; Chou and Bentler, 1995).

Chou and Bentler (1995) suggest that there are three estimation methods commonly used: ML, GLS and ADF. Anderson and Gerbing (1988) say that, basically, there are two estimation methods, ML and GLS. It shall be noted, however, that what Anderson and Gerbing (1988) make reference to, as GLS, is what in LISREL is referred to as WLS, or generalised weighted least squares (Salgueiro, 2012). This reconciles all the positions, since, as explained by Anderson and Gerbing (1988) and Salgueiro (2012), ULS, GLS and ADF are special cases of WLS. WLS is a family of estimation methods based on a fit function that includes a weighting matrix. Depending on the definition of the weighting matrix, the fit function will be presented as a ULS, GLS or ADF estimator.

Estimation functions are functions of the observed and reproduced matrices, and are such that they are continuous, they are a scalar, they are ≥ 0 and they are zero only when the observed and the reproduced matrices are equal (Browne, 1987; Salgueiro, 2012).

The ULS estimation method calculates the sum of the squared differences between the elements of the observed covariance matrix and the elements of the covariance matrix resulting from the imposition of certain relationships on data, and calculates the model parameters in order to minimise the sum of those squared differences (Raykov and Marcoulides, 2006). The function associated to the ULS method does not require data to have a particular distribution. Nonetheless, the ULS estimator depends on the measurement scales and is not appropriated for big samples, since it derives higher variances from the data (Salgueiro, 2012).

The GLS method is a weighting method where, like for the ULS method, the goal is to minimise the sum of the squared differences between the elements of the observed covariance matrix and the elements of the reproduced covariance matrix, except that that sum is weighted by a weight matrix (Bentler and Bonett, 1980), which is the inverse matrix of the observed covariance matrix (Salgueiro, 2012). The GLS estimation method assumes that the distribution of the data is multivariate normal (Chou and Bentler, 1995; Salgueiro, 2012).

The ML is the most used or predominant estimation method (Anderson and Gerbing, 1988; Chou and Bentler, 1995; Curran et al., 1996; Hair et al., 2006). The function to be minimised contains the observed and reproduced matrices via the logarithms of their determinants, the inverse of the reproduced matrix and the number of observed variables and free parameters. Although the ML estimator assumes that the observed variables have a multivariate normal distribution, the estimator is robust enough to deal with violations of normal distribution of a moderate nature and provide adequate estimation of free parameters (Anderson and Gerbing, 1988; Bentler and Chou, 1987; Muthén and Kaplan, 1985).

As mentioned above GLS and ML estimators require data to be multivariate normal, that is, the distribution of each variable should be normal and the joint distribution of the variables should also be normal. On the other hand, and contrarily, when the generally weighted least squares (WLS) estimator has a discrepancy function, which includes elements that counter the effects of the fourth-order product moments about the

variables' means, or kurtosis, it becomes an ADF estimator, that is, an estimator that can be used independently of the type of the distribution of the variables (Anderson and Gerbing, 1988) and, as such, is appropriate to estimate models with variables that do not evidence univariate and multivariate normality. Building on the GLS method (Kaplan, 2000), the WLS method considers the discrepancy function of GLS to be weighted by variance and by kurtosis, acknowledging that kurtosis is the main manifestation of non-normality. Kaplan (2000), however, draws the attention of his readers to the fact that those ADF estimators, which deal with non-normality, are appropriate essentially for very large samples and small models, which is a somewhat unrealistic scenario in terms of research.

All the three main estimation methods commonly used by researchers with SEM, that is, ML, GLS and WLS/ADF allow for the calculation of free parameters, namely the regression weights between latent variables, and also a χ^2 statistic (Chou and Bentler, 1995). However, estimation with the ML method is so generalised that Kline (2011) argues that researchers need to justify in their studies why they have opted for alternatives methods. Monte Carlo studies, which simulate results of estimation methods, have been providing evidence that there are pros and cons for each estimation method and that, apparently, there is not a single estimator, which is a panacea for all the estimation situations (Bentler and Dudgeon, 1996; Chou and Bentler, 1995; Curran et al., 1996; Flora and Curran, 2004; Hu et al., 1992; Lei and Lomax, 2005; Muthén and Kaplan, 1985; Olsson et al., 2000; Tomarken and Waller, 2005). Typically, those Monte Carlo studies address the results of estimation methods according to sample size and variables' distributions (e.g. Hu et al., 1992; Lei and Lomax, 2005), but can also address the effects of models' misspecifications (e.g. Olsson et al., 2000), and type of variables used (e.g. Flora and Curran, 2004; Muthén and Kaplan, 1985). Before going further, it is worth noting that most of the Monte Carlo studies that the author had access to, consider small models with no more than 10 to 15 indicators and two, sometimes three latent variables, which in the opinion of the author of this study leaves room for doubts in terms of the generalisations of the findings, considering that many studies, including this one, may have easily 25, 30 or more indicators.

Research on estimators do not provide a clear recipe for the practical situations faced by researchers in the domain of the social sciences, where, depending on the

topic, samples' sizes and number of observed variables may vary substantially, where variables may, or may not, be normal and when they are nonnormal may have levels of skewness and kurtosis that differ significantly from one variable to another, where researchers do not know, because that is part of the research, if the models that they propose are misspecified or not, and where categorical variables, which are often used may, or may not, be seen as continuous. However, there are main trends that can be drawn from the studies available, some of which have been mentioned above. Estimators based on normal distribution, ML and GLS, are said to be robust for some deviations from normality, except for severe deviations. Muthén and Kaplan (1985), with a sample size of $N=1000$, found that ML and GLS estimation methods provide unbiased estimation of parameters and mild to moderate downwards bias for the values estimated for standard errors when for most of the variables involved univariate skewness and kurtosis are in the range -1 to $+1$. As for the χ^2 statistic, Muthén and Kaplan (1985) found values too large if variables were simultaneously severely skewed and kurtotic, but no distortion if variables were kurtotic only. Boomsma (1983) and Boomsma and Hoogland (2001) confirm that ML and GLS estimators, on the one hand, provide unbiased parameters' values, and that, on the other hand, standard errors and χ^2 statistic estimations are biased, downwards and upwards, respectively, for small sample sizes with variables which are not univariate normal. It shall be noted that Boomsma (1983) worked with a sample size of $N=400$ while Boomsma and Hoogland (2001) worked with sample sizes with $N \geq 200$. Since the χ^2 is one of the most common statistics used to assess model fit, the estimation of models' parameters with ML or GLS methods with small samples with moderate and severe nonnormality may lead to an over rejection of models (Curran et al., 1996).

A way to prevent the χ^2 statistic and the standard errors to be impacted by nonnormality is to adjust the discrepancy, or fit function, of the estimation method for the nonnormality conditions, namely kurtosis (Chou and Bentler, 1995; Satorra, 1990). In practice the statistic that is called as χ^2 is the product of the fit function by $(N-1)$, where N is the sample size and the statistic is named a T statistic. That product is a statistic that for variables with univariate and multivariate normal distributions has a chi-square distribution. When the variables have distributions that are non-normal, the T statistic does not have anymore a chi-square distribution. If the T statistic is multiplied by a constant, which accounts for the deviation from normality, the T statistic becomes

scaled. The T statistic obtained with the ML estimation method, when corrected for nonnormality is said to be Satorra-Bentler scaled (Chou and Bentler, 1995). ADF estimators or WLS, as named in LISREL, although developed to work with nonnormal data may behave poorly if samples are of a small or moderate size (Satorra and Bentler, 2001). For example, Chou and Bentler (1995) in a study with samples with 200 observations, 6 observed variables loading in 2 factors, each factor with 3 variables, and 13 distributions showing different levels of nonnormality, with only one presenting multivariate normality, conclude that ML, GLS and the scaled test statistic of Satorra-Bentler provide better results for samples of $N=200$ and small models, where data has nonnormal distributions. Satorra (1990) as well suggests that ADF estimation methodology is not robust enough to deal with small and moderate size samples. However, Satorra (1990) does not qualify what he means by a small, or moderate, sample. Curran et al. (1996), who studied several estimators for a single sample size of $N=500$ conclude that ADF estimators work well for that sample size under conditions of nonnormality, while Muthén and Kaplan get to the same conclusion in a study where they used a single sample size of $N=1000$. However, Curran et al. (1996) suggest that ADF estimators are not appropriate for complex models. In their turn Boomsma and Hoogland (2001), in a study involving different sizes of samples, different levels of nonnormality and different estimators, say that ADF methods require very large sample sizes, such as $N>1600$, to provide unbiased parameters estimates. Hu et al. (1992) found that ADF estimators do not work well with sample sizes smaller than $N=2500$ and that they work fine, and are reliable, when samples are equal to $N=5000$. Besides sample size, levels of nonnormality and type of estimators, model specification play a role as well (Olsson et al., 2000). These authors (Olsson et al., 2000) designed a study with 11 distributions, mainly changes in kurtosis, 3 conditions of model misspecification and 5 different samples' sizes to study the estimation behaviour of 3 estimators: ML, GLS and WLS/ADF. The ADF estimator requires sample sizes of $N=2000$ and high kurtosis in order to provide better estimations than its competitors, but it does not behave well in the presence of model misspecification. Olsson et al. (2000) suggest that the better fit provided by the WLS estimator for large sample sizes and large kurtosis, may be a trade-off for lower accuracy in terms of parameters' estimates. Besides their apparent superiority for severe nonnormal large size samples, according to a large number of authors, ADF estimators are robust against heteroskedasticity of errors while other estimation methods, namely ML and GLS, are not (Satorra, 1990). In studies involving

latent variables and indicators with medium to high correlations, in domains where, in spite of discriminant validity, variables are dimensions of something more general, it could happen that errors of variables are correlated with their effects, that is, the variance of the error of a variable depends on the strength of the effect of that variable, a phenomenon known as heteroskedasticity. Unfortunately, most of the studies for which samples are small, and variables are nonnormal, are also those that are made in domains where dimensions of broader phenomena are present, and studied, and where errors are sometimes correlated to variables, thus precluding researchers from taking advantage of this feature of ADF estimators.

Bentler and Chou (1987) draw the attention of their readers to the fact that ML and GLS estimators perform well even under nonnormal distributions, except for the χ^2 and standard errors estimations. Since ADF estimators work well only for large size samples, and that ML and GLS estimators overestimate the χ^2 statistic leading to an over rejection of models in case of nonnormality and small and moderate sample sizes, researchers looked for alternative methods to address the specific cases of SEM with nonnormal, small or moderate size samples, which, in the domain of the social sciences, might be the rule rather than the exception. One of these methods is the robust ML and the statistic Satorra-Bentler scaled χ^2 . The ML estimation method, like other estimation methods, provides a tool for model fit via the fit function. The minimum of the fit function multiplied by N-1, where N is the sample size, has a chi-square distribution. If data do not have a normal distribution, then the product of the fit function by N-1 will not have anymore a chi-square distribution, and the estimate of the χ^2 will be overstated, leading researchers to reject models that may be well specified (Curran et al., 1996). However, Raykov and Marcoulides (2006) suggest that the statistics obtained by the ML estimation method may be corrected if data are nonnormal, provided, however, that the data does not pile at one of the extremes, that is, provided that the data are not censored (Muthén and Kaplan, 1985). The corrected statistics, known as robust ML (Raykov and Marcoulides, 2006), aims at modifying the original statistics resulting from the application of the ML method in order to have the resulting statistics with a chi-square distribution, and consists in a correction of the χ^2_{ML} statistic according to the level of kurtosis, by the multiplication of the inverse of a certain scalar. In the words of Chou and Bentler (1995: 46) the scaling constant, *“conceptually, is a product of two matrices containing fourth-order moment information used to compute kurtosis; it*

represents the deviation of the distribution of the data from the normal distribution.” That scalar “*is a function of the model implied residual weight matrix, the observed multivariate kurtosis, and the model degrees of freedom*” (Curran et al., 1996: 18). The higher the kurtosis the bigger the χ^2_{ML} and the more the correcting or scaling factor will counter-balance that increase (Chou and Bentler, 1995; Curran et al., 1996). The χ^2_{ML} divided by a certain scalar K, or multiplied by its inverse K^{-1} , gives the corrected or scaled χ^2_{ML} , also known as the SB (Satorra-Bentler) scaled χ^2 (Curran et al., 1996). It is worth noting that the correction principle mentioned here above may apply as well to other estimation methods, and that the correction factor is naturally 1 in case the data distribution is multivariate normal (Chou and Bentler, 1995; Hu et al., 1992).

A4.2 Fit Measures

Absolute Fit Measures. Absolute fit measures are absolute in that they compare how the model proposed by the researcher fits into the raw data. The covariance terms in the implied matrix²⁹ are compared to the covariance terms of the matrix of the raw data. Among the absolute fit measures, the most used are the χ^2 statistic, the Goodness-of-Fit index (GFI), the Root Mean Square Residual (RMSR), or Standardised Root Mean Residual (SRMR), and the Root Mean Square Error of Approximation (RMSEA). Hair et al. (2006) call RMSR, or SRMR, and RMSEA as measures of badness-of-fit, and recommend that one of the three measures be reported.

Incremental Fit Measures. When fit is assessed taking into account the comparison of a model proposed by a researcher and the null model, or any other model that serves as a baseline (Hair et al., 2006), such fit measures are said to be incremental. The null model assumes that the observed variables are not correlated (Hair et al., 2006). The null model is assumed as a benchmark for bad fit, against which the fit of the model proposed by the researcher is going to be compared (Salgueiro, 2012). The most used indices of incremental fit are the Comparative Fit Index (CFI), the Normed Fit Index (NFI), and the Tucker Lewis Index (TLI). Other incremental fit indices are Relative Fit Index (RFI), and the Incremented Fit Index (IFI).

²⁹ Matrix that results from the constraints (free parameters or relationships) imposed on the data by the researcher.

Parsimony Fit Measures. Sometimes researchers wish to compare competing models, including nested models, that is, models that are subsets of the overall model, where less free parameters, or relationships, are established. The basic Parsimony Index (PI) results from the ratio between the χ^2 statistic and the degrees of freedom (df). Basically, all the other indices result from similar approaches. The Adjusted Goodness-of-Fit Index (AGFI) results from adjusting the GFI in respect to the degrees of freedom. Other indices are the Parsimonious Normed Fit Index (PNFI) and the Parsimonious Goodness-of-Fit Index (PGFI). Another parsimony index is the Akaike Information Criterion (AIC), which compares models with different numbers of free parameters.

A4.3 Constructs' Properties

Unidimensionality. Unidimensionality means that each indicator, which is part of a set of indicators measuring a concept, or construct, measures that single concept, or construct, only, and nothing else (Anderson and Gerbing, 1982; Gerbing and Anderson, 1988). Furthermore, correlations among indicators should be relatively high, without items correlating very much, and items correlating very little (Hair et al., 2006). Although saying that composite reliability is neither a necessary, nor a sufficient condition, for unidimensionality, Anderson and Gerbing (1982) argue that low composite reliability is a symptom of lack of internal consistency, which is one of the conditions for unidimensional measurement. Anderson and Gerbing (1982) further argue that external consistency, which results from discrimination between constructs, is a second condition to assess unidimensionality.

In order to assess unidimensionality, whenever doubts subsisted if two constructs were different or not, that is, whenever the author had doubts in terms of external consistency, or discriminant validity, the author decided to compare a model made up by the two constructs being examined, measured by their respective indicators, with a model made up by a single construct (unifactorial), measured by all the indicators of the two constructs under analysis, and assess and compare data fit of the two models. Furthermore, the analysis of unidimensionality mentioned above shall be complemented by the comparison between a model, which considers all the indicators of all the constructs retained in this study as loading into a single factor, and a model where all the constructs retained are measured by their respective indicators, or observed variables, in order to assess external consistency of the whole measurement model (Gerbing and Anderson, 1988). Drawing on the work of Gerbing and Anderson (1988),

CFA will be used to assess construct unidimensionality, and such assessment shall be made by the calculation and analysis of composite reliability (internal consistency) for each construct, by the calculation of the average variance extracted for each construct, and by the comparison of data fit between unidimensional and bi-dimensional or multidimensional models (external consistency).

Reliability. Reliability relates to how a construct is measured, while validity relates to what is measured (Hair et al., 2006). Peter (1979) says that reliability is a necessary condition for the validity of a measurement, and Cronbach (1951: 297) adds that *“even those investigators who regard reliability as a pale shadow of the more vital mater of validity cannot avoid considering the reliability of their measures.”* Cronbach (1947) suggests that reliability, and precision, are the same concept, and that reliability could be measured by the error variance of repeated measurements, in which case reliability would equate to consistency of measurement (Field, 2005; Hair et al., 2006). In a later study, Cronbach (1951) insists on the accuracy aspect of measurement, and defines reliability as measurement accuracy. Peter (1979: 6) defines reliability *“as the degree to which measures are free from error and therefore yield consistent results.”* Cortina (1993: 98) quotes the definition of reliability of Nunnally (1967) *“the extent to which [measurements] are repeatable and that any random influence which tends to make measurements different from occasion to occasion is a source of measurement error”*, to add that there are several ways to estimate reliability, and that each way *“depends on the particular error-producing factors that one seeks to identify”* (pg. 98).

Cortina (1993) suggests that when a researcher is interested by the effects of time, test-retest techniques, that is, testing the same sample with the same instrument at two different points in time, or multiple and simultaneous applications of the same test to different samples, are adequate for the purpose, while the coefficient alpha, typically referred to as the Cronbach's alpha, should be used when researchers are interested in errors associated with the indicators used to measure the constructs, or latent variables. It is worthwhile noting that, in the case of this research project, prior to the pre-test of the initial questionnaire, and with the results of the matching between indicators and constructs resulting from the evaluation of a panel of four judges, the questionnaire to be pre-tested was readjusted in terms of items wording. The questionnaire was then presented to four other managers and, once answered, resent to those same managers roughly three weeks after in order to test for test-retest reliability (Field, 2005). The

average time spent by the managers making up the panel to reply to the questionnaire was 12 minutes, and there were no significant differences between the responses provided the first and the second times.

Peter (1979) argues that in spite of the fact that measurements of behaviour are never, or seldom, reliable and valid, scientific work requires reliability, and validity, to be assessed. Bagozzi and Yi (1988) suggest that three types of reliability are assessed: indicators' reliability, reliability of the latent variable, or composite reliability, and the average variance extracted. In this study, constructs' reliabilities are assessed with the coefficient alpha (Cronbach's alpha) proposed by Cronbach (1951), using SPSS17, and composite reliability (CR) and average variance extracted (AVE) with measures proposed by Fornell and Larcker (1981), and recommended by Bagozzi and Yi (1988) and Hair et al. (2006), using data provided by LISREL8.80.

The Composite Reliability (CR) of a construct η is given by (Fornell and Larcker, 1981):

$$CR_{\eta} = \frac{(\sum_{i=1}^p \lambda_{yi})^2}{(\sum_{i=1}^p \lambda_{yi})^2 + \sum_{i=1}^p Var(\epsilon_i)} \quad (1)$$

Where CR_{η} is the composite reliability of construct η
 λ_{yi} is the loading of indicator i on construct η
 $Var(\epsilon_i)$ is the variance of the error associated to the measure of i

Hair et al. (2006) recommend that $CR \geq 0.7$, while Bagozzi and Yi (1988) recommend CR to be ≥ 0.6 . These last authors suggest that $0.6 < CR < 0.7$ is acceptable provided, however, that other reliability measures of the construct are good.

As for the Average Variance Extracted (AVE) of a construct η , AVE is given by (Fornell and Larcker, 1981):

$$AVE_{\eta} = \frac{\sum_{i=1}^p \lambda_{yi}^2}{\sum_{i=1}^p \lambda_{yi}^2 + \sum_{i=1}^p Var(\epsilon_i)} \quad (2)$$

Where AVE_{η} is the composite reliability of construct η

λ_{yi} is the loading of indicator i on construct η

$Var(\epsilon_i)$ is the variance of the error associated to the measure of i

Bagozzi and Yi (1988) suggest that AVE should be ≥ 0.5 .

Validity. “Construct validity is the extent to which an observation measures the concept it is intended to measure” (Bagozzi and Phillips, 1982: 468). Peter (1981) presents a definition of construct validity similar to that of Bagozzi and Phillips (1982), but stresses that construct validation is concerned with, besides the measurement tool, the whole measurement process, and generalisation. Hair et al. (2006) emphasize as well the association between construct validity and generalisation. Cronbach and Meehl (1955: 300), however, note that “constructs employed at different stages of research vary in definiteness”, which makes Peter (1981) emphasize the role of theory in construct validation. Peter (1981) goes further to suggest that construct validity is the adequacy of measurement behaviour to theory prediction, while Clark and Watson (1995), stressing the importance of theory, argue that theory says what a construct is and what it is not. Clark and Watson (1995), drawing from the work of Cronbach and Meehl (1955), suggest that construct validity is achieved by

- i) Defining theoretical concepts and their relationships;
- ii) Measuring those theoretical concepts or constructs; and
- iii) Testing the relationships between constructs and their indicators, or observable measures.

Clark and Watson (1995) suggest that this broad definition of construct validity is what Cronbach and Meehl (1955) mean by nomological net or network. Cronbach and Meehl (1955) argue that a construct needs to be part of a nomological network and needs to have observable indicators in order to have scientific value. Furthermore, theoretical relations should relate indicators among them, should justify the relationships between a construct and its indicators, and should support relationships among constructs.

It is relatively unanimous (e.g. Hair et al., 2006) that on top of construct's internal consistency, that is, unidimensionality and reliability (Venkatraman and Grant, 1986) researchers shall look for construct's content or face validity, convergent validity, discriminant validity and nomological validity.

Convergent Validity. Bagozzi and Phillips (1982), and Hair et al. (2006), define convergent validity as the extent to which two measures of a given construct are

correlated. Shook et al. (2004) suggest that the measurement model of a construct provides evidence of convergent, and also of discriminant validity, if factor loadings are significant and ≥ 0.7 and fit indices are ≥ 0.9 . Bagozzi et al. (1991) suggest that when the loadings λ_i of each indicator are significant, this provides evidence of the achievement of convergent validity. Hair et al. (2006) agree, although they recommend that λ_i are ≥ 0.5 , or, preferentially, ≥ 0.7 . Hair et al. (2006) suggest the evaluation of convergent validity by calculating the average percentage of variance extracted (VE). Furthermore, Hair et al. (2006), and Shook et al. (2004), suggest that $VE \geq 0.5$ is an indication of adequate convergence.

Hair et al. (2006) define VE as

$$VE_{\eta} = \frac{\sum_{i=1}^n \lambda_i^2}{n} \quad (3)$$

Where λ_i^2 are the standardized factor loadings for the construct η
 n is the number of indicators of the construct η

In this study, the approach adopted is to check for factor loading values and statistical significance, including t-values, to calculate the average percentage of variance extracted and to check fit indices.

Discriminant Validity. “*Discriminant validity is the degree to which measures of distinct concepts differ*” (Bagozzi and Phillips, 1982: 468) or, in the words of Hair et al. (2006: 778), “*the extent to which a construct is truly distinct from other constructs.*” A construct has discriminant validity when it is not a mere replication or derivation of another latent variable (Churchill, 1979). Bagozzi et al. (1991) propose that constructs denote discriminant validity, when correlation between them diverges significantly from 1.00, at a given significance level, typically 0.05 for the social sciences, herein including management science (Field, 2005).

Several authors (e.g. Anderson, 1987; Bagozzi and Phillips, 1982; Hair et al., 2006; Shook et al., 2004) suggest the appraisal of discriminant validity by testing “*whether a confirmatory factor analysis model representing two measures with two factors fits the data significantly better than a one-factor model*” (Shook et al., 2004: 400). However, a better method (Hair et al., 2006) to assess discriminant validity, is to compare the

average percentages of variances extracted of two constructs, with the variance or squared correlation between those constructs (Fornell and Larcker, 1981; Shook et al., 2004).

The approach retained in this study is to assess discriminant validity by comparing the average percentages of variances extracted of two constructs, with the squared correlation between those constructs. However, in case of doubts raised by theory considerations, two-factor and one-factor models will be compared to assess data fit.

Nomological Validity. *“Nomological validity determines whether the scale demonstrates the relationships shown to exist based on theory or prior research”* (Hair et al., 2006: 138). Nomological validity can be defined as the overall soundness of a model expressing relationships between indicators and constructs, and among constructs. In other words, nomological validity is the evidence that constructs and supporting theories are related. Nomological validity is the system of laws and relationships, where something, in this case a model, occurs (Cronbach and Meehl, 1955), or which, drawing from Clark and Watson (1995), we call an articulated story. Peter (1981: 135) says that *“nomological (lawlike) validity is based on the explicit investigation of constructs and measures in terms of formal hypotheses derived from theory”*, and further develops by saying *“nomological validation is primarily ‘external’ and entails investigating both the theoretical relationship between different constructs and the empirical relationship between measures of those different constructs.”* Anderson and Gerbing (1988), and Gerbing and Anderson (1988), suggest that SEM, including CFA, allow for comprehensive construct validity, including nomological validity. Based on the same premises, that is, based on relationships drawn from theory between observable and unobservable variables, Spreitzer (1995) tested empirically a model of psychological empowerment in the workplace, and considered that by testing and achieving good fit between the model and the data, and by confirming the hypotheses, he achieved nomological validity. Likewise, Govindarajan and Kopalle (2006) used hypotheses testing to assess nomological validity. Hair et al. (2006) argue that nomological validity results from sound and expected, that is, posited, relationships among constructs. These authors suggest that checking if the correlations among constructs make theoretical sense, tests also nomological validity.

Drawing from the work of Hair et al. (2006), Peter (1981) and Spreitzer (1995), in the context of this study, nomological validity shall be assessed through theoretical fit, model fit, and hypotheses testing.

ANNEX 5. RATIONALITY, UTILITY AND PROBABILITIES AND DECISION-MAKING THEORY

A 5.1 Rationality

The word 'rational', and the concepts behind the word, namely the normative versus the descriptive concept and realities, have created controversy and debate. A quotation from Einhorn and Hogarth (1988: 113) illustrates that well when they say "*imagine that atoms and molecules failed to follow the laws supposed to describe their behaviour. Few would call such behaviour irrational or suboptimal. However, if people violate expected utility axioms or do not revise probabilities in accord with Bayes' theorem, such behaviour is considered suboptimal and perhaps irrational. What is the difference, if any, between the two situations?*" Dictionaries define 'rational', as far as the definitions are related to the matters related to this study, as having reason, or understanding, and relating to, based on, or agreeable to reason. On the other hand, rationalism, in philosophical terms, is a line of thought that sustains that the principles of logic and mathematic cannot be contradicted. The view adopted in this study is that, while the descriptions of rational behaviour were 'merely' qualitative, there were no major sources of disagreement. Reasons for disagreement came from the axiomatisation of preferences, and maximisation of expected utility, which, according to their proponents, cannot be challenged, unless new axioms, providing a different logic, are introduced (von Neumann and Morgenstern, 1953). The axiomatisation of preferences by some authors (e.g. Marschak, 1950; Samuelson, 1952; Savage, 1972; von Neumann and Morgenstern, 1953), having put things into the realm of logic and mathematics, narrowed considerably the definition of rationality, or rational, in the context of decision-making, and in current usage (Simon 1986), leading to disputes around the meaning of rational and its opposite meaning, irrational, clearly creating a rift. Although many authors used the word 'rational', or 'rationality', rather carefully, others did not. While von Neumann and Morgenstern (1953), the chief promoters of maximisation, clearly say that 'rationality', or 'rational', or 'rational behaviour', is a way to treat mathematically human behaviour, that is, to describe behaviour with axioms, others, such as Savage (1972), seem to indicate that what they mean by rationality, or rather by irrationality, is what is challenged by Einhorn and Hogarth (1988). In spite of the early care showed by him and his colleague von Neumann, Morgenstern (1979) uses careless

language, when compared to the one used in the book he co-authored with von Neumann, *The Theory of Games and Economic Behavior*, contradicting his earlier views, when he says that Expected Utility Theory axioms, being unquestionable, make decision-makers follow them, and that if they do not, that might be because they are not able to understand the explanations. Morgenstern (1979) carries on to say that if someone, who is not fit intellectually to understand maximisation of utility is called irrational, that is a "*matter of taste*". It is understood in this study as an indication that, although Morgenstern himself may have not used the word 'irrational' to describe behaviours contrary to those predicted by maximisation of utility, he has no problems with its utilisation, which in the context goes beyond the mathematical aspects, and clearly brings the meaning of irrational to the normal usage of the word, that is, to a broader meaning (Simon, 1986). Savage (1972), speaking about himself, says that after having made choices in cases exemplified by Allais (1953), in what is known as the Allais paradox, where he contradicted canons of rationality, he reversed some of his initial preferences back to rational preferences, and that he felt that he had corrected an error made when making the initial choices. In spite of defending that preferences being subjective cannot be right or wrong, Savage (1972: 103) says that in a "*more subtle sense they can be*", that is, those who follow the canons, or the axioms, are rational, while those who do not follow them are not. Savage (1972) insists and gives an example of a buyer of a car, who having bought a car with a radio installed feels that he has made an error, because had he had already a radio he would not have paid the amount that he paid for the difference between a car with a radio installed and the same car without a radio. Savage could not have predicted the future, but, nowadays, most cars are equipped with radios and many other 'extras', whereas buyers certainly pay prices for 'extras', of which they are not aware, or do not care to be aware, that are in the cars mainly to provide value to the cars themselves. Reality, such as the evolution of the automobile industry, shows that consumers do not necessarily break down the whole in order to see the parts, which, it is argued here, contradicts Savage when he assumes that canons of rationality, as defined by him, prevail when people give themselves the time to think and behave according to those canons.

Marschak (1950, 1951) is, among the authors promoting utility maximisation, the one who is more careful in respect to the definition of rational behaviour. He states that when axioms or postulates of preferences and maximisation are consistently followed, rational behaviour is achieved. Marschak (1951: 493) says that "*people may often act*

contrary to these precepts or norms but then we say that they do not act reasonably. To discuss a set of norms of reasonable behaviour (or possibly two or more such sets, each set being consistent internally but possibly inconsistent with other set) is a problem in logic, not in psychology. It is a normative, not a descriptive, problem." In other words, drawing from Marschak (1950, 1051), it is argued in this study that acting rationally, or reasonably, being the latter term preferred, or irrationally, or unreasonably, being the latter term preferred as well, means following or not following norms of preference and maximisation, respectively, not meaning that people behave rationally or irrationally in the broader sense of the words, and not meaning as well that people make the right or the wrong decisions by following, or not following, the norms.

Simon (1986: 209) goes directly to the centre of the controversy when he argues that *"everyone agrees that people have reasons to do what they do"*, and that that aspect shall not be disputed. He says (Simon, 1986: 210) that he *"emphasizes this point of agreement at the outset – that people have reasons for what they do – because it appears that economics sometimes feels called on to defend the thesis that human beings are rational. Psychology has no quarrel at all with this thesis. If there are differences in viewpoint, they must lie in the conceptions of what constitutes rationality, not in the fact of rationality itself."*

A5.2 Utility and Probabilities

A5.2.1 Utility

Jeremy Bentham (2000³⁰: 15) defines utility as *"that property in any object, whereby it tends to produce benefit, advantage, pleasure, good, or happiness, (all this in the present case comes to the same thing) or (what comes again to the same thing) to prevent the happening of mischief, pain, evil, or unhappiness to the party whose interest is considered."* Friedman and Savage (1948: 280) refer to utility as *"some common quantitative characteristic"* that people would attribute to goods. These same authors (Friedman and Savage, 1952: 463) say as well that utility is a *"hypothetical quantity"* defined as the *"expected value of some quantity"* that results from risky choices, although they clarify and say that their utility is a function that reflects maximisation of that quantitative characteristic previously defined by them as utility, rather than the quantitative characteristic itself. Alchian (1953: 31) provides another definition of

³⁰ Original document from 1789.

utility as “*the thing – or numerical measure of the ‘thing’ – which he [any given individual] seeks to maximise.*” Utility is also seen as a numerical attribute of the alternatives to be chosen, which allows a decision-maker to have those alternatives ordered in terms of preference. Fishburn (1989b) suggests that money, probably the most common standard to measure utility, is evaluated according to the utility it provides.

In the words of Edwards (1954: 382), when making reference to and interpreting the principles of the school of thought started by Jeremy Bentham, “*the goal of action is to seek the maximum utility*”. However, the measurement of utility and the maximisation concept raise difficulties that are also observed by Edwards (1954: 382) when he says that “*assumptions about maximisation only become specific, and therefore possibly wrong, when they specify what is being maximised.*” It could be said that what is maximised is utility. However, the mathematical concept by itself is meaningless unless it is attached to something of value to someone, and it is argued in this study that that is where part of the divergences in respect to the concept of utility, utility measurement and utility maximisation lie. Bernoulli (1954: 24) defines a “*mean utility*”, which he calls as well “*moral expectation*”, as the sum of the products of the utility of each outcome by the number of ways that outcome can materialise, divided by the total number of occurrences, which by definition is a weighted mean. Ellsberg (1954: 531) calls that weighted mean “*the mathematical expectation of utility, the expected utility, the moral expectation, moral expectancy, actual value of utility and the first moment of the utility-probability distribution.*” Von Neumann and Morgenstern (1953), followed by Friedman and Savage (1948, 1952) and many others, drawing certainly from the work of Daniel Bernoulli and the philosophy of Jeremy Bentham, posit that men shall seek utility maximisation and define axioms which, they argue, define rationality in choice making.

Using an example provided by Daniel Bernoulli (1954) regarding the utility that one thousand ducats has for a poor and for a rich man, it is easy to see that if the utilities of the same outcomes were different to a same person in different conditions - poor vs. rich, for instances - so would be the moral expectations (weighted average expectations) assuming that the number of ways the outcomes occurred were the same. This aspect is important because a person evaluates outcomes subjectively and according to contexts. Even those outcomes that are perfectly measurable, such as those of a monetary nature, have, nevertheless, different utilities to a same person in different conditions. If the

utility of a given and sure sum of money can be different for the same person, depending on the context, measurement of utility becomes an issue when prospects to be chosen are uncertain and, or, include outcomes of different nature, and include factors which are independent from the decision subjects.

Realising the difficulties to measure utility as defined by Bernoulli, Bentham and others, that is, the subjective value that something has to someone, scholars, in the first half of the 20th century, have dealt with outcomes primarily in terms of preferences, that is, by ranking those preferences or, in other words, by ranking the utilities of those preferred outcomes. By the end of the first half, beginning of the second half of the 20th century, researchers began attaching probabilities of outcomes to their utilities and more than ever the measurement of utility became an issue. Ordering outcomes by preference, and assigning probabilities to outcomes, became the core aspects of certain decision theories since the 1940s such as Expected Utility Theory (Friedman and Savage, 1948; von Neumann and Morgenstern, 1953), Subjective Utility Theory (Savage, 1954) and even, to a great extent, Prospect Theory (Kahneman and Tversky, 1979). For choices without risk the decision-maker is expected to maximise utility, and for risky choices decision-makers are expected to maximise expected utility (Edwards, 1972). However, the utility, which von Neumann and Morgenstern (1953) posit shall be maximised for the sake of using rational behaviour, is not, according to some scholars (e.g. Arrow, 1951; Baumol, 1958; Ellsberg, 1954; Fishburn, 1989), the same utility that Bentham meant to, nor is, still according to those same scholars, the utility that economists in the first half of the 20th century used in consumer's theories (Stigler, 1950). The utility concept that von Neumann and Morgenstern (1953) deal with is related to the usefulness of something weighted by its probability of occurrence, while the utility of Bentham was related to pleasure or good in the outcomes in relative terms, that is, in terms of the differences.

Taking into account that for more than 60 years the approach to utility, and to decision-making, that is, the maximisation of utility presented by von Neumann and Morgenstern (1953) has been the basis for most of the subsequent studies, it shall be noted at this point in time, that there are many scholars interpreting what von Neumann and Morgenstern said about utility (e.g. Allais, 1953; Baumol, 1958; Ellsberg, 1954; Fishburn, 1989b; Samuelson, 1952), and at least one quoting extensively what they did say (Fishburn, 1989b), but, nevertheless, providing their own interpretations of what is written, thus indicating that there are divergences in respect to the purpose and

conclusions of the work of von Neumann and Morgenstern (1953). Baumol (1958: 669) says that the purpose of the utility index developed by von Neumann and Morgenstern is the "*prediction of the rankings of lottery tickets*" or, in other words, the prediction of the rankings of outcomes to which probabilities are assigned. This study adopts the approach of Baumol (1958: 665) when he says that the von Neumann and Morgenstern measure of utility "*turns out to be just an ordinal measure*", since the purpose is not to calculate differences but simply to rank preferences. Nevertheless, the approach of this study is also that the basic utility that von Neumann and Morgenstern (1953) use and transform with a certain function is the same that earlier economists, mathematicians and philosophers use, that is, the usefulness of something, the benefit that someone derives from something, and so forth. In reality utility and risk have the same problem, in conceptual terms, insofar that the concepts and their measures or characterisations are confounded with each other. In the same way variance is seen as risk and as a measure of risk, utility measurement is seen simultaneously as utility and as a measure of utility.

Expected utility, being the result of a relationship between utilities, that is, the subjective value attributed by a decision-making unit to outcomes, and numbers of occurrences, transformed into percentages and, therefore, into probabilities adding up to 1, became the core of some of the main theories of decision-making. However, divergences in respect to the measurement of utility and to the definition and measurement of probabilities, and attempts to explain differences between actual and expected behaviours in terms of decision-making and risk-taking, led to the development of other theories and explanations of decision-making and risk-taking behaviour. Measurement of utility has focused around three aspects essentially: is utility ordinal, cardinal or a psychological measure of the aspects mentioned by Bentham (2000) such as pleasure, satisfaction, good, evil, pain, etc? Apparently the answer lies in the purpose and, or, context of the utilisation of utility, and on its definition. In riskless situations, that is, in situations where choice-makers deal only with preferences by making choices among sure outcomes, utility is ordinal and no measurement is required. That is the case for example if one has to choose among one orange, one apple and one banana, if all the three fruits are equally accessible, at the same cost and effort, and one simply picks the fruit one prefers. In situations where risk is present, that is, where outcomes are not certain, utility, whether being cardinal or ordinal, becomes, however, a function of the probabilities associated to outcomes. In that case utility becomes a function and a decision-maker is said to have a utility function such that makes him

elect a certain choice or alternative, where utility is maximised, regardless of whether utility is money or anything else of value to the decision-maker. Authors, such as von Neumann and Morgenstern (1953) and Friedman and Savage (1948), argue that it does not matter if a decision-maker thinks about preferences, or not, if he assigns probabilities to outcomes, or not, if he calculates expected utilities, or not. What is important to those authors is that decision-makers do, or should do, as if they were maximising expected utility, and that their utility function represents a maximisation. In other words, utility functions are recognised at posteriori.

A 5.2.2 Probabilities

The classic view or classic approach is based on the separate works of Jacob Bernoulli and Pierre-Simon Laplace in the 18th and 19th centuries, respectively, namely the so-called Principle of Indifference or Principle of the Insufficient Reason. Basically, that principle says that in the absence of information all the possible outcomes of an act³¹ have equal probability, or are equally probable (Good, 1959), provided they are mutually exclusive (Gilboa et al., 2010). The classic view, although recognised as a starting point, is, in general, criticised, except for situations where apparent symmetry is evidenced, as in the case of a coin, or a dice. Otherwise, saying that one event and its opposite have a 1/2 probability may be wrong if there is evidence that there is no symmetry. Gilboa (2009: 16) concludes that the classic view, namely the Principle of Indifference, “*allows for a large degree of arbitrariness, and probability assignments based on it will be fundamentally ad hoc.*”

Anscombe and Aumann (1963) consider that probability has basically two different definitions, one, of a day-to-day use, that is related to plausibility, and entails, therefore, some logical aspects to the individual getting to the conclusion of plausibility, and another of physical nature, that is, the frequencies of occurrences of events. The main division is, therefore, between the frequentist and subjective, or personal views. De Finetti (1937) concurs with that vision and bringing matters to a philosophical level says that for subjectivists, probability has a meaning intrinsic to individuals, while for frequentists, probability is something extrinsic to individual thought.

‘Frequentists’ define probability as the relative frequency, that is, the ratio between the number of occurrences of a certain phenomenon and the number of trials, especially

³¹ Decision, choice.

in the case of an important number of trials, which, ideally, should be infinite. Probability of a given event would be the frequency of occurrence of that event in a certain number of trials, in a certain population under similar conditions (Shafer, 1992). If, for example a coin was tossed n times, the probability of getting heads would be the number of heads divided by the number of tosses. However, frequentism is associated with long-run frequency and independent trials (Good, 1959). Differently from the classic view, frequentism is not based on equally probable outcomes. Savage (1972: 3) calls frequentism as “*objectivistic views*”, and says that the interpretation of holders of such views is that probability “*is to be obtained by observation of some repetitions of the event, and from no other source whatsoever.*” By the same token, Gilboa (2009) says that frequentism sees probability as a property of an event. Frequentism also considers that experiments have to be independent, that is, that there shall not be any causality relationship (Gilboa, 2009). De Finetti (1937: 111) establishes a link between classic and frequentist views when he says that both the equally probable cases and the frequencies “*have been thought to provide an objective meaning for probability*”, while “*refusing to admit the existence of an objective meaning and value for probabilities*” (de Finetti, 1937: 99).

Personal, or subjective, probability has its foundations essentially on the work of Ramsey (1926) and de Finetti (1937), which was developed and made known by Savage (1972), in the context of subjective expected utility theory. More recently authors such as Machina (2005) and Gilboa (2009) contributed to promoting subjective probability views. Subjective view considers probability to be a property of the individual assessing the probability of an event, rather than a property of the event (Gilboa, 2009). Subjective probability is governed by the theorems of Bayes and follows the laws of the theory of probabilities (de Finetti, 1937; Savage, 1972). De Finetti (1937: 97), in the foreword of an essay where he reproduces some lectures he gave at the Institut Henri Poincaré in 1935, says that probability is to him a “*purely subjective entity.*” Arrow (1951) and de Finetti (1937) state that the uncertainty related to choice making is in the minds of the decision-makers. However, Arrow (1951) suggests that the uncertainty that is subjective is conveyed by the observation of phenomena, thus extrinsic to the decision-maker. Savage (1972: 3) prefers to call subjective probabilities as ‘personal’ probabilities and says “*probability measures the confidence that a particular individual has in the truth of a particular proposition.*” Edwards (1961: 478) states that a

subjective probability “*is a number that represents the extent to which an individual thinks a given event is likely.*” Furthermore, holders of subjective views have no problems to accept that different individuals may have different measures of truth for the same proposition (Savage, 1972). In reality, supporters of subjective probability condition the acceptance by different people of different measures of truth, for the same proposition, to rationality or reasonability. In other words, different measures of truth, by different people, for the same proposition, are acceptable only if people are rational, that is, if they follow certain principles of coherence that are discussed below.

De Finetti (1937: 111) adds in respect to the laws of probabilities “*conceived as conditions necessary to ensure coherence among the assignments of probability of a given individual*”, that “*they constitute, in fact, only the precise expression of the rules of the logic of the probable which are applied in an unconscious manner, qualitatively if not numerically, by all men in all circumstances of life.*” In a footnote B. de Finetti (1937) argues that his statement about the utilisation of subjective probabilities in ‘all circumstances of life’ has raised some overreactions. He recognises that the ‘men in the street’ “*frequently violate*” (B. de Finetti, 1937: 111) the rules of coherence, but he signals that like one makes arithmetic mistakes, those violations of the rules of coherence are just mistakes not challenging the rules of coherence.

The principles or conditions of coherence that are considered by subjectivists are drawn from de work of de Finetti (1937). De Finetti’s goal is to show that subjective probabilities can be dealt with by the laws of the theory of probabilities, and that subjective probabilities are a legitimate vehicle to make predictions based on past experience. As far as the laws of the theory of probabilities are concerned, de Finetti (1937) works with the notion of comparison and establishes axioms, whose purpose is to define what this author (de Finetti, 1937) names conditions of coherence. It shall be noted that when de Finetti (1937) makes reference to consistency he indicates that someone shall not hold contradictory beliefs.

The degrees or gradations of probability provided by the axioms proposed by de Finetti (1937), which are of a qualitative nature, can also, according to de Finetti (1937), be given quantitatively through the conditions “*under which [an individual] would be disposed to bet on [a certain event]*” (de Finetti, 1937: 101). De Finetti (1937) points out that the sum of subjective probabilities for mutually exclusive outcomes needs to equal

1. Furthermore, de Finetti (1937) argues that any probabilities between 0 and 1 that are assigned to potential outcomes of an event cannot be rejected, unless their sum is not equal to 1. It shall be noted, however, that this view is a source of disagreement, with several authors (Gilboa, 1987; Schmeidler, 1989; Tversky and Kahneman, 1992), who claim that subjective probabilities need not to be or shall not be additive and that there are no reasons for probabilities adding up to 1.

However, as pointed out by de Finetti (1937), past frequencies and events equally probable are also of a subjective nature due to the discretionary power of the decision-maker to elect a certain class of events with certain characteristics, rather than another class of events and, or, other characteristics. De Finetti (1937: 117) says that the utilisation of either frequencies or equally probable events is *“preferable either because more accessible to direct estimation, or because a rougher estimate or even one of a purely qualitative nature suffices for the expected conclusions.”* Subjective probabilities can, thus, be built based on frequencies, or equally probable events, and, more importantly, can be adjusted based on new evidence – new frequencies or equally probable events. However, de Finetti (1937) does not see such adjustment as a correction to the subjective probability provided initially by an individual, but rather as a second value of probability conditioned upon new evidence. In other words, the second probability is a new probability that is assigned based on the original probability and on the ‘new evidence’ through the theorem of Bayes. De Finetti (1937: 147) carries on to say that *“an evaluation of a probability only makes sense when and as long as an individual does not know the result of the envisaged event; given that he does not know this result (and therefore that he is not led to the definitive value 0 or 1), he can take account of successively more circumstances which would modify his judgment, in one sense or another, without it being a question of correction or rejection.”* De Finetti (1937: 120) insists on the idea of subjectivity and says that *“probability being purely subjective, nothing obliges us to choose it close to the frequency; all that can be shown is that such an evaluation follows in a coherent manner from our initial judgment when the latter satisfies certain perfectly clear and natural conditions.”* Furthermore, de Finetti (1937: 154) argues that *“observation can only give us information which is capable of influencing our opinion.”* Good (1959) provides an example where an apparent problem that would suit a frequentist approach raises the possibility of the utilisation of subjective or personal probabilities. In that example, a pack of cards,

apparently fair, the red cards are sticky and, therefore, get stuck to each other and have a lower probability of reaching a certain position in the pack, such as being at the bottom of the pack. Good (1959) contends that a player having access to that information – the sticky aspect - will consider that together with the event itself, that is, to placing a red card at the bottom of the pack. Basically the player would consider the probability of having a red card at the bottom conditioned upon the sticky aspect.

The difficulty to provide real-life business examples, and to show that subjective probability works, leads scholars to use coins, dices, cards, etc, as examples in a systematic manner. However, the utilisation of those examples blurs the differences between the frequentist and the subjectivist views of probability. It is unlikely to find an author, who, to justify one view or another, does not bring to the discussion table the same coins and, or, dices and, or, cards or any other sort of device that produces outcomes seen as equally, or roughly equally, probable. De Finetti (1937: 99) one of the fathers of subjective probability argues that *“one can get a clear idea of the reasons, themselves subjective, for which in a host of problems the subjective judgments of diverse normal individuals not only do not differ essentially from each other, but even coincide exactly.”* However, the issue at stake here that does not help the subjectivist view side is that the host of problems that is mentioned concerns, most of the time, trials with devices that can be seen as delivering equally probable outcomes, and with numbers of trials that can lead us to think that there are grounds to adopt a frequentist view. Furthermore, followers of subjectivist views of probabilities, like followers of utility maximisation, need to observe behaviour first in order to assess the probabilities that were assigned to an event (de Finetti, 1937), or to the states of the world (Savage, 1972), or the utility functions of decision-makers, in the case of expected utility, which, clearly, does not help the normative or prescriptive aspects of the theories. In other words, subjectivists seem to ‘predict’ after the fact!

A5.3 Expected Utility Theory (EUT)

When speaking of risk, risk behaviour and related theories, it is nearly impossible not to start with and not to mention Expected Utility theory (EU or EUT), regardless of the position that a researcher has about this theory, since most of the literature since the mid 1940's relates to EUT and or theories somehow derived from EUT, and the first studies that are known about risk, which date from the 18th century, introduce EUT, or

at least aspects of EUT, as well. Most of the studies made, which expanded the explanations for risk-taking and risk behaviour associated to decision-making, result either from expected utility supporters, or from expected utility opponents testing postulates of the expected utility theory. Schoemaker (1982: 529) argues that *“it is no exaggeration to consider expected utility theory the major paradigm in decision making since the Second World War”*. He adds that EUT *“has been used prescriptively in management science (especially decision analysis), predicatively in finance and economics, descriptively by psychologists, and has played a central role in theories of measurable utility”* (pg. 529). In spite of some doubts that could be raised, especially about the descriptive role attributed by psychologists to EUT, Expected Utility became certainly one of the main theories for decision-making and risk-taking and *“modern decision theory can be said to begin with the pioneering work of von Neumann and Morgenstern (1947)³² who laid down several qualitative principles, or axioms, that should govern the preferences of a rational decision maker”* (Kahneman and Tversky, 1984: 343).

One of those studies mentioned above (Bernoulli, 1954) contributed to having authors such as von Neumann and Morgenstern (1953³³) and Friedman and Savage (1948) set the bases for EUT and make EUT popular. Paul Schoemaker (1982: 556) in a paper where he presents several limitations of EUT, and also of Subjective Expected Utility Theory, SEU, states, in a clear way, the importance of the EUT models by saying

“Although the evidence and associated interpretations have been critical as to the models usefulness, it must be emphasised that much of the research would not have resulted without the existence of EU theory in the first place. As such, the model has yielded deeper insides and more refined questions, those descriptively and normatively, concerning decisions under risk. It has revealed that people perceive and solve problems differently, and has offered a framework and language in which to discuss the differences. Our intellectual indebtedness to the EU model is thus great, although its presence paradigmatic status (in certain fields) should be questioned. Nevertheless, until richer models of rationality emerge, EU maximisation may well remain a worthwhile benchmark against which to compare, and toward which to direct, behaviour. On the other hand, it is likely that

³² Second edition of the Theory of Games and Economic Behavior.

³³ First edition of von Neumann and Morgenstern's book: 1944.

today's paradox and persistent EU violations hold the seed of future normative as well as descriptive theories of choice. After all it was a paradox³⁴ (Bernoulli, 1738) that gave birth to the current normative model."

In the 18th century Daniel Bernoulli published an essay that has been systematically referred to in discussions involving the measurement of risk and choices among risky and or uncertain alternatives. Friedman and Savage (1948), when referring to the maximisation of expected utility as the criteria to make choices among risky alternatives, noted that Bernoulli was one of the first authors known to have elaborated on risk measurement using known probabilities and outcome value. However, Bernoulli (1954: 23) indicates that mathematicians before him had used probabilities of outcomes or the "*number of ways in which [a given outcome] can occur*" and outcome values to calculate risk and says that

"There has been general agreement on the following proposition: Expected values are computed by multiplying each possible gain by the number of ways in which it can occur, and then dividing the sum of these products by the total number of possible cases where, in this theory, the consideration of cases which are all of the same probability are insisted upon."

However, later in the same essay, Bernoulli (1954) introduces a notion of subjectivity, or rather of personalisation, into the analysis, when he moves from gain, or price, to utility, where utility is something of value to someone, or of subjective value to someone. This author says (Bernoulli, 1954: 24) that "*the price of the item is dependent only on the thing itself and is equal for everyone; the utility, however, is dependent on the particular circumstances of the person making the estimate*" and he adds that "*there is no doubt that a gain of one thousand ducats is more significant to a pauper than to a rich man though both gain the same amount.*" Edwards (1961: 474) mentions that same notion of subjectivity and calls utility "*subjective value.*"

Expected Utility Theory is based on the idea that outcomes of choices have utilities to the decision-maker, that there are probabilities of occurrence that can be associated to those outcomes or, in other words, that probabilities can be associated to the utilities of

³⁴ The St. Petersburg Paradox.

those outcomes, that probabilities are related to frequencies and that outcomes, or rather the utilities of outcomes, are ordered by the decision-maker in terms of preferences (Fishburn, 1989; Schoemaker, 1982; von Neumann and Morgenstern, 1953). Edwards (1961: 474) says that *“the combination of subjective value or utility and objective probability characterizes the expected utility maximization model.”* In the case of EUT what defines risk are the probabilities associated with the outcomes and not the outcomes themselves, though the measurement of risk, that is, the measurement of expected utility – or rather its maximisation - is what counts in terms of the theory. The outcomes have utilities for the decision-makers and those utilities may be positive or negative. Nonetheless, the utilities per se do not define risk according to EUT. Gilboa (2009: 79) observes *“that the theorem [of von Neumann and Morgenstern (1953)] is about decisions under ‘risk’, that is, in circumstances with known probabilities, as opposed to situations of ‘uncertainty’, where probabilities are not known.”*

EU is based on axioms developed by von Neumann and Morgenstern (1953). Those axioms³⁵ address four principles in terms of preferences among alternatives, or in terms of rational behaviour of an individual decision-maker in face of risky alternatives, as suggested by those authors. Those principles are transitivity, substitution, dominance and invariance (Kahneman and Tversky, 1984).

Other than the axiomatic aspects of EUT developed by von Neumann and Morgenstern (1953), which have led to systematic testing and, in some cases, criticism of the theory (e.g. Allais, 1953), or, at least, relaxation of properties of the axioms (e.g. Fishburn, 1967, 1988, 1989), it is important to review and analyse the premises and reasoning leading to those axioms.

First of all, von Neumann and Morgenstern (1953: 1) say that the purpose of their book, *The Theory of Games and Economic Behavior*, is to discuss *“fundamental questions”* that *“have their origin in the attempts to find an exact description of the endeavour of the individual to obtain a maximum of utility, or, in the case of the entrepreneur, a maximum of profit.”* It could be argued at this point, without challenging, at least for the time being, the maximisation aspect, that profit is utility, but that utility may not be profit, and that an entrepreneur may be looking for other types of utilities and not only, and not necessarily, for profit (Simon, 1959). On the other hand, it is worth saying in respect to maximisation that there is numerous evidence that

³⁵ Axioms are presented in this Annex 5.

entrepreneurs, in particular, and decision-makers, in general, do not look only for a maximisation of profit, and that entrepreneurs have many other drivers (Brockhaus, 1980; Busenitz and Barney, 1997; Carland, Hoy, Boulton and Carland, 1984; Pettigrew, 1979), such as locus of control and need for achievement (de Vries and Miller, 1986; Miller, de Vries and Toulouse, 1982; Miller and Toulouse, 1986).

Secondly, von Neumann and Morgenstern (1953) justify as well in their study their approach to using mathematics in economics. Basically, they say (von Neumann and Morgenstern, 1953: 3) that mathematics and axioms shall be used in economic theory, regardless of any arguments that they say they have heard of whether mathematics should not be used “*because of the human element, of the psychological factors, etc.*” They add, however, that they “*shall attempt to utilise only some commonplace experience concerning economic behaviour which lends itself to mathematical treatment and which is of economic importance*” (pg.3). In other words they stress the importance of games, lotteries, insurances and so on. Importantly, they add, immediately after, that they “*believe that the possibility of a mathematical treatment of these phenomena refute the ‘fundamental’ objections referred to in 1.2.2*” (von Neumann and Morgenstern, 1953: 5). Those ‘fundamental objections’ are, it is assumed here, the use of mathematics in economics to deal with the human element, the psychological factors, etc. Insisting on their explanations about the use of mathematics in economics those authors say in the same page (von Neumann and Morgenstern, 1953: 5) that “*to conclude, we may also observe that part of the feeling of dissatisfaction with the mathematical treatment of economic theory derives largely from the fact that frequently one is offered not proofs but mere assertions which are really no better than the same assertions given in the literary form.*” It becomes clear that for von Neumann and Morgenstern (1953) assertions in literary form to explain individual, or entrepreneurial, behaviour in the context herein discussed are not acceptable, or in softer words not recommended, and that, considering the complexity of the subject, there should be a mathematical treatment of human behaviour that has economical importance and for which results are known, but proof, in the mathematical sense, does not exist. In this last respect von Neumann and Morgenstern (1953: 7) say, in preparation for the EUT mathematical axiomatic approach, that “*the theory finally obtained must be mathematically rigorous and conceptually general. Its first applications are necessarily to elementary problems where the result has never been in doubt and no theory is actually required. At this early stage the applications serve to*

corroborate the theory.” These authors were expecting not only a normative role but also a predictive one when they say (von Neumann and Morgenstern, 1953: 8) that the “*field of real success*” is “*genuine prediction by theory.*” As it is well known, the human behaviour with economical importance and for which results were known is assimilated to games, that is, essentially lotteries and insurance.

Thirdly, evidence that contradicts the ‘commonplace experience’ related to behaviours, which, according to von Neumann and Morgenstern (1953) and their followers (e.g. Friedman and Savage, 1948, 1952), should be mathematically treated in an undisputed way, has been provided (e.g. Allais, 1953; Ellsberg, 1961; Kahneman and Tversky, 1979; Tversky and Kahneman, 1974). It shall be noted that Morgenstern (1974: 4) classifies challenges such as those made by Allais (1953) as “*generalities*” and says that “*one would expect that a new axiom be established to be fitted into the existing system, however modified.*” The view taken in this study is that Morgenstern (1974) was more concerned with the results derived from the axioms, rather than with the empirical observations. However, empirical observations contradict, a number of times that cannot be ignored, some of the rules set forth by the axioms. In addition, von Neumann and Morgenstern (1953) provide a definition of rationality, which has been misrepresented several times, but which, regardless, raised and keeps raising considerable polemic. These authors say that traditionally, that is, according to economic views back in the 1940s and 1950s the motivation of individuals, in terms of economical behaviour, is the maximization of utility, and they label such behaviour as rational. In reality they say that “*the individual who attempts to obtain these respective maxima is also said to act ‘rationally’*” (von Neumann and Morgenstern, 1953: 9) and they use the word rationally between inverted commas clearly indicating that the intention is to give a special meaning to the word in a certain context. They carry on to say, as they had said before, that qualitative descriptions of such behaviour of utility maximisation is not enough, and that the problem needs to be defined in quantitative terms. When stating the problem of utility maximisation von Neumann and Morgenstern (1953: 9) say that “*a study of all these questions in qualitative terms will not exhaust them, because they imply, as must be evident, quantitative relationships*” and add that “*it would, therefore, be necessary to formulate them in quantitative terms so that all the elements of the qualitative description are taken into consideration*”, with the purpose of revealing that “*the maximum problem which is supposed to correspond to the notion of rationality is not at all formulated in an unambiguous way.*”

Morgenstern confirms that 'rationality' "is a concept to be derived and given meaning from the theory" where "one merely assumes that the players prefer a greater payoff to a lesser one" (Morgenstern, 1974: 7).

A5.3.1 Axioms of Expected Utility Theory

Drawing from the work of Edwards (1954), Schoemaker (1982), Fishburn (1988; 1989) and Yates (1990), the axioms of Expected Utility Theory can be presented as follows:

- i) **For two outcomes u and v , u is preferred to v or v is preferred to u or the decision-maker is indifferent to u or v , being this axiom called **completeness** (Schoemaker, 1982). Drawing from the work of Luce and Raiffa (1957), Yates (1990: 255) calls this postulate the "*comparability of outcomes*";**
- ii) **For three outcomes u , v and w , if u is preferred to v and v is preferred to w then u is preferred to w , being this axiom called **transitivity** (Schoemaker, 1982);**

Edwards (1954: 381) states that the two conditions above are required "*to put all the available states into a weak ordering*", being the available states the potential outcomes. Von Neumann and Morgenstern (1953: 26) say that the two conditions above are a "complete ordering" of U where U is the set of potential outcomes. Friedman and Savage (1952: 468) say that for the same two conditions an "individual can be supposed to have a complete and consistent (transitive) ordering of all possible alternatives."

- iii) **Assuming that outcome u is preferred to outcome v and outcome v is preferred to outcome w then there exists some probability p between 0 and 1 such that the prospect $pu+(1-p)w$ is "*equally attractive*" to the decision-maker as the outcome v (Schoemaker, 1982: 531);**
- iv) **Assuming that outcome u is "*equally attractive*" (Schoemaker, 1982: 531) to outcome v then the prospects $pu+(1-p)w$ and $pv+(1-p)w$ are also "*equally attractive*" (Schoemaker, 1982: 531);**

- v) **Assuming that outcome u preferred to outcome v then prospect $pu+(1-p)v$ is preferred to prospect $qu+(1-q)v$ if and only if probability p is bigger than probability q (Schoemaker, 1982);**

The postulates (iii) to (v) above are considered by von Neumann and Morgenstern (1953: 26) axioms of “*ordering and combining.*” Von Neumann and Morgenstern (1953: 27) consider these postulates, which they present in a different way, a “*plausible continuity assumption.*”

- vi) ***“It is irrelevant in which order the constituents u, v of a combination are named. It is legitimate, particularly since the constituents are alternative events”*** (von Neumann and Morgenstern, 1953: 27);
- vii) ***“There is no attraction or aversion to gambling. Functionally the only things that matter when choosing between two prospects are the ultimate outcomes and their probabilities, as calculated via probability theory. In particular, outcomes that are contingent on compound events make a prospect neither more nor less attractive”*** (Yates, 1990: 256).

A5.4 Subjective Expected Utility Theory (SEU)

Edwards (1961: 474), just a few years after the seminal work of von Neumann and Morgenstern, says that EUT did not “*fit the facts*” and that theorists were focusing on a “*model which asserts that people maximise the product of utility and subjective probability*”. Edwards (1961) claims to be the author who has named the model as Subjectively Expected Utility Maximisation Model or SEU. However, according to Edwards himself (Edwards, 1961: 474) “*subjective value is usually called utility*”, therefore, the subjective aspect of a model involving utility that differentiates it from Expected Utility comes certainly from the subjective probability aspect and not from the utility one. Gilboa (2009: 94) says “*von Neumann and Morgenstern tell us how to obtain utilities given probabilities, and de Finetti does the opposite – shows how to obtain probabilities given utilities*” and suggests that Savage (1972) brings both things together keeping preferences, in terms of utilities and in terms of probabilities, as the cornerstone of the theory (SEU). While EUT uses a subjective concept, utility, and an

objective one, probabilities associated to outcomes, Subjective Expected Utility Theory (SEU) uses both, value of outcomes and probabilities, subjectively.

Savage (1972) in order to link the subjective value of something to someone with the subjective probability of occurrence of that thing, and thus bring together EUT and the work of de Finetti on personal, or subjective probabilities, builds a model around the person, the world and its states, notably small worlds, events, acts and consequences. SEU is defined through 7 postulates or axioms. Since many authors define the 5th, 6th and 7th postulates as technical (Fishburn, 1981; Gilboa, 2009; Shafer, 1988) we will present in this study³⁶ the first four only, of which the first two are common to EUT. These postulates, together with the notion of small worlds and its implications, are the basis of SEU. One of the pillars of SEU, and EUT, is the notion of clear and transitive preferences, two notions that are challenged by many authors (Kahneman and Tversky, 1982; Shafer, 1988; Tversky and Simonson, 1993; Tversky, Slovic and Kahneman, 1990). The notion of clear preferences applies not only to preferences in terms of utilities but also to preferences in terms of subjective probabilities. As mentioned before in this Annex 3, Savage (1972) provides an example of a man, who is buying a car and wonders if he should buy a car with a radio installed or not (please note that we are speaking about 1954 when car radios and or features were optional items). When learning the difference of prices between a car without a radio and a car with a radio installed, the man realises that should he have bought the car with a radio, he would have made an error because he would not have paid that amount of money, i.e. the difference, for the radio alone. Savage (1972) argues that the man should have a clear preference between the radio and the equivalent money, and that if he preferred the cost of the radio to the radio itself, he should not buy the car with a radio, and that if he did, he would realise that he had made an error. Shafer (1998), on the other hand, suggests that preferences are constructed and that many times people simply do not have preferences. He says, making reference to the example provided by Savage (1972), that the man would buy the car with the radio simply because he had the money and the radio was already installed in the car, and that that was not a matter of logic. In reality Savage could not have foreseen that in 1954, but overwhelming evidence shows that car manufacturers started incorporating radios and other equipment in cars, including those of a more affordable price, knowing very well that that helps selling cars and that

³⁶ Part of the axioms of SEU are presented in this Annex 5.

almost nobody, i.e. buyers, is going to compare the price of the car with most of the traditional extras, including radios, with the price of the car without extras. Not intending to pick on this specific example it is clear that consumer behaviour contradicts Savage's views in this domain.

A5.4.1 Axioms of Subjective Expected Utility Theory

Based on the work of Elmsberg (1961), Gilboa (2009), Savage (1972) and Shaffer (1988) the main postulates of the Subjective Utility Theory are proposed as follows:

P1- There is a preference (not preferred to) among acts, either $x \leq y$ or $y \leq x$ and those acts or the preferences for those acts are completely ordered; furthermore, there is transitivity, that is, if $x \leq y$ and $y \leq z$ then $x \leq z$, where \leq indicates the relation 'not preferred to' (Savage, 1972).

P2 – “The choice between two actions (acts) must be unaffected by the value of the payoffs corresponding to events for which both actions have the same payoff” (Ellsberg, 1961: 648) or, in the words of Gilboa (2009: 97) “*preferences between two acts, f and g , should depend only on the value of f and g when they differ.*”

The existence of clear preferences among decision-makers and the transitivity of those preferences, postulate P1, have been challenged by many authors as discussed above for EUT; numerous examples of violations have been presented. The postulate P2, frequently named as the sure-thing principle (Ellsberg, 1961; Gilboa, 2009; Savage, 1972), or the independence principle (Allais, 1953; Shafer, 1988), likewise, came under fire.

P3 – If a person prefers a consequence c to a consequence d , in general terms, then c shall be always preferred to d , regardless the context, that is, the state of the world or event under which such outcomes occur (Shafer, 1988) or preferences of outcomes shall be independent of the factors related to them (Gilboa, 2009). Gilboa (2009), like Shafer (1988), interprets as well P3 in terms of outcomes that are ordered independently from the states of the world under which they occur.

Bruno de Finetti (1937) and Savage (1972) do not always use the term 'event' with the same precise meaning. While Savage (1972) defines an event as set of states of the world, de Finetti (1937) sees an event as a trial such as the tossing of a coin. Furthermore, de Finetti (1937) differentiates his definition of event from those of the frequentist, who define event, using the same example of tossing a coin provided here above, as a sequence of tosses. Savage (1972) considers, as far as choices are concerned, the existence of, other than the individual making a choice or decision-maker, 'acts', 'states of the world' and 'consequences', also called by Gilboa (2009) 'outcomes'. 'Acts' are the decisions or choices to be made, 'states of the world' are the contextual variables or factors that condition the outcomes, about which, according to Savage (1972), decision-makers are uncertain, and outcomes are of the results of the decisions or choices made, conditioned by the states of the world. It is worthwhile noting that a state of the world is "*a description of the world, leaving no relevant aspect undescribed*" Savage (1972: 9). Savage (1972: 14) calls outcomes the "*states of the person.*" Savage (1972) introduces as well the concept of small world, which is a description of all aspects for which there is uncertainty that influence the outcome of a decision or choice. If, for example, the only difference to differentiate a woman from a man were the gender, then the gender would be a small world, since the gender would define completely and in full the uncertainty about a human being, being a man or a woman. The concept of small world is important in the theory developed by Savage, as we will see below, because it allows the breaking down of states of the world and consequences to an extent that, according to Savage (1972), makes subjective value independent of subjective probability or, in other words, makes the value or the preference for something independent from the likelihood of its occurrence.

It is contended in this study that the man in the street and the manager assign probabilities to events, in the sense used by de Finetti (1937), that is, to outcomes, and not to the states of the world, as suggested by Savage (1972), though the feeling of control that managers have over outcomes of decisions (March and Shapira, 1997; Shapira, 1995) are in reality over the 'states of the world' that contribute to those outcomes. For some complex business decisions it is hardly imaginable to have a complete knowledge of all the variables contributing to define the outcome of a certain decision, and, many times, it is equally hard to list exhaustively all the outcomes that may materialise. How many 'states of the world' should be considered by a decision-maker and how, if at all necessary, should those 'states of the world' be combined?

Empirical evidence suggests that individual managers assign probabilities to outcomes and not to their determinants. However, it is argued in this study that what makes sense would be the assignment of probabilities to the determinants of outcomes, although assigning probabilities to outcomes is a matter of common usage.

Robert Aumann (1987) in a letter to Leonard Savage questions what are states (of the world), what are acts and what are consequences, arguing that different definitions lead to different conclusions in respect to Savage's postulates of SEU, namely that, for example, the postulate P3 (please see below) is "*unreasonable*" depending on whether an act is in reality a consequence or not (pg.78). Aumann (1987: 78) argues that "*it seems that the notions of 'state', 'act', and 'consequence' have rather fuzzy interpretations; in particular, it is not always easy conceptually to distinguish between them. But to make sense of the axioms, it is essential to have a fairly shape idea of what these notions mean.*" One of the pillars of SEU is that utility and belief, that is, utility and probability, can and shall be separated. Savage (1972) proposes such separation between utility (subjective value) and probability (subjective probability) under postulates P3 and P4 of SEU. This aspect being important, since it shows some disconnect between theoretical writings and empirical observation, and also between authors, as mentioned below, deserves further review. Therefore, an example provided by Aumann (1987) and one provided by Savage (1972) will be presented, commented and compared to an example of a business decision.

In the letter mentioned above written by Aumann (1987: 78) to Savage, he says:

"There is a conceptual question regarding subjective probabilities that has been puzzling me, about which I would like to consult you. Consider the following two acts

Act A: You get an umbrella if it rains, nothing if it does not rain.

Act B: You get an umbrella in either case.

Suppose your utility for an umbrella is 1, and for no umbrella is 0; suppose further that your subjective probability for rain is $\frac{1}{2}$. Then acts A and B have utilities $\frac{1}{2}$ and 1 respectively. On the other hand I don't think it would be unreasonable for you to be indifferent between the two acts, since an umbrella is useless in fine weather.

Obviously, the answer is that your utility for umbrellas depends on the weather, i.e. on the state of the world. But that leads rather quickly to the

conclusion that your postulate P3 is unreasonable; for example, all in all, I prefer an umbrella to a nickel, but if it does not rains, I prefer the nickel."

Clearly Aumann (1987) says that if preferences for consequences are related to states of the world then utility (subjective value of something for someone) is not independent from belief (subjective probability or likelihood that something of value for someone materialises), reason why he says that P3 is unreasonable, unless getting an umbrella is an act rather than a consequence. Savage (1984: 79), developing the latter possibility proposed by Robert Aumann, says "*that decision situation can be usefully structured in terms of consequences, states and acts in such a way that the postulates of F. of. S [The Foundation of Statistics] are satisfied.*" In practical terms Savage says that consequences can be acts of further breakdown of decision matters.

In an example, this time provided by Savage (1972: 25) he says:

"Before going on a picnic with friends, a person decides to buy a bathing suit or a tennis racket, not having at the moment enough money for both. If we call possession of the tennis racket and possession of the bathing suit consequences, then we must say that the consequences of his decision will be independent of where the picnic is actually held. If the person prefers the bathing suit, this decision would presumably be reversed, if he learned that the picnic was not going to be held near water...

But under the interpretation of 'act' and 'consequence' I am trying to formulate, this is not the correct analysis of the situation. The possession of the tennis racket and the possession of the bathing suit are to be regarded as acts and not as consequences. (it would be equivalent and more in accordance in ordinary discourse to say that coming into possession, or the buying, of them are acts). The consequences relevant to the decision are such as these: a refreshing swim with friends, sitting on a shadeless beach twiddling a brand-new tennis racket while one' friend swim, etc. It seems clear that, if this analysis is carried to its limit, the question at issue must be answered in the negative."

In the example provided by Aumann (1987) it is difficult to understand why being given, or not, an umbrella would be understood as a decision, that is, being understood as an act and even less as a consequence for the one accepting or refusing the umbrella.

A decision could, instead, be accepting or refusing the umbrella and the consequences of accepting or refusing the umbrella could be, for example, getting wet, or not, if it rained, depending on the decision not to accept, or to accept, the umbrella. But even if accepting or refusing the umbrella is an act, the matter of fact is that the act, that is, the decision, is made as a function of the state of the world that is expected, that is, raining or not raining.

In the example above provided by Savage (1972), possessing is clearly a consequence of buying. But it is also a matter of semantics. Someone who buys something, automatically possesses that thing once the purchase is made. Someone buys something or makes a decision with a purpose even if the purpose is not necessarily an outcome per se (March, 1997). It is contended herein that Savage (1972) is right when he sees buying or coming into possession as acts or decisions. However, what is not clear is that preferences are absolute. In the example provided by Savage above he suggests that purchasing the tennis racket or the bath suit are choices to be made, which are related to a certain picnic to be held. Therefore, we are speaking about a choice to be made in a certain context, and, as such, context dependant. Even if the person choosing between the tennis racket and the bath suit elected one or the other based on a general preference, that is, independent of that specific context, but dependent on the general context of the life of the choice maker, the maximum that one could say would be that the decision would not be related to that specific state of the world, that is, where the picnic would supposedly be held, but would, certainly, be related to other states of the world considered by the choice-maker.

Let's assume that a firm, a conglomerate for instances, is making a strategic decision and that that decision is the acquisition of another firm. Let's assume as well that the top management of that conglomerate has a general preference for a certain industry, for historical reasons, for example, and that they have the option to acquire a firm in that industry or a firm in another industry but cannot acquire both and have to make two choices: acquire a firm or not, and, should they decide to acquire, which company to acquire in which industry. In a very simplistic way the act, or decision, could be a buy no buy decision and the outcome could be a 'possess or do not possess' a new company in case there was a decision to buy and a question mark in respect to what the future would have been in case of a no buy decision. Which would be the state or states of the world considered? And how would be the outcome defined? Depending on the complexity of the type of business involved we could either list an almost infinite

number of states of the world or a state of the world that would be almost infinite if broken down to the maximum extent. Suppose that the target firms were part of the bank industry and the steel industry. The states of the world that would need to be considered would take into account factors related to the country or countries directly related to the bank domiciles, countries in the economic areas where those banks and countries are inserted, the worldwide banking situation, governmental policies in place or potentially applicable in a foreseeable future, gross domestic products of the countries, demand for automobiles, shipyard demand, inflation, consumer behaviour, investors' behaviour, energy price, etc, etc, in short all sorts of macro economical, micro economical, geopolitical factors, and so forth. Does any firm list all possible states of the world or does any firm consolidate into a single state of the world the sum of all possible scenarios (one of the words that is used empirical to refer to what Savage calls states of the world)? Or does any firm detail so much an outcome to the point where it is possible to make abstraction of the business scenarios? Since the main topic of this study is the risk perceived by individual managers in organisational context and the consequences for their engagement in decision-making, do individual managers breakdown the states of the world and the outcomes to the point where their utilities for outcomes are independent of their beliefs in respect to the likelihood of occurrence of the states of the world? Savage (1972; 1987) suggests that consequences can always be more refined in a way that allow for consequences and states of the world to be evaluated independently. However, what is defended here is that empirical observation shows that the subjective value that something has to someone (utility) is clearly related to the states of the world, that is, to the factors that condition the outcomes of choices or decisions. This position is sustained as well by Shafer (1988: 196) who "*argues that empirical facts do not support the assumption*" that it is possible to disentangle subjective value and probability.

P4 – For every event A, B either A is less preferred than B or B is less preferred than A, regardless of the outcomes resulting from a given act or decision (Savage, 1972). Belief can be discovered from preference (Shafer, 1988; Gilboa, 2009).

Savage (1972) argues that beliefs about states of the world or likelihoods of scenarios are independent from the outcomes that may result from decisions made under those scenarios. According to Gilboa (2009: 102) "*P4 is the counterpart of P3*" under

the interpretation that subjective value and subjective probability can be taken from observed behaviour.

A5.5 Behavioural Decision Theory

Decision-making and risk behaviour, including risk-taking by individuals (Kahneman and Tversky, 1979; Tversky and Kahneman, 1992), namely societal risk (Slovic, 1987), or by organisations (Cyert and March, 1992; March and Simon, 1993), became an important topic in psychology, management, business and finance and has been dealt with, to a great extent, independently from economic science. Nevertheless, Weber and Johnson (2009) suggest that economy science benefits from developments in judgment and decision-making driven by behavioural concerns, and exemplify with the preferences of decision-makers, which behavioural decision theory has shown as being constructed rather than innate. However, the concepts of rationality and maximisation kept economic science and other fields, such as psychology and management, simultaneously very close and very far from each other, since, on the one hand, some normative concepts are welcomed because predictability, especially in business and management, is welcomed, thus keeping the fields somehow close to each other, and, on the other hand, most of the behavioural theories became descriptive in nature, refusing the normative concepts. Optimality of behaviour, together with rationality, is central to normative theories of decision-making (Einhorn and Hogarth, 1987). However, decision-making models and actual decisions cannot be defined as optimal, or suboptimal, without considering them within the contexts in which they occur and within a time horizon. *“To consider human judgment as suboptimal without discussion of the limitations of optimal models is naïve”* (Einhorn and Hogarth, 1987: 56).

Three main types of behavioural decision theories have been developed: those drawing from rationality, in the perspective of an ideal economic man, and maximisation, those departing from expected utility and subjective expected utility theories with a descriptive purpose, such as prospect theory, cumulative prospect theory and other rank dependent theories, and those of a naturalistic sort, which assume a full descriptive nature. Empirical evidence strongly suggests that decision-makers do not maximise utility, that decision-makers are not always consistent and not always coherent in their choices, that decision-makers do not always have clear and transitive preferences, that decision-makers have numerous computational limitations (Simon,

1959), that decision-makers use heuristics and are, therefore, subject to biases (Tversky and Kahneman, 1974), that decision-makers violate, most of the time and in one way or another, all the principles of normative decision-making theory (Becker and McClintock, 1967; Rapoport and Wallsten, 1972). Therefore, it is not a surprise that many authors look for alternative explanations that focus more on the behaviour of individuals, individually and, or, in groups and, or, in societies and less on axioms and definitions of rationality, which have shown their limitations. *“Confronted with real world violations of rational choice theory, many economists and other social scientists now recognise the need for behavioural assumptions in the marketplace”* (Mellers et al., 1998: 469). Weber and Johnson (2009), two representatives of a group that brings psychology to decision-making and could be interested in the philosophical discussions about rationality, argue that the discussions about rationality are misplaced because there are different standards of rationality, which are context specific, and say that *“emerging instead is a realisation that broad-scale characterisations of human judgment or choice as flawed or rational are not particularly useful”* (pg. 76). Mellers et al. (1998) add that labelling behaviour as ‘irrational’ became more problematic, based on overwhelming empirical evidence of behaviour that would be labelled that way, thus suggesting that new approaches need to be found.

A major change in the way researchers, who bring psychological, contextual and task factors to explain behaviour in decision-making, deal with the descriptive aspects of real world decision-making, is that there is an understanding that description of actual decision-making can be used to predict decision-making or to improve the decision-making processes, through training or by changing some features of the decision-making processes (Payne et al., 1992; Pitz and Sachs, 1984; Weber and Johnson, 2009). For example, decisions can be improved by manipulating the context in which information is processed and decisions are made (Payne et al., 1992). This brings a prescriptive flavour to descriptive decision-making theory, which, in the opinion of the author of this study is extremely important from an applied management standpoint. As contended elsewhere in this study, what is the point in simply describing and understanding decision-making if such knowledge is not used to influence the processes? Some authors (e.g. Bell, Raiffa and Tversky, 1988) have called for a need of prediction in models proposed by behavioural theories, by arguing that describing what normative theories wrongly predict, and cannot explain, is not enough. The position adopted in this study is similar, in that some level of prediction needs to be achieved in

organisational contexts. Stating and evaluating the outcomes, or consequences of decisions made, to get to the conclusion that decision-makers do not follow the canons of rationality, as envisaged by von Neumann and Morgenstern (1953) and Savage (1972), without drawing any practical conclusions is not enough from a business perspective. However, as asked by Gilboa (2009: 5) in his book *Theory of Decision under Uncertainty*, “*can free choice be predicted?*” Conceptually, among the alternatives available to him, a decision-maker can choose any way he likes. Yet, he or she is most of the time part of a group, or part of a society, and, or, cares about the impact of choices to be made on other people, and, or, cannot apprehend all the alternatives made available to him or her. On the other hand, alternatives to be chosen are often limited, and, in business, many times are about one alternative and the status quo. Therefore, expecting some degree of prediction, in spite of ‘free will’, seems to be legitimate.

Einhorn and Hogarth (1987) contend that judgement and choice are different concepts, insofar choice can be made without judgment, or that judgment can be ignored when the time to decide comes, although they recognise that in many situations judgment and choice cannot be separated. The thesis sustained in this research project is that strategic decision-making is a process and that judgment and choice are part of the process and shall not be separated. Even if a decision-maker decides not to take any judgement into account when making a decision, in reality, before deciding, he is already judging the reasons to take his own judgment into account or not.

In spite of the possibility that some could view decision research as “*fragmented and chaotic*” (Payne et al., 1992: 122), due to the fact that decision processes are context, task and decision-maker dependents (Einhorn and Hogarth, 1981; March, 1978, 1991; Payne et al., 1992), and are not invariant, it is contended herein that there are some concepts that have been identified that seem to be common to decision-making under risk and uncertainty, and which establish a framework for models of real world decision-making, namely for strategic decision-making in organisational contexts. It shall be kept in mind, however, that due to the complexity of the subject it might be unworkable to build general models.

First of all, decision-makers' behaviours do count (Becker and McClintock, 1967; Edwards, 1961; Einhorn and Hogarth, 1981; Hastie, 2001; March, 1978; Mellers et al., 1998; Payne et al., 1992; Pitz and Sachs, 1984; Rapoport and Wallstend, 1972; Simon, 1955, 1959, 1979; Slovic et al., 1977; Tversky and Kahneman, 1974; Weber and

Johnson, 2009). Attention determines what is and is not brought into decision-making processes (Ocasio, 1997; Weber and Johnson, 2009). Perceptions, namely risk perceptions, are an antecedent of risk behaviour (Mellers et al., 1998; Sitkin and Pablo, 1992; Sitkin and Weingart, 1995; Weber et al., 2002; Weber and Milliman, 1997), and so are emotions as well (Finucane et al., 2000; Mellers et al., 1998; Slovic et al., 2004; Slovic et al., 2007; Weber and Johnson, 2009). Upper echelons theory (Finkelstein et al., 2009; Hambrick, 2007; Hambrick and Mason, 1984) and leadership theory (O'Reilly et al., 2010; Schein, 2010; Waldman and Yammarino, 1999), among others, strongly indicate that decision-makers' behaviours impact decision-making. Behaviour is not simply expressed through preferences (value or utility) and beliefs (probability).

Secondly, decision-making in most of the real world contexts is a process made by phases, and routines, (Eisenhardt and Zbaracki, 1992; Mintzberg et al., 1976; Schwenk, 1995), where behavioural phenomena play a role (Beach, 1993; Fredrickson, 1985; Kiesler and Sproull, 1982; Rerup and Feldman, 2011; Thomas et al., 1993), rather than a mere point in time when a choice is made.

Thirdly, preferences are constructed (March, 1978; Payne and Bettman, 1992; Payne et al., 1999; Slovic, 1995), that is, preferences are not innate to decision-makers, and beliefs and preferences are not independent from each other (Heath and Tversky, 1991). Therefore, what surrounds decision-makers elicits and, or, contributes to constructing preferences building and impacts beliefs.

Finally, an extensive body of literature provides either empirical evidence or suggestions that contextual factors influence decision-making outcomes and consequences. Organisational culture (Denison 1984; Hofstede, 1990), CEO's leadership (Tsui et al., 2006), perceived organisational support (Wayne et al., 1997) and industry (Bromiley, 1991; Wally and Baum, 1994), among others, are some of the contextual factors considered in the decision-making literature.

Thousands of articles and papers address specific aspects of non-conformity of normative decision-making theories, to a point that makes Weber and Johnson (2009) suggest that research in judgment and decision-making is biased in that it is mainly used to find evidence against normative theories. Mellers et al. (1998) confirm the viewpoint of Weber and Johnson (2009), when they say that for many years the focus of behavioural decision theory has been the search for violations of rational behaviour. However, behavioural theory has moved from challenging normative theories and finding phenomena that directly challenge those theories, to developing theory and

testing hypotheses to explain the processes that underlie decision-making (Weber and Johnson, 2009). Furthermore, behavioural decision theory is concerned with real life decisions (Hastie, 2001; Weber and Johnson, 2009), not only with laboratory experiments. With an approach that is new, in a field where there is a tendency to see behavioural decision theory as totally explanatory or descriptive (Connolly and Koput, 1997), Weber and Johnson (2009) argue that developments in behavioural decision theory, in spite of a great deal of descriptiveness, may help design and condition decision-making contexts and provide decision aid in order to lead decision-makers to construct certain preferences, that is, to make certain decisions, rather than others. Nevertheless, some authors (e.g. Pitz and Sachs, 1984: 142), in spite of their sympathy towards the inclusion of psychological aspects into judgment and decision-making, argue that theories must have a prescriptive role and suggest “*that a broader formulation of prescriptive theory is needed in which the distinction between description and prescription is made less important.*” Pitz and Sachs (1984) propose that a multi-attribute approach be adopted, that is, an approach that would bring to normative/prescriptive models of decision-making variables of a psychological nature, such as regret and utility for gambling (utility related to the engagement/participation in decision-making). The downside of the viewpoint sustained by Pitz and Sachs (1984) is that in the case of complex decisions, such as those of a strategic nature made in organisational contexts, models would need to consider so many variables and have so many qualifications and exceptions, that they would unlikely work.

Behavioural theories' starting point was expected utility theory and subjective expected utility theory. Not surprisingly, there is a great deal of research around preferences, values and beliefs, insofar utility is related to preferences and values and probabilities are related to beliefs. Edwards (1961), certainly due to the fact that he was involved in the field of decision-making theory contemporaneously with von Neumann and Morgenstern (1953) and Savage (1972) and others who were proponents of expected utility theories, focused very much on static models, on utility and subjective probabilities and on the theory of games. However, Edwards (1961) says that by the 1960s there was already a great deal of studies on personality variables, and, making reference to contemporaneous authors, brings to the discussion variables, such as motivation towards success and towards failure avoidance and incentives. Nevertheless, Edwards (1961) shows surprise by the lack of studies relating to the theory that was the flavour of the day at that time, that is, subjective expected utility theory, with

personality variables. This author (Edwards, 1961) makes a call for the need to address dynamic models of decision-making, by arguing that real life decision-making is rather of a dynamic nature, and stresses that decisions made in environments that change, while decision-makers are deciding, are very little studied because of their complexity, a comment that remains very actual. Becker and McClintock (1967) focus essentially on the definition of value. These authors do not challenge the principle of expected utility, nor do they challenge the normative and prescriptive aspects of decision theory, although they see utility in a way that brings to the normative/prescriptive models concepts such as motivation, attitudes, preferences and tastes, goals and rewards/punishments, and beliefs. Becker and McClintock (1967) do not see the need for a decision-maker to maximise, or minimise, only, and indicate that 'satisficing' is also a criterion. In order to circumvent the issues related to rationality, insofar normative and prescriptive models are accused of imposing views on rationality that are too strict and theoretical, Becker and McClintock (1967) basically say that rationality is what each man wants, and tolerate limitations in respect to what a model requires from a decision-maker in terms of his or her capabilities. In other words, a prescriptive model is rational for a given decision-maker if a violation of the model, by that decision-maker, does not seem reasonable to him or her, and if the model is reasonable in respect to the computational and informational capabilities of the decision-maker. Rapoport and Wallsten (1972: 131) define decision theory as an attempt "*to prescribe how decisions should be made and to describe systematically what variables affect decisions.*" These authors acknowledge that little had been done back in 1972 in respect to dynamic decision theory, that is, the type of most of the decisions that are made in businesses, certainly because of the complexity and difficulties to model such type of decisions. Slovic et al. (1977) reaffirm that complexity and add that even if models are built the assumptions are so numerous that the interpretation will, most of the time, be ambiguous. Slovic et al. (1977) argue that psychological variables are being taken into higher consideration by descriptive and, more notably, by normative theories of judgement and decision-making. Furthermore, more and more disciplines are getting involved in decision-making studies (Slovic et al., 1977), making psychological variables entering into several disciplines via decision-making. In line with other authors (e.g. Einhorn and Hogarth, 1987; Pitz and Sachs, 1984; Weber and Johnson, 2009), Slovic et al. (1977) contend that decision-making research of a descriptive nature may have a role in helping decision-makers, and inform that certain organisations are

already engaged in programmes looking for that sort of assistance. Payne et al. (1992) suggest that preferences and beliefs result from training and experience, and depend on decision-makers, decision subjects and contexts features. Slovic et al. (1977: 6) stress the role of heuristics and biases, argue that "*heuristics may be faulted as a general theory of judgment because of the difficulty of knowing which will be applied in any particular instance*", thus clearly providing deserved relevance to the topic, and contend that important decisions are biased. Payne et al. (1992) support the importance of the heuristics and biases phenomena, and comment that research dealing with complex decisions has provided evidence that the more complex the decisions the bigger the utilisation of heuristics.

Some of the theories that followed EUT and SEU, which are considered in this study of a behavioural nature, kept many of the features of EUT and SEU, namely utility and probabilities, and introduced variables of a behavioural nature such as risk aversion, regret, decision weights, aspiration, and so forth. That is the case, for example, of Regret Theory (Loomes and Sugden, 1982; Loomes and Sugden, 1987; Sugden, 1993), of Prospect Theory (Kahneman, 1979) and Cumulative Prospect Theory (Tversky and Kahneman, 1992), of Rank-Dependent Utility Theories (Diecidue and Wakker, 2001; Quiggin, 1991) and of Security-Potential/Aspiration Theory (Lopes and Oden, 1999). Nowadays, and in spite of the fact that virtually everyone acknowledges the limitation of EUT and SEU from a descriptive purpose, there is a vast number of authors, who, in general, appreciate the prescriptive side of classical decision theories such as EUT and SEU, and produce work related to those theories addressing some specificities. However, other topics such as attention, emotion, perception, attitudes, propensities, inference, memory, cognitive maps, heuristics and biases, expectations, goals, incentives, information acquisition, information processing, learning, experience and so forth, became as well part of behavioural theory, since their importance has been recognised by many authors.

Preferences and inferences are related and are part of the same cognitive processes, not distinct realities (Weber and Johnson, 2009), that is, preferences are not just part of something of a normative nature, and thus reserved to economic science, while inference is not part of something else not connected to the cognitive processes. Before a problem is addressed, decision-makers need to process the information that is made available to them and, or, that they have gathered themselves and which represent the decision subject (Pitz and Sachs, 1984). Decision-makers restructure decision subjects

with the purpose of eliminating conflict and, or the purpose of simplification. Such restructuring is related to the way decision-makers process information, whether information is transformed and, or, rearranged and, or, eliminated (Payne et al., 1992). Einhorn and Hogarth (1987) emphasise the importance of information acquisition, and of the role of attention in that process, namely selective attention and cue or feature identification and salience, being salience the familiarity and, or, intensity and frequency of the feature (or stimuli), noting that salience leads to diagnosis.

Weber and Johnson (2009) suggest that in decision-making processes, where experience prevails, decision-makers focus their attention on past decision features, and propose that more recent consequences are more important from an attention focus standpoint, than older consequences. Einhorn and Hogarth (1987) point out that it is difficult to separate good outcomes from good decisions, and bad outcomes from bad decisions, in that learning from decisions made results from outcomes' feedback, and suggest that outcomes cannot be disregarded when evaluating decision-making. Pitz and Sachs (1984) argue that representativeness, that is, judgments of similarity between problems, or situations, or decision subjects, or the perception of causality between stimuli (information for instances) and outcomes, form the basis for inference. Connection, or perceived connection, between events is context dependent, and depends as well on the availability of cues to establish such connections. Significantly, Einhorn and Hogarth (1987: 61) stress that "*normative models gain their generality and power by ignoring content in favour of structure and thus treat problems out of the context*", and argue that decision-making theory shall include contextual and decision-maker related variables.

Weber and Johnson (2009) relate attention, or rather selective attention, to perception, and situate such relationship at the initial stages of the decision-making processes, that is, at the identification and assessment phases. Attention is a limited resource that needs to have a proper focus. Novel stimuli draw the focus of attention, whereas repeated stimuli lead to driving the focus away, since decision-makers do not notice those stimuli anymore, or the stimuli do not elicit anymore any type of reaction by decision-makers (Weber and Johnson, 2009). Pitz and Sachs (1984) suggest that people look for cues to confirm their initial perceptions, rather than to contradict them. Similarly, Weber and Johnson (2009) suggest that selective attention focus could explain inconsistencies in judgment and decision-making. In the same vein, Pitz and Sachs (1984) argue that decision-makers deal with information through anchoring and

adjustment (Tversky and Kahneman, 1974), confirming that the initial perceptions could be the most important ones.

Representation of a decision subject depends on decision-makers' experiences (Pitz and Sachs, 1984, Weber and Johnson, 2009). Tversky and Kahneman (1974), who present several examples of different choices of equivalent problems that have elicited different responses from decision-makers, depending on how the problems were framed, that is, on how the information was presented, posit that the way information is provided to decision-makers, influences their construction of preferences, by making them focus more or less on certain features of that information. It is worthwhile noting that in strategic decision-making processes, both experience and information play an important role. Therefore, it is expected to see the attention of decision-makers focused on both information and experience, and, thus, it is expected that information related issues, such as framing, and experience, play a role in strategic decision-making. Attention is also driven by emotions (Weber and Johnson, 2009). Decision-makers have emotions towards features of the decision subject and of the context. Those emotions draw attention to specific features and lead decision-makers to behave in certain ways. Nevertheless, Weber and Johnson (2009) also suggest that decision-makers give more decision weight to the status quo.

Weber and Johnson (2009) draw our attention to the importance that goals, material and non-material, have on decision-making. According to Einhorn and Hogarth (1987) judged rationality results from instrumental rationality, that is, the appropriateness of means to achieve the ends and the very nature of the ends, that is, of the goals themselves, keeping in mind that goals are part of the representations that people have of the contexts in which they are inserted. By goals, Weber and Johnson (2009) mean, for example, things such as making decisions in a sound way, or with a sound process, or making sure that whatever is decided is justifiable. Weber and Johnson (2009) suggest that the antecedents of goals are the characteristics of the decision-makers, the decision domain, and the context in which the decision is supposed to be made.

What is herein referred to as Behavioural Decision Theory, is very diverse and address many topics as seen above. In common, behavioural decision theories have a concern in respect to behaviour, acknowledging that behaviour is relevant, and, as matter of fact, that behaviour is more important than norms and rationality derived from

those norms. Beach and Lipshitz (1996) stress that decision-making theory has evolved through four stages: first of all scholars focused on utility maximisation and rationality not caring about behaviour or simply stating that rational behaviour should conform to axioms (von Neumann and Morgenster, 1953; Savage, 1972). On a second phase or stage, scholars, recognising that behaviours were not always rational as per the canons of EUT and SEU, but recognising the importance of behaviour, argued that the norms were correct and that behaviour that did not follow the norms was incorrect or irrational and should, therefore, be changed (Bell, Raiffa and Tversky, 1988). A third stage occurred when supporters of maximisation and norms, who also cared about behaviour, or who cared more about behaviour than about norms (Beach and Lipshitz, 1996) to the point that they felt that the most important thing was not to change the behaviour of decision-makers, but rather understand it, started adapting the theory to the actual behaviour of decision-makers – it is the case of Kahneman and Tversky (1979). Finally, the fourth stage, that, curiously, started when EUT was at its highest popularity among the academic world, that is, in the 1950's (Simon, 1955, 1959), results from a reaction to norms and maximisation as a model of decision-making putting individual and, or, collective behaviour at the centre of the discussion.

As pointed out in this study, being rational, within the frame of EUT and SEU does not mean having, or not having, a reason to think and, or, do something. However, that point of having reasons to think, or do something, including human limitations in terms of computational capabilities and information processing limits, is the main claim made by Simon (1959) against utility maximisation, while Kahneman and Tversky (1979) and Tversky and Kahneman (1990) attack rationality via the framing effects and the existence of heuristics and biases.

Yates (1990) argues that decision-making, and, therefore, it is contended here, risk-taking, have been studied with two purposes: normative or prescriptive and descriptive. Bell, Raifa and Tversky (1988), however, make a distinction between normative and prescriptive purposes by assuming that there is actual behaviour that might be modified by making decision-makers aware of the factors influencing decision-making, such as framing, and that such awareness, in this example, is of a prescriptive nature. In the 1940s and 1950s (e.g. von Neumann and Morgenstern, 1953), economists tried, and keep trying nowadays, to obtain generalisations that would allow them to forecast economical behaviours, such as families, businesses and governments' consumptions

and families, businesses and governments' investments. Forecasts, for example, have a prescriptive character, in terms of expectations of behaviours, which is based on sets of rules, or norms, or axioms, as is the case of EUT, thus the normative designation. The starting point for the normative, or prescriptive, purpose of the studies of decision-making, and risk-taking behaviour, was the expected utility theory, and the triggers for the descriptive purpose of the studies on those very same topics were the challenges to the definition of rationality used by the subscribers of expected utility, which were made by Simon (1955) and followers, and numerous examples of actual behaviour that challenged assumptions of forecasted/expected behaviour (e.g. Allais, 1953; Edwards, 1954, 1961; Ellsberg, 1961; Kahneman and Tversky, 1979; Tversky and Kahneman, 1974; Tversky and Kahneman, 1992).

Real life examples that have been used exhaustively to study risk behaviour are lotteries and insurances, and examples of "*practical decision situations*", as Yates (1990: 222) puts it, that have served the same purpose are, for example, a choice to be made by a fast food company between ways to organise a counter service (Yates, 1990). However, with the exception of lotteries and insurances with a caveat that is mentioned below, most of the examples provided by literature that sustain expected utility theory either consider recurrent decisions for similar situations, or one shot decisions concerning recurrent situations. Insurances and lotteries might be examples of one-shot situations from a decision-maker perspective. Nevertheless, those are recurrent situations from the perspective of the insurers and lotteries organisers. In spite of the fact that the work of Daniel Bernoulli (1738) has, on one hand, inspired many scholars, who have developed risk-taking and decision-making theories based on expected utility and that, on the other hand, that same work clearly spells out that certain decisions are made or should be made because people, simply, can or cannot afford to make them, this latter aspect has been systematically neglected even in studies related to insurance, a topic that is directly addressed by Bernoulli when providing an example of a merchant who wanted to ship some goods from Amsterdam to San Petersburg (1738: 30)

If, therefore, Caius, apart from the expectation of receiving his commodities, possesses an amount greater than 5,043 rubles he will be right in not buying insurance. If on the contrary, his wealth is less than this amount he should insure his cargo.

Two hundred years after, Lopes (1987: 255) bluntly speaking about insurances and lotteries say, in a way that is argued herein summarises very much the practical utilisation by individuals of maximisation and rationality concepts, that “*countless hours have been spent by psychologists and economists alike in trying to explain theoretically why people buy both lottery tickets and insurance. Lottery tickets cost a dollar. One. We buy insurance (when we can afford it) so that we can sleep better. Is it really so strange that we should want to buy both?*”

The view adopted in this study is that there are two major sources of criticism of Expected Utility Theory (EU) and Subjective Expected Utility Theory (SEU), and one source of support. On the one hand, there are those who reject EU, tout court, based on the approach that, no matter what, human beings have computing limitations, limited information storage capacities and limited capacities to predict events, and, therefore, cannot be the economic man assumed to exist by EU (e.g. March and Simon, 1993; Simon, 1955), and those who departed from EU by testing some of its axioms and concluding that actual behaviours did not match normative behaviours, as prescribed by EU, without, nevertheless, challenging the concepts of maximisation and rationality, but rather including new concepts such as weights affecting probabilities (e.g. Kahneman and Tversky, 1979; Tversky and Kahneman, 1992). On the other hand, there are numerous authors who have tried to ‘fine tune’ EU by finding or proposing mathematical relaxations (e.g. Fishburn, 1988, 1989). It is argued in this study that those who criticise EU based on examples that provide evidence against the axioms, and those who look for relaxation of those same axioms, are different sides of the same coin if, it is concluded, they do not challenge the maximisation of utility concept. The opinion espoused here is that the fundamentals of EU are challenged mainly by those who in the late 1940’s and in the 1950’ and 1960’ were part of what became known as the Carnegie School that is Herbert Simon, James March and Richard Cyert. However, the fundamentals of EU and SEU were weakened from within, that is, by those who although not challenging maximisation and utility, did challenge the axioms, the notions of preference and ultimately the notions of rationality, and contributed with an impressive amount of evidence against EU and SEU. We are speaking essentially about Amos Tversky and Daniel Kahneman.

A5.5.1 Prospect Theory and Cumulative Prospect Theory

Prospect theory became one of the most popular decision-making theories for researchers and practitioners, overcoming expected utility theory, and deals with many different empirical subjects. Camerer (2000) provides examples of the utilisation of prospect theory in fields going from stock market to consumer goods, including insurance, lotteries, labour economics, and consumer choice, where expected utility theory is of little help to explain behaviour. Further examples of the utilisation of prospect theory are provided in table A3.1, below. Prospect theory explains, descriptively, many of the behaviours that expected utility cannot explain, such as framing, behaviour related to low probabilities and high stakes, risk aversion in the domain of gains and risk seeking in the domain of losses. Furthermore, prospect theory is not built and supported by axioms, in spite of some axiomatisation efforts related to cumulative prospect theory (Wakker and Tversky, 1993), but rather by self-explanatory experiments, which contributes to its popularity.

Tversky and Kahneman (1986:252) state that expected utility theory “*does not provide an adequate foundation for a descriptive theory of decision making.*” Nevertheless, and despite the fact that these two authors are together with Herbert Simon, James March, Paul Slovic, Baruch Fischhoff, Sarah Lichtenstein, Maurice Allais and Daniel Ellsberg among those who have provided more examples and or arguments against expected utility theory, or subjective utility theory, it is argued in this study that Amos Tversky and Daniel Kahneman challenge the descriptive role of the theory but are very sparse in terms of comments to its normative aspect. This could be because Tversky and Kahneman intended to position prospect theory as a descriptive theory of behaviour in the face of risk, without attacking the normative merits of expected utility theory. Furthermore, Tversky and Kahneman (1981) clearly indicate that they see prospect theory as an evolution of expected utility theory when they say, (pg. 454), that they “*have presented elsewhere a descriptive model, called prospect theory, which modifies expected utility theory so as to accommodate these observations.*” The ‘observations’ that Tversky and Kahneman (1981) make reference to, are, (pg. 454), “*patterns of preference which appear incompatible with expected utility theory*” that people exhibit.

Table A5.1: Examples of Topics where Prospect Theory has been used

Subject	Author(s)
Escalating commitment in individual and group decision-making	Whyte (1993)
Income tax withholding	Schepanski and Shearer (1995)
Economic restructuring in some Latin American countries	Weyland (1996)
Health values	Treadwell and Lenert (1999)
Asset prices	Barberis et al. (2001)
Consumer choice	Thaler (2000)
International relations	Levy (2002)
Liquidation decisions	Kyle et al. (2006)
Route choices in risky traffic networks	Gao et al. (2010)

Kahneman in the preface to his and Tversky's edition of *Choices, Values and Frames* (Kahneman and Tversky, 2000), says, speaking about prospect theory (pg. x), “we stayed within the decision theoretic framework in which choice between gambles is the model for all decisions. We did not challenge the philosophical analysis of choices in terms of beliefs and desires that underlies utility theory, nor did we question the normative models of rational choice offered by von Neumann and Morgenstern and later by Savage.” However, Tversky and Kahneman (1986) get to the conclusion that the differences between the behaviours expected according to normative theories of decision-making, that is, expected utility and subjective expected utility, and actual behaviours are so notorious that there are no relaxations of the normative system that could bring normative and descriptive theories close enough. As a matter of fact, all the main assumptions of expected utility theory, that is, cancellation, transitivity, dominance and invariance (Tversky and Kahneman, 1986), which are supported by the axioms of von Neumann and Morgenstern (1953) are challenged by the authors of prospect theory (Kahneman and Tversky, 1979) and cumulative prospect theory (Tversky and Kahneman, 1992). Kahneman and Tversky (1986) push the differences

between normative and descriptive theories to the point where they say (pg.272), that “*the dream of constructing a theory that is acceptable both descriptively and normatively appears unrealisable.*”

Tversky and Kahneman (1974) started by challenging the ways by which decision-makers allocate probabilities to events, and showed the existence of several heuristics and biases related to that allocation of probabilities. Later on, these same authors observed that there are choice problems for which expected utility theory does not provide adequate explanations, and proposed an alternative theory, that is, prospect theory (Kahneman and Tversky, 1979). These authors using monetary examples, conceptually similar to Allais (1953), although with less extreme values, confirmed, as other authors had done before (Allais, 1953; Ellsberg, 1961), the existence of “*common attitudes toward risk or chance that cannot be captured by the expected utility model*” (Kahneman and Tversky, 1979: 267). There are choices where the rule of maximising expected utility is not followed and there are choices where behaviours related to cancellation, transitivity, dominance and variance do not obey the von Neumann and Morgenstern (1953) axioms of rationality. More importantly than confirming that there are circumstances when maximisation of expected utility is not followed, other authors had done that before, Kahneman and Tversky (1979) noticed other phenomena that made prospect theory more than a simple extension of expected utility theory, which are mentioned here below.

Prospect theory keeps some of the principles of expected utility, such as choosing the prospect with the highest value, although not claiming any maximisation principle, and multiplying values, or utilities, of alternatives by their probabilities, although considering probabilities affected by weights. Among the main differences in respect to expected utility theories, and besides the weighting aspect of probabilities referred above, another major difference is that in prospect theory outcomes are presented as gains or losses against a reference. That reference point is, in reality and as far as individual decision-making is concerned, the status quo of the individual reaping the benefits of the gains or suffering the losses. While expected utility theory is characterised by the shape of the utility function, which has a concave shape, prospect theory is characterised by two functions, a value function for subjective value, or utility,

and a weighting function for decision weights, that is, for weights assigned to probabilities (Tversky and Fox, 1995).

Prospect theory divides decision processes, in theoretical terms, in two phases: in a first phase alternatives or options or prospects are framed and edited and in a second phase are evaluated (Kahneman and Tversky, 1979; Tversky and Kahneman, 1986; Tversky and Kahneman, 1992). Framing is basically the way the decision subject is presented, that is, and for example, if the decision subject is presented in terms of rates of death or rates of survival, in terms of gains or in terms of losses, or in terms of an expenditure or of a benefit. Editing is a process where prospects are 'cleaned' and, or, 'prepared' in order to be presented in ways that make them easily comparable. That is the case, for example, of eliminating options that are dominated by others (Tversky and Kahneman, 1986), being dominance understood as the case when "*one option is better than another in one state and at least as good in all other states*" (Tversky and Kahneman, 1986: 253). Edwards (1996: 20) says that 'editing' is a phase during which "*four major sequential operations occur: coding, combination, segregation and cancellation.*" When coding, a decision-maker defines if a prospect is located in the domain of gains or losses, while combination is the operation that combines probabilities related to the same outcome. Segregation consists of the separation of risky and riskless elements of a prospect, and cancellation in the elimination of the elements that are common to prospects involved (Edwards, 1996). The evaluation is simply the phase of the decision process in which choice of the prospect with the highest subjective value for the decision-maker is made. The thesis adopted in this study, however, based on empirical evidence and literature (Edwards, 1996), is that in practice decision-makers do not follow this type of rules, at least explicitly, especially in the case of decisions that are not of a routine nature. In reality, (Tversky and Kahneman, 1986: 256) speaking about violations of dominance and variance acknowledge that "*the failure to construct a canonical representation in decision problems contrasts with other cognitive tasks in which such representations are generated automatically and effortlessly.*"

Tversky and Kahneman (1992) argue that prospect theory had to be modified based on suggestions that prospect theory faced problems of stochastic dominance and of subadditivity of the weights assigned to probabilities. These authors suggest that those

two issues could have been addressed by making sure that prospects clearly dominated were eliminated altogether, and that decision weights were normalised in order to add up to 1, respectively (Tversky and Kahneman, 1992). Instead cumulative prospect theory was developed. By applying decision weights to the cumulative distribution function rather than to each probability individually, Tversky and Kahneman (1992) contend that they solve stochastic dominance and subadditivity.

The main differences between cumulative prospect theory and prospect theory are that in cumulative prospect theory weights are assigned to cumulated probabilities rather than to each probability individually, as is the case in prospect theory, and allows for different decision weights to be assigned to losses and gains (Tversky and Kahneman, 1992), that cumulative prospect theory deals with uncertainty, that is, unknown probabilities, and risk, that is, known probabilities, while prospect theory deals with risk only (Chateauneuf and Wakker, 1999), that cumulative prospect theory expands prospect theory in respect to the number of outcomes that can be treated at once and, finally, that stochastic dominance is met in cumulative prospect theory which is not the case in prospect theory (Fennema and Wakker, 1997). Fennema and Wakker (1997) contend as well that cumulative prospect theory allows for a better modelling of diminishing sensitivity. Diminishing sensitivity is a phenomenon that occurs when an individual decision-maker allocates a different subjective value to a loss or a gain that is given in absolute terms, depending on where, that is, for which levels of wealth that loss or gain is located. In the words of Tversky and Kahneman (1986: 259) "*preferences are quite insensitive to small changes of wealth but highly sensitive to corresponding changes in reference point.*" For example a gain of 10 that changes wealth from 10 to 20 is given a bigger subjective value than a gain of 10 that changes wealth from 190 to 200. Likewise, a loss of 10 that changes the wealth of a decision-maker from, for example, 20 to 10 is given a bigger subjective value than a loss of 10 that changes the wealth of a decision-maker from 200 to 190.

Prospect theory and cumulative prospect theory are said to explain the "*four fold pattern of risk attitudes: risk aversion for gains and risk seeking for losses of high probability; risk seeking for gains and risk aversion for losses of low probability.*" (Tversky and Kahneman, 1992: 297). However, in spite of their wider acceptability as alternative theories to expected utility, since they accommodate many of the behaviours that expected utility cannot explain, prospect and cumulative prospect theories face, like expected utility theory, criticism due to behaviours or paradoxes that those theories do

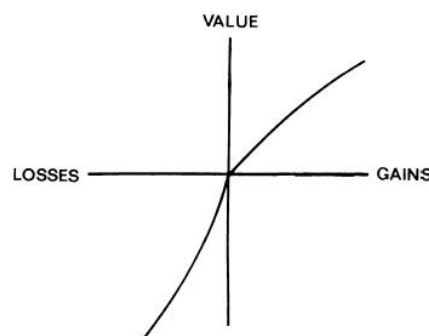
not explain (for a review of paradoxes see e.g. Birnbaum, 2004; Birnbaum, 2008; Birnbaum, Patton and Lott, 1999).

A5.5.1.1 Main Features of Prospect Theory

The main features of prospect theory are (Khaneman and Tversky, 1979; Kahneman and Tversky, 1984; Tversky and Kahneman, 1986; Tversky and Kahneman, 1992; Tversky and Fox, 1995; Fennema and Wakker, 1997):

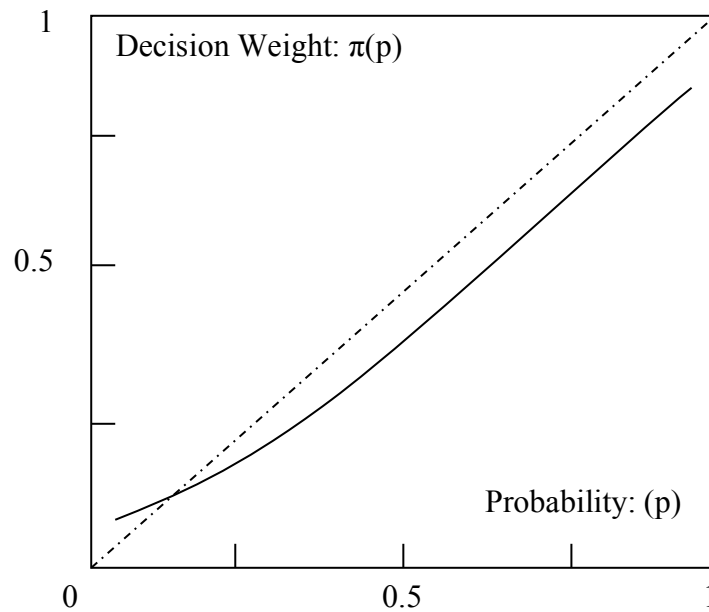
- i) Attitude toward risk depends on outcomes and weighed probabilities. This applies to both prospect theory and cumulative prospect theory (Fennema and Wakker, 1997);
- ii) Individual decision-makers are risk averse in the domain of gains and risk seeking in the domain of losses being their function of subjective value (utility) S-shaped. That S-shaped function is concave in the domain of gains and convex for losses and steeper in the domain of losses (fig. A4.1). The function being steeper in the domain of losses indicates that everything else being equal for losses and gains of the same amount, decision-makers give more value to losses than to gains. However, as cautioned by Kahneman and Tvserky (1986: 258) the “*hypotheses regarding the typical shape of the value function may not apply to ruinous losses or to circumstances in which particular amounts assume special significance.*” This particular feature of prospect theory does not change in cumulative prospect theory (Tversky and Kahneman, 1992).

Fig. A5.1: Risk Aversion - Source: adapted from Kahneman and Tversky (1979)



- iii) Outcomes, that is, the subjective value function, shall be analysed in terms of gains and losses to the individual decision-maker, rather than in terms of the total assets position after those gains or losses, and shall be analysed against a reference point, typically the status quo or any other neutral outcome reference (Kahneman and Tversky, 1986). The value function is such that it shows diminishing sensitivity, that is, gains and losses are felt as more important when close to the reference point (Tversky and Fox, 1995). As far as domains of gains and losses are concerned prospect theory considers that the subjective value of an outcome shall be discounted against a reference point. Therefore, in prospect theory, a prospect is valued according to $\sum \pi(p_i)v(x_i-r)$, where π is the weight assigned to probability p_i , v is the subjective value, or utility, of gain or loss associated to outcome i deducted from reference point r . Kahneman and Tversky (1984) argue that the reference point is not always objective, and provide an example of an employee of an organisation, who, although getting a salary raise, is disappointed and may experience that raise as a loss if that salary raise is smaller than those obtained by his or her co-workers;
- iv) Weights are assigned to probabilities associated to outcomes. Due to the assignment of weights, the association between probabilities and outcomes is not linear anymore, as is the case in expected utility and subjective expected utility theories. The relationship between weights and probabilities can be observed in fig. A3.2 below. Low probabilities are overweighted, while moderate and high probabilities are underweighted (Tversky and Kahneman, 1986). The weighting function has two reference points, which are extreme points: impossibility and certainty. Like the subjective value function, the weighting function evidences diminishing sensitivity, that is, changes in probability are more important when close to the reference points. It is worth noting, in terms of the diminishing sensitivity phenomenon, the change from impossibility to possibility and from possibility to certainty compared to changes from some level of possibility to another level of possibility. In the words of Tversky and Fox (1995: 97) *“an event has greater impact when it turns impossibility into possibility or possibility into certainty than when it makes a possibility more or less likely.*

Fig. A5.2: Decision Weights vs. Probabilities - Source: adapted from Khaneman and Tversky (1979)



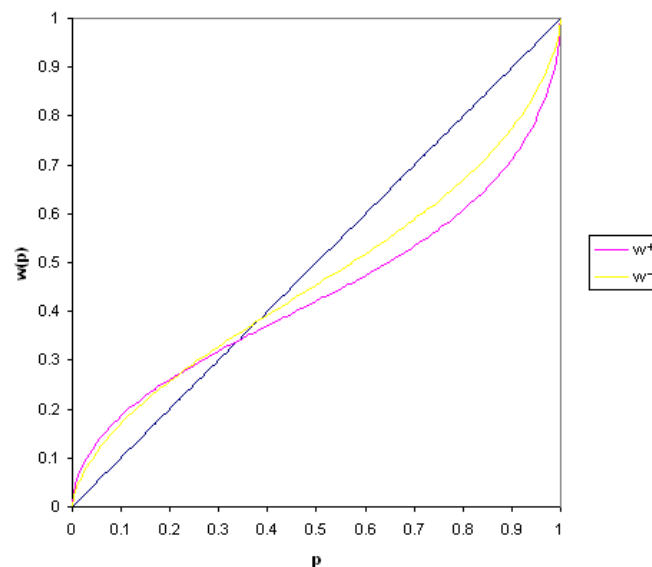
- v) The curve of probabilities to which weights are assigned does not behave well in the regions close to certainty, that is, close to 0 probability or close to 1 probability. Decision-makers give, in relative terms, more value to a change in absolute terms that makes something possible certain, or something impossible possible, rather than to changes in levels of possibility.
- vi) Losses of an equivalent absolute amount are given more value than gains, that is, losses have more value than gains in relative terms. Decision-makers exhibit thus loss aversion (Kahneman and Tversky, 1984). Therefore, there is a bias towards the status quo unless alternatives or options provide higher probabilities of gains than losses. In other words a decision-maker if faced with a choice that can bring him a gain of X or a loss of X would prefer the status quo. He or she would need a probable gain of X bigger than a probable loss of Y to accept to make a decision with outcomes either X or Y. The value function is steeper for losses than for gains.

A5.5.1.2 Main Features of Cumulative Prospect Theory

Cumulative prospect theory, like prospect theory, considers two functions: one related to the subjective value of gains and losses and one related to the non-linearity of

probabilities once assigned weights. Although for the subjective values of gains and losses the function does not change between prospect theory and cumulative prospect theory, for probabilities with assigned weights the functions are different, since in cumulative prospect theory probabilities are dealt with cumulatively (fig. A3.3). Cumulative prospect theory treats gains and losses separately. The theory is rank and signal dependent, that is, outcomes are ranked in terms of their subjective value, probabilities are cumulated and two different distributions of probabilities are taken into account: one for gains and one for losses.

Fig. A5.3: Weights assigned to Probabilities - Source: adapted from Tversky and Fox (1995)



According to prospect theory the decision weights assigned to the probabilities, which in their turn are associated to outcomes, are not probabilities and shall not be seen as degrees of belief (Kahneman and Tversky, 1979). Those weights have a descriptive purpose, which is to adjust the probabilities in the vicinity of the ranges impossible to possible and possible to certain. It may happen that, empirically, weights correspond not only to views on probabilities but also to the willingness to achieve a particular outcome. Kahneman and Tversky (1984) suggest that in the vicinity of the range impossible to possible, that is, for low and or very low probabilities those probabilities are either grossly overweighted or neglected. Those authors justify individual decision-making behaviour for both lotteries and insurances with the overweighting-neglecting duality. Kahneman and Tversky (1984: 345) say that “*people*

are often risk seeking in dealing with improbable gains and risk averse in dealing with unlikely losses."

A5.5.2 Naturalistic Decision-Making

Naturalistic decision-making (NDM) refers to the way people actually make decisions in their natural contexts, that is, in their personal and professional lives (Zsombok, Beach and Klein, 1992), rather than in laboratories (Klein, 2008), having thus solely a descriptive purpose and being concerned, mainly, about individual decision-making. According to these authors, NDM is different from decision-making based on maximisations of any sort, basically because the latter focus on choices among options, while the former focus on situation assessment and on the diagnosis of the decision subject. NDM encompasses different theories, which, however, share a viewpoint where classical decision-making theory and its "*closer descendants*" (Connolly and Koput, 1997: 285), Prospect Theory for instances, are seen as descriptively inadequate (Connolly, 1996). NDM includes Image Theory, Recognition-Primed Decision-making (RPD), Story Telling, Belief Updating and Confirmation Seeking, among other theories or models of decision-making.

Naturalistic decision-making is concerned essentially with those ill-structured decisions where the situation changes continuously, that is, environments are uncertain and dynamics, and causes and courses of action are difficult to identify, if at all possible, decisions that have to be made under time constraints, which processes evolve as information, most of the time ambiguous, unfolds, where goals change and actions are adjusted during the process, where multiple decision-makers may have multiple agenda and multiple and conflicting goals and make real time decisions, and where stakes are high (Connolly, 1996; Shattuck and Miller, 2006). NDM theorists have also noticed the existence of actions and feedback loops and the interaction of multiplayers (Shattuck and Miller, 2006). In short naturalistic decision-making is concerned about decisions that are not routine, although the experience of the decision-maker plays an important role (Beach and Connolly, 2005; Zsombok, Beach and Klein, 1992). In spite of a clear intention to expand NDM to decision-making in organisational context, by arguing that the situations with which NDM is concerned are pervasive in organisational contexts (Connolly, 1996), NDM's main characteristic is, probably, the reliance on experts and thus looks more adapted to operational contexts. Simple

observation makes it difficult to say that firms have only experts making strategic decisions. In reality it seems that the opposite is more accurate. Decision-making at an organisational level is made by groups of individuals, where some experts are certainly included, but where, in general, most of the decision-makers are generalists and not specialists in a given field, even if they have spent all their careers in a single industry. However, some of the NDM theories (e.g. Recognition Primed Decision model or RPD) were built around the observation, in real life contexts, of decision-making by decision-makers, who “*are highly familiar with the situations in question and that they have extensive training and experience in dealing with those situations*” (Beach and Connolly, 2005: 32), which does not correspond, it is contended in this study, to decision-makers in business firms. In reality Beach and Connolly (2005) suggest that the RPD model is of little use for the study of decision-making behaviour, when decision-making situations or subjects are not reasonably identified, and experience and training are of little help.

The initial development of naturalistic decision-making results essentially from the study of decision-making of fire-fighting commanders (Kahnemann and Klein, 2009), that is, field action, from mid to the end of the 1980s, beginning of the 1990s, which was expanded to the analysis of military decision-making. Lately, in a series of articles (e.g. Klein, 2008; Lipshitz and Strauss, 1997, Lipshitz et al., 2001) proponents of naturalistic decision-making have been speaking about interactions with decision-making in organisational contexts, arguing that naturalistic decision-making draws from the work of Richard Cyert, James March and Herbert Simon, who were the chief promoters and advocates of bounded rationality, and the chief challengers of rationality, as defined by classical decision theory, and of maximisation, and who brought individual decision-making into organisational contexts. It is worthwhile noting that observation of corporate life does not suggest that decision-makers involved in strategic decision-making are placed under the same time constraints of fire-fighting commanders, or military officers, in action. Furthermore, experience achieved by intensive training, such as those of military or firefighters, where certain hypothetical situations are exhaustively repeated are not part of the training of corporate managers. On the other hand, in spite of the existence of conflicting goals, essentially at an individual level, observation suggests that at a corporate organisational level conflicting goals are, in general, reasonably accommodated, which does not seem to be the case, for

example, either at an individual or organisational level, when military have to conciliate, or otherwise, “*defeating the enemy, causing no harm to non combatants, and protecting soldiers from harm*” (Shattuck and Miller, 2006: 990). This suggests that in spite of many shared concerns between proponents of naturalistic decision-making and other behavioural theorists, who study decision-making in organisational contexts, there are important differences that may lead to different conclusions.

Among the theories that have “*heretical approaches to decision making*”, Image Theory is the “*best developed*” and is the theory that “*more broadly represents the cluster of heretical theories*” (Connolly, 1996: 197).

A5.5.3 Image Theory

By the 1980s there was no consensus in respect to the way people make decisions, but we were at a point where there was a beginning of consensus in respect to the way people do not make decisions, especially in the case of decisions made in natural contexts, including the organisational one. After three decades, during which the way people assign probabilities and the way people maximise utility were challenged, some authors looked for alternative theories to explain decision-making, which changed completely the decision-making paradigm.

Beach and Mitchell (1987) proposed a theory that basically says that decision-makers have principles, which lead to the pursuit of objectives. Plans are created or adopted to achieve the goals, and the decision-maker, looking for compatibility and profitability, anticipates the results of the plans. In short, characteristics of the decision-maker are considered. A decision is represented by the adoption of new principles and, or, new goals and, or, new plans, and a measurement of the progress, or implementation. Making a decision means that new principles and, or, new goals and, or, new plans are compared to the existing ones, seeking for compatibility, or, alternatively, potential losses and gains are compared in a rather traditional fashion. Situations that require decisions to be made and become, thus, decision subjects, are framed and are either recognised, or not. Recognition recalls principles, goals and plans of the decision-maker (Beach and Connolly, 2005).

Beach and Mitchell (1987: 219) argue that “*most decisions are made rather simply (sufficient compatibility) and that it is inappropriate to use high-powered, very precise,*

maximising models to describe the general run of decisions because that simply is not how such decisions are made." In business firms, principles and values of decision-makers are those that they hold concerning the way they see the functioning of their firms within their industries and business environments, while the goals are the firm goals and the courses of action correspond to the plans and tactics adopted to achieve the goals (Beach et al., 1988). One important caveat to mention is that principles and values that decision-makers hold in respect to the businesses of their firms shall not clash with their own general principles and values, otherwise, conflict will arise.

Image theory is based on cognitive maps, that is, on mental representations that individuals have of what surrounds them and, in this specific case, of decision-making. Those maps include the principles and values of decision-makers, where they want to go and, or, what they want to achieve, and the actions they need to take in order to achieve their goals. The actions, revealed through the behaviour of decision-makers, result from the specifics of the plans, and are called tactics (Beach and Mitchell, 1987). When a new principle, or value, is adopted that may lead to the adoption of new goals and new plans to achieve those goals. New goals lead to new plans, and new plans alone are ways to achieve goals already defined. Results of the application of plans are anticipated in order to compare the anticipated results to the objectives defined. That may lead to the adoption of new plans, or the modification of existing plans. Compatibility, or incompatibility, of principles and values and goals and plans is not measurable. Compatibility and incompatibility rather manifest themselves through feelings of comfort or discomfort (Beach and Mitchell, 1987). In spite of the fact that compatibility shall be sufficient, in order to adopt a new principle, goal or plan, it is not clear how such sufficiency is defined. Beach and Mitchell (1987) contend that principles and values of decision-makers are adopted – not purposely though – early in life. Because of this early adoption, the existing principles and values are predominant and may prevent the adoption of new and valid principles and values, goals and plans.

Image theory starting point is quite obvious and results from observation of decision-making in organisational contexts. Many times decision-makers do not have options or alternatives to chose. Many times decision-makers in organisational contexts have a situation that develops and either do something or do nothing, that is, look for an action, or stick to inaction, and action means in general one single alternative (Beach et

al., 1988; Mintzberg, 1975), while inaction means the status quo. Beach and Mitchell (1988) argue that it is more important to know why an alternative, or option, is considered, or selected, than why an alternative is chosen among selected alternatives, especially considering that many times decision-makers work with only one alternative and the status quo. Furthermore, they argue that if alternatives were considered in terms of relative merits there would be always alternatives, when, in reality, many times there are no alternatives whatsoever, which are retained.

Image Theory application has been expanded to organisational decision-making. However, according to Beach and Connolly (2005: 173) "*the individual members make decisions, either as agents of the organisation or as a participant whose individual decision is in some way combined with the individual decisions of the other participants to arrive at a collective decision.*" In other words, organisational decision-making cannot be isolated from individual decision-making.

ANNEX 6. DECISION-MAKING AS A PROCESS

A6.1 Decision-making and the Bottom Line - Firm Performance

Decision-making is important in an organisational context to the extent that the outcomes of decisions made are related to firm performance, regardless of the definition of performance adopted. The point made here is that, no matter the metrics chosen, decisions need to have a purpose, that is, outcomes need to be a consequence of the decisions made and, as such, are supposed to fit the purpose. If the purpose is met, if goals are achieved, if firms and, or, individuals perform, and how they perform, that is something that is beyond the scope of this study. However, it is important to mention that the author of this study argues that decision-makers think about the consequences of decision-making, namely if purposes are going to be achieved, or not, since in those thinking processes managers are evaluating and balancing risks. Finkelstein et al. (2009: 4) say that they “*believe that performance is determined in great part by the strategic choices and other major organisational decisions made within the firm.*”

Results of firms depend on numerous decisions made such as the ways those firms decide to organise themselves, the ways they approach markets, the ways they act or react vis-à-vis their competitors, the staff they hire and how (especially mid and top level managers), and so on. Therefore, factors having an impact on decision-making processes and strategic decisions, have an impact on companies' performance as well (Schwenk, 1995), and so do have the strategic decision-making processes (Dean and Sharfman, 1996). Mintzberg (1973) considers that making important decisions, that is, strategic decisions (Mintzberg, Raisinghani et Théorêt, 1976) and linking those decisions together is strategy building, and adds that those decisions are made under different modes, or organisational behaviours, in respect to the way firms face or look for opportunities, threats and the like (Mintzberg, 1973). Mintzberg, in a later paper (1978: 934), is even more precise when, speaking about the way literature deals with the topic of “*strategy formulation*”, says that that literature “*addresses the question of how organizations make and interrelate their significant (that is, strategic) decisions*”, thus clearly identifying, if there were any doubts, strategy-making and strategic decision-making.

On the one hand, tangible indicators such as profit, sales growth and market share, and intangible indicators, such as shareholders' satisfaction, may measure firm performance as proposed by Lumpkin and Dess (1996). On the other hand, scholars (e.g. Eisenhardt, 1989; Gordon and Ditomaso, 1992) contend that decision-making processes have a direct impact on some metrics of firm performance. For example, Gordon and Ditomaso (1992) point out, based on a study of Denison (1984), that decision-making processes have an impact on return on investment, while Eisenhardt (1989) says that quick decision-making processes, at least in high-velocity business environments, where products change quickly, as is the case in the computer industry, are related to performance, being performance measured based on objective metrics, such as sales growth and profit, and on subjective metrics based on opinions of CEO's in respect to company effectiveness and comparisons with competitors. Furthermore, Hart (1992) stresses that different types of organisational structures may direct to different preferences of performance indicators.

Fredrickson (1985) states that "*strategic decisions are those that commit firms to actions that will have significant effects on their long-term performance.*" However Fredrickson (1985) gets to the conclusion that firm performance is a contextual variable that, although influenced by strategic decision-making, reciprocally influences the attention that managers allocate to decision-making.

Direction of causal relationships between variables and performance is difficult to determine when variables are highly related, as, for example, in the case of organisational structures to scan the environment and the action of scanning the environment. It can be argued that the environment is scanned because there is a structure, or that the structure exists because there is something, for example business opportunities, to scan. Miller (1987: 8) argues that a proper alignment between scanning and structure "*will enhance performance*". In trying to establish links among scanning, interpretation, action and firm performance, for what Thomas, Clark and Gioia (1993) call sense-making, which phases are, in reality, the phases of a strategic decision-making process, performance was found to be related to action, what should not be a surprise, since scanning and interpreting lead decision-makers to action. However, those authors (Thomas et al., 1993) say that scanning and interpretation lead to action and, subsequently, to performance for issues seen by managers as controllable.

Dean and Sharfman (1996) question if strategic decision-making processes, or practices, should be related to firm performance or to 'decision effectiveness'. In short, they argue that "*effectiveness as perceived by external constituencies may of course differ from management's perceptions*" (Dean and Sharfman, 1996: 372), indicating that, on the one hand, performance metrics such as returns on investments or assets, sales, etc., may not be seen in the same way by managers and, for example, investors, and that, on the other hand, aspiration levels of managers may change overtime, reason why the relationship between the strategic decision-making processes and the goals of managers shall be defined by the time decisions are made, and not at a later stage.

What is at stake here are the strategic decision-making processes, or practices, and not the contents of the strategic decisions (Schwenk, 1995), that is, there is no intention to focus on particular decisions. More specifically, the crucial aspect in the context of this study is to find theoretical support for the existence of factors influencing strategic decision-making processes, or practices, and see where in those processes, or practices, perception is involved. It is also crucial to confirm that the perceptions that managers have of those factors influence the perceptions that managers have of the risks involved.

It has been argued that the contents of strategic decisions could have more influence on the strategic decision-making processes, than the contexts under which those decisions are made (Papadakis, Lioukas and Chambers, 1998; Pettigrew, 1990). For this study, such argument of level of influence between the contents of the decision issue and the factors influencing the decision process is irrelevant. That would not be the case, though, if contents or contextual factors did not play a role. It is contended herein, however, that both the decision content and the contextual factors do play a role.

Strategic decision-making processes have been approached by several angles: characteristics of decision-makers (Finkelstein et al., 2009), nature of the problem to be decided upon (Sitkin and Weingart, 1995), organisational variables (Sitkin and Pablo, 1992; Wiseman and Gomez-Mejia, 1998), such as organisations' structures (Miller, 1987), and environmental characteristics (Baird and Thomas, 1985). Nevertheless, regardless of the angle of approach, what is really relevant from an applied management perspective is that strategic decision-making and risk behaviour have been related to firm performance. For example, Eisenhardt and Bourgeois (1988) link power and politics, that is, the influence exerted by managers to influence decisions, by showing

that politics influence performance negatively in the case of rapidly changing business environments.

A6.2 Decision-making viewed as a Process

Decision, as defined by some dictionaries, is “*the act of making up one's mind*” (the Free Dictionary online by Farlex), a “*determination arrived after consideration*” (Merriam-Webster online), “*the act or process of deciding*” (Merriam Webster online). If the latter definition includes ‘process’ explicitly, the former definitions provided include ‘process’ implicitly through the expression ‘act of making’ or the notion of time associated to ‘after consideration’. It shall be noted, however, that it is not suggested here that processes are formal or informal. It is simply argued that decision-making processes, or practices, do exist. This point is of paramount importance in this study because many studies about individual decision-making concern only the choice among alternatives, that is, in those studies it is assumed that a decision is a point in time when a decision-maker, or a group of decision-makers, picks one among several alternatives using certain criteria. Beach (1993: 215) says “*decision theory and research have focused almost exclusively on choice – the selection of the best option from a choice set containing two or more options. Largely overlooked is the question of how those particular options got there in the first place – why them and not others?*”

The concern here is not the decision, or choice, act, but rather the decision-making process. If decision-making was not a process there would be little place for perceptions and there would be little place for behaviours, for contexts, and so forth. We would fall into choice criteria, utilities, and so on. However, what is contended here, is that decision-making is a process, not an act and that, as such, it is not about simple maximisation of a given parameter.

Mitzenberg, Raisinghani and Théorêt (1976: 246), separating choice from the decision process, define decision (or choice) as a “*specific commitment to action.*” Even if the specific commitment for action is made on the spot, it is, however, build overtime as part of a process. Those same authors (Mintzberg, Raisinghani and Théorêt, 1976: 246) define decision process as “*a set of actions and dynamic factors that begins with the identification of a stimulus for action and ends with the specific commitment to action.*” That set of actions ending with a commitment to action can be made as a response to either opportunities or threats (Jackson and Dutton, 1988), which are part of

a continuum where opportunities and threats, or “crisis” in the words of Mintzberg et al. (1976: 251), are ends of that continuum, or, in general, to any stimuli deemed important by organisational actors with the power to bring matters to strategic organisational agendas (Dutton, 1997). Fredrickson (1985: 823-824), reminds us, however, that “*true crisis rarely allow the luxury of such reflection*”, that is, rarely allow decision-makers to think thoroughly all the steps of the decision-making processes, which led to the appearance of decision theories that specialised in decisions made in very specific contexts of crisis, such as fire-fighting and military combat, such as Recognition-Primed Decision (Klein, 1993).

Wally and Baum (1994: 933) define strategic decisions as those “*nonprogrammable decisions that involve the commitment of substantial resources at the level of the total enterprise.*” Schwenk (1984: 111) allocates, as Mintzberg et al. (1976), a connotation of process to strategic decision-making when he says that “*decision-making involves the activities of goal formulation, problem identification, alternatives generation, and evaluation selection.*” Drawing from the work of Beach (1993), Beach and Mitchell (1978), Lang et al. (1978), MacCrimmon and Wehrung (1986), Mazzolini (1981) and Mintzberg et al. (1976), it is concluded herein that, from a risk behaviour viewpoint, decision-making is not just the point in time when a decision is made, and that the decision-making process does not end at the moment decisions are made. Instead, the decision-making process ends at the end of the implementation phase or, in other words, whenever the individuals, groups or organisations feel that they cannot impact anymore the process, which includes the outcomes and the consequences of the decisions made. Therefore, risk behaviour and risk-taking follows the whole decision-making process all along.

Strategy making in organisations may result from planning processes, from individual decisions (just a few decisions not necessarily related to each other) made during the life of organisations, or from a combination of both (Fredrickson and Mitchell, 1984); Mitzenberg, 1978). Fredrickson and Mitchell (1984) argue that planned strategic processes are more common in stable environments, while decisions made on a spot basis, during the lifetime of an organisation, are more representative of unstable environments. Regardless, both strategic processes have in common features of a decision-making process, that is, reasons for the process to start, what is to be achieved,

which alternatives are available, how do the expected outcomes compare to the goals to be achieved, and so forth.

Choices in games and decision-making in organisational contexts shall not be seen as being equivalent. The relevant reason, in the context of this study, is that choice in an organisational context is part of decision-making, and that decision-making is a process rather than an action, or act. Prominent scholars such as Mintzberg, Raisinghani and Théorêt (1976), Beach and Mitchell (1978), MacCrimmon and Wehrung (1896), Thomas, Clark and Gioia (1993), Wally and Baum (1994), Beach and Connolly (2005) define decision-making as processes, which include choice, being choice or what, sometimes, is commonly treated as 'decision', part of the process. Mintzberg et al. (1976: 252) contend that decisions processes are made by the "*identification, development and selection*" phases, having each one of those phases several sub-phases or 'routines', as characterised by those authors, although they contend that phases are not necessarily and, or, simply sequential. Beach and Mitchell (1978: 440) define models of "*individual decision-making*" as processes with five phases, which include "*problem evaluation, strategy information, strategy selection, information processing and strategy implementation*", which occur before the 'choice' phase.

The phases of decision-making processes, which are not necessarily sequential but rather work in loops or cycles back and forth (Beach and Connolly, 2005; Beach and Mitchell, 1978; Eisenhardt and Zbaracki, 1992; MacCrimmon and Wehrung, 1986; Mintzberg, Raisinghani and Théorêt, 1976; Schwenk, 1995; Wally and Baum, 1994), are basically those stages

- i) In which situations in the continuum opportunities – threats, or crisis, are recognised, or diagnosed, or identified;
- ii) An action is screened, or selected, or developed, or evaluated, and assessed; and
- iii) A choice, or a decision, is made.

Wally and Baum (1994: 933) say that the decision-making process can be seen as made of "*intertwined activities*" and later on mention as well the existence of iterations. Shattuck and Miller (2006: 990), who argue that there are actions and feedback loops, and add that "*decisions are not discrete events but happen amidst the flow of activity in a system and are impacted by the decisions and activity that precede them*", confirm the viewpoint of Wally and Baum (1994). Wally and Baum (1994) name the phases of the

strategic decision-making processes as 'activities' and say that there are 'intelligence', 'design' and 'choice' activities. MacCrimmon and Wehrung (1986) consider, and the author of this study concurs with them, that before a choice is made, risk is adjusted, that is, decision-makers evaluate if there is something that they can do to control and, or, to influence the variables affecting risk, and after a choice is made decision-makers monitor the situation with the same purpose, that is, with the purpose of influencing the outcomes through risk-mitigation actions.

MacCrimmon and Wehrung (1986) suggest that during the recognition phase of the decision-making process the risks inherent to the decision subject are identified and structured, and that during the evaluation phase decision-makers decide if they are "*in or out*" (pg. 31). Beach and Connolly (2005) mention a phase of "diagnosis", MacCrimmon and Wherung (1986) speak, on top of the recognition phase, about an 'evaluation' phase, as being part of the initial stages of the decision-making process, Mintzberg et al. (1976) refer to "sets of routines" where they include, for instances, 'decision recognition' and 'diagnosis', while Thomas et al. (1993) indicate 'scanning' and 'interpretation' and Beach (1993) refers to 'screening'. Mintzberg et al. (1976) see decision recognition and diagnosis as two aspects of the identification phase, being diagnosis an active phase, while recognition is more of a passive nature. An individual may recognise an issue without taking any action. On the other hand, Beach and Connolly (2005) condense recognition and diagnosis into one single phase, which they call the diagnosis phase, and argue that during that phase the decision-maker frames the situation in order to, using past experience, decide what to do or, if the situation is quite new and unique, define a plan for action. The suggestion made by MacCrimmon and Wehrung (1986) that in the early phases of the decision-making processes, decision-makers, or at least some of the participants in the decision-making processes, decide if they are in or if they are out, is extremely important, because empirical observation indicates that final decision-makers in organisational contexts, typically top managers, are seldom involved in the recognition and evaluation phases of the decision matters. Therefore, it can be argued that decisions processes that are carried on and that get to the final decision-makers are those for which participants in the decision-making process, who have an earlier access to the decision-making process, typically mid level managers, decide to be in. Not only does this highlight the importance of mid level management, but it also emphasises the importance of risk assessment and risk

behaviour all along the decision-making process.

A6.3 Routine Decision-making versus Strategic Decision-making

There are, essentially, two types of decisions: routine and strategic. Routine decisions, being repetitive in their nature, are identified with firms' procedures and bureaucracy, thus with rationality in the sense defined by economic theories, that is, coherence and consistency of preference and maximisation (Mintzberg et al., 1976; March and Simon, 1993). Decision-making, which has been described as not following the normative rules, and has associated behaviours not seen as 'rational', as per the definition of rationality provided by economic theories of decision-making, is, in general terms, the one associated to non-routine decisions. This is easily explained since those non-routine decisions are the ones for which i) clear preferences are not always well defined, ii) probabilities or likelihoods associated to conditions influencing the outcomes, or to the outcomes themselves, not only are subjective but are also very difficult to assess, and iii) utilities are not explicit. In short those non-routine decisions are, in general, those for which the determination of utility functions for the decision-makers is extremely difficult for proponents of utility theories. However, even for routine decisions, managers have rational behaviours, in the same sense posited by economic theories of decision-making, only for a limited number of situational characteristics (March and Simon, 1993). For routine decisions it can be argued that there is little influence of the decision-making process in the behaviour of the decision-makers, since what is a routine in 'routine decisions' are not the decisions, or choices, themselves, but rather the processes that lead to those decisions, or choices, processes in which the decisions-makers have little, or no participation. It is contended as well that in routine decisions there is little room for personal utility, or as called by Simon (1959: 262) "*psychic income*", and that the 'psychic income' that managers can obtain from their firms is available during the decision-making processes, mainly for strategic decisions.

Strategic decisions are characterised by their main impact on firms, and stockholders, including people working for those firms and their families, by their infrequency and criticality to organisational performance, including survival (Eisenhardt and Zbaracki, 1992), and by their uncertainty (Schwenk, 1984). Strategic decisions, as opposed to routine decisions, are those as well "*which shape the course of a firm*"

(Eisenhardt and Zbaracki, 1992: 17), are “*important in terms of the actions taken, the resources committed, or the precedents set*” (Mintzberg et al., 1976: 246), and are “*fraught with peril*” (MacCrimmon and Wehrung, 1986: 7), hence making behaviours involved be less prone to match normative theories of decision-making, risk-taking and, or, risk-behaviour. Furthermore, Mintzberg et al. (1976: 250) characterise the strategic decision-making processes by their “*novelty, complexity and open-endedness, by the fact that the organisation usually begins with little understanding of the decision situation it faces or the route to its solution, and only a vague idea of what that solution might be and how it will be evaluated when it is developed.*” Those non-routine decisions, of a strategic nature or not, are, therefore, at the realm of behavioural decision theories.