Unpacking the context of decision criteria:

Four types of enacted and sustained competitiveness

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ABSTRACT

We investigate sense-making processes among innovation managers and suggest that the company's boundary with its environment is enacted among individual innovation managers, contributing to the literature on portfolio management, competition, and managerial cognition. Specifically, based on a repertory grid analysis of 20 interviews with five resilient businesses, we propose that the enactment is bracketed in terms of goals and methods, with some shared intersubjectivity and some unshared, resulting in four types of constructed competition. One of the managerial implications is that competitiveness is a complex notion that is more difficult to make an object of management than previously imagined.

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INTRODUCTION

For managers that consistently are confronted with complex and ambiguous information about issues, opportunities, and problems that they need to make sense of (March, 1997; Mason and Mitroff, 1981), increased competition, disruptions, and shorter product life cycles underpin the need for understanding how competitiveness is embedded in strategic decision-making allocating resources for future innovation activities. Managers cope with these challenges by employing knowledge structures, or cognitive framing, which, when imposed on an information environment, enable individuals to give the content form and meaning (Walsh, 1995; Weick et al., 2005). Cognitive frameworks are stable constructs that provide a lens that allows individuals to see and understand a situation (Smith and Tushman, 2005).

Mumford et al. (2009) argue that understanding NPD managers' assumptions, expectations, values, and beliefs (i.e., thinking or cognition) can lead to more successful innovation outcomes. Kester et al. (2014) point to the organizational culture as essential for decision-making, and based on an earlier inductive study, they suggest that the firm's mindset "enables them to align the entire portfolio to their strategic goals. Not only do they understand how projects complement each other in achieving the strategic objectives, but they also understand where the strategic gaps are in their portfolio" (p1210). Nevertheless, Cyert and March (1992) suggested that "People (i.e., individuals) have goals; collectives of people do not" (Ibid p. 30). In Barnard's seminal example of the five people trying to move a stone, everyone may have different reasons for wanting the stone moved (Talbert and Hall, 2016). Hence, Bernard imagined that organizational members are

apt to have different perceptions of their goals and may be more closely allied to their primary duties and, therefore, their functional attachment (ibid.).

Scholars highlight the importance of cross-functional knowledge flows between the organization's various functional competence areas (horizontally). Recent studies signify that knowledge only flows via a common understanding between functional areas enabled by language as a cognitive frame. Functional areas represent different “thought worlds” (p628) that must make sense of each other for knowledge to flow efficiently and become resourceful (Beverland et al., 2016). It follows from prior NPD literature that two critical groups of managers are involved in decision-making on projects and portfolios: project and senior managers (Griffin and Page, 1996; Schultz et al., 2013; Christiansen and Varnes, 2009). Moenart et al. (2010) propose competitiveness to be a distinct criterion, whereas a wider body of literature points to a problem of “fit,” “evaluation,” and “alignment” with a strategy to achieve competitiveness (Cooper, 2009; 2011, for instance).

While the attention has been horizontal, these management levels may enact different thought worlds vertically. In the present study, competitiveness represents the context for innovation managers as portfolio management and competitiveness are two sides of the same coin, and the role of the interpretation of the word and process as it is applied to the various contexts in NPD has not been explored previously. It is critical to understand how managers enact cognitive patterns and learn what it means to them to be competitive and how they reason in terms of competition.

Weick (1995, 2001) argues that it is possible to understand organizational cognition and, hence, organizational action by understanding individual cognition or personal constructs. Thus, understanding individual cognition is critical as it is considered "[…] the foundation of a new paradigm of how organizations work and how people within organizations achieve shared action"

(Jelinek and Litterer 1994, p33). Analyzing the cognitive patterns of decision-making that individuals apply can be explored using Kelly's (1955) personal construct theory—and its methodological extension—the Repertory Grid technique (RepGrid). The RepGrid is a cognitive mapping technique that attempts to describe how people reason about the phenomena in their world (Fransella and Laurie, 1988): “How does a person, consciously or unconsciously, construe the world?” (p2). This methodology has previously been applied to NPD by Goffin and Koners (2011) and Micheli et al. (2012), for instance, to understand the cognitive aspects related respectively to “learning” or “design products” in an innovation management context.

In this study, five B-t-B companies that have maintained a competitive position and produced innovative products and services for more than 60 years were strategically sampled, and 20 managers at two different managerial levels were studied. From the data captured, 144 constructs were aggregated into 19 categories, analyzed, and synthesized into a grounded conceptual behavioral competitiveness model.

The study makes several contributions. First, the findings showed that senior managers and project managers share a cause-and-effect relationship of competitiveness. It is bracketed (Weick, 1979) as a means and an end in organizational decision-making. The literature has not previously mentioned competitiveness as a means of competitiveness, which so far has been considered the phenomenon to be an end. Moreover, the cognitive frame is multi-dimensional in five dimensions: integrating customer knowledge, long-term growth, value creation through relations in the ecosystem, innovation strategy employment, and fast customer feedback. Moreover, these findings are unexpected to the literature, as competitors are not directly considered an end. Similarly, as a means, competitiveness is equally multidimensional: competing criteria for attention, the perspective on the present market position, and setting the right balance for controlling activities.

Second, the finding of competitiveness as a means-and-end construct exists only intersubjectively (Weick, 1979) among the two levels of management. Still, as a self-identity, competitiveness is different as a means. On the project management level, competitiveness includes several dimensions: having the right product features, the project's feasibility, using external partners for support, and spurring internal support for the project. Competitiveness differs for senior managers as the cognitive frame of competitiveness focuses on timing, intuition, internal and external competencies, profit, portfolio management, and financial analysis. These are substantially different from the project managers.

Finally, a synthesis of the review of the literature is that competitiveness as a strategic option is considered 1) as an ex-post predictor of new product success, 2) as a concrete objective, and 3) the goal that companies pursue to survive and thrive. This study's findings suggest that competitiveness is also an ex-ante predictor, a multidimensional construct, and a means and goal.

PRIOR RESEARCH

Prior research on portfolio management in Scott and Davis' taxonomy.

Scholars initially studied portfolio management (PFM) as a calculative phenomenon in the Closed Rational Perspective. The goal was to maximize the portfolio given resource restrictions (Cooper *et al.*, 1999; Martinsuo, 2013). Complex mathematical programming methods tackle constraint optimization issues well (Petersen, 1967; Taylor *et al.*, 1982). These scholars did not address the absence of accurate data and the inability to reflect portfolio decision-making complexity. While building on the constraints of previous models, innovation, technology, and project management continued to develop and recommend portfolio management frameworks, methodologies, tools, and procedures, especially on project evaluation, prioritization, selection, and resource allocations. These advancements in portfolio management have also incorporated

techniques such as Monte Carlo simulation and fuzzy logic to handle uncertainties and subjective decision-making processes (Kwak and Anbari, 2009; Shenhar et al., 2001). Additionally, recent research has emphasized the importance of considering strategic alignment, risk management, and stakeholder engagement in portfolio decision-making (Killen et al., 2012; Archer and Ghasemzadeh, 1999). Holistic PFM frameworks integrate NPD procedures like the gate system into project selection, and according to Archer and Ghasemzadeh (1999, p. 209), initiatives "that have reached significant milestones or gates should be re-evaluated at the same time as new projects being considered for selection." Cooper *et al.* (2000) present two holistic portfolio management systems emphasizing portfolio reviews or gates. According to Archer and Ghasemzadeh (1999), portfolio evaluations dominate, and all projects compete in one portfolio and gate meeting, whereas gate meetings assess project schedules and finances. In contrast, gate meetings make crucial choices, while portfolio reviews assess portfolio performance. Another way Mathews (2010, 2011) distinguishes PFM between "innovation portfolio" and "project portfolio" is that these holistic frameworks may make PFM "an overarching system and approach for managing product development" (Martinsuo, 2013, p. 795). These suggested PFM frameworks, processes, methodologies, and tools included rational choice model-based decision information systems (March, 1999). It implies perfect linear or sequential decision-making with all information (Gutierrez and Magnusson, 2014). Cooper and colleagues' "Best Practice" studies (1997a,b; 1998; 1999; 2000; 2001) support the idea of PM as a rational decision-making process. Ideally, decision-makers understand the consequences of their decisions and the objectives that determine their preferences (Simon, 1976; Eisenhardt and Zbaracki, 1992). Cooper *et al.* (1999) found that successful firms use a systematic and formalized PFM approach. Other best practice studies (McDonough III and Spital, 2003; Barczak *et al.*, 2009; Menke, 2013) verified this. Barczak *et al*. (2009, p. 17) state that "the best has a well-defined, structured portfolio management

process." The strategic buckets method is distinguished as the best. According to Menke (2013), the strategic buckets method is the best portfolio management approach.

Although the natural system perspective was developed from critical reactions to the "inadequacies of the rational system" (Scott and Davis, 2008, p. 60), the focus in the closed natural perspective is on a behavioral component as an extra characteristic (Scott and Davis, 2008): Incentive structures and accounting system (Chao et al., 2009; Unger et al., 2014; Kopmann et al., 2015; Hutchison-Krupat and Kavadias, 2018), degree of structural centralization (Petro and Gardiner, 2015; Carbonell and Rodriguez Escudero, 2016; Kopmann et al., 2017), degree of top management involvement (Unger et al., 2012b; Lechler and Thomas, 2015; Petro and Gardiner, 2015), organizational culture related factors (Teller and Kock, 2013; Unger et al., 2014; Carbonnel and Escudero, 2016; Kock et al., 2016), degree of PM system formalization(Cooper et al., 1999, 2001; Loch, 2000; Blichfeld and Eskerod, 2008; Teller et al., 2012; Kock et al., 2015; Kopmann et al., 2015 PM), decisions made outside the formal process (Loch, 2000; Engwall and Jebrant, 2003; Perks, 2007; Christiansen and Varnes, 2007; Blichfeld and Eskerod, 2008; Mosavi, 2014; Patanakul 2015), appropriate behavior(Christiansen and Varnes, 2008), and attention directing patterns (Bentzen et al., 2011)

The main aim of the open, rational perspective is to support portfolio decision-making to maximize the value of the portfolio with the right balance of projects that are also strategically aligned (Cooper *et al.*, 1997a,b) to "invest for the future" (Cooper *et al.*, 2001, p. 361). For instance, the strategic buckets method intends to align the R&D resource allocation decisions with the business and innovation strategy (e.g., Cooper *et al.*, 1999; Terwiesch and Ulrich, 2008; Chao and Kavadias, 2008; Cooper, 2013). Cooper (2006, p. 30) suggests strategic buckets protect against biased decision-making, reflecting their primary target of rationalizing portfolio decisions. For instance, Bitman and Sharif (2008) developed a conceptual framework for ranking

R&D projects that includes an evaluation form with specific criteria, pairwise comparison matrices, a weighted scoring model, a scorecard, and radar diagrams. But external factors can complicate investment in the future: Environmental turbulences (Chao and Kavidias, 2008; Voss and Kock, 2013; Kopmann et al., 2015; Kock et al., 2016; Kopmann et al., 2017), uncertainty cannot be resolved (Martinsuo *et al.*, 2014; Teller *et al.*, 2014; Patanakul, 2015; Kokshagina *et al.*, 2016) state of the industry cycle (Chao and Kavadias, 2013), environmental complexity, (Chao and Kavadias, 2008 Fox and Baker, 1985; Floricel and Ibanescu, 2008), and competitive intensity (Voss and Kock, 2013).

The review of the views reveals that the critical management task is to align and apply energy to sustain the PFM management systems to internal and external contextual factors for the best outcome, regardless of contextual dynamics. *One fundamental assumption is that there is a barrier between the firm and the environment, but boundaries are not fixed in the open natural perspective* (Scott and Davis, 2006). Citing Pfeffer and Salancik (1978, p. 30), they suggest that "individual persons are not enclosed within the boundaries of organizations, only certain of their activities and behaviors" (p. 95). Scott and Davis (2006) refer to Weick's organizational conceptualization, where sense-making entails "developing a common interpretation or set of common meanings" (p. 105). Because of the openness, identifying their borders "is always difficult and sometimes appears to be a quite arbitrary decision" (p. 95).

Competitiveness

Some researchers suggest that competitiveness is the product of firms' endeavors without elaborating on the concept itself. Following this research, product innovation (Meutia and Ismail, 2015), process innovation (Piening and Salge, 2014), R&D (Flor and Oltra, 2005), and NPD procedures (Millson and Wilemon, 2010) are the processes that drive the firm's competitiveness.

Meutia and Ismail (2015) indicate that pressure from competition, flexibility towards the environment, innovation, creativity, and marketing performance are essential elements in explaining competitiveness. Their findings suggest that flexibility to the environment and inventive product originality are crucial elements in determining competitiveness, whereas rising competitive pressure appears to reduce innovation and creativity. Some consider the innovation process one of the most important sources of competitiveness. Piening and Salge (2015) apply the Resource Based View (RBV) theory to process innovation and business performance. Process innovation enables organizations to utilize and rearrange resources, which, depending on their effectiveness, will contribute to enhanced performance; the authors see process innovation as an indirect, or mediating, component in financial performance (Piening and Salge, 2015, p. 85). Competitiveness is not clearly defined, but company success is judged regarding financial effects. Their empirical analysis reveals that diverse innovation activities are good for successful process innovation, improving economic performance. Flor and Oltra (2005) question the use of R&D activities as an indicator of innovation, arguing that other non-R&D activities that firms engage in are equally important. Non-R&D activities, such as engineering design, benefit the tile business (Flor and Oltra, 2005).

Another body of papers discusses the significance of knowledge for competitiveness, knowledge about the use of innovation intermediaries (Colombo, Dell'Era, and Frattini, 2015), knowledge management and networks that drive innovation, resulting in competitiveness (Hidalgo and Albors, 2008), and knowledge communication between units, which is critical for fostering innovation (Williams and Nones, 2009). Similarly, Brettel and Cleven (2011) emphasize the importance of a culture that promotes openness to external knowledge as a competitive advantage. Other scholars emphasize the importance of a "culture of competitiveness," such as

Hult, Ketchen, and Arrfelt (2007), who explore data from 201 companies and discover that competitiveness necessitates a culture that encourages learning, innovation, and entrepreneurial orientation.

Others have investigated how variations in NPD activities (e.g., speed, integration, centralization, formalization, consumer preferences, etc.) affect business competitiveness. Millson and Wilemon (2010), for example, examine the impact of four factors on corporate competitiveness: the speed with which product developers create new products and bring them to market, the degree of integration among the various groups involved in the NPD process, the proficiency with which the product developers perform their tasks, and the degree of success attained after the NPD process is completed. Market dynamism, or the degree of client changeability, antagonism, or competitiveness, modifies the interactions between the four previously mentioned components.

Formal techniques have previously been linked to improved product development and innovation performance. However, research on the subject needs to be more conclusive. Millson and Wilemon (2009) found no evidence of a favorable association between a firm's centralized decision-making and an organization's NPD process formalization in terms of competitiveness in their sample of 91 medical device businesses. Furthermore, total marketing performance did not differentiate between more and less successful items, whereas technical performance did. According to exploratory studies, an NPD process design with five elements produces industry competitiveness: senior management involvement, use of formal stage gate processes, business case content, customer integration, and cross-functional integrations (Harmancioglu, McNally, Calantone, & Durmusoglu, 2007). Some additionally emphasize the need for strategic foresight, or future-oriented planning, in increasing organizational ambidexterity, which has been shown to improve competitive advantage (Amniattalab and Ansari, 2016).

A collection of studies examines numerous motivational components and factors that determine how competition is accomplished. Kistruck, Lount, Smith, Bergman, and Moss (2015) discuss when cooperative goal structures are more effective at motivating groups than competitive goal structures, whereas Marcel, Barr, and Duhaime (2010) discover that differences in management teams influence how firms respond to external threats that may alter their competitiveness. Taking into account the fact that management teams of privately held companies do not always have only financial goals in mind when making strategic decisions, McCann and Vroom (2013) investigated the role of non-financial criteria in those companies and discovered that non-financial objectives play an important role in making entry, exit, and pricing decisions.

Tsai, Su, and Chen (2011) and Kilduff, Elfenbein, and Staw (2010) emphasize the relational component of competitiveness and the role of competitors in determining company competitiveness. Competitiveness entails the concept of one or more competitors and, thus, a rivalry between individuals, groups, organizations, or businesses. and some emphasize the importance of strategic analysis for becoming and remaining competitive, as "competitor analysis is essential for strategy formation and to maintain and improve competitiveness," e.g., by having some form of knowledge that may shorten reaction time (Tsai, Su, and Chen, 2011, p.761). According to Kilduff, Elfenbein, and Staw (2010), the role of "others" or rivals is more relational, stronger, and more intense amongst groups or organizations that view each other as close and have some relationship. As a result, in this view, competitiveness is characterized by the perceived significance of units or organizations that are regarded as "relevant" competitors. Competitors are picked. Some may be considered relevant, while others may not, depending on relationships, such as when specific football teams compete fiercely against one another while excluding others from their rivalry, such as Barcelona versus Real Madrid, who have an ongoing battle in the 'El Clásico' soccer matches.

Previous research has described competitiveness both outwardly (in terms of the firm's surroundings) and internally (in terms of the firm's internal architecture of processes and activities). Regardless, in both circumstances, competitiveness is viewed as a) a quantifiable goal, b) a predictor of post-launch new product success, and c) the goal that firms strive for in order to survive and grow in a competitive environment. Furthermore, the literature in this field discusses the factors that influence competitiveness and how to achieve it, but no study has investigated competitiveness as a cognitive phenomenon and made it the subject of analysis.

RESEARCH METHODOLOGY AND DESIGN

This study explores competitiveness as a cognitive phenomenon in innovative and resilient firms sustaining performance over half a century: RQs: 1) How is competitiveness enacted between innovation managers? Are they similar or dissimilar? 2) How is competitiveness bracketed among innovation managers?

Sample

The approach adopted in this research was to select an exploratory, purposeful sample of five innovative companies. Companies were chosen according to several criteria; first and foremost, they have achieved sustained competition for numerous years (>60 years), and second, they all have a long tradition of successful product launches, including new-to-the-world products. All companies insisted on anonymity, and pseudonyms were used.

Table 3. Interviewees in the Exploratory Sample of Five Companies

	Company pseudonym	Typical products/ company background	Interviewees, job descriptions	Management level
1	Paint solutions (PAINT)	• Advanced paint for reducing friction in the water (large vessels) and paint for stopping ice from attaching to wings on windmills in cold areas. • Established 100 years ago.	• Technical Director R&D • Regional Protective Manager • Project Manager • Senior Engineer, R&D	2 Senior Managers 2 Project Managers
2	Biological solutions (BIO)	• Advanced solutions for e.g. bioenergy with cellulosic ethanol and new production technologies for the leather industry. • Established more than 80 years ago.	• Portfolio Manager • Vice President R&D • Director Project Management • Project Manager • Project Manager	2 Senior Managers 3 Project Managers
3	Medical devices (DEVICE)	• Advanced solutions for patients living with personal and private medical conditions. • Established more than 60 years ago.	• Director Project Management • Project Director, Global R&D • Senior Project Manager	2 Senior Manager 2 Project Managers
4	Insulation (INSU)	• Advanced solutions for insulation of private homes and industrial buildings. Insulates against outside temperature differences but protects also against fire. • Established more than 60 years ago.	• Vice President R&D • Project Manager • Project Manager	1 Senior Manager 2 Project Managers
5	Measurement (MEASURE)	• Advanced solutions for accurate (and swift) information on a number of parameters used in the diagnosis and treatment of patients. • Established more than 60 years ago.	• Vice President R&D • Head of Program Management • Project Manager • Project Manager	2 Senior Managers 2 Project Managers
	Total			9 Senior Managers 11 Project Managers

A company with a 75-year anniversary (not part of the sample mentioned in the table) was selected to test the validity of the study design and the analytical approach. Four interviews on the two management levels were conducted but without asking directly about “competitiveness.” This produced very different results, validating the study's design (these results are not shown) as the responses were very different when they were not prompted on “competitiveness” while conducting the interviews.

Data Collection

Following the literature review synthesis, we can already see that perceptions of competitiveness may not be homogenous and are likely to be more subjective. Data were collected through interviews using the repertory grid technique. The repertory grid technique was selected to stimulate interviewees to articulate their cognitive views on complex topics using their own words (Fransella, Bell, and Bannister, 2004; Goffin, 2004; Jankowics, 2004). This technique has been applied previously in exploratory studies in NPD (Goffin and Koners, 2011; Micheli, Jaina, Goffin, Lemke, and Verganti, 2012) and in general management (e.g. Wright, Paroutis, Blettner, 2013; Brown 1992).

Each interview followed the guidelines in the repertory grid methodology: First, the respondent was introduced to the study and informed about the procedure. Second, the decision criteria are set through the literature review (table 1) and discussed in terms of the individual company with the respondent. The respondents were asked to name the criteria used by the company for each criteria type. For instance, the question was asked: “What is important within the financial criteria for New Product Development in your company?”. This is written on a card.

Next, random groups of criteria (shown as cards and known as *triads* in the Repertory Grid Technique) were asked: *how are two of these similar and different from the third for improving competitiveness*?

This process elicits the attribute or *construct* of using decision criteria for improved competitiveness. With this aspect raised by the respondent, he or she was then asked about the contrasting point or *pole* to the aspect raised. In this discussion, the interviewee gave an explanation or an example. The respondent was then asked to rate the remaining three cards on a scale of 1-5 against the construct. Further triads were selected arbitrarily, and the same question was used each time to elicit more constructs. The respondent was not allowed to repeat the same attribute/pole scale. The process is highly personal to the interviewee and sometimes offers comments like "it feels like an exam…". All interviews were digitally recorded and transcribed in full for further analysis. Transcripts were mailed to the respondent for approval and comments.

Data Analysis

The repertory grid technique was effective in helping respondents articulate their perceptions of competitiveness. Two examples, one from a senior manager and one from a project manager, are presented:

Example grid Senior Manager: The R&D Vice President's grid from the Device company is shown in Figure 1. Across the top of the R&D VP's grid are the six criteria the respondent chose for each category. The VP chose net present value as the financial criterion, technology as a strategic criterion, technical feasibility as the feasibility criterion, building competencies as an informal criterion, market segmentation, dynamics as the market criterion, and finally, users of products as the customer criterion. The first triad (the cards indicated by the asterisks in Table 5, first row) was presented to the VP with the question: Looking at the three criteria, how are two of

them similar and different to the third in terms of competitiveness?" This elicited the first construct: "We look at the customers and the market segment that we are about to enter and ensure that *what we do is* the right thing" (referring to strategy and technical feasibility). Further, the VP elaborated: "When we look at the financial, it just means that we can profit from what we have chosen to develop." From the VP's explanations, the construct name emerged as *outside–in and the pole inside-out.* Then, the six criteria were rated against this construct (e.g. the technology criteria as a strategic factor were rated "1"). The second construct elicited *good knowledge of customer needs as opposed to poor knowledge* ("customer and feasibility is something about how close we collaborate with the customers, and what is important is that we know our customers, and we know what kind of job they try to perform"). In total, 12 constructs were elicited from the interviewee, with the 12th one being *Good knowledge about competitors as opposed to poor knowledge about competitors* by saying that "it is not that important that we know our competitors for our strategic strength but more the customer." The column Final Categories in Tables 5 and 6 indicates how the researchers coded the constructs. The ratings in the repertory grids indicate respondents' most essential constructs, i.e., the ones that most strongly differentiate the criteria in terms of competitiveness.

Table 5. Example Senior Manager

	Constructs	Final Categories	Financial	Strategic	Feasibility	Informal	Market	Customer	Pole
			The respondent's own theme specific subcategory						
			Net Present Value	Technology	Technical Feasibility	Building Competences	Market segmentation and dynamics	Users of products	
1	Outside-in	Customer knowledge integration	5*	1*	3*	5	1	2	Inside-out
2	Good knowledge of customer needs	Meeting customer needs	4*	2	2*	5	3	1*	Poor knowledge of customer needs
3	Good correlation between the sales process and the buying situation	Value Creation (through relations)	2	3	4*	5*	3	1*	Poor correlation between the sales process and the buying situation
4	Internal competences	Internal and external competences and knowledge	4	3*	1	1*	5*	3	External competences
5	Future	Timing	3	1	3	1*	4	1*	Past
6	Holistic / 360-perspective	Need for innovation strategy	4*	2	3	1*	2*	2	Fragmentation
7	High degree of economic focus	Miscellanous	1*	2*	3	5	2	4*	Low degree of economic focus
8	Short time-to-market (3-5 years)	Timing	1	4	2*	2*	5*	2	Long time-to-market (5-10 years)
9	Large focus on customer needs	Meeting customer needs	5	3*	4*	5	2	1*	Low focus on customer needs
10	Large focus on business model	Value Creation (through relations)	2*	4	3	5	4*	1*	Low focus on business model
11	Organic growth / aquisitions	Growth is essential	3*	1*	2	1	4*	5	Inorganic growth
12	Good knowledge about competitors	Customer knowledge integration	4	2*	3	5	1*	4*	Poor knowledge about competitors

Example grid Project Manager. Another interviewee from the Device company was the Project Director of global R&D. From Table 6, the interview elicited six constructs with explanations such as "it is not only profit *but also growth. We have the ambition to fulfill both* [NPV and strategy] ... *It [competitiveness] is not only a matter of profit; it is also about growing in the market."; "How we operate out there, how we position ourselves, how we orientate in the landscape, where are we. Feasibility is very internal"; "I would say market and financial together and separated from informal. These parameters can be calculated, created numbers, and analyzed... That is not possible in terms of informal."; "Value to the company? That is what gives us our business foundation. That is the market and the customer."*

Table 6. Example grid Project Manager.

	Constructs	Final Categories	Financial	Strategic	Feasibility	Informal	Market	Customer	Pole
			The respondent's own theme specific subcategory						
			Net Present Value	Strategic Fit	Technical Feasibility	Stakeholder Management	Competitivenes	Create advantage for the customers	
1	Large contribution to competitiveness	Growth is essential	1*	1*	3*	4	1	1	No contribution to competitiveness
2	Numerical	Using financial analysis but uncertainty on data	1*	3	3	5*	1*	1	Non-numerical
3	External	Internal and external competences and knowledge	5	1*	4*	5	1*	1	Internal
4	Large contribution to business foundation	Value creation	5*	2	5	5	1*	1*	No contribution to business foundation
5	Very successful in the market	Meeting customer needs	2	1	2*	3*	1	1*	Not successful in the market
6	High degree of ability to influence	Limits for control and uncertainty	1	1*	1*	1	3*	3	Low degree of ability to influence

The example grids indicate the different perceptions of senior and project managers. Looking at tables 5 and 6 and the quotes from the transcripts, it appears that senior managers perceive competitiveness in terms of value creation, meeting customer needs, and integrating customer knowledge, growth, and timing. The project manager's perception is directed towards growth, customer needs, and value creation, as well as limits for control and uncertainty.

In the 20 interviews, 144 constructs were elicited, each eliciting an average of 6. Many of the constructs from different interviewees were similar, and the terms mentioned by the interviewees were used to name constructs. In other cases, representative terms were used to name constructs that were similar, but different terms were used by the interviewees. To ensure validity and reliability, the researchers performed the coding process in several stages as shown in Table 7. The analysis included an initial coding, a re-coding, and an independent reliability check.

Table 7**.** Reliability checks on the coding (categorization) process.

	Stages of coding		
Measure	Initial Coding (Researchers Team A versus Researchers Team B)	Re-Coding (Team A versus Team B)	Independent Researcher Check
Time required for this stage	• Eight hours for each team for coding • Four hours for the first reliability table (not shown)	• Nine hours for the teams to produce 19 agreed categories • Three hours for recoding • Three hours for the reliability table	• Four hours for the independent researcher check • Two hours for final discussion
Number of categories	• 25 (Team B) • 23 (Team A)	• 19 enhanced category definitions	• 19 final category definitions (Table 9) [1]
Inter-coder reliability (ICR)	• 75%	• 91%	• 93 %

[1] One new enhanced category emerged from the miscellaneous category during the follow-up discussion.

In the initial coding phase, two identical sets of construct cards were prepared (Jankowitcz, 2004). The cards included the construct that had been elicited, the reference number of the construct, and the quotes from the manuscript. Two teams of researchers (2 researchers per team; teams A and B) read, compared, and contrasted the quotes and coded them based on the interviewees' explanations. The teams could not communicate during this stage and worked in two separate rooms. Each team documented the coding independently in an Excel digital file. After eight hours of in-team discussion, this initial coding phase resulted in 23 and 25 preliminary categories for teams A and B, respectively. In the next stage, four hours were spent preparing a reliability table (Jankowitcz, 2004) with 23 x 25 cells. Both pairs of researchers identified similar

groups of constructs across the table. The table also highlights differences in the coding of the two pairs of researchers. The areas of agreement in the tables were colored green, and the columns and rows were reorganized to group these cells on the diagonal. The constructs that remained off the diagonal (green cells) symbolized the differences of opinion between the two pair of researchers. These discrepancies were discussed, and enhanced category definitions were created. This process addressed both convergent and discriminant validity. The researchers constantly referred to the interviewees' accounts to ensure construct validity. Over nine hours, this process produced 19 agreed category definitions. Each team used three hours to recode, and an additional three hours enabled definitions of 19 enhanced categories. Finally, an independent reliability check was conducted in four hours, and a further two hours were allocated to discuss the proposal from the independent person of an extra enhanced category from the miscellaneous constructs, bringing the final reliability to 93 percent.

Findings: perceptions of competitiveness among managers

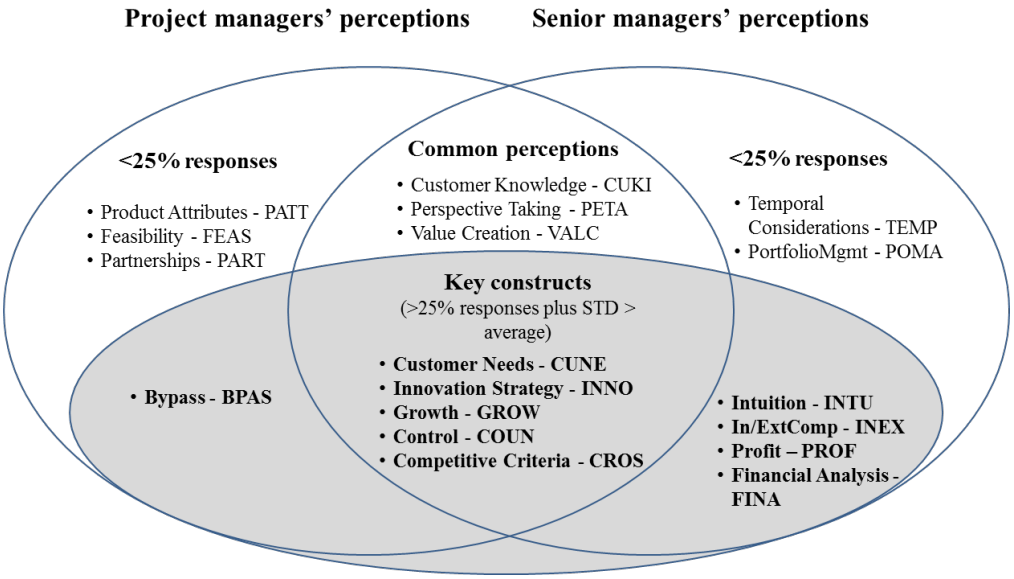
Following the Rep Grid Protocol in Micheli et al. (2012), two criteria are applied to identify key constructs for project managers and senior managers: 1) frequency and 2) the construct's standard deviation compared to the sample average. This analysis is reported in Table 8 (below).

Table 8. Definitions and Occurrences of Categories

No.	Code	Code (4 letters max)	Category	Category definitions (what is included)	Topics this category excludes	Example Quotes	Number of Mentions by Project Leaders	Number of Mentions by Senior Managers	Total Number of Mentions	Std dev.
2	CUSTNEED	CUNE	Meeting customer needs	Customer vs technology focus; difference for customer; address needs; positive feedback from market; customer vs. Competitor focus; customer oriented; lead by the customers; desired difference; unmet needs; needs self-explanatoriry; ideas must be combined with end users; nobody wants to buy it, "a difference for the customer", avoid "we do not want this", "successful in the market"	customer knowledge; product attributes; innovation strategy	"true unmet needs versus trying to push something because it is my pet project" - We have enough new ideas. These must be combined with an end-user need. This combination is challenged by easiness of implementation and solutions loved by engineers. - whether a customer really would want that; if they do not experience the difference it never takes off"	10	14	24	1,40
10	FINANA	FINA	Using financial analysis - but uncertainty on data	"competitive feasible from a financial perspective"; "financial and feasibility are kind of hard facts"; "measuring system"; "something you can calculate, something which is financial"; "NPV is a way of calculating benefit, making decisions on this will not change our competitivness"; "organic growth is easy to measure"; "These parameters can be calculated, create numbers, and analyse"; financial is somehow an exact scientific approach";	FINR; PROF;	"if we make the risk comprehensible, then it becomes easier for this with the direct responsibility to accept investing in the future"; "if you do not put the right data in to your financial and your business case, it does matter. You could make decision based upon those numbers but they would be wrong"	3	10	13	1,49
5	INNOSTRA	INNO	Need for innovation Strategy	More advanced solutions; "from strategy incremental innovation always follows"; "reach market faster if you pick some of the low hanging fruits" (Go-To-Market); "the most extreme ideas, probably do not come from customers"; "stratetic direction is given by where the markets are going"	Portfolio management; success; customer knowledge	- wrong quote - #90. # 115 says "N/A" - should it be in this category then?	5	7	12	1,48
3	INEXTCOMP	INEX	Internal and external competences and knowledge	Outside-in -inside-out; Out-there; market and "customer is external - strategic is internal"; outside perspectives; blue collar - low lewel of knowledge"; leverating the competences of employees; low awareness of strategy; internal-external competeneces	Feasability; customer needs	"How do we orientate in the landspace" - I have projects that despite not being relevant for the market but you do it because it fits with your feasibility and capabilities" - "our innovation depends on our people and how innovative they are and their skills and knowledge and experience they have" - "we need employees that understand customer needs"	3	7	10	1,48
9	PORTMGT	POMA	Portfolio management	"broad/narrow portfolio" "degree of importance"; "too many or few but right projects"; "individual product versus portfolio"; "our lacking ability to say no to new developments"; "feasibility versus commercial worth"; "save money for future developments"; "personal hobbies, dedicated aggressiveness"	INNOSTRA,CROWTH, VALCREATE, ,FEAS	"how many horses to play at the same time in the development phase"	3	7	10	1,21
6	VALCREATE	VALC	Value Creation [thorough relations]	"internal valuation"; "we need better relationship with bigger customers"; "we try to unite customer value with shareholder value"; "focus on business model", "financial viable in the market"; "financially attractive"; value to the company, business foundation"	profit; financial analysis, growth; success	"we have realized that we need better relationsship with the large customers" - the customer relation is important but we also have tgo remmeber that we need to have a revenue"	4	5	9	1,25
18	CUSTKNOW	CUKI	Customer knowledge integration	"customer feedback"; "visibility of the customer"; "focused on the customer"; "clarify your market"; "customer insights";	CUSTNEED;	"You let the customer try the product during development-presenting the mock-ups"; "We know more about the customer. We have greater visibility of the customers";	3	6	9	1,34
7	GROWTH	GROW	Growth is essential	"Growth is an objective"; "we have to grow and be profitable at the same time"; growin g in the market"; "long term growth is a strong driver for creating compeititive products"; [informal criteria] gives direction for growth;	portfolio management; innovation strategy;	"the strategic technological on the other hand it is linked to organic or inorganic growth" when we talk organic growth, at least we will not have the traditional competititors" - strategically we have a growth ambition and our projects from an innovation perspective need to fit within that strategic growth ambition"	3	5	8	1,56
4	TEMP	TEMP	Timing	Future; early or late in the NPD process; quick profit; short term vs long term; quick and cheaper alternatives	innovation strategy; portfolio management; profit; success	""you need to have a mix of something which delivers on a daily basis and then some of these bets where you a few times hit gold" (# 90) —-"what are we able to execute in a short-term perspective and what is it the market needs in a long-term perspective."	1	5	6	1,33
8	INTUITION	INTU	Relying on intuition	"you want to make a difference", "acting non professionally", "absolutely not rational", "gut feeling and experience"; "we do stuff because it is sexy"; "intuition is working without strategy"	BYPASS	"There is also much gut feeling and experience"	0	6	6	1,57
14	BYPASS	BYPA	Spur internal support for project	"behind the scenes"; "sell it as a real project"; "they can just decide"; "the sponsor will help giving us resources"; "nursing the sandbox development"; "made it sound easy"; "slipped right through";		"if [an] individual is sufficiently high in the organization they can just decide that this is important". p. 173 "[…] some of them are so strong so they can make self-fulfilling propheciesˮ. p.173 "And they can be wrong and be right, but it is something that is not supported necessarily by the rest of the organization"	5	1	6	1,42
12	FEAS	FEAS	Feasbility	"weather we can realise it"; "solutions are [driven] by feasibility; "this is more about if we time and people enough to do it";	INEXTCOMP; CROSSFUNC	"We do not necessarily come out with […] more competitive products […], just because we are either good or bad at producing them"	4	1	5	1,17
17	CONUNCER	COUN	Limits for control and uncertainty	"uncertainty and risk are related"; "Uncertainty, high risk"; "certainty, low risk"; "ability to influence"; "affected by external factors"; "out of control"; "personal control"; "in control"	FINANA	"it is more the extent to which we cn control it. We are able to control certain things in the market but it is also under great influence of what happens in the world, which we cannot control."; here I feel much more out of control, much more dependent on something not related to me, where I feel much more in control here." p.20 "[...] I feel I can manage it, I feel that we can take actions, I feel we can plan it, I feel that it is tangible, I know what to do and that I can do something and I can plan something and make a difference on my own." (on the question why financial scores 1)	2	3	5	1,49
13	PROF	PROF	Profit	"There is no point in making a product we cannot sell"; "[strategic criteria] is fixed cost, [financial criteria] is variable cost"; "talk about total price";	SUCCESS; GROWTH; FINR;	"They [financial and strategic criteria] are linked to the price which determine the cost for the costumers."	0	4	4	1,45
16	PRODATT	PATT	Right product features	"User-friendly and viable features"; "right features"; "certain prerequisites"; "how the products performs"; "end-products features";		"It is often used in order to avoid gold-plating or make christmas trees. You just need the right features."	4	0	4	1,21
20	MISC	MISC	Miscellaneous				2	2	4	1,12
11	COMPCRITERIA	CROS	Competing criteria	"various departments utilizes various criteria"; "R&D people vs business people"; "commercial focus vs technical focus"	INEXTCOMP, FEAS,	"The business people like it because they know if this is successful there is a huge market, while the R6D people they hate it because the business people do not understand the technical hurdle."	1	2	3	1,60
15	PARTNER	PART	Using external partners to gain support	"positive external relations"; "someone with whom you can share the investment"; "they might bring with them some capabilities"; "personal dimension"; "close partnerships";		"a reason why we want close partnerships [is] because we believe we can get […] faster to the market, with the more right products […] that the market needs."; "Partnerships usually are an advantage for innovation […]." p. 185 " […] It could […] be creating network, it could be creation of knowledge […]."	3	0	3	1,38
19		PETA	Perspective taking			"it is the ability to look into the future that is important in terms of competitiveness vs. having an understanding of how we reached our current position - we will not earn profit right away , so that is more of a long term business case" # 72: "p.41 "I think people tend to analyze the market from where they are sitting". p.42 "I do not think it adds a lot to the product development […] to focus on what is realistic in terms of what we can do in our lines [production lines]."	1	1	2	1,38

Figure 1 was derived based on the analysis of the more frequently mentioned constructs and those with high ANV (above average). This is a Venn diagram of senior managers' and project managers' main constructs, showing 19 constructs (one construct being the miscellaneous category).

Figure 1. Comparing attributes of competitiveness



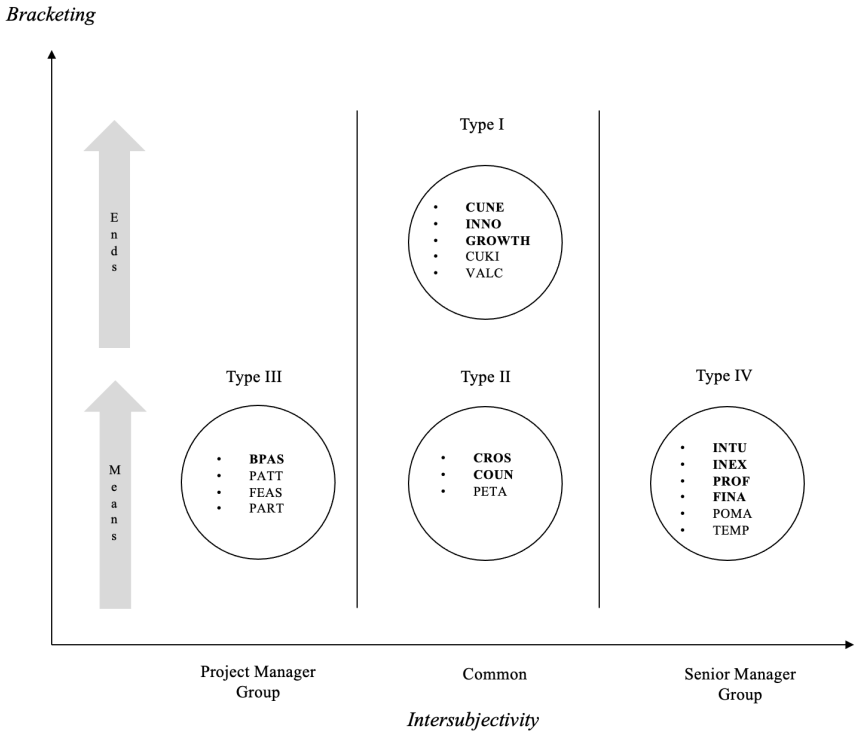
There are differences in perceptions of decision-making criteria about competitiveness between project managers and senior managers, although there are some similarities. The grey-shaded oval in the lower half of Figure 1 represents significant categories of constructs with higher-than-average normalized variability. Figure 1 shows a high degree of similarity in the constructs utilized by senior managers and project managers. Indeed, both groups mentioned eight of the 18 construct categories. In the central "Common Perceptions" area, both management levels defined competitiveness using five categories of essential constructs: customer needs (CUNE), innovation strategy (INNO), growth (GROW), control (COUN), and competitive criteria (CROS). While the central half of Figure 1 (above) depicts the constructs that both project managers and senior managers share, the left-hand area depicts constructs used mainly by project

managers. At the same time, the right-hand side shows constructs used primarily by senior managers. The right side of Figure 1 indicates that senior managers have varying judgments of competitiveness in several attributes: InextComp (INEX), Intuition (INTU), Profit (PROF), and Financial Analysis.

FOUR TYPES OF ENACTED COMPETITIVENESS

Weick *et al.* (2005) suggest that groups "put brackets around or highlight particular, puzzling issues," and competitiveness is found to be both a goal and method in this study. Following Weick (1995), ideally, the social reality of competitiveness transforms subjective meanings into intersubjectivities, a shared meaning between individuals in a group. The findings show bracketing (Weick, 1979) occurring between the two management levels as a goal and a method (see Table 9) but also unshared meaning between the two levels, producing tour types of interpretation. The bracketing suggests that both groups are orientated towards the "ends" and what they intend to achieve, and both perceive some antecedents ("means") necessary to achieve these ends, even if several antecedents are also specific to each group of managers. These types are detailed in the following.

Figure 2. Types of enacted competitiveness.



Type I: Common goals

The literature portrays competitiveness primarily as a goal (Piening and Salge, 2014; Flor and Oltra, 2005; Milson and Wilemon, 2010; Meutia and Ismail, 2015). Five construct categories, CUNE, INNO, CUKI, GROWTH, and VALC, are attributes of competitiveness as an end (Figure 2). These categories highlight the multi-criteria aspect of competitiveness as a goal.

INNO is the need for an innovation strategy: *"[…] the reason why you do macro trends is because you want to achieve that transformational innovation, whereas risk is just, for me, a process under which you sort of fine-tune your long list of ideas or projects to assess which ones are the, the most obvious ones to go with*" (Senior Manager, BIO). *"[…] forcing [the project] to fit into the strategy in a strict sense may be counterproductive. Or suppose it must fit into a strict*

interpretation of a market segment. In that case, it will prevent coming up with a novelty […] typically [competitiveness] will overcome the management resistance - act outside usual habits" (Project Manager, INSU). In this view, innovation and disruptive or radical innovation is the goal (Hidalgo and Albors, 2008; Harmacioglou, 2007). This affirms the findings in previous literature where innovation was used interchangeably with competitiveness, as in Colombo et al. (2014) or as a dimension of competitiveness in Brettel and Cleven (2011) and Piening and Salge (2014), who specifically see innovation performance as a proxy of competitiveness.

GROWTH is described as essential: "*[…] when you create organic growth, most of the time you have no competition [...] organic growth for us is an indirect [...] competition with new fields [...] those we consider as being our normal competitors are not the normal competitors. Does a car compete with a plane? When discussing organic growth, we will not have the traditional competitors […]* (Senior Manager, BIO). In this category, growth is seen as an attribute of competitiveness. Many articles in the literature emphasize growth (in sales and turnover, top-line growth) as a dimension of both innovation performance (Piening and Salge, 2009; Hidalgo and Albors, 2008; Harmacioglou et al., 2007) and competitive behavior in itself (McCann and Vroom, 2013; Hult et al. 2009), while Forsman et al. (2013) also relates growth to market-related competitiveness.

CUNE is described as meeting customer needs: "[…] *whether the solution meets the end user needs is key to becoming competitive* […]" (Project Manager; BIO). "*And it is because we have had this focus on the market and the customers, which resulted in a purchase of* [the company name] *even though there are huge companies way bigger than us who also offer products in this category* (Senior Manager; MEASURE). Defining competitiveness as a goal in terms of meeting customer needs aligns with what Hult et al. (2007) describe as filling gaps when they define competitiveness as the degree to which firms "are predisposed to detect and *fill gaps* between

what the market desires and what is currently offered" (p. 1037, italics added). This category also supports the findings of Harmacioglou et al. (2007), where meeting customer needs is one of the main aims of NPD processes, and Forsman et al. (2013) where they show that meeting customer needs is a common characteristic of successful eco-innovators.

The fourth construct of an end, CUKI, also relates to the customer but is described as integrating customer knowledge: "[…] *the customer is a bit more objective than the market* […] *we know more about the customer. We have greater visibility of the customers*" (Project Manager; MEASURE). "[…] *perhaps we should make a broader market analysis. Remember the customer. I want a broader market analysis and based on that the products can be developed and thereby generate better competitiveness* […]" (Senior Manager, PAINT). This dimension highlights competitiveness in terms of the capability of integrating, synthesizing, and assimilating customer knowledge. Customer needs from different sources are what Hult et al. (2007, p1037) define as the degree to which companies "*detect gaps."* It also supports previous findings on the importance of knowledge and customer input for competitiveness and innovation (Hult et al., 2007; Williams and Nones, 2009; Colombo et al 2015; Kistruck et al., 2016).

Finally, VALUE is concerned with creating value through relations: "*we have realized that we need better relationships with the large customers,"* and *"[…] the customer relation is important, but we also have to remember that we need to have revenue. Sometimes it results in giving too much, which can result in not getting a high enough gross profit*" (Senior Manager, PAINT). Competitiveness as value is also recognized in the literature, i.e., scholars refer to competitiveness and innovation as creating superior value for customers (Brettel and Cleven, 2011; Forsman et al., 2013; Colombo and Albors, 2015).

Hence, competitiveness is not an effect of positioning and rivalry with competitors but manifests in customer needs, knowledge, growth in new markets, the risk of 'not acting,' and relationships. Surprisingly, in these companies, innovation strategy is only one component, and even if the scholars exploring competitiveness suggest it to be a goal, the findings show the multidimensionality of this end.

Type II: Common methods

The interviewees also accredited competitiveness as a means, and they align on three construct categories: CROS, PETA, and COUN (see Figure 2).

CROS is described as competing criteria. Both senior managers and project managers mentioned how different departments understand competitiveness based on different criteria: "[*...] the businesspeople like it because they know if this is successful, there is [...] a huge market [...], while the R&D people they hate it because we do not understand the technical hurdle, we have no clue what is going on. […] in the example I described, you can put each here and swop them, depending on which side you are on."* (Senior Manager, BIO). Project managers acknowledge the existence of different competing criteria as well with statements like: "*we can do it like this (financial and strategic together) and say commercial versus technical focus*" (Project Manager, MEASURE). This category emphasizes the presence of different departmental or functional world views manifest in different criteria when considering competitiveness (Christensen, 2016), indicating that complexity (conflict) in criteria is an element of achieving sustainable competitiveness.

Another category, PETA, which emerged from the data, was the importance of perspective-taking concerning competitiveness. A senior manager highlighted the time perspective (future vs present) when considering the criteria and links strategy and feasibility to the future and market

price to the present, i.e., "[…] *any strategic criteria is linked to something about the future, meaning that you have to figure out somehow, if what you will do, will be feasible* […]" (Senior manager, INSU, p16). A project manager states the lack of cross-functional and visionary perspective: "I think people tend to analyze the market from where they are sitting […] *I do not think it adds a lot to the product development […] to focus on what is realistic in terms of what we can do in our* [production lines]" (Project manager, INSU). These managerial perceptions point to the importance of cross-functional collaboration for competitiveness, reinforcing the findings of Harmacioglou et al. (2007), who show a positive relationship between cross-functional collaboration (where perspective taking takes place) and innovation productivity (a proxy of competitiveness). During perspective-taking, employees share knowledge to challenge each other's worldviews (Hult et al., 2009).

Finally, senior and project managers acknowledge the limits of control and the manifestation of uncertainty [COUN] when linking the criteria to competitiveness. Financial, strategic, and feasibility criteria are the ones that managers feel in control of, while market and customer criteria are the ones that they exert the least control over. As such, they see these as more prone to high levels of uncertainty e.g., "[…] *here* [informal criteria] *I feel much more out of control, much more dependent on something not related to me, where I feel much more in control here* [financial criteria] *I feel I can manage it, I feel that we can take actions, I feel we can plan it, I feel that it is tangible, I know what to do and that I can do something and I can plan something and make a difference on my own."* (Senior manager, INUL, p20). Along the same lines, a project manager remarked: "*It is more the extent to which we can control it. We can control certain things in the market, but it is also under great influence of what happens in the world, which we cannot control*." (Project manager, DEVICE). This indicates that achieving competitiveness is a

complex managerial and organizational phenomenon; where multiple means with a varying degree of uncertainty and malleability come into the play creating space for potential creative ways (Hidalgo and Albors, 2008) in achieving sustained competitiveness.

Type III: Project Managers

However, differences also were revealed when senior managers and project managers reflected on competitiveness as a means; project managers portrayed competitiveness in terms of product attributes [PATT], feasibility [FEAS], partnerships [PART], and gaining support [BPAS] while senior managers considered competitiveness in terms of the firm and organizational competencies (internal and external competencies [INEX], portfolio management competencies [POMA]), financial analysis [FINA] and profit [PROF] and individual competencies (temporal considerations [TEMP] and relying on intuition [INTU]).

In terms of product attributes, one of the project managers states: "If you develop something that fits the strategy—no matter how well it fits—you will not be able to sell it if it does not fulfil*l certain prerequisites in terms of performance and price*" (Project manager, PAINT). Project managers seem to consider product attributes as a means in achieving competitiveness. This supports the findings of Millson and Wilemon (2009), who state that product quality (an attribute) distinguishes successful NPD projects from unsuccessful ones. However, in their study, Forsman et al. (2013) identify product orientation as a characteristic of unsuccessful innovators. The studies' different data sources could explain these contradictory results. Millson and Wilemon (2009) collected their data by surveying the project's responsible (mainly project managers from R&D, marketing, and business units), while Forsman et al. (2013) collected their data from financial annual reports, companies' websites, industrial analysis, and patent registration.

FEAS is seen as a means of competitiveness in terms of being a space where solutions are created in organizations, e.g., "*Strategic and feasibility are connected concerning the solutions we manage to create. Needs are created under strategy while the solutions are created in feasibility—so what is the customer solution we end up with?*" (Project Management, DEVICE) another manager states: "T*his is more about if we have time and people enough to do it*" (Project Manager, PAINT). Viewing feasibility as a means of achieving competitiveness explains why Moenaert et al. (2010) find feasibility as one of the two most important strategic decision criteria in the ex-ante evaluation of ideas (projects and products) but not in the ex-post evaluation of success.

Project managers see PART as an enabler of competitiveness. They relate PART to informal criteria (partnerships are selected based on personal relationships and preferences) and feasibility (partnerships make things possible by reducing time or bringing complementary competencies to a project). A project manager explains why partnerships are beneficial in the NPD process: "[…] *a reason why we want close partnerships* [is] *because we believe we can get* […] *faster to the market, with more right products* […] *that the market needs*." (Project Manager, BIO). Another project manager points to the competencies benefit: "*If you have an external partner inside, then you have someone with whom you can share the investment. It could also be that the investment is not that big because they might bring with them some capabilities; Partnerships usually are an advantage for innovation … it could* […] *be creating a network, it could be the creation of knowledge* […]." (Project Manager, INSUL). In their study, Brettel and Cleven (2011) show the positive relationship between a firm's innovation orientation and collaborative partnerships with customers, universities, and independent experts. Our analysis shows that partnerships are primarily a concern of project managers. This suggests that partnerships or

collaborations would take place on a project level more often than on a portfolio level, as partnerships are not considered a segmentation dimension (Goffin and Mitchell, 2017)

Finally, BPAS refers to creating internal support in the organization by bypassing formal processes or procedures to attract more resources around specific ideas or projects. One of the project managers states: "*We made it sound easy to manufacture… It was not that easy, but it was relatively easy, and it also slipped right through*." (Project Manager, INSUL). Another project manager reports how to successfully get project ideas through the NPD process: "*Nursing the sandbox development and nurse it to a level where marketing gets interested and then sell it as a real project*" (Project Manager, PAINT). This behavior of project managers is aligned with the findings of Kistruck et al. (2016), which show that in a resource-scarce environment, project rivalry flourishes, and project managers learn quickly that access to resources is highly contested. Thus, they need to find ways to create support for their projects or bypass formal processes and procedures to attract more resources. This also points to internal rivalry versus external rivalry when thinking of competitiveness in organizational settings; it supports the argument of Kilduff et al. (2010) who considered the notion of competitors relative to the perception of the respondent.

Type IV: Senior Managers

Senior managers, on the other hand, see competitiveness as a function of internal and external competencies [INEX] needed in the organization e.g., "*Our innovation depends on our people and how innovative they are and their skills and knowledge and experience they have, so it is only with that we can create feasible products*" (Senior Manager, DEVICE) Another senior manager, mentions: "*Developing medical devices require a lot of cooperation within the organization and that is a typical* [MEASURE] *thing. The other two are more about understanding what lies*

outside the company: market, segmentation, and strategy, and then matching it with what we are good at. (Senior Manager, MEASURE). Here, senior managers highlight the internal and external capabilities organizations need to have in order to integrate and synthesize knowledge to be able to innovate. This view highlights the dynamic capabilities perspective, according to which "firms do not achieve rents because of their superior resource endowments, but rather because their distinctive capabilities allow them to make better use of their resources" (Piening and Salge, 2015, p. 82) or what Meutia and Ismail (2015) call adaptability.

POMA is about a broad versus narrow portfolio of investments. Senior managers refer to the difficulty of maintaining portfolios at a reasonable size where resources are not spread too thinly across projects: "*few but right projects for resources and funds. The opposite would be that you are doing too many projects. That every project gets a tiny bit. That is the bad opposite*." (Senior Manager, MEASURE); *"… at the same time, it is a consideration of how many horses to play at the same time in the development phase*" (Senior Manager, PAINT). Senior managers reflect here what Pinening and Salge (2015) call a curvilinear relationship between a firm's innovation activities and its process innovation success. Hence, process innovation success might increase with the number of projects pursued simultaneously only up to a point, after which marginal costs outweigh marginal benefits.

INTU is described as listening and considering intuition in innovation processes. The senior managers usually identify intuition as part of the informal criteria and juxtapose it usually against financial and feasibility criteria. For example, "*It is not rational. Sometimes we do stuff because it is sexy, even though both market size and the NPV demonstrates we should not*" (Senior Manager, BIO) "*Okay, here is something that kicks ass and "you want to make a difference*" [pole – "driven by heart"] where the other is "*we need to do this because that is how to behave professionally* [pole – "driven by brain"]" (Senior Manager, DEVICE). The literature recognizes the

role of intuition in achieving competitiveness in terms of cognitive aspects, e.g., Marcel et al. (2010) shows how cognitive differences influence different responses to market changes, while McCann and Vroom (2013) show the importance of informal criteria and non-financial objectives in executive decisions.

In the PROF category, profit is perceived by senior managers as a method to competitiveness, not a goal in itself, where the financials are used to indicate product cost and price: "*They [*financial and strategic criteria] *are linked to the price which determines the cost for the costumers*." (Senior Manager, INSUL). Contrary to Forsman et al. (2013), senior managers regard profit not as a proxy for competitiveness but rather as a means to achieve competitiveness.

FINA describes financial analysis as a support function. The senior managers highlight the role of financial analysis as a support factor to competitiveness. For example: "*Something has a direct impact and something else has a support effect* […] *Financials does it too, but it is more a support function*." (Senior Manager, DEVICE) or "*This* [financial] *is a result of something depending on the input but is it contributing as such? It is not contributing anything. It is a means*." (Senior manager, PAINT). While the senior managers emphasize the supporting role of financial analysis, they acknowledge its properties of tangibility and calculability, which affords them more control (or a sense of power) and accountability over investments, as stated in the following statement: "*They* [financial and feasibility criteria*] are kind of hard physical, kind of monitoring or measuring system. While this* [informal criteria] *is emotional*." (Senior Manager, BIO).

The last construct category identified by senior managers is TEMP. It refers to temporal considerations and dilemmas when considering competitiveness as a means: "*Perhaps, it is the ability to look into the future that is important in terms of competitiveness versus having an understanding of how we reached our current position*." (Senior Manager, MEASURE). Another

senior manager states the timing dilemma as: “What are we able to execute in a short-term perspective and what is *the market needs in a long-term perspective*” (Senior manager, MEASURE). As in the INEX category, this category also expresses a boundary. But instead of referring to the need for finding direction between cardinal points in the external and internal environment here, the boundary refers to discovering direction between cardinal points in the time continuum (past, present, and future). This capability refers to both strategic foresight—being able to plan for the future—and ambidexterity, the ability to balance exploration (long-term viability) and exploitation (short-term viability) activities (Amniattalab and Ansari, 2016).

DISCUSSION AND CONCLUSIONS

The present study highlights competitiveness's multidimensional and heterogeneous character as a cognitive construct. The review of past research has revealed the ambiguous use and definition of the concept, and the empirical analysis presented here shows that this ambiguity is also reflected in managers' perceptions but only as a means. Furthermore, the study shows the different perceptions of competitiveness as a means or end. Competitiveness as a “goal” manifest in different attributes upon which project and senior managers agree. They view competitiveness as meeting customer needs, innovative behavior/orientation, growth, value creation, and integrating customer knowledge. The literature on competitiveness views competitiveness as an object in its own right and relates it to only some attributes, creating a fragmented and simplistic image of competitiveness, one that portrays competitiveness as an unambiguous, conflict-free, and stable goal pursued by organizations. By mapping a spectrum of attributes empirically, this study provides a comprehensive image of competitiveness as perceived by companies that have managed to sustain themselves for more than half of a century as leaders in their respective industries. In

this way, we depict competitiveness as many potentially conflicting and ambiguous goals by design to achieve sustainable competitiveness.

Competitiveness as a "means" describes the dimensions of competitiveness. Our study shows that the means for pursuing competitiveness are multiple and managerial attention is partial (Bentzen et al., 2011; Ocasio 1997; March 2000). Project and senior managers share some mutual attributes of competitiveness as means, while at the same time, the two levels indicate different attributes when thinking in terms of means. For project managers, product attributes, feasibility, and partnerships are the means to competitiveness. At the same time, only project managers view the role of bypassing rules, routines, and processes to achieve competitiveness. On the other hand, senior managers emphasize the role of temporal considerations and dilemmas of portfolio management while recognizing the role of intuition, internal and external competencies, financial analysis, and profit as means of competitiveness.

The differences in the perceptions on how competitiveness is achieved can be seen in Kilduff et al. (2010) and Kistruck et al. (2016). The two management levels reside and operate in different settings. The conditions of the project managers' operating environment are characterized by scarce resources and a competitive environment (Shollo et al., 2015; Kistruck et al. 2016; Kilduff, 2010), while that of senior managers is "nested" (Shollo et al., 2015, p. 181) in a fitting and synthesizing exercise to fit projects, strategies, competences, feelings, and calculations concerning the larger external environment. This highlights the relational aspect of rivalry and competition (Kilduff, 2010).

The differences between the management levels provide a plausible explanation for the paradox documented in the Moenaert et al. (2010) study. Under the premises of that study, the participants were thinking of means of competitiveness in the ex-ante evaluation of project success, i.e., feasibility, while they were thinking of competitiveness as a goal in the *ex-post*

assessment of project success. It is also interesting that senior managers view profit as a means of competitiveness instead of a goal.

The managers agree when thinking of competing criteria, perspective taking, and control vs. uncertainty as means of competitiveness. These shared attributes emphasize managerial phenomena that shape competitiveness through a contestation and negotiation process of different priorities, preferences, world views, and degrees of manageability.

Another important observation is that none of the interviewees mentioned, specifically, competitors or the competitive environment as an essential facet of competitiveness. On the contrary, one interviewee at the senior level stated the opposite, e.g., *"It is not that important that we know our competitors for our strategic strength but more the customer."* This suggests that the views on competitiveness do not subscribe only to Porter but also relate to continuous monitoring, enacting, and reflection on the company's setting in the overall environment, more in line with the resource-based view where the focus is on resources as a "mean." Hence, the competitiveness attributes identified in the sampled companies resemble a mixed strategy perspective between the two.

IMPLICATIONS

Among the theoretical implications of the present study is that NPD decisions cannot be understood without an understanding of a decision context, e.g., competitiveness, and how senior managers and project managers translate this similarly and differently. Furthermore, the results indicate that these decision-makers interpret meaning and cognitive framing differently.

Managers and management should be aware of the very different conceptualizations of competitive positions in NPD decision making. Creating a set of decision criteria does not necessarily ensure alignment among decision-makers. Their interpretation varies widely based on the

context (here, competitiveness) and the decision makers' level in the company (project vs. senior manager). Simply put, different managers regard these quite differently.

This translates to a call for more leadership than just managing metrics and key performance indicators; innovation leadership that embraces complexity, allowing for interpretation, negotiation, and the existence of various artifacts to encourage learning, cross-fertilization of ideas, and an alignment process.

Interestingly, the data here indicate that many project managers considered bypassing a necessary practice for achieving competitiveness. Regarding competitiveness, bypassing is an artifact of commitment rather than a threat to effectiveness. At the same time, senior managers considered profit a means rather than a goal for their activities, implying that many managers consider long-term survival rather than short-term profit as essential. Further studies could investigate if this relates to specific industries or cultures.

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