Paper to be presented at the

35th DRUID Celebration Conference 2013, Barcelona, Spain, June 17-19

The strategic decision making perspective: How do high-tech firms reach decisions?

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Abstract

The development of R&D importantly influences the socio-economic environment in a country and the development of industrial organization. Therefore, there is a need to gain insight into the internal R&D decision processes at place in order to facilitate the management of their organizational decision making. Grounded in the strategic decision making literature, we focus on three main processes: rational, intuitive and political decision making. The literature has mainly treated those processes as separate and lacks insights on their configuration. Based on an embedded case study, we show how these processes interrelate. Specifically we offer four key findings. Firstly, rationality and intuition interact with each other in an ongoing process throughout the decision. Secondly, rational decision contexts facilitate more effective political processes. Thirdly, managers that make their intuitions explicit and respond to their co-workers decisions improve the effectiveness of the political decision making process. Fourth, a high level of alternation between intuitive and rational decision processes leads to a lower amount of political behavior. We discuss the implications of our findings for future research on strategic decision making and offer practical recommendations for managing organizational decision making in R&D from a behavioral perspective.

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Key words: Decision making, strategic decision making, R&D, NPD, rationality, intuition, political behavior

Word count: 9825

1 Introduction

While there has been some research that looked at the characteristics of product development decisions and the contingencies that drive research and development (R&D) new product development (NPD) decisions (e.g. Krishnan & Ulrich, 2001, von Zedtwitz, Gassmann, Boutellier, 2004, von Zedtwitz & Gassmann, 2002), little research has looked at the actual process of decision making in an R&D and NPD environment. The strategic decision making literature has identified three streams of decision processes that can help to understand decision making in an innovative, technology intense R&D context.

Firstly, researchers that take a rational process perspective depart from the assumption that decisions involve a comprehensive analysis of alternatives and consequences (Butler, 2002). Secondly, the literature on intuitive processes argues that decisions entail unconscious and subconscious ways of information processing that involve quick judgments and the application of experience, rather than available information and analyses (e.g. Dane & Pratt, 2007, Kathri & Ng, 2000). Thirdly, the political process perspective sees decisions as occurring through the interaction of different actors in a process of mutual influence, in which decision makers try to implement their individual interests and goals with the exertion of power (Elbanna & Child, 2007, p. 434). While these separate streams have been studied extensively, there is little insight about the interactions of these streams throughout the decision process (Dean & Sharfman, 1993, Dean & Sharfman, 1996, Elbanna & Child, 2007, Kester et al, 2011).

Resulting from the need to gain further insight into R&D and NPD decision making and the interaction between different strategic decision making processes, this study aims to answer the following research question: How do rational, intuitive and political decision processes connect and interact in an R&D department of an innovative firm in the high tech

sector? In this paper, we present insights from an embedded case study that was conducted the R&D department of a multinational high-tech firm in the telecommunications industry.

This paper is structured as follows; in section 2, we discuss the empirical and theoretical research that has been conducted about strategic decision making. Firstly, we review the literature that has been conducted regarding decision making in an R&D and NPD context in order to demonstrate how our research can contribute to these findings. Secondly, we will discuss research on rationality, intuition and political behavior and the interaction between the three processes. In section 3, we discuss the methodology that has been used. The analysis and findings are then shown in section 4. Finally, section 5 discusses the contributions for decision making in R&D and NPDM practice and literature.

2 Conceptual background

2.1 Decision making in R&D and NPD

Previous research has found that decision outcomes and decision processes may depend upon specific decision characteristics, such as decision uncertainty (Elbanna & Child, 2007, Papadakis, Lioukas & Chambers, 1998), frequency of occurrence (Papadakis, Lioukas & Chambers, 1998) or decision motive (Elbanna & Child, 2007, Nutt, 1993). Building on these findings, it is important to look at strategic decision making in its specific context. In the following section, we provide an overview of the insights regarding strategic decision making in an R&D and NPD environment.

So far, little research has explicitly looked at the rational, intuitive and political processes in this context. Ilori & Irefin (1997) pointed at the importance of rational-analytical, intuitive-emotional and behavioral-political approaches in technology decision making. They propose that these processes interact in technology decision making, influenced by environmental factors, especially varying levels of uncertainty, certainty, risk and pressure. These interactions occur across different level in the firm, reaching from the lower level

technical personnel who, due to the authors, initiate the decision process across the middle level management who commit themselves emotionally to a certain issue up to the upper-level management that has the final say regarding the issue. Ilori & Irefin (1997), however, have not supported their suggestions empirically.

Kester et al (2011) have investigated the consequences of evidence-, power- and opinion-based decision making processes portfolio decision making of four different firms. They find indications that decision processes rarely depend on purely one process but occur parallel to each other and that the processes that are activated depend on cultural factors, such as trust and leadership style as a determining. The authors' indicate that opinion- and power-based processes - triggering intuition and politics, respectively - become more dominant in breakthrough product areas with a high uncertainty concerning the available information. Managers engaging in political behavior but with the best interest for firm and stakeholders lead to successful NPD portfolio decisions. These findings contradict other literature further discussed below (Dean and Sharfman, 1996, Eisenhardt & Bourgeois, 1989, Elbanna & Child, 2007) that stresses the negative effects of politics on decision outcomes. Therefore, a more differentiated view on political decision making may be necessary.

While the research named above draws attention to the importance of looking at the three processes in R&D and NPD decisions simultaneously, most other research has looked into two of the separate dimensions, specifically rationality (Atuahene-Gima & Li, 2004, van Riel, Lemmink and Ouwersloot, 2004, McNally et al, 2007) and intuition (Cowlrich et al., 2011, McNally et al., 2007).

Concerning the rationality dimension, for instance, Atuahene-Gima and Li (2004) have looked at decision making comprehensiveness in a new product environment. In line with Kester et al's findings (2011), the authors have found that comprehensive decision processes are not promotive to new product performance when the technological uncertainty

is high, since it is hard to collect information. In contrast, comprehensive decision processes improved new product success when the demand of the market was uncertain, as it was easier to obtain this information. A study into 251 NPD projects by van Riel, Lemmink and Ouwersloot (2004) found that "innovation success" is directly related to how knowledgeable and well informed decision makers are. Similar findings come from a study of McNally et al (2007) who investigated decisions in the context of product portfolio selection. According to their study, managers with an analytic cognitive style are better able to balance the several performance criteria of a project than managers who act intuitively. They are able to regard the same amount of attention to the multiple evaluative criteria and therefore improve NPD performance. Regarding the intuitive dimension, Cowlrich et al (2011) have found in a study on go/no-go decisions in the pharmaceutical industry that there are substantial differences in the individual intuitive judgments of benefit and risk of new drug development decisions. These findings on intuition indicate that intuition must be used with care and shows the importance to gain insight into when and how intuitive processes are at place.

Little research has looked at political behavior in an R&D and NPD context but indications that a political decision process matters can be seen for example in a study of 1632 decisions concerning R&D projects conducted by Patzelt, Lechner & Kauklien (2011). This study finds that scientists are more likely to persist with underperforming R&D projects if they receive positive feedback by their environment. The social environment therefore plays and important role when it comes to the continuation of R&D projects and may in the case of underperforming projects even lead to financial loss in these projects.

In conclusion, research has shown the importance of strategic decision processes on the results of R&D and NPD projects. For example, decision comprehensiveness does promote NPD decisions when technological uncertainty is high, intuitive judgments may differ considerably in NPD and politics may lead to the continuation of unsuccessful R&D

projects. Therefore, while research has shown that the understanding of rational, intuitive and politic processes is important to improve decision making in the area of R&D and NPD, little research has been conducted to understand the relationships between these processes and their effects on the strategic decision making process. The following sections provide more insights on the literature regarding the strategic decision making process dimensions (intuition, rationality and political behavior) in other research contexts and their interactions.

2.2 Strategic decision making

2.2.1. Decision making processes dimensions

Strategic decision making is very complex. Therefore, researchers have studied different decision making processes (e.g. Elbanna & Child, 2007, Hough & White, 2003). However, no single view on how these decisions are made is sufficient to explain strategic decision making in its complexity (Elbanna, 2006, Hitt & Tyler, 1991, Langley et al 1995, Schwenk, 1995). Therefore, research is needed in order to gain insight into the way different decision processes interact.

The literature has traditionally emphasized three different processes occurring in strategic decision making: rational, intuitive and political processes. The rational process perspective depicts decision making as a predominantly analytical and comprehensive process, accomplished by decision makers that have access to a wide amount of information regarding their decision problem. These rational decision makers engage in careful analysis of different alternatives before making their choice (e.g. Dean & Sharfman, 1993, Fredrickson & Mitchell 1984). Decision comprehensiveness, the consideration of many alternatives, has shown to be associated positively with making better, faster and more effective strategic decisions (Eisenhardt, 1989, Elbanna & Child, 2007)

The rational process perspective, however, does not account for other findings that indicate that judgment, emotions and unconscious processes may play an important role when

it comes to taking decisions, especially when decision problems are ill structured or involve moral evaluations (Agor, 1986, Dane & Pratt, 2007, 2009, Eisenhardt, 1989, Kathri & Ng, 2000, Shapiro & Spence, 1997). Therefore, the intuitive stream investigates under which conditions intuition is instrumental to strategic decisions and how it can best be integrated into the strategic decision making process. For example, intuition is assumed to be especially important in tasks with high complexity and short time horizons (Dane & Pratt, 2007) because it involves the ability to quickly synthesize and integrate information and also makes use of the decision makers' experience (Dane & Pratt, 2007, 2009). In spite of these findings, Elbanna & Child (2007) only find a weakly positive relationship between intuition and decision making effectiveness. A finding that, as the authors indicate, can be subscribed most likely to the explanation that firms are predominantly rational actors that might not admit to the use of intuition (Elbanna & Child, 2007, Kathri and NG, 2000).

Though research has indicated the importance of rational and intuitive processes in organizational decision making, both perspectives disregard the fact that strategic decisions are often made in a social process through the interaction of different actors and groups of actors. For that reason, a third perspective – the political process perspective - states that decisions are made in a process of mutual influence that may involve actors with different, sometimes even opposing interests. Moreover, the political behaviour perspective stresses the role of negotiation and power in order to enforce the goals of the most influential group. Political processes have been associated negatively with firm performance (Eisenhardt & Bourgeois, 1988), decision success (Dean and Sharfman, 1993, 1996) and decision effectiveness (Elbanna & Child, 2007).

While each of these perspectives importantly contributes to our understanding of the decision making process and its outcomes, none of these processes alone is sufficient to comprehensively describe the complexity of strategic decision making process. According to

Langley et al (1995) strategic decisions in organizations consist of different stages and interact with other decisions in a complex manner including the individual level, the collective level and the context of the decision. Moreover, the authors state "decision processes are characterized more by their interrelations and linkages than by their isolation" (p. 264). Those linkages can be sequential, involving different related decisions at different points in time; lateral, describing linkages across different issue streams, that is decision evolving around the same issue; and ultimately, precursive, namely affecting how subsequent decisions are made by enabling decisions, evoking new problems or pre-empting decisions by making them obsolete.

Hence, according to Langley et al (1995), isolating decisions and decision processes does not lead to a correct reflection of what actually happens in strategic decision making. More specifically, it is important to gain insight into the interactions of different processes in decision making in order to offer a more complete picture of the complex phenomena in place in strategic decision making. The following sections will review empirical findings and theoretical contributions to show what is known up to this point about the interaction between rational, intuitive and political decision processes.

2.2.2. Rationality and political behavior

Dean and Sharfman (1993) found in a study of 61 strategic decisions that procedural rationality and political behavior are independent processes and can therefore occur in parallel. The authors defined procedural rationality as "the extent to which the decision process involves the collection of information relevant to the decision and the reliance upon analysis of this information in making the choice" (p.1071), and political behavior as "intentional acts of influence to enhance or protect the self-interest of individuals or groups" (p. 1072) are independent processes and can therefore occur in parallel rather than being on opposite sites of the same dimension. Consequently, the authors found that a decision process

can be simultaneously high/low in politics and high/low in rationality. As a result, it can be rational to behave politically or political to behave rationally.

Eisenhardt & Bourgeois (1988) found in their study of strategic decision making in high velocity environments that politics may "often impede the flow of information" (p. 763, see also Pettigrew, 1973). When information is only shared amongst selected members of the group, the decision unit may lack access to information from other areas. Based on these findings political behavior may hinder rationality when it precedes the rational assessment of a situation, since decision makers cannot consider the whole range of different alternatives.

2.2.3. Political behavior and Intuition

To the knowledge of the authors of this article, there is no empirical study about the interrelation of intuition and politics. Findings by Eisenhardt and Bourgeois (1988, Eisenhardt, 1989) indicate that emotions of frustration, distrust and loyalty influence the form of political decision making. Though emotion is not the same as intuition, intuition may often include an emotional dimension. The relationship between political behavior and intuition therefore requires further investigation.

2.2.4. Intuition and Rationality

Researchers have made assumptions regarding the interaction between rationality and intuition, but have so far not provided rigorous empirical data (e.g. Agor, 1986, Dane & Pratt, 2009, Elbanna & Child, 2007, Shapiro & Spence, 1997). Blattberg and Hoch (1990) investigated five business-forecasting situations in order to identify the extent to which decisions should be based on intuition and analytical modeling. Their findings suggest that a decision process that uses model forecasts together with intuition (50% model and 50% manager) result in more accurate predictions than each processes in isolation (Dane and Pratt, 2007). Several authors have discussed in which order rationality and intuition should best be used. For example, Shapiro & Spence (1997) propose that managers should record intuition

first, for example by writing it down and then engage in a rational assessment of the decision problem in question. The authors further suggest that managers should rely on intuition more heavily, when the problems are poorly structured, for example in NPD planning and R&D planning. In contrast to Shapiro and Spence (1997), Agor (1986) state that intuition is used after rational context to "synthesize and integrate the information gathered and analyzed" (Dane & Pratt, 2007, p.48). Dane and Pratt (2007) build on these contradicting findings by proposing a more differentiated view on intuition where three different types of intuition - problem solving intuition, creative intuition and moral intuition - are active before and after the analytical assessment of the problem. Specifically, according to the authors, individuals will experience spontaneous problem solving intuitions before analyzing the problem carefully and analytically. Individuals however should not act upon these intuitions, since such decisions might be biased but rather record them and put them on hold to analyze the problem analytically. After careful analysis, individuals are advised to assess the question again by returning to the initial intuitions. At this stage, creative intuitions may emerge and serve to integrate the different mechanisms and individuals are advised to stay attuned to the gut feelings that occur at that stage and allow for integrating the different insights of complex phenomena (Dane & Pratt, 2007).

We conclude that in order to explain decision making, different decision processes need to be combined and we need to gain further into the interaction of the decision processes. Research has shown that decision processes can occur in parallel, and has given some suggestions on the interrelation between some process dimensions (see table 1). However, so far, little research has provided empirical data to understand the interaction between intuition, rationality and political behavior throughout the decision process and it's effect on the decision making process.

Insert table 1 about here

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3 Methodology

In order to answer the research question of this study, we applied a qualitative methodology. A qualitative methodology can help to gain insight into such complex and dynamic phenomena as decision making processes (Maitlis, 2005, Pettigrew, 1992). Furthermore, when studying decision processes, distinguishing the context from the phenomena can be challenging and qualitative data may help to offer a differentiated view on the phenomenon, while also taking the context of the phenomenon into account (Yin, 2009, Kester et al, 2011). Additionally, the processes that this study set out to investigate involve a high degree of sensitivity. For instance, political processes may involve covert activities that are difficult to assess with quantitative methods, such as questionnaires. Intuition may involve unconscious and subconscious processes that can only be assessed by a high level of reflection, as granted with a qualitative method, such as interviews.

The aim of this study was to elaborate theory regarding strategic decision making processes in and R&D and NPD environment. As can be seen in the literature review of the previous sections, there are some preexisting ideas regarding the relationships between the decision processes. Therefore, this research works with predefined codes, rather than grounded theory (Eisenhardt, 1989, Kester, 2011, 1999, Maitlis, 2005, Yin, 2009).

In this study, we chose an embedded case study design, set in an R&D department of a Dutch multinational, to explore our research question. A single case design was chosen due to the revelatory nature of the case. A revelatory case "exists, when an investigator has an opportunity to observe and analyze a phenomenon previously inaccessible" (Yin, 2009, p. 28). During a time period of 6 months, we traced decision processes in real time and

retrospectively. The situation of the firm was distinctive to other cases previously studied, since the R&D department was undergoing substantial changes that ultimately led to the closure of the site. Therefore, the research context provides us with a unique opportunity for studying decision making processes in times of restructuring. Though restructuring is a reality in most firms (e.g. in order to relocate R&D centers to low wage countries), it is rare to gain access as a researcher to the affected areas within the firm, which provides us with a unique data set.

As a level of analysis we chose the decision process level, as it is common in other studies regarding strategic decision making (e.g. Eisenhardt, 1989, Dean & Sharfman, 1996, Nutt, 1993). Insight in the decision processes were collected in two different projects of the firm an in the organizational context of these to projects.

3.1 Research Context

The study was conducted in a multinational company with ca 100,000 employees in the high tech sector. An embedded case design was set in an R&D department of the local branch of the firm with ca 120 employees at the time of data collection. The company is listed in the stock exchange. Within the last 10 years, the R&D department had undergone continuous reorganizations that included the lay off of ca 400 employees within the R&D department since the year 2000. During the course of data collection that lasted six months, two reorganizations were communicated and implemented. One concerned the closure of a project portfolio governed by the site and the other concerned the closure of the whole R&D site.

3.2 Data sources

Data sources that were used to formulate our propositions were based on 1) interviews with informants inside and outside the firm, 2) observations of meetings and 3) the analysis of secondary sources, such as company documents and processes, organizational charts,

documented presentations and meeting notes. An overview of the collected data can be found in table 2.

Insert table 2 about here

Interviews were conducted with key persons involved in the decision making within the firm. The aim of this study was to gain insight into a diverse set of decisions taken by individuals operating in different sections of the firm surrounding R&D. In total, 35 semi-structured interviews with 24 individuals were conducted. Interviews asked about the professional background and career development of the respondent, the decisions the individual was involved with, the respondents involvement in rational, intuitive and political processes, the respondent's experience with decision making within the firm and how it affected the respondents' work (see table 3). We followed Eisenhardt's (1989) approach of holding a diary to register the activities of the day and writing down observations and impressions within a time frame of 24 hours.

Insert table 3 about here

While some decisions were investigated retrospectively and relied on the information gathered from multiple informants, other decisions were still ongoing and real time data could be collected on these decisions. Following processes in real time as well as retrospectively, helps to reduce bias of participant's perceptions that may occur, because individuals are aware of the final outcome of a decision (Langley etl al, 1995, Schwenk, 1995). Those real time data included observations regarding the decision processes at place. During the course of data collection, 28 meetings (such as presentations, weekly meetings, strategy meetings) were

observed by non-participant observation. Besides from gaining insight into sensitive issues as mentioned earlier, the observations also helped to triangulate the data and improve construct validity (see table 4, Yin, 2009).

Insert table 4 about here

3.3 Data analysis

The interviews and meetings were recorded and verbatim transcription was used to prepare the data for analysis. The software atlas.ti was used to code the data. Data analysis consisted in three steps.

Step 1: Identifying the decision cases. In a first step, database with all the available data from the interviews, observations and documents was established. From this database, a list was made of all the decision topics that were mentioned during the interviews. Decision topics involved questions that required decision making from the respondent or a reaction from the respondent to the decisions taken in his or her surrounding.

In order to choose the most relevant decisions, the list was reduced according to two criteria: First, the decision had to refer to at least two of the three decision processes (rationality, intuition or politics). Second, the decision had to be considered important by the respondents to the individual, the group or the firm. A total of six decisions were analyzed for this paper (see table 5). The six decision processes covered three main themes; firstly strategic decisions taken to implement an open innovation initiative, second, NPD management decisions in the development unit and third, decisions related to restructuring the firm.

Insert table 5 about here

Step 2: Coding the cases. In a second step, the decision processes were coded to allow for within case analysis. The decision processes were coded, applying predefined codes for the decision processes, their interaction and outcome (Eisenhardt, 1989). A coding scheme with precise definitions was established to allow for independent coding by multiple researchers and to ensure replicability of the study (Yin, 2009). The codes for the decision processes were subdivided into sub codes, e.g. sub codes for rationality included collect information, analyze information, apply analytic tools, generate alternatives and think about consequences. Coding the cases allowed gaining detailed insight into the interaction of decision processes, firstly, by identifying the interaction of decision processes, and secondly by identifying the dominance of one or more decision processes. We also coded the outcome of process interactions, when the data indicated the emergence of a conflict, the avoidance or resolution of a question or concern expressed by one or more decision makers.

Step 3: Cross case comparison. In a third step, we used cross case analysis (Eisenhardt, 1989, Miles and Huberman, 1984) to identify common patterns for process interactions amongst the cases and as well as differences between the cases. Therefore, we looked across the six decisions to identify common sequential patterns of process interactions and their outcomes. When the same process interactions reached different results, we described the characteristics of the respective part of the decision process. This allowed us to identify common and divergent characteristics.

Step 4: Proposition development. In step 4, we formulated propositions drawing from existing theory on the interaction of decision making processes and the effectiveness of decision making processes. Existing theory is used to explain how individual and group behavior and decision contingencies may influence decision processes at place in R&D in times of restructuring.

4 Analysis and Findings

Based on the analysis we formulate four propositions that provide insight into the relationship between rationality, intuition and political behavior. The decisions observed in our sample show in line with Dean and Sharfman (1993) and Kester et al (2011) that decision processes occur simultaneously and differ in the intensity to which they weigh on a certain decision process. Adding to these results, we find that decision processes differ to the extent to which the interact and rely on a specific process as dominant.

4.1 Rationality and intuition

Interaction. Our findings indicate, that analytical decision processes are used extensively in R&D planning and product development decisions. In our study, we found indications that analytical and intuitive processes occur in a circular manner, therefore confirming Dane and Pratt's (2009) assumption that intuition is applied both before and after the analytical process (see table 6). Professionals in a NPD environment indicated that they first set the broad requirements for the project, based on their intuitions and then engage in a rational process of data collection by asking their technical staff for input after those have been working with the requirements. Afterwards, the operating managers would engage in another intuitive process, using their empathy. One respondent said:

> *"You have to look at it from the outside, like 'how does the client look at these things?' and you just need to sense that intuitively. I think that you need a little bit of experience to take this step."*

Concluding the development of a new product feature, the respondent gathered more information from the market and indicated that this information was essential for similar future project. Our findings also indicate that individuals actively navigate between decision processes. Rationality is also actively used to counteract a strong emotional response and seek more alternatives. One respondent said:

"Just conceptually, look at more ideas and move away from the emotion and then maybe see more ideas emerge"

Hence,

Proposition 1 *Rationality and intuition feed each other in an ongoing process.*

Table 6 about here

Dominance. We find that decisions do not solely interact, but also differ in the extent to which they depend on one process as dominant. For example, the need for security of an individual, the decision importance, trust within the team and the encouragement of management influences the extent to which a decision relies on intuition or rationality as a dominat process (see table 7).

An important antecedent of the level to which intuition is chosen as a decision process maybe the level of experience of the individual. This goes in line with Dane and Pratt's (2009) proposition that intuition is based on domain specific knowledge. On the other hand, the more responsibility an individual has or the higher the management level is the more he or she also relie on rationality as a predominant process. One respondent said:

"Sometimes (running checks) turn out to be unnecessary, my gut feeling would have been sufficient to make the decision. But that's the need for security that plays a part here, at least for me, before I dare to take a decision."

Table 7 about here

4.2 Rationality and political behavior.

Interaction. While the respondents in all the studied projects rated the overall culture of the company as being very open with a low level of political behavior, the level of political processes actually observed in the projects differed depending on the presence or absence of a rational infrastructure. In NPDM decisions (see table 7), we found that rationality helped to counteract political processes. A project that had legitimacy and was embedded in a rational structure of procedures, project management tools and job descriptions, acted like a buffer for political behavior. A certain amount of legitimacy may be necessary to build a rational context and a process that predominantly relies on rationality can help to keep the level of political behavior low.

The projects of our case study that were embedded in an infrastructure of project management tools and processes showed a higher level of role clarity and clearly distributed responsibilities. For example, one respondent said about the application of project management tools:

> *"If you follow the agile method, you do not need to force people to do certain things."*

Decision makers in a rational context also followed common goals, while decision makers in the project that was placed outside the rational context of the firm exhibited a higher amount of contradicting goals and a poorer quality of communication. Hence,

Proposition 2 *A rational decision context yields more effective political processes.*

Dominance.

While respondents described the firm as having a rather open structure, participants also described the decision culture as being based on consensus. Coming to a decision could take considerable time and involved extensive negotiation and compromising. In our study,

the most political decision was the decision to close the local R&D site. During the last couple of years, the firm had centralized its decision processes, therefore reducing the decision autonomy and discretion of strategic management of the local organization. In reaction to this development, the higher management of the R&D department set up a project to implement open innovation in the department in order to strengthen the departments' position within the region. This initiative used input from experts concerning open innovation and involved the consultation of multiple partners, therefore taking a rational approach and relying importantly on rational argumentation. On the other hand, the initiative occurred in a context that was marked by political behavior: The department goals diverged from the firms' goal. In a context that was marked by a high level of political behavior, the departmental management protected their open innovation initiative from being communicated early in the process to the headquarters in order to maintain discretion and increase the likelihood of building evidence to maintain the project (build a success as an analytic argument). In processes where the interests of the most powerful prevail, it may be difficult for the less powerful actor to behave rationally, due to a lack of shared values and interests.

The role of rationality was to justify and understand the political decisions. Even after the decision to close the R&D site had been communicated, the respondents in our sample considered that decision reasonable from a firm perspective. Therefore, the perspective taken when identifying the dominant decision process is an important factor to consider.

4.3 Intuition and political behavior

Interaction. We found that decision makers perceived processes as most pleasant when a manager who is open towards expressing intuitions led them. Those processes also led to more concrete outcomes of the decisions, such as adjustments in the product development plan, decisions to continue or stop a certain product development process. This may be related to the fact that people tend to have different (sometimes contradicting) goals that may never

come to the surface if there is no space created for them. People who expressed a high clarity regarding their intuitions also had more clarity regarding their own goals. Goal clarity may facilitate the open discussion of diverging goals in a political decision processes (Eisenhardt & Bourgeois, 1988, Eisenhardt, Kahwajy & Bourgeois, 1997). Perceiving and expressing intuitions are therefore important capabilities of a decision maker to guide political processes. In our sample, we found little interaction between intuition and political behavior, probably because intuition is mainly brought into the political process using rational arguments. Hence,

> Proposition 3 *The ability of the decision maker to perceive and express intuitions acts as a buffer against the disadvantages of political process.*

Dominance. Managing intuition, especially the emotional aspect of it, may reduce the gap between personal goals and group goals. On the other hand, when a process is power based, there is a danger that intuitions that are brought into the process are not considered. This might influence the commitment of its decision makers and the quality of the decision (Elbanna & Child, 2007). Political behavior may also serve as a trigger for a strong emotional reaction. One respondent decided to leave the company, since he was not satisfied with the lowering level of autonomy granted to him as a manager. Therefore political processes may importantly influence people's perception of autonomy (Ryan & Deci, 2000) and lead to lower job satisfaction (see table 7).

4.4 Rationality, intuition and political behavior

We found that a process dominated by rationality and supported by intuition yield more effective political processes. Decision makers communicate openly, strive for common goals and have well distributed responsibilities. Processes with a frequent interaction of intuitive and rational approaches have two advantages; Firstly, due to the level of intuition, decision makers are connected to their personal goals and the notions of their team members,

and may be better able with issues such as resistance. When there is openness for intuition other points of views are included into the process (though that does not imply a consensus) and a situation that otherwise might end in measuring power may lead to the communication of real concerns. Secondly, due to the high level of rationality, decision makers have the vocabulary, the necessary arguments and security to express, justify and - eventually - adjust their intuition.

The interaction of rationality and intuition may therefore help to counteract political behavior: decision-makers actively seek other peoples' opinions, are open about their own interest and to the interests of others. Therefore,

Proposition 4 *A high level of interaction between rationality and intuition is negatively related to politics.*

5 Discussion and conclusion

While most R&D and NPD decision making literature has looked at characteristics and contingencies of single decisions, our study has taken a strategic decision making perspective, focusing on simultaneous decision processes and integrating rational, intuitive and political decision processes. Our findings indicate that these decision processes have been inadvertently considered as separate. Instead, different decision processes interact with each other throughout the decision process.

5.1 Contribution to theory

Our findings indicate that rationality and intuition feed each other in an ongoing process and hereby confirm assumptions made by Dane and Pratt (2009), namely that decision makers use intuition before and after analytical thinking. More specifically the processes interact in a circular manner and a continuous feedback mechanism. Therefore, studies that look at the comprehensiveness of the decision making process, should integrate

how decision comprehensiveness is brought into the political process and how other input, such as professional intuition can facilitate the process of project management.

The strategic decision making lens on R&D and NPD environments offers a perspective that poses human action central to the activities in the firm. Decision processes involve human behavior and individuals are able to actively navigate through the decision process and hereby influence their outcomes. These findings are in line with Seo & Barrett (2007), who find that people who are able to identify and distinguish between their current feelings and emotions have a better control about possible biases and therefore, achieve higher decision making performance. Decision makers should, therefore, not only reinforce the rational process but also learn to bring sub conscious and unconscious processes to light.

Our findings proposes that intuition is both personal and social: It is the level of ability to perceive ones intuition to make one's intuitions explicit that promotes the positive effects of political behavior. Elbanna & Child (2007) have indicated that intuition has shown a weaker relationship with decision outcomes than expected. These findings are not surprising, since our study indicates that individuals often use rational argumentation in order to present their intuitions. While rationality is more widely accepted in organizations and therefore more frequently expressed, intuition may be dominating in private, individual decision process. This indicates a difference between how R&D professionals think decisions should be made and how decisions are actually made, when no one else is around.

Earlier research has indicated that decisions that are high in rationality and low in politics are most successful (Dean & Sharfman, 1993). Our findings indicate that rationality might also cause processes to be less political, since decision makers in a rational context have better vocabulary and occasions to discuss limitations of their project.

Finally, our findings have implications for the literature regarding NPD in an open innovation environment, specifically open innovation implementation. Firms that implement

open innovation have to manage multiple external partners but additionally have to convincing the internal firm and align different internal interests. Open innovation may therefore force decision makers to act in a highly political environment, which might explain why open innovation projects have shown to be negatively related with performance (e.g. Knudsen & Mortensen, 2011).

5.2 Managerial implications

Our results indicate two main recommendations for practice.

First, when managers of R&D strive to develop new initiatives, such as the implementation of open innovation projects, managers are advised to first focus on building simple rational structures, with clear job descriptions and a clear line of command and a few project management tools. Those rules should be held flexible but will help to prevent hidden agendas and contradicting goals in political decision making, especially if the endeavors are radically new to the firm.

Second, on a more micro level, professionals should be good listeners, both to their inner instincts and to their co-workers and subordinates. Managers can importantly facilitate decision making processes by training their capability to bring intangibles, such as feelings and emotions, successfully into the decision process. This capability can help to communicate difficulties early in the process and make sure that possible frustrations are discussed in the meetings, where managers rather than outside of the meeting, therefore outside of the control of the manager.

5.3. Limitations and further research

Future research should continue to investigate the relationships between rational, intuitive and political decision processes and the different kinds of links and feedback loops that exist among them (Langley et al 1995) and their effect on decision making effectiveness. Additionally, future studies can differentiate between different forms of intuition, such as

creative intuition and problem solving intuition (see Dane & Pratt, 2009), and rationality and political behavior in order to offer a more differentiated perspective on the processes at place in R&D and NPD decisions.

Research should also look further into the behavioral aspects of strategic decision making in R&D and NPD. The role of emotions and individual decision styles in these contexts should be further explored and, therefore, the development of solid quantitative instruments to assess decision making processes is necessary. More specifically, research should combine methodologies that have previously rarely been used in the strategic decision making literature in an innovative environment, such as diary methods (Bolger et al, 2003, Ohly & Sonnentag, 2010). Those methods can help to provide deeper insight into intra- and interpersonal decision processes and the decision process itself and show how intuitions go from implicit to explicit and how they are integrated into the rational and political process.

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6 Appendix

Table 1. Literature review

Authors	Dimension	Suggestion/Finding	Empirical data
Strategic decision making processes			
Agor, 1986	Intuition	Intuition follows rationality to synthesize information	No
Dane & Pratt, 2007, 2009	Intuition	Intuition precedes and follows rationality	No
Dean and Sharfman, 1993	Rationality, Politics	Rationality and politics are independent dimensions that can occur in parallel	No
Dean and Sharfman, 1996	Rationality, Politics	Rationality/Politics positively/negatively influence decision success, even if controlled for the favorability of the environment and the decision implementation	Yes
Eisenhardt & Bourgois, 1988	Politics	Emotion (frustration, distrust, loyalty) influence politics	Yes
Eisenhardt & Bourgeois, 1989	Rationality	Considering more alternatives is related to faster strategic decisions	Yes
Elbanna & Child, 2007	Rationality, Intuition, Politics	Rationality is positively related to decision effectiveness; Intuition is weakly positively related to decision effectiveness; Politics is negatively related to decision effectiveness	Yes
Fredrickson & Mitchell, 1984	Rationality	Comprehensiveness is positively related to performance in a stable environment	Yes
Kathrhi & Ng, 2000	Intuition	Intuition is positively/negatively related to organizational performance in unstable/stable environment	Yes
Shapiro and Spence, 1997	Intuition	Intuition should be recorded first, then rational assessment should be applied	No

Table 1. (continued)

Authors	Dimension	Suggestion/Finding	Empirical data
Strategic decision making processes in R&D and NPD			
Atuahene-Gima and Li, 2004	Rationality	Decision comprehensiveness leads to better/worse product performance in technological/market uncertainty is high	Yes
Blattberg & Hoch, 1990	Rationality, Intuition	Managers should use modeling in combination with intuition in forecasting-decisions	Yes
Cowlrich et al, 2011	Intuition	There are substantial differences in individual judgment in drug development	Yes
Ilori & Irefin, 1997	Rationality, Intuition, Politics	Interactions of processes occur across different levels of the firm	No
Kester et al, 2011	Rationality, Intuition, Politics	Several processes occur in parallel; Intuition and Politics are important in breakthrough ideas	Yes
McNally et al, 2007	Rationality, Intuition	Managers with analytic cognitive style are better able to balance the several performance criteria of a project than managers who act intuitively	Yes
Patzelt, Lechner & Kaukien, 2011	Politics	Positive feedback from social environment leads to persistence with unsuccessful projects	Yes
van Riel, Lemmink and Ouwersloot, 2004	Rationality	Well informed decision makers are related to more innovation success	Yes

Table 2. Summary of Data Sources

Data Sources	#
Formal interviews	
Executive manager	1
Other managers	8
Technicians	12
External collaborators	3
Total	24
Meetings	
Project meetings	8
Steering group	3
Weekly Team meetings	11
Monthly Firm meetings	3
Presentations	3
Total	28
Documents	
Project Management & Processes	Yes
Weekly stand up notes	Yes
Presentation	Yes

Table 3. Decision constructs and interview questions

Construct	Definition	Dimension	Interview questions*
Rationality	"the reason for doing something and to judge a behavior as reasonable is to be able to say that the behavior is understandable within a given frame of reference" (Butler, 2002, p. 226)	1. Collect information	Did you/your group collect relevant information to come to the decision?
		2. Analyze information	Coded
		3. Use (analytic) tools	Did you use analytic tools or calculations to come to a decision?
		4. Generate alternatives	Have you considered several options?
		5. Think about consequences in terms of goal	Did you think about the consequences of your actions?
Intuition	"affectively charged judgments that arise through rapid, non-conscious, and holistic associations" (Dane & Pratt, 2007, p. 40)	1. Personal judgment	Did you trust your personal judgment when making decisions?
		2. Gut feeling	Did you rely on your gut feeling?
		3. Past experience	How important do you think past experience was?
		4. Emotional moments	Were there especially emotional moments?
		5. Felt Fit	Coded, e.g. "feel right"
Political	"assumes that decisions emerge from a process in which decision makers have different goals, forming alliances to achieve their goals in which the preferences of the most powerful prevail" (Elbanna & Child, 2007, p. 434)	1. Interests/preferences/goals (open/covert)	To what extent where people open to each other about their interests?
		2. Negotiate/Bargain	Coded
		3. Power	Was the decision influenced by powerful individuals?
		4. Alliances	Where there alliances between different people/groups?
		5. Information (hold back)	Did you share all important information with others?

*derived and adapted from Bacharach & Lawler, 1980, Child, 2007, Dean & Sharfman, 1996, Eisenhardt & Bourgeois, 1988, Elbanna &, Khatri & Ng, Papadakis et al.,1998

Table 4. Validity and reliability checks in this study

Type	Definition	Action
Internal validity	Properly demonstrate causal relationships (explanatory cases)	Explicit research framework Pattern matching Compare patterns Theory triangulation
Construct validity	Correct operational measures Does it investigate what it claims to investigate?	Interview protocols (theory) Chain of evidence Multiple coders Data triangulation: observation, archival data, interviews
External validity	Are the findings generalizable to other contexts?	Multiple (embedded) cases Different projects & functions Show details of case study context
Reliability	Operations of study can be repeated in other studies	Case study protocol Case study database

*derived and adapted from Eisenhardt, 1989, Gibbert, Ruigrok & Wicki, 2008, Yin, 2009

Table 5. Case characteristics (decisions)

Topic	Decisions	Prevailing Processes	Governed	Outcome
Open Innovation Implementation	1. Should we choose a strategy with a narrower focus? 2. How should we reformulate our goals? (Real-time data collection)	Rational-Political Process	Locally. Local initiative established by R&D Management. No formal processes and attachment with daily business of the firm.	Struggle to construct a working business model. Goal of establishing a spin off not reached. Goals of working closer together with current company not achieved. Successful completion of Prototypes.
New Product Development Project	1. Scope decisions 2. Decide on features of the project (Retrospective data collection)	Intuitive-Rational Process	Locally and Headquarters. Local team and product managers have responsibility about daily decisions regarding the product portfolio and products. Report back to higher management in headquarters. Headquarters take decision about the continuation of overall project, though there is some discretion about research conducted in local site.	Portfolio stopped shortly before data collection as the result of the headquarters (financial decision). Managers and Team members highly satisfied with product, project procedures and collaboration.
Reorganization	1. How do we implement the decision (e.g. which employees leave when)? 2. How do I continue my	Political-Rational Process	Headquarters. Decision concerning when and how to restructure and when to close the R&D site taken in	Stop of certain product portfolios. Closing of R&D site. Transfer of projects to China.

career? (Real-time data collection)	headquarters. Local strategic group (management) involved with decisions early in the implementation process of the decision. Implementation decisions occur at the autonomy and discretion of local managers.

Table 6. Interaction between rationality and intuition

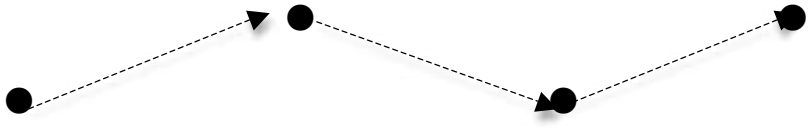
Process	Development			
Rationality Intuition				
Activity	Choose a starting point.	Look for information from team members, managers and engage in testing.	Use empathy as input to improve product.	Use feedback from market to apply in next decision (information available on the long-term).
Illustration	"First, you set out the broad line based on intuition"	"Then look for arguments to find out whether we should change some things due to this or that" "I have heard from a few testers that have been involved in the project at a later stage that (the product) is in any case a lot better than the last version"	"You have to look at it from the outside, like 'how does the client look at these things?' and you just need to sense that intuitively. I think that you need a little bit of experience to take this step."	"And when I receive feedback from the client, for example the client looks at it a certain way, then you can consider that in your next decision (...) and that's what you take with you with your own intuition and what you can take on to the next project when you have to take decisions".

Table 7. Dominant and subordinate processes in the interaction of two processes

Dominant	Subordinate	Quote	Decision Type
Rationality *Role:* provides decision maker with security, gives confidence to take action	Intuition *Role.* Considered unreliable by the decision maker ("to be avoided")	"Sometimes (running checks) turn out to be unnecessary, my gut feeling would have been sufficient to make the decision. But that's the need for security that plays a part here, at least for me, before I dare to take a decision." "In the end you base your decision on information that you share with each other". "Just conceptually, look at more ideas and move away from the emotion and then maybe see more ideas emerge"	High stakes. When the decision is to be justified to higher level.
Intuition *Role:* quick assessment of situation, input function	Rationality *Role:* seen as support for intuition, to refine and help communicate	"You just have to act intuitively. It's a question of setting our broad guidelines and honestly, I have the impression that we have succeeded pretty well. Of course, you can always reason some issues regarding how it could be done better. I think that's how it goes, first to set up the broader guidelines and then look for arguments to find out whether we should change some things due to this or that reason."	Routine situations. After encouragement of management. After having trained one's intuition (being experienced). Good relationship and trust between team members. When ultimate responsibility belongs to different person.

Table 7. (continued)

Dominant	Subordinate	Quote	Decision Type
Rationality *Role*: Methods and tools used, job functions taken seriously.	Politics *Role*: Engage counter-political behavior. Other decision makers are included in the process by seeking for information.	"If you follow the agile method, you do not need to force people to do certain things." "It has happened in this team that they did totally wrong things (…) So next time, I do it differently and I pose more questions: 'guys, before you start, is it clear and if something is not clear, contact our software-architect because he is responsible for this kind of stuff'."	Contexts where projects have legitimacy and formality. (see Dean & Sharfman, 1997)
Politics *Role*: Used to enforce interests of most powerful actor. Seen as a necessity.	Rationality *Role*: Accept and respect decisions by more powerful actor as a less powerful actor. Justify decision that goes against personal interests.	"That's how the firm works today, decisions are taken quickly, centrally in the headquarters, (…) the market is more competitive than ever. In order to keep the performance, the company has to take these hard decisions"	Strategic, impactful decisions that involve multiple actors with diverging goals.
Politics *Role:* Enforce action.	Intuition *Role:* Facilitate process (if in agreement) or delay process (if in disagreement).	Example of a political process where decision maker attempts to bring in his intuition "You receive a whole bunch of knowledge and possibilities for free, so to say." (negotiation) → "But that nags at me, these issues need time, probably not for you internally (..) but for me towards the	When goals are aligned (decision moves fast, intuition facilitates) or when goals diverge very widely (intuitive individuals excluded from active participation).

		market." (misfit, gut feeling) → interruption, not further discussion.	
Intuition	Politics	Example (from observation): Employee decides to leave the company, frustrated by the centralized decision structure in the company.	Individual, judgmental and moral decisions (see Dane & Pratt, 2007)