Reducing Biases of Decision-Making Processes in Complex Organizations

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Purpose – Over the last 30 years, scholars interested in decision-making have been raising their interest in the development of quality control tools to mitigate the effects of cognitive distortions. However, they have often neglected the use of psychological instruments for understanding the role of decision makers' personality in the quality of the decision-making processes.

Design/methodology/approach – This is an intrinsic case study about an Italian complex organization which tries to shed light on the identified research question. Three decision makers responsible for the decision processes of three new business initiatives were interviewed using a recent quality control tool (i.e. checklist) and their personality types were tracked by performing MBTI® tests. The thematic analysis, approached by using NVivo software, and after six months of direct observations inside the organization, allowed an understanding of the decision processes and their distortions.

Findings – The results of this study show how initiatives with frequent quality control mechanisms and different stakeholders are more able to pass the decision phase than initiatives with no controls, few participants and little difference between personalities.

Originality/value – The results of this work show how reducing biases of decision-making processes in complex organizations can benefit from the simultaneous use of the checklist and MBTI® test. As demonstrated, when used together they can make more effective use of and provide better results for both, as well as providing a better quality control of the decision-making processes. From that, an approach is proposed that both takes into account the two perspectives and can work together with other cognitive problem structuring methods.

Keywords: Decision-making – Heuristics – Personality. **Article Type:** Case Study

Reducing Biases of Decision-Making Processes in Complex Organizations

1. Introduction

How could biases in decision-making processes in complex organizations be reduced?

This question is addressed, from a scientific point of view, in the specific literature on decision-making known as the "behavioural theory of the firm", a pioneering idea which stimulated the interest of management scholars about the way decisions are made both within the company and on its behalf (e.g. Thompson, 1967; Grandori, 1984; Senge, 1990; Cafferata, 2014). In this regard, many scholars have, over time, placed the focus on the correlation between decision-making and the cognitive characteristics of the decision makers (e.g. Tversky and Kahneman, 1974); others, however, have focused their attention on the study of the role of personality types in decision-making processes (e.g. Henderson and Nutt, 1980; Hough and Ogilvie, 2005; Jennings and Disney, 2006), but without taking into account cognitive distortions and the quality of decision-making processes.

From this point of view, this work helps to build a bridge between management studies on cognitive distortions, quality of decision-making processes and psychological studies on personality types as influencers of the former. In this regard, the role of personality has been strongly considered as the link between cognitive processes and strategic decisions (Haley and Stumpf, 1989). In particular, during the past 40 years the Jungian psychological types, and cognitive styles, have been widely used as the theoretical lens for investigating managers' personality through the application of the MBTI® test (Armstrong *et al*., 2012). Results of the studies linking the personality of managers and their choice have shown confirmative results of this connection in strategic situations (Stumpf and Dunbar, 1991), highlighting the relationship between executives' personality type and recurrent strategic choice patterns when making a decision (Nutt, 1993; Gallén, 1997; Hough and Ogilvie, 2005; Cristofaro, 2016).

On the other hand, the complex debate regarding the role of cognitive distortions, has been pivotal in recent decision making literature (e.g. Langabeer and DelliFraine, 2011, Workman, 2012; Pleggenkuhle-Miles *et al.*, 2013; Abatecola, 2014); as a consequence, more and more climactic have been both the tools and techniques elaborated to overcome those distortions (Waddell *et al.*, 2013) and the study of the cognitive characteristics of decision makers (through the MBTI® test), used for finding practical insights for strategic decisions (Jennings and Disney, 2006).

In this regard, the research question introduced above is addressed through the use of two different qualitative tools. The first is a quality control tool recently developed by the psychologist Daniel Kahneman and his colleagues (2011). This tool helps to identify and reduce cognitive distortions in decision-making processes through verification, *ex post*, of their quality. Second, in order to capture more effectively the role that decision makers' personality characteristics may have in these processes, we also use the Myers Briggs Type Indicator (hereafter MBTI®; Myers and Myers, 1980) personality test. Results of the interviews are analyzed through the thematic analysis approach (Braun and Clarke, 2006) which highlights the main difficulties caused by the identified distortions. At the centre of the work is the intrinsic case study of an Italian organization that provides higher education programmes[1]. Stemming from the fact that decision makers very often are victims of cognitive biases (Langabeer and DelliFraine, 2011, Pleggenkuhle-Miles *et al.*, 2013;

[1] For privacy reasons it is not possible to give the exact name of the company, so it will be simply called "the company" throughout this paper.

Abatecola, 2014; Caputo, 2014), especially regarding long-term strategic initiatives (Workman, 2012), this intrinsic case study analyzes the quality of the decision-making process related to the introduction of three new initiatives.

The added value of this work resides in the practical consideration of how reducing biases of decision-making processes in complex organizations can benefit from the simultaneous use of the checklist and MBTI®. In this regard, it follows the recent recommendations on how to conduct research in the decision making area by Nutt (2011); indeed, he strongly stressed the use of qualitative methods for understanding the decision making process (i.e. "the key factor") and, the adoption of action theory research that allows the combination of description and prescription, in order to know the tools and techniques needed to deal with conditions that can emerge during the decision making.

This article is specifically aimed at scholars and professionals interested in learning more about the way that psychological and behavioural aspects may influence decision-making processes, as well as the methods to investigate this phenomenon. Moreover, it is strongly focused on the application of the research method used here as one that can be used along with other problem structuring approaches.

The work is developed as follows: first, the theoretical framework underlying this contribution is reported to the readers of *Management Research Review*, paying special attention to the literature about cognitive distortions, those tools elaborated for reducing biases, and the role of personality factors in managerial decision making. Then the case study at the centre of this work is introduced, placing particular emphasis on the decision-making processes under investigation. The article continues with a discussion of the results and, finally indicates the managerial implications and some possible ideas for future research on this subject.

2. Theoretical framework

As the recent literature on the behavioural theory of the firm recognizes (Argote and Greve, 2007; Gavetti *et al.*, 2012), the influence of cognitive and procedural distortions on decision-making processes is rooted in three major works: *Administrative Behavior* (Simon, 1947), *Organizations* (March and Simon, 1958) and *A Behavioral Theory of the Firm* (Cyert and March, 1963).

Herbert Simon, studying the actual process of decision-making in organizations, elaborated on the concept of bounded rationality and the idea of the so-called "administrative man" (1947). The administrative man is the one who seeks to mitigate the cognitive limitations (i.e. bounded rationality) inside organizations, because they are systems of cooperative behaviour (Barnard, 1938) in which people tend towards decisions that, although not maximizing, can be considered at least satisfactory (Simon, 1957).

Simon is also universally considered to be one of the precursors to problem solving studies to which subsequent research has contributed works of a psychological nature, because of the fact that "judgement refers to the cognitive aspects of the decision-making process" (Bazerman and Moore, 2009, p. 1). More specifically, stemming from the fact that the individual's representation of the objects, goals and actions in the problem situation (i.e. the problem space; Newell and Simon, 1972), have at their base a cognitive representation of the overall problem (Greeno and Simon, 1984), the distortions that may occur in problem solving are certainly linked with the cognitive functioning of the involved decision makers.

In this regard, Tversky and Kahneman (1974; 2001) and Klein (1999) mark a milestone on this pathway. In particular, Daniel Kahneman formalizes the existence of a set of heuristics in humans,

namely, cognitive shortcuts that affect decision-making processes. Added to such heuristics are a series of decision traps (Hammond *et al.*, 1998), indicating the cognitive errors that influence decisions. Heuristics and traps can both alter, *in peius,* the decision-making process.

Hence the interest, which has grown over time, in an understanding of cognitive distortions in decision-making processes (e.g. Workman, 2012; Pleggenkuhle-Miles *et al.*, 2013) and for the elaboration of the tools needed to mitigate those effects (e.g. Russo and Schoemaker, 1990; Forgas, 2001; Waddell, *et al.,* 2013; Abatecola, 2014). Today, these tools are called quality control tools; they strongly derive from the problem structuring methods and may operate both at the decision-making and implementation levels of decisions (Rosenhead, 1996; Adizes, 1999).

2.1. Reducing biases of decision-making processes

Improving the quality of decision-making means significantly increasing the effectiveness of the decision-making processes through correcting or anticipating the deficiencies which decision makers may incur (Adizes, 2004; Bazerman and Moore, 2009). On this premise, the first point in reducing biases is recognizing them, because only in this way are decision makers able to improve the quality of their own decisions (Bazerman and Moore, 2009).

In this vein, Simon's studies on the structuring of the problem situation were later expanded by the study of problem structuring methods (e.g. Rosenhead, 1996). Indeed, for authors interested in this field, problem structuring methods are needed for problem situations, embracing multiple stakeholders, perspectives, interests and uncertainties (Rosenhead and Mingers, 2001). In particular, they come before tackling the problems and enable decision makers to solve them through the inclusion of different approaches in order to allow difficulties to be recognized and solved (Mingers and Rosenhead, 2004). Since the 60s, several tools in this area have been developed, with some of them focused on the cognition of decision makers, such as the cognitive mapping by Eden (2004) (also called SODA, Strategic Options Development and Analysis), who proposed structuring issues through merging the cognitive maps elaborated by each decision maker involved in the problem situation. In particular, through this approach decision makers are asked to hierarchically develop a complex issue by a means/ends graph, paying attention to the chains formed by them in order to find the virtuous and vicious circles within the problem being faced.

Later, other scholars tried to follow this path and started elaborating new problem structuring methods that have the purpose of taking into account the decision maker's cognition in order to better interpret problems and reduce distortions.

Having said that, a tool that is mainly focused on identifying those deficiencies is the so-called checklist of Kahneman *et al.* (2011). According to this tool, a third person is needed in order to recognize and moderate the effects of the distortions in decision-making processes through questioning decision makers with a set of 12 questions, each one linked to a precise cognitive or procedural distortion. The connections between questions and specific biases simplify the role of the third party who then identifies the distortions and attempts to minimize their impact. In particular, the above-mentioned checklist looks for the heuristics and cognitive biases that have received great attention in the management and psychological literature over time. Indeed, it is comprehensive of the seminal heuristics recognized by Tversky and Kahneman (1973; 1974) and the cognitive distortions identified by management scholars as Russo and Schoemaker (1990) and Hammond *et al.* (1998). The contributions on heuristics and distortions were mainly based on psychological experiments in which participants were asked to respond to certain stimuli in order to

verify the occurrence of the distortion; in this regard, the seminal work by Tversky and Kahneman (1973) on the study of the occurrence of the availability heuristic, through the testing of the individual assessment of the probability of events by the ease with which significant objects come to mind, opened the door to later works on cognitive distortions. Indeed, Tversky and Kahneman (1974) successfully proved the existence of the representativeness heuristic, by which probabilities are evaluated by the degree to which an object is representative of a category that people already have in their mind, and anchoring bias, by which people shape their estimations on initial values that they do not later adjust.

In the 80s, Russo and Schoemaker (1990) and Hammond *et al.* (1998) focused their attention on cognitive traps in managerial decision making, that always have a negative effect on choices (while heuristics can also be beneficial for the decision maker). In particular, they studied the major biases that affect the decisions of executives, such as the sunk cost trap – occurring when people base present decisions on past decisions that do not have any effect at the present time – or the confirmation evidence trap – which means looking for information that can confirm decision makers' initial choice. Those biases have recently been extensively studied in the strategic decision literature; for example Chen *et al.* (2015) proved strongly that CEOs with great overconfidence are less prone to improving their management forecast on which they received no confirmatory feedback.

All those heuristics and cognitive traps were later deepened by different scholars, and well organized and discussed in the worldwide bestseller by Kahneman (2011), which refers to all the distortions that are at the base of the Kahneman *et al.* (2011) checklist.

In the following table are detailed all the distortions that are investigated by the checklist.

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Insert Table 1 about here

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In particular, Kahneman *et al.*'s (2011) set of questions originates from the ideas of Kahneman about the functioning of the human cognitive process. According to Kahneman's (2003) studies, that enhance the contribution by Stanovich and West (2000), human cognitive functioning occurs in two different "Systems" of the brain. System 1 is where the intuitive and unconscious thinking lies, rather than in System 2, where the thought is far more reflective and where individuals recognize the mistakes that occurred during reasoning. The operations of System 1 are fast and automatic, usually also emotionally driven; thus, they are difficult to control or modify. The cognitive operations of System 2 are "more likely to be consciously monitored and deliberately controlled" (Kahneman, 2003, p. 698). Kahneman (2003) also underlines how the output of System 1 is usually unmonitored by System 2. In fact, System 2 allows many intuitive judgments to be explicated (Stanovich and West, 2000), mainly because System 2 is activated only when System 1 runs into difficulty. It is important to notice how Kahneman (2003) identified System 1 as responsible for the Perception mechanism of our mind, while System 2 is devoted to the Judgment activity; moreover, he stated that that "intuition and reasoning are alternative ways to solve problems" (p. 1469) and because of that it is quite impossible to have them working jointly.

Due to the existence of these two Systems and their assumptions, the presence of a third party is particularly important in controlling the quality of decisions because this allows individuals to identify the distortions occurring in others' System 1; here, the third party's System 2 is able to

mitigate the identified biases in the System 1 of other individuals. This intuition, about the intervention of a third external party, is strongly suggested for decisions that are biased by the cognitive perception of the decision maker (Caputo, 2016).

Correlatively, a second important tool for reducing biases in decision-making, one that is frequently used in managerial practice, is the so-called premortem technique (Klein, 2007). This tool is used at the beginning of the discussion of a project, rather than at its end; in fact, unlike a typical meeting, members of the project team are asked why the project may fail, assuming that the patient (i.e. the proposed project) will die (or fail) and they need to presume the possible factors of failure.

This technique is very similar to the use of another quality control tool, the devil's advocacy, which aims to have individuals who take a contrary or alternative position in a team discussion explore solutions further. Although decision makers reach a better quality decision through the use of the devil's advocacy than is reached in a free discussion, recent studies (e.g. Waddell *et al*., 2013) demonstrated how it raises the level of affective conflict and therefore implementation of the solution may be hindered.

Nevertheless, in this case study the checklist was adopted, rather than the premortem technique or the devil's advocacy, as the main tool of analysis. The checklist has greater effectiveness, when deciphering distortions that have occurred, because of the direct link between questions and biases and, for this reason, it is more appropriate for the downstream implementation of decision-making processes; in essence, it is not limited to a more simplistic view on the feasibility or solutions of the projects.

Last but not least, it is worth mentioning another important theoretical contribution to the quality control of decision-making processes – the four management styles of Adizes. According to Adizes (2004), four roles (i.e. Producer, Administrator, Entrepreneur, Integrator) with different duties and goals, need to be performed during decision-making processes in organizations by four different people, who focus their attention on different sides of the problem: what, how, when and who. According to Adizes, if all the four management styles are together committed to solving a problem or taking a decision, they can considerably avoid the risk of incurring distortions.

Although this last technique may seem more committed to the characteristics of individuals within organizations, it has neither the aim to identify distortions nor consideration of the personalities of decision makers. Even if people with different management styles look at the same problem from different points of view, they do not avoid the risk of incurring the same biases, because of the probability of having the same psychological functioning due to the homogeneity in personality types.

For these reasons, a more comprehensive approach that considers both the distortions and personalities of decision makers could be more effective in detecting and reducing biases; that is what is going to be presented in the following pages.

2.2. The personality factor in managerial decision studies

Individual characteristics have, from time to time, been considered as "basic to some of the salient characteristics of human behaviour in organizations." (March and Simon, 1958, p. 24). Further scholars deepened this relationship. The main work in this area can be considered the Upper Echelons Theory of Hambrick and Mason (1984), in which the authors recognized the cognitive base of the decision maker as an influence in their final choice by working as a filter of the problem situation. For this reason, scholars over time have tried to understand human behaviour in

organizations, as being driven by its cognitive base (and background features; Abatecola and Cristofaro, 2015), through the application of several psychological measures (e.g. Abatecola *et al.*, 2013).

According to Nutt (1990; 1993) the unit of analysis of cognitive functioning is *decision style*, which is inclusive of the cognitive responsible functions for *gathering* and *evaluating* information, while the *attitude of people to the outer world* and their *style of dealing with it* are considered as *cognitive styles* that are complementary to the former (Gardner and Martinko, 1996; Hough and Ogilvie, 2005). A mix of these forms the personality type.

In this vein, management scholars that are focused on the study of personality factors in managerial decision making have taken strong account of the cognitive and decision styles of managers by using the MBTI® test during the last 40 years of research (Haley and Stumpf, 1989; Armstrong *et al*., 2012), despite there being some critics (e.g. Schweiger, 1985). According to the extensive literature review by Gardner and Martinko (1996), this psychological questionnaire, apart from being the most administered test in research and practice in the study of stable decision and cognitive styles, has a test-retest consistency that often surpasses .80 in all the four dichotomies (reliability) as well as general criterion-related validity.

Each individual, according to the Jungian theory applied by the MBTI® test, has a personality type that emerges from his/her preference for each of four dichotomies, i.e. independent of the preferences for the other dichotomies. Those four dichotomies are: i) Extraversion-Introversion (E, I), which refers to the attitude to the outer world with the first preference concerned with people and objects and the second with concepts and ideas, ii) Sensing-iNtuition (S, N), which refers to the gathering information process in which the first preference concerns an approach based on data while the second concerns a style focused on the connections between data, iii) Thinking-Feeling (T, F), which refers to the evaluating information process in which the first preference concerns an approach based on logical principles while the second concerns a style focused on values, and iv) Judging-Perceiving (J, P), which refers to the organization of people in the outside world in which the first preference implies order and planning while the second concerns a style focused on flexibility and spontaneity.

It is critical to underline that the Myers and McCaulley (1985) theoretical model based on the Jungian studies, has strong interconnections with Kahneman's thoughts on Systems 1 and 2; indeed, their Judging-Perceiving function, underlining the individual sight on the outer world and that it is also at the base of the information gathering and evaluation processes, is very similar to the conceptualization of Kahneman (2003) about the Perception and Judgment functions at the base, respectively, of Systems 1 and 2.

The different dichotomies previously exposed can form 16 possibile personality type combinations and their notation emerges from the mix of the four letters of the personality orientations (e.g. ESTP). Moreover, the mix between the preferences within the gathering and evaluation information processes shape the so-called decision styles (Myers and McCaulley, 1985). Those styles are given below:

Sensor-Thinkers (STs): Their concern is on facts about things rather than facts about people. They gather all the information through the five senses, while they evaluate them through logic and impersonal analysis.

Sensor-Feelers (SFs): Their concern is on facts about people rather than facts about things. They gather all the information through the five senses, while they evaluate them through analysis

influenced by personal warmth.

iNtuitive-Thinkers (NTs): Their concern is on possibilities rather than facts. They gather all the information through perception of new ideas in their unconscious, while they evaluate them through logic and impersonal analysis.

iNtuitive-Feelers (NTs): Their concern is on possibilities rather than facts. They gather all the information through perception of new ideas in their unconscious, while they evaluate them through analysis of the future benefits of ideas.

Scholars involved in the study of the personality factor in managerial decision making through the MBTI® test found strong results in identifying the NT dichotomy as the one that permits reaching more satisfactory results (Gardner and Martinko, 1996; Hough and Ogilvie, 2005), while Lang (1997) found that NTJ types are the most suitable for strategic planning. In sum, personality characteristics, as measured by the MBTI® test, matter.

However, even if attention is more and more paid to the role of decision styles, recent works have raised the importance of focusing attention on the other two cognitive style as being determinants in the variance of the choice outcome (Cristofaro, 2016). From that, the interest of scholars in looking at all the Jungian cognitive styles of the decision maker (i.e. the whole personality) has been raised. After having recognized the critical value of personality in strategic decision making, and stemming from the fact that biases and heuristics have been widely discovered to explain a significant amount of the variation in strategic decision-making (Haley and Stumpf, 1989; Busenitz and Barney, 1997), later scholars tried to identify the connection between them and cognitive distortions. For example, STs have been discovered to be largely affected by the anchoring trap (Haley and Stumpf, 1989), while Stumpf and Dunbar (1991) identified, through a laboratory study involving 407 participants, specific patterns between personality types and biases, thus: STs tend towards selective perception, NTs tend towards overconfidence, SFs tend towards social desirability and NFs tend towards reasoning by analogy. Also Trippas *et al.* (2015), using a different inventory, arrived at the same conclusions, i.e. that analytic cognitive styles suffer from the most common biases.

What is important to notice is that decision teams that have been investigated through action research methods, in terms of personality composition and identified biases, have encountered difficulties in communication with external parties when composed of members with the same personalities, as discovered by Kaiser and Bostrom (1982) who raised the importance of more heterogeneous teams. In sum, even if from some studies it is possible to state that NTs can be considered as the most effective (and desired) styles (Gardner and Martinko, 1996; Hough and Ogilvie, 2005; Cristofaro, 2016), on the other hand other styles, such as STs and NFs, are welcomed in order to have more effective teams.

Unfortunately, none of those studies used a systematic method for identifying distortions, especially the ones pointed out by the cognitive psychologists previously discussed, nor were they aimed at analyzing an on-site managerial decision process.

3. Method

The applied research methodology is the intrinsic case study (Stake, 2005). This kind of case study is particularly used to obtain a nuanced understanding of a causal mechanism, rather than to make wide generalizations (Mills *et al.*, 2010), and fits the scope of understanding "new constructs with few formal measures in an open-ended inquiry" (Edmondson and McManus, 2007, p. 1160), such as how to reduce biases of decision-making processes in complex organizations.

The selection of this case study was driven by the aim to find a representative case (Seawright and Gerring, 2008) of a complex bureaucratic organization with an "active" board that, in such cases, controls the decision processes of new strategic initiatives taken at the managerial or operational level; the company, as explained later, has those characteristics, thus is suitable for this study.

It is acknowledged that a single case study is likely to be biased because *a)* it represents a small sample and *b)* all the real playing variables are not always considered; however, if a single illustrative case, as in this article, does demonstrate how a construct really works and how the identified variables actually operate (in this case, cognitive distortions and personality types), showing the relationship between them, then this "is a quite powerful use of a case" (Siggelkow, 2007, p. 22).

To examine this complex case, composed of several interactions among participants, multiple methods were employed (Yin, 2004; 2014), such as interviews, questionnaires and direct observations, in order to strengthen ideas by triangulating sources of evidence; these methods are also in line with the research suggestions for methodological fit of Edmondson and McManus (2007). This is also perfectly in line with the new suggested directions of research in the decision making area by Nutt (2011), who underlined the need for more qualitative methods for understanding decision making processes and the use of action theory research. White (1991), considered to be one of the intellectual founders of this approach, declared that "in participatory action research, some of the people in the organization or community under study participate actively with the professional researcher throughout the research process" (p. 20). This method is considered useful in order to discover tools and techniques to adopt in decision making processes, thus using a description-prescription mixed lens (Nutt, 2011). The implementation of this research approach has followed the recommendations by White (1991). In particular, in order to have a better understanding of the decision processes, the structure of the organization and decision makers' behaviours, a direct observation over about six months (from September 2012 to March 2013) was conducted in the organization under investigation; this period of observation and mixing with workers was useful to identify the problems existing in the organization.

Subsequently, three semi-structured interviews with the decision makers involved in the three decision-making processes under investigation, were conducted, and they included, for the most part, the questions mentioned in the checklist of Kahneman *et al.* (2011). According to academic practice (e.g. Sutton and Callahan, 1987; Burgelman, 1988), the checklist was modified, adding a few questions in order to shed light on some important aspects of the processes. In particular, because the organization under analysis has several collaborations with other business entities at both governance and management levels, which significantly affects the shape of the initiatives, some additional questions have been included in order to recognize the presence of the following biases: i) lack of control, ii) lack of systemicity, and iii) external influence. The first additional bias refers to the lack of effort on the part of the principal to "control" the behaviour of the agent (Jensen and Meckling, 1976), the second recognizes the overconfidence in own ability to retain all the

pieces of information collected (also called "shooting from the hip", see Russo and Schoemaker, 1990), while the third identifies the proximate stakeholder (over)influence on companies and its decisions (Lee, 2011). The effects of those biases are respectively: i) not having a general understanding of the workflow from whoever is in charge of it, or, as in this case, to excessively control the activity causing its stall, ii) making a decision without taking into consideration some important information collected that is not recalled at the time of the decision (usually it is caused by the overconfidence of the decision maker), and iii) excessively shaping the firm's activity according to institutional and stakeholder pressures.

It is worth mentioning that only three decision makers are responsible for the newly investigated initiatives. Although it would have been useful to have formal interviews with other employees, it would not have added a greater value to this study because "those three people are the true decision makers of the Management Department that are in charge (depending on their role) for ideating, analyzing, evaluating and communicating new initiatives", as reported by the CEO and other employees in one of several informal conversations.

Furthermore, the MBTI® test was administered (Myers and Myers, 1980), which has been used more and more over time in order to analyze the role played by personality types in decision-making processes in organizations (e.g. Henderson and Nutt, 1980; Hough and Ogilvie, 2005; Jennings and Disney, 2006).

The application of this mixed approach, the checklist and the MBTI® test, is perfectly in line with the participatory action research, indeed "in complex organizations, few problems arise in such form that they can be solved by the use of any single discipline" (White, 1991; p. 40).

Finally, the three formal semi-structured interviews lasted between 120 and 140 min and were conducted in private, audio recorded and at a later stage transcribed into data; the transcripts were then investigated through the thematic analysis approach (Braun and Clarke, 2006), following the suggestion for methodological fit (Edmondson and McManus, 2007).

The thematic analysis was performed using NVivo software and data were coded using a theoretical approach (i.e. deductive; Boyatzis, 1998) to focus attention on the particular features when coding the answers, thus the distortions. For this reason, biases' definitions were used to code the answers to the checklist questions, then the themes that emerged from those codes were selected for identifying the main difficulties of the decision processes under investigation.

4. Case study

The case study at the centre of this article is regarding a so-called *complex bureaucratic organization* (Weber, 1947) which, thanks to its hierarchy and rules, controls very effectively the productivity of a large number of individuals, because it eliminates, or at least restricts, the individual whim in decisions. From the six-month direct observation of the structure, procedures and operations of the company, it was found that this firm has all the identified features later described.

The company was founded in 1992 by Ericsson and other companies with the mission to realize and deliver higher education programmes. Today, it has more than 200 employees and its revenues have continuously grown from its foundation, reaching €7,885,000 in 2013. It provides hundreds of education programmes for thousands of students each year, reaching 90% employability, on average, for its students at the end of such programmes.

This *consortium* was established in order to formalize the relationships among a group of 76 highly qualified companies (including Accenture, BT Group, Cisco, DHL, ENI, Enel, E&Y, Nokia, Oracle, Sky, Vodafone) that are both the privileged partners (i.e. stakeholders) of the results of these higher education initiatives and shareholders in the company.

The organizational decision process is structured as follows: in order to become effective, organizational decisions must pass the scrutiny of the board, which is composed of executives of the associated companies; those decisions will also relate to the new higher education programmes to be implemented, which, in this case, form the core of this analysis.

Within the company, the decision-making processes of new business initiatives may follow, in order of their implementation, two different streams: Top-Down and Bottom-Up; in both, the associated companies on the board, may control the decision processes of new programmes ideated at the managerial or operational level, and therefore, substantially could be seen as a quality control checker of decisions.

In the Top-Down processes the ideas are generated from the board of the company. More specifically, the company that is in charge of the presidency, together with the other associated companies, sets the guidelines for the new programmes and controls the output of the sub-decisions at the managerial and operational level.

In the Bottom-Up processes, however, the ideas are generated from the bottom part of the hierarchical pyramid (e.g. Senior Consultants), or from middle management; these processes may be controlled by the shareholders in each moment of their flow.

The company acts primarily through three centres of activity: the Management, HR and ICT Departments, where the education programmes take place; the three new programmes, that are the subject of this work, have the following names: Business Model Lab (BML), Pursuing Shared Value (PSV) and Business School (BS). Below is a brief description of the purpose of each.

BML is a new higher education programme focused on the modelling of business ideas, aimed at two different types of stakeholder: a) the associated companies and b) the university students selected to participate in the higher education programme. The new higher education programme was tested between September 2012 and March 2013.

PSV is a programme aimed at business executives on issues of innovation management. It arises from the need for managers to find new and better ways to develop products and to serve their target markets. Created in 2011, PSV had great success in its first edition, which encouraged its revival in the years 2012, 2013 and 2014.

BS is a programme aimed at transferring knowledge and tools for the realization of business ideas, the management of the business and/or of the start-up. This higher education programme, contrary to the other two, has been conceived and its most important parts designed. However, to date, it has not been launched.

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Insert Figure 1 about here

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The decision makers who participated in the decision-making processes of all three initiatives under consideration are: a) the Head of the Management Department, who joined the company through participation in one of its higher education programmes; b) the Head of Innovation and Entrepreneurship, who is currently focused on the development of new higher education

programmes; and c) the Senior Consultant who also joined the company through a higher education programme.

5. Findings

This section reports the results obtained from the use of the two tools already described in the methodological section. In particular, in the two datasets reported (Tables 2 and 3) it is possible to find some of the characteristics of the investigated decision-making processes, the most relevant distortions (i.e. the codes of the thematic analysis), and the three main themes that emerged as common roots of the effect of the detected distortions, thus: a) internal communication, b) management of corporate cannibalism, and c) lengthy decision-making process.

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Insert Table 2 about here

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Insert Table 3 about here

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Below the results summarized in the two tables are explained in more detail.

BML – The flow of the decision-making process of this initiative is individual-collective. The Head of Innovation and Entrepreneurship generated the idea for this higher education programme, but it was not brought to the attention of the company board because of the limited amount of resources available to be invested.

Looking at the biases, all three decision makers agreed to recognize that the individual background of the instigator, together with the external influences to his idea, influenced the structure of this initiative. The decision process was carried out without any external evaluator attending the group of decision makers (i.e. lack of control), leading the process to take place rapidly. Moreover, the Head of Innovation and Entrepreneurship did not involve other decision makers until the final stage of the process because he considered himself able to evaluate the project without the need for other information (i.e. overconfidence). Among the identified biases, there is the so-called lack of systemicity that derives from the charge to collect data assigned only to the personal capacity of the decision maker (i.e. the Head of Innovation and Entrepreneurship).

The described biases are at the base of the main difficulty labelled “internal communication”, that stems from the underestimation of cannibalization among programmes, driven by the fact that, for this new programme, “...the benefits would have been superior to the cost of the cons” (i.e. affect heuristic) as declared by the Senior Consultant.

The saliency bias occurred because the project was always compared with the same mature programme which has a wide success history behind it. The so-called halo effect played a pivotal role in the fear of cannibalism, because features of the above cited similar service were extended in the commercial proposal of the new one.

The last two distortions mentioned, which caused the difficulty in managing the cannibalism among the two services, are probably due to the participation of both the Head of the Department and the Senior Consultant in the similar education programme.

As a consequence, the initiative BML after a first trial of six months was no longer implemented because of the high probability of cannibalization; this would confirm the negative effect of the distortions detected.

PSV – The flow of decision-making of this new higher education programme is Top-Down. The idea came from an associated company that proposed the theme on which to set the new higher education programme. A survey of the Heads of the associated companies has subsequently clarified the object of the programme, then the Head of Innovation and Entrepreneurship was charged with the detailing phase; this allowed the two different decision centres, managerial and operational, to find the same space (in terms of time) with no apparent imbalances in decisions. This choice was made in order to reduce the time needed to market the new higher education programme.

In this regard, as indicated by the Senior Consultant, "the collective phase was very complex and long; in fact, every two weeks some meetings were programmed for the evaluation of the idea" (i.e. excessive control). The new higher education programme was evaluated by both internal decision makers, such as the board of the company and the units involved, and external parties, such as faculty experts and potential participants.

The presence of various decision makers with multiple needs resulted in a lengthy decision-making process; this bias is understandable because of the company's legal identity (i.e. *consortium*) and the multi-stakeholder logic of its business model.

BS – The flow of the decision-making process of this new initiative is Bottom-Up. The Head of Innovation and Entrepreneurship generated the idea at the operational level, then a stage of idea evaluation with experts and external stakeholders took place and the decision maker came up with the idea of the Business School programme. After further refinement, the project was finally presented to the associated companies in its final form.

The decision-making process was focused, above all, on assessing the possibilities of the sustainability of the initiative in financial terms and of the possible target market to which to propose this project. The Head of Innovation and Entrepreneurship considered the process as "not totally efficient because of too many moments of alignment with the board" (here, it is defined as overconfidence).

The disadvantages of the decision-making process are, without doubt, the alignment that occurred between the various business needs at various organizational levels. This alignment was probably caused by overconfidence based on their own opinions and assumptions, which affected the internal communication with the evaluators.

The initiative was not implemented because of the different needs among the board and decision makers; the internal communication of the programme's objectives hindered its implementation.

5.1 The relationship between cognitive distortions and decision makers' personality

For all three decision makers, personality types were detected through the MBTI® test and are analyzed as follows.

Looking at the cognitive dichotomies considered in the MBTI® test, it is possible to identify the affinity and occurring distortions among personalities. Starting from a more general analysis, it is possible to note that the personality types of the decision makers converge on the following characteristics: Extroversion (E), Sensing (S) and judgment based on Thinking (T), but diverge on the basic orientation in Judgment (J) or Perception (P).

The MBTI® test coded the Head of Innovation and Entrepreneurship with the personality type ESTP. According to Myers (1980), this type, also called the Doer (Jung, 1921), lives constantly in the world of action; he/she first looks at the facts of a situation, decides in a quick way what he/she should do, and performs the action; then, he/she performs the next task.

Turning now to the Senior Consultant and Head of the Management Department, they are identified with the personality type ESTJ, also called the Guardian (Jung, 1921). Those types live, principally, in a world of facts and concrete needs, constantly scanning their environment to make sure that everything is running smoothly and systematically. This type of personality, contrary to ESTP, respects laws or rules and has a clear set of them on which they are completely reliant (Myers and Myers, 1980).

According to Myers (1980), types with ST as their decision style have the primary object of interest in facts, which are approached with impersonal analysis that is conducted in depth, while, codes which include personality types starting with ES are described as those containing more practical and realistic personality types. In sum, all the decision makers have a common decision style (Sensing-Thinking) and cognitive style (Extraversion), while they differ on the Judging-Perception cognitive style.

The personalities of the decision makers taken into account are all extroverts (E) and conditioned by a sensory perception (S); these characteristics could be some of the causes that led the decision makers to generate new higher education programmes (i.e. BML) through an evaluation of external ideas and suggestions. The idea generation for the BML and BS programmes could be considered as the result of the experiences of the Doer and the assimilation of external ideas perceived through his senses.

The distortions characterizing the BML programme are probably due to the similarity of decision makers' perceptions about the new programmes. The Head of the Management Department and the Senior Consultant, in addition to the fact that they were involved, as users, in the higher education programme that now is the victim of cannibalization, also have the same characteristics of cognitive judgment (J). This judgment function was probably distorted and could not apply its function of contrast to the judgment, through perception, held by the Head of Innovation and Entrepreneurship. Perception (P) implies an open mindset and a willingness to welcome new facts, ideas and proposals. The Head of Innovation and Entrepreneurship's perception type does not make many decisions but waits for new information, usually from outside. This characteristic of the personality, along with that of extroversion (E), is in line with the decision approach of the Doer, on the BML and BS programmes. In these two decision processes, the generation of the idea started from him, but was subsequently refined with adjustments resulting from the insights and ideas gathered from the outside.

It is important to notice, from the subtle differences in cognitive styles of the three decision makers, the effect of *commonality* in those styles. Even if some subtle differences exist among the

personalities of the decision makers, what is important to highlight is that they share most of the personality characteristics; this determines an equal interpretation and analysis of the reality and, as a consequence, the occurrence of distortions because of the lack of different personalities (thus, different cognitive features) that can recognized or reduce distortions. Indeed, if on the one hand some cognitive distortions could be considered as the cause of the cognitive orientation of the decision makers, on the other hand having the same cognitive styles (i.e. EST) either worked as a facilitator of the BML and BS decision making processes or as a detractor in terms of not being able to recognize the *cognitive* distortions that occurred. This point is reinforced by the fact that the only process in which the decision team was enlarged to a greater number of decision makers, i.e. the PSV programme, did not suffer from cognitive distortions, but only from a *procedural* distortion, i.e. excessive control.

6. Discussion, managerial implications and conclusion

What seems to emerge from a more systemic view of these results is that the excessive individualization of the initial steps of the project development (BS and BML), allowing for a certain grade of rapidity, led to a greater number of cognitive distortions than those that occurred in the more collective and controlled decision-making process (PSV). Having a very similar personality, in terms of decision and cognitive styles, among the decision making team members, did not allow recognition of the presence and impact of cognitive distortions on the bottom-up decisions under analysis. That is in line with the assumptions of the Kahneman *et al.* checklist (2011), and more recently of Caputo (2016), by which the distortions that occurred can be recognized by third parties thanks to their System 2.

On the other hand, the *shared* decision process of the PSV initiative was influenced by the participation of different stakeholders, who promptly adjusted time after time the distortions that occurred, through an intensive exchange of feedbacks. In this case, the common vision (and distortions) shared by the members who pushed the bottom-up initiatives has been adjusted by the board of directors; in this case System 2 has worked thanks to this "external" check.

Two of the difficulties that emerged in the bottom-up processes, the management of corporate cannibalism and the internal communications, contrasted with the simple rules of managerial life, i.e. reviewing recommendations, transforming recommendations into decisions and evaluating decisions made by others (i.e. control the quality of decisions) (Bazerman and Moore, 2009); the only programme that proceeded without distortions was the one in which the application of those controls was massive (i.e. PSV).

It is worthy of mention that, in line with the recent literature (Pleggenkuhle-Miles *et al.*, 2013), although the quality control of decision makers was affected by the opinions of a third party in all three decision-making processes, these influences have been moderated in the initiatives in which the board played a pivotal control role (PSV and BS), while they remain embedded in the decision made without board control (BML).

On this basis, what seems to emerge is that initiatives with frequent quality control mechanisms and different stakeholders are more able to pass the decision phase than initiatives with no controls, few participants and little difference among personalities. Indeed, the problem revealed by the analysis of all three decision making processes, taking into account the intervening personalities, lies in the shared vision of the decision makers due to the common cognitive functioning (i.e. EST). While in the bottom-up processes the flaws that occurred may be attributed to the similarity in the

cognition of the team members, which does not allow considering the cognitive distortions that were occurring, during the top-down process several stakeholders took part and activated an adjusting feedback mechanism that allowed them to overcome the ongoing cognitive distortions. This intervention only caused an excessive length of the decision process (thus a procedural distortion) but did not prevent the success of the new initiative, as occurred for the bottom-up processes that were affected by the cognitive biases determined by the similar personalities of decision makers.

So there is, as mentioned above, a trade-off between the quality of decision-making and the number and heterogeneity of the decision makers involved, as also identified in the previous literature (Kaiser and Bostrom, 1982). From that, it is important to notice that the similarity in personalities among decision makers, accompanied by a lack of "external" control, worked as a facilitator for the occurrence of the cognitive distortions; at the same time, the controlling mechanism on the decision process, undertaken by the board members for one of the three initiatives, corrected the distortions that occurred and contributed to the success of the idea.

In this regard, the findings are in line with the literature; in fact, Kahneman *et al.* (2011) suggest that the role played by the characteristics of the decision makers, is to create a diverse group of decision makers resulting in a mix of different skills and views that may operate a better quality control. Myers (1980), on the same point, identifies that "if the group is composed of very different types, the agreement will be harder to reach than if the group was homogeneous, but the decision will be far more broadly based and thoroughly considered, and thus in less danger of turning out badly for an unforeseen reason" (p. 152). Moreover, even if the two streams of literature have different roots (personality psychology and cognitive psychology) they are quite similar in the interpretation of the human cognition functioning that is reflected in the personality features. Indeed, according to Kahneman (2003) the individual mind is divided into System 1 (oriented to Perception) and System 2 (oriented to Judgment), similarly to the dichotomous personality Judging-Perceiving orientation of Myers and McCaulley (1985). From that, the critical point of investigating the occurring cognitive distortions, due to the alternative functioning of the two systems, through the lens of the personality features clearly emerges.

Stemming from the fact that very often decision-makers are victims of biases, especially regarding long-term strategic initiatives (Workman, 2012), this work has tried to highlight how reducing biases of decision-making processes in complex organizations can benefit from the simultaneous use of the checklist and MBTI®. As demonstrated, when used together they can give a more effective use of and results for both. The first tool, without a complete understanding of personality types of decision makers, led to the identification of a few biases occurring in decision-making. The second one, however, without a practical aspect in the life of the enterprise, is not effective as a management tool, but remains only an exploratory one (e.g. Coe, 1992; Jennings and Disney, 2006; Abatecola *et al.*, 2013).

Having found those interesting results increases the willingness to understand how to implement this particular, but potentially effective, approach. The proposed methodology takes into account the problems derived from the relationship between personality features and distortions as well as from the lack of control by a third party, in order to reduce the distortions caused by participants' System 1 thinking.

On this basis, the main practical suggestions for implementing the approach are the following: *firstly,* structuring a team of decision makers – that have to elaborate a recommendation – in which are included participants with different personality features (in terms of cognitive and decision

styles), as also suggested in previous literature (Kaiser and Bostrom, 1982). This is recommended in order to reduce the risk of not being able to recognize the cognitive distortions that occurred because of the presence of the same cognitive styles, which have been found to be related to specific recurring biases (Haley and Stumpf, 1989). *Secondly*, applying the Kahneman *et al.* checklist (2011) for non-routine decisions by a third party that has the duty to make the decision. In this phase the external party is able to recognize, through its System 2, the cognitive distortions that occurred caused by participants' System 1. This is needed in order to avoid the potential biases that had not been reduced by the automatic cognitive adjustments made by the presence of different cognitive and decision styles. While applying the checklist, the third party should also investigate some *procedural distortions* that are considered important for the decision process. The questions to be implemented have to be identified from the procedural distortions that occurred in the past for the same or similar decisions and/or from the risks from which those processes can generally suffer; having one of the decision members acting as a third party, taking into account the needs of other decision members and of the organization itself, should also avoid the excessive length of the decision process caused by the presence of a multitude of decision makers in the controlling phase.

This proposed approach in reducing biases in non-routine decisions fits the problem situation in which are involved multiple stakeholders, perspectives, interests and uncertainties (Rosenhead and Mingers, 2001). Moreover, it is in line with the recommendation of the inclusion of different approaches while investigating a problem in order to allow difficulties to be recognized and solved (Mingers and Rosenhead, 2004). This suggested approach might also be implemented along with the Eden (2004) cognitive map problem structuring method; indeed, thanks to the explication of the participants' beliefs through cognitive mapping of decision processes, it is possible to detect the most important vicious circles, to which to apply the Kahneman *et al.* (2011) checklist, in order to identify the managerial decision processes that are affected by cognitive distortions.

At present, there is great interest in stimulating the cross-fertilization of two different disciplines, namely cognitive psychology and management, in the field of organizational decision-making. In this vein, a cue for future research is to accurately identify the role of the third party who has to monitor decisions, in fact, while Kahneman *et al.* (2011) argue that a dedicated organizational figure for the quality control of decisions is not needed, on the other hand, it is believed to be at least essential that those who perform such control have deep competencies in terms of cognitive psychology. The quality control tool of organizational decision-making leaves many areas open for future research, especially regarding finding stronger links between the performance of decision-making processes, the personalities of decision makers and the demographic characteristics of the same, considering other theoretical strands, such as the Upper Echelons Theory (Hambrick and Mason, 1984). From that emerges the need, already highlighted by Nutt (2011), of reinforcing the study of this research area with qualitative research methods that allow understanding the key factor in decision making (i.e. the process), and discovering the tools and techniques that are suitable when some problematic situations arise in decision making contexts, thus following an action theory approach analogous to the one proposed in this work.

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Table 1: The Checklist of Kahneman et al. (2011)*

Distortions (heuristic or decision trap)	Description	Effect
Self-interested bias	The decision maker has a preference for a particular outcome through which he/she can gain more than usual in financial or organizational terms.	The decision maker recommends a preferred alternative not considering the organizational interests.
Affect heuristic	The decision maker tends to minimize the risks and costs and/or exaggerate the benefits of something he/she likes.	The decision maker has an emotional preference for an alternative and he/she does not take others into account.
Groupthink	The inclination of groups to converge on a decision because it reduces the conflict and can gain large support.	The decision group chooses the alternative that has the most common agreement, without considering more conflictual alternatives that can work better.
Saliency bias	The decision maker tends to approve a proposal that is similar to a successful one in the past.	The decision maker chooses a solution by analogy without weighing the pros and cons.
Confirmation bias	The decision maker tends to elaborate only one alternative for which he/she tries to find confirming data.	The decision maker does not pay attention to not confirming data and remains stuck with the alternative.
Availability bias	The decision maker makes the decision with the available data without making an effort to find other useful information that is uncovered.	The decision maker makes a decision without having a correct information base.
Anchoring bias	The decision maker makes the decision taking into consideration some initial reference data without adjusting its estimates according to the new information gained.	The decision maker makes a decision without having an updated information base.
Halo effect	The decision maker sees a story as more emotionally consistent than it really is.	The decision maker chooses an alternative because of its connections with some emotions that it recalls and not because of its strengths.
Sunk Cost	The decision maker makes a decision on new investments disregarding past expenditures that did not influence future results.	The decision maker chooses a less profitable alternative because considering already absorbed investments.
Overconfidence	The decision maker with positive track records is prone to excessive optimism in forecasts.	The decision maker overestimates his forecasting ability and makes wrong predictions.
Disaster neglect	The decision maker builds negative scenarios that are not bad enough.	The decision maker does not correctly forecast a bad future and he/she will not be prepared for its consequences.
Loss aversion	The decision maker who faces risky decisions prefers to avoid losses than desire gains.	The decision maker tends to choose more prudent alternatives.

*All the definitions are taken from Kahneman et al., 2011.

Figure 1: Decision process flow of new initiatives in the company

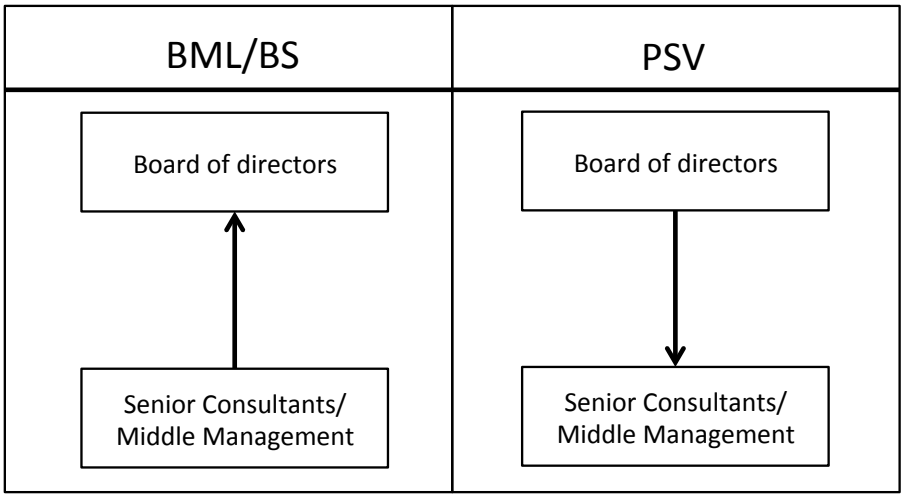

Table 2: Results of the checklist application (2011)*

Questions	Bias/Code	Content Example	Respondent(s)
**1-Was the decision process adequately controlled?	Lack of control	"The decision process went very smoothly because of the lack of supervisioning by the board due to the scarce resources to be invested"	Head of Innovation and Entrepreneurship; Head of the Department
		"Every two weeks some meetings were programmed for the evaluation of the idea"***	Senior Consultant
2-Have the people making the recommendation fallen in love with it?	Affect heuristic	"The wariness of those responsible for a similar programme wasn't taken into account because of the wide benefits being more than the costs of the cons for the new programme (BML)"	Senior Consultant
**3-Was the team overconfident in its ability to retain and process information?	Lack of systemicity	"In the initial phase of this project (i.e. BML) I collected all the data by myself because I knew all the different sources to take into consideration"	Head of Innovation and Entrepreneurship
**4-Have you given a positive opinion on the proposal on the basis of external factors?	External influence	"Some start-up incubators in contact with the Head of Innovation and Entrepreneurship influenced the structure of this new higher education programme (i.e. BML)"	Senior Consultant; Head of the Department
5-Can you see a halo effect?	Halo effect	"The new programme (i.e. BML) will have almost the same success as the older one because of the similarities between their marketing formula"	Senior Consultant

6-Could the diagnosis be overly influenced by an analogy to a memorable success?	Saliency Bias	"Due to the similarities between ideas and formula (between BML and the older one), we think that BML will have a great success"	Head of Innovation and Entrepreneurship
7-Is the base case overly optimistic?	Overconfidence	"I did not involve the other decision makers because of the fact that I have the expertise to judge the information gathered"	Head of Innovation and Entrepreneurship
		"For the new project (i.e. BS) the board always questioned about our figures, even if we were sure to reach a positive economic value!"	Senior Consultant; Head of Innovation and Entrepreneurship
		"The decision process for BS was not totally efficient because of too many moments of alignment with the Board of the company"	Head of Innovation and Entrepreneurship

* Only the checklist questions for which distortions occurred are reported.
** Additional questions.
*** This distortion is reported here as a contrast to the lack of control.

Table 3: Decision-making processes of the three new initiatives and biases

Initiative	Decision process flow	Idea generation	Problem structuring in decision-making process	Biases/Codes	Main difficulties/Themes emerged
BML	*Bottom-Up* Individual-Collective	Individual	*Low*: few decision-making phases.	External Influences	Internal communication
				Lack of Control	
				Lack of Systemicity	
				Affect Heuristic	
				Saliency Bias	Management of corporate cannibalism
				Halo Effect	
PSV	*Top-Down* Collective-Individual	Collective	*High*: several decision-making phases.	Excessive control	Lengthy decision making process
BS	*Bottom-Up* Individual-Collective	Individual	*Lower Middle*: located in the operating unit but with many decision-making phases at board level.	Overconfidence (2)	Internal communication