The integration of ideation and project portfolio management — A key factor for sustainable success[☆]

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Abstract

Effective management of single projects is no longer sufficient. In today's business market, proactive management of the whole project portfolio has become increasingly important for achieving long-term success and competitive advantage. At the front end of projects, opportunities are discovered, ideas are created, and the foundation for later project, portfolio, and, eventually, corporate success is laid. This paper contributes to the project management body of knowledge by combining the front end view on projects with the holistic view of managing project portfolio landscapes. It focuses on establishing a framework for conceptualization of the relationship between ideation and project portfolio management in product development environment by relating *ideation portfolio management*, *front end success,* and *project portfolio success*, and lays the groundwork for further empirical research. The overarching topic I address is the conceptualization of how ideation can facilitate and sustainably improve portfolio success in the product development environment in the long-term.
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1. Introduction

The share of activities and budgets in project-organized undertakings has significantly increased over the last several years. As a result of this development, the project landscape of companies has become increasingly complex. A consequence of this increasing complexity is that it is no longer sufficient to manage single projects effectively and efficiently to be successful (Dammer and Gemünden, 2006; Dammer et al., 2006; Elonen and Artto, 2003). Hence, a proactive and structured management of the project landscape as a whole that takes a holistic view of the multitude of projects becomes a major topic for companies striving for a competitive advantage (Dammer, 2008; Patanakul and Milosevic, 2009).

However, sustainable success is more likely to be achieved if portfolio opportunities are recognized and then actively managed and exploited. Potential current and future gaps in the portfolio must be identified early on. Given that portfolio development and eventually corporate success are influenced by various factors, one of the major sources for success is a company's innovation competence. Thus, it is not surprising that an analysis of the Boston Consulting Group reveals that 72% of their interviewed companies considered innovation to be one of the top three priorities (Andrew et al., 2010). A major lever to trigger innovation and opportunities lies within the front end of a company's project portfolios (Khurana and Rosenthal, 1998; Reinertsen, 1999; Zhang and Doll, 2001).

Nevertheless, the majority of contributions examining the "fuzzy front end" – a term that was introduced in the innovation management literature 25 years ago by Reinertsen (1985) and that was made popular by Smith and Reinertsen's work (1991) – still posit that this is a *single* project management task and not a project *portfolio* management challenge. Thus, the proponents of fuzzy front end typically argue that

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innovation projects should comprise the earlier stages, that the early stages should be executed much more intensively, that technology- and market-related homework should be conducted with great care, and that the approaches should be professional and of high-quality. This is because in these early stages not only are the target costs of new products defined, but the benefits and the total cost of usage that future users of a new product have to bear are also defined (Cooper and Edgett, 2008; Zhang and Doll, 2001). However, the proponents ignore that there are thousands of interesting ideas that may lead to hundreds of very interesting concepts that can be further developed into many project proposals. Only a very small fraction of these ideas, concepts, and project proposals can and should be selected, because resources are limited and choices have to be made. It makes sense to invest more money, time, and intelligence into the earlier stages of innovation projects (Reid and de Brentani, 2004; Verworn et al., 2008), but this cannot be done for each and every innovative venture. Therefore, not only the execution stages of new products and service innovations but also the early and evolutionary stages, where new opportunities are discovered and new options are developed, require a professional portfolio management system. The decisions as to which ideas should be further developed into concepts and then into project proposals and which of these proposals should then become projects should be decided from a project *portfolio* management perspective. I call this type of portfolio management *ideation portfolio management*. The task of ideation portfolio management is to feed the subsequent project portfolio management with a sufficient flow of project proposals that generate high value and that support the implementation of developed strategic goals, which includes the support of desired changes in strategic goals that appear to be implementable within the targeted time and with accepted risk.

Attracting, selecting, and developing ideas into project candidates are important management tasks that suffer from several misunderstandings. For example, contributions from engineering management often state that the target cost of a new product is defined in the early stages, but the high budgets are spent in the later stages. Furthermore, senior management, often with a background in business administration, does not become involved until it is often too difficult and very costly to change design decisions (Creese and Moore, 1990; Herstatt and Verworn, 2003; Specht et al., 2002; Wheelwright and Clark, 1992). This claim is further supported by marketing researchers such as Robert Cooper, Elko Kleinschmidt and co-authors who repeatedly found that market-related research must be conducted at an early stage to define target groups and critical needs of key customers in this target group (Cooper and Edgett, 2003; Cooper and Kleinschmidt, 1993; Cooper et al., 2004b). This is necessary to define real product advantages that cannot be imitated easily and to elaborate and validate such unique selling propositions throughout the product development process. Again, if the early fundamentals of this proposition are weak and if they are not challenged to detect errors early, then high investments in advertising and sales will also fail and brand values will suffer. Empirical findings indicate

that senior management involvement does start earlier than suggested in the literature and that in successful firms, it is much greater during early stages than it is in low-performing firms (Dammer, 2007; de Brentani and Kleinschmidt, 2004; Unger et al., in press). Senior management, however, cannot and should not get involved in too many single projects as it has a limited management capacity. Moreover, there is a danger in senior management supporting "pet projects" that may potentially prevent or delay termination of problematic projects (Balachandra, 1984; Bonner et al., 2002; Cooper, 2008; Ernst, 2002). Professional portfolio management allows senior management to obtain more transparency about the landscape of ideas, concepts, and project proposals as well as to assess the value of the pipeline (Jonas, 2010). Thus, professional ideation portfolio management is a good means of bringing innovation management back to the boardroom and fostering the exchange between experts and hierarchical power holders.

A systematic portfolio management approach is also needed for the ideation and concept definition stage, which ensures that appropriate ideas and concepts are selected and supported. If performed properly, support should be much higher, leading to better funding of valuable ideas, concepts, and project proposals. Finally, if the ideation portfolio is well integrated with the project portfolio management, projects can, thus, be implemented much faster.

However, integrated workflows and processes between these two worlds at the front end, on one side, and project portfolio management (PPM), on the other, are, for the most part, absent (Khurana and Rosenthal, 1997). For practitioners and academia alike, it is important to know how one can apply the ideation vacuum cleaner to suck and pull the relevant ideas into the project portfolios (Terwiesch and Ulrich, 2008). Consequently, this paper takes a new approach on investigating project portfolios and focuses on the integration of ideation at the front end into PPM and develops a conceptual framework for analyzing the impact of ideation portfolio management on project portfolio success. The overarching question that I want to address with this paper is how ideation and, thus, ideation portfolio management can facilitate and sustainably improve portfolio success in the product development environment in the long run. There are three aspects to this question:

(1) What is ideation portfolio management (IPM)?
  a. What are the dimensions of IPM and by which constructs can it be described?
  b. How can success of IPM (i.e., front end success) be conceptualized?
(2) How can we conceptualize the influence of the configuration and design of IPM on PPM?
(3) How do the IPM constructs effect PPM metrics and respectively project portfolio success?

The motivation for the first research question is quite simple. As previously mentioned, scholars examine ideation through a single project lens rather than from a portfolio vantage point (Dammer, 2008; Ernst, 2002; Gerwin and Barrowman, 2002).

That is, authors investigate the front end and its processes in general (Kim and Wilemon, 2002; Koen et al., 2001; Langerak et al., 2004; Moenaert et al., 1994; Montoya-Weiss and O'Driscoll, 2000; Reid and de Brentani, 2004; Schulze and Hoegl, 2008; Verworn et al., 2008) or they assess the factors in the early phases that make a project or a product a success (Poskela, 2009) and then establish processes to repeat this success for other projects or developments (Cooper, 2008). However, to cope with the multitude of ideas and concepts at the front end in a portfolio manner, it is necessary to understand the dimensions that constitute the ideation setting and, therefore, ideation portfolio management as well as to understand how these ideas and concepts could be conceptualized. Moreover, a connection between ideation and the front end with PPM is rarely in the scope of research contributions in academic literature, albeit the potential that such a connection may hold for future company success. Khurana and Rosenthal (1997) posit that there often is a discontinuity between front end processes and portfolio management. Thus, my second research question addresses this point by conceptualizing the influence of IPM design on PPM. Finally, my third research question addresses whether IPM can actually foster and improve project portfolio success. Such a question has neither been asked yet nor answered, but it is the logical consequence of the previous two research questions. In posting these research questions, I follow Schulze and Hoegl's call for more attention of the academia to the "under-researched field" (Schulze and Hoegl, 2008, p. 1743) of the pre-project phase of ideation. This call is in line with Kahn et al. (2003) who still see the front end as an important issue in future research on product development management.

To answer my research questions, I use the following approach in this paper: On the basis of a literature study, I develop a framework for conceptualizing the relationship between ideation portfolio management and the fruits of PPM: project portfolio success. I suggest *project portfolio success* as a dependent construct and *ideation portfolio management* as its antecedent. *Front end success* serves as a mediator between these two. The constructs of this conceptual framework will be described in greater depth in the subsequent chapters. A preliminary validation of this framework has been conducted by an interview series with practitioners from various industries. Finally, I discuss the conceptual implications of this framework and how they may pave the way for further research into this field. This article aims at adding new findings to close the identified gap in recent scientific research. Here, ideation and the front end of projects are assessed from a portfolio management perspective. This innovative concept ensures a consequent and thorough recognition and exploitation of opportunities at the front end aimed at fostering project portfolio success.

2. Project portfolio management and ideation — what we know from the literature

Project portfolio management and ideation are established concepts in the scientific literature. In this chapter, the theoretical bases of these two concepts are described, and the scope of this paper is depicted. These two concepts will be used to build a novel framework for the integration of ideation and project portfolio management, which will be presented and discussed in subsequent chapters.

2.1. Project portfolio management

Project portfolio management (PPM) addresses the project landscape at large (Dammer, 2008; Hiller, 2002; Lomnitz, 2004). The ultimate goal is to maximize the contribution of projects to corporate success. Thus, PPM can be considered as the simultaneous management of the collection of projects that make up an investment strategy of a company (Artto and Dietrich, 2004; Levine, 2005; Patanakul and Milosevic, 2009).

The main objectives of PPM are maximizing the value of the portfolio, balancing the portfolio, and linking it to strategy (Cooper et al., 1999). Recent contributions to the related literature stress the importance of PPM in evaluating, prioritizing, and selecting projects according to the overall strategy (Archer and Ghasemzadeh, 2004; Meskendahl, 2010). In this context, some authors consider project prioritization as part of the portfolio management process to be a key factor for success (Cooper et al., 1999; Elonen and Artto, 2003; Fricke et al., 2000). Cooper et al. (1999) contend that an important part of PPM is resource allocation to achieve the company's objectives. This view is shared by other authors who consider resource allocation among simultaneous ongoing projects to be one of the primary themes in PPM (Blichfeldt and Eskerod, 2008; Engwall and Jerbrant, 2003; Payne, 1995). According to Müller et al. (2008), a further important objective in PPM is portfolio steering, which includes all the recurring tasks that must be undertaken to keep the portfolio on track and to permanently coordinate the portfolio. The PPM process proposed by Jonas (2010) incorporates these aspects. He suggests a chronological sequence of four interdependent phases: (1) portfolio structuring, (2) resource management, (3) portfolio steering, and (4) organizational learning and portfolio exploitation. The latter phase ensures value capturing from the portfolio.

However, to allocate the scarce resources to the most promising project ideas and to prioritize the ideas according to strategic objectives, the project pipeline must first be fueled with the *right* ideas. At this juncture, the integration of ideation and PPM comes into focus.

2.2. Ideation and the front end

The front end is an umbrella term for everything that occurs between the proverbial *blank sheet of paper* up to the project proposal, that is, the scope change of running projects. Reinertsen (1985, 1999) coined the term "fuzzy front end" for this period. Koen et al. (2001) note that the adjective *fuzzy* implies that this phase is somewhat nebulous, mystical, and non-controllable. Even if this may be a bit exaggerated, it holds true that the front end is a period where uncertainty is rather common.

Moenaert et al. (1995) postulate that this is the phase where organizations create a product concept and make resource

decisions as to whether to invest in the idea. Similarly, Khurana and Rosenthal (1997, 1998) suggest, with their holistic approach, that the fuzzy front end consists of product strategy formulation and communication, opportunity identification and assessment, idea generation, product definition, project planning, and early executive reviews. For Kim and Wilemon, the front end begins "when an opportunity is first considered worthy of further ideation, exploration, and assessment and ends when a firm decides to invest in the idea, commit significant resources to its development, and launch the project" (Kim and Wilemon, 2002, p. 270). Nobelius and Trygg (2002) identify six elements of the front end process after an opportunity has been identified: mission statement, concept generation, concept screening, concept definition, business analysis, and project planning. Koen et al. (2001) characterize this phase as marked by those activities and actions that occur prior to any formal, well-structured new-product-development or stage-gate process. Consequently, the front end is the phase that precedes the project portfolio management phase.

The crucial activity in this pre-project phase is ideation (Cooper and Edgett, 2008). Poskela (2009) states that ideation and the processing of new product concepts normally occur in this front end phase, well in advance of the actual start of a development project. The ideation process has to ensure that a sufficient amount of ideas are generated and that efficient processes are in place to advance and develop these ideas so as to crystallize new product concepts and to identify selection routines for choosing the most promising concepts for the next level, that is, projects within a project portfolio.

The ideation phase and the front end of a project are of strong strategic relevance for the success of projects, project portfolios, and, eventually, the business at large since most projects fail at the beginning of the project funnel (Cooper et al., 2004b; Zhang and Doll, 2001) because it is in the beginning that mistakes tend to have the most sustainable impact. For example, Shields and Young (1991) estimate that, on average, 75 to 90% of the final production costs of a product are defined during this early conception phase. This phase typically entails multiple opportunities for improvement as the implementation of the appropriate activities at the beginning of the project funnel can lead to the greatest cost savings (Reid and de Brentani, 2004; Smith and Reinertsen, 1991; Verworn et al., 2008).

On the basis of the literature review, I use the following working definition for the front end of project portfolios. The front end consists of three stages: (1) ideation in its narrow sense of identifying opportunities and generating ideas, (2) evaluating and selecting these ideas, and (3) condensing, clustering and bundling these ideas into proposals for new projects or changes in the scope of existing projects. I refer to these three stages of the front end as ideation in its broader sense or just *ideation* in this paper. The front end of the ideation phase concludes with a project proposal or a proposal for a change of scope of a running project. The project proposal is the point in time where a formal decision is made with respect to the further treatment of the idea. Verworn and Herstatt (2003) refer to this point at which the idea turns into a project pictorially as the

money gate as now considerable resources are committed. Once the project proposal is accepted, the project is integrated into the project portfolio and managed according to the PPM process. I call the management of this ideation phase with its multitude of ripening ideas, concepts, and project proposals *ideation portfolio management* to underscore the importance of a portfolio perspective on the front end.

3. Research setting and methods

This research is based on a sound review of the literature. I derive a conceptual framework from a literature review of publications in the relevant research fields. My work is mainly based on two streams of research: project portfolio management and innovation literature. I draw on project portfolio management literature to develop the dependent constructs of my framework (Elonen and Artto, 2003; Killen et al., 2008; Martinsuo and Lehtonen, 2007). To deduct the independent variables, I use innovation and, more specifically, ideation literature (Khurana and Rosenthal, 1997, 1998; Kim and Wilemon, 2002; Koen et al., 2001; Nobelius and Trygg, 2002). In a second step, the constructs of this framework have been verified for relevance and face validity by a series of ten interviews conducted with practitioners from various industries such as automotive, consumer goods, machinery, aviation, media, medical equipment, and the internet. Given the nature of the research, there was an attempt to include not only firms from various industries but also firms that varied in size. Consequently, the size of the companies participating in the study ranged from less than 500 employees to more than 80,000 employees.

I selected the interview partners according to the parameters of this research undertaking (Eisenhardt, 1989), that is, I chose interviewees who have a portfolio background. Furthermore, I selected interview partners from top and middle management to ensure that they were able to oversee the entire portfolio. All interview partners worked within the innovation context of their firms. Out of the ten interviewees, seven were responsible for the management of an innovation-oriented project portfolio within their company. The other three interviewees were representatives of their company's innovation management. Of the ten interviews, seven were conducted face-to-face, and six of those occurred at the company site. The other three interviews were conducted via telephone conference calls. Each interview session lasted between 60 and 90 min, was conducted with a semi-structured questionnaire, and was recorded to allow for further analysis (Bortz and Döring, 2003). I made use of extensive note taking during the interviews and prepared a written letter of summation with the key findings from the interview that I shared with each of my interview partners for validation. All letters of summation were considered to be correct by the interviewees. During the interviews, I presented and discussed with the practitioners the relevance of the various constructs of ideation portfolio management and front end success, which will be discussed in greater depth in the subsequent chapters. As a result of this process, I can assume relevance and face validity of the constructs that I derived from

the literature and that constitute my framework (Hardesty, 2004).

4. A conceptual framework for success

Is the front end really "fuzzy" (Reinertsen, 1985, 1999)? One goal of this paper is to take some of the *fuzzine*ss out of the front end and analyze how it could be organized and established from the perspective of the portfolio. I will conceptualize how ideation and ideation portfolio management can be integrated into the project portfolio management processes and systems to achieve a better portfolio performance—keeping in mind the challenge of overcoming the splits between setting strategic guarding rails and not destroying creativity in the ideation phase. Consequently, in the underlying conceptual framework of this paper, the dependent (second-order) construct is *project portfolio success*. The concept of *ideation portfolio management* entails several constructs and serves as an independent part of the framework. However, the distance between *ideation portfolio management* to *project portfolio success* is significant. Therefore, I propose that the relationship between the dependent and independent constructs is mediated through *front end success*. Moreover, I explore moderating effects from external dynamics.

4.1. Project portfolio success

The ultimate goal of a company's activities eventually aims at corporate success. The link between project portfolio success and corporate success has been proven by several scholars (Gemünden et al., 2009; Meskendahl, 2010). Therefore I focus here on the impact of ideation portfolio management on project portfolio success.

Project portfolio management objectives are rather well established in the project management literature: maximization of portfolio value, that is, economic success, a link to strategy, and balancing the projects within the portfolio in consideration of the firm's capacities are the main objectives (Cooper et al., 2002; Coulon et al., 2009; Elonen and Artto, 2003; Killen et al., 2008; Martinsuo and Lehtonen, 2007). Finally, the product development project portfolio's aim is to prepare the organization to meet future customers' needs and survive in the market place in the long run. Thus, project portfolio success can be considered a second-order construct with four constituent constructs.

4.1.1. Economic success

Economic success deals with the impact of the portfolio on the organization's performance. I divide economic success according to Shenhar et al. (2001) into the two subsets market and commercial success. Market success is characterized by the degree to which measures as sales volume or market share goals where reached while commercial success takes classical financial measures into account such as break-even, return-on-investment, or profit (Manion and Cherion, 2009).

4.1.2. Strategic fit

The concept of strategic fit portrays the extent to which all projects combined reflect the corporate business strategy. Based on the strategic fit concept of Dietrich and Lehtonen (2005) I assess the alignment of project objectives and resources with strategy as well as the extent to which the project portfolio reflects the overall business strategy.

4.1.3. Portfolio balance

In order to provide the best value to the company, portfolios should be balanced along various dimensions (Cooper et al., 2002), i.e. the constant utilization of resources over the path of project execution on one side and the constant generation of cash flow on the other side (Killen et al., 2008).

4.1.4. Preparing for the future

Preparing for the future is the longest-term project portfolio success dimension and describes the long-term opportunities and benefits for the company that originate during the ideation phase and then in the portfolio. Here, a theoretical construct was derived from the literature (Shenhar et al., 2001) and transferred to the portfolio context. Questions worth noting are whether competencies and sufficient new technologies are generated and developed within the portfolio and how this will position the company towards competitors.

4.2. The mediating role of front end success on project portfolio success

The positive link between a successful front end and business success has been suggested by previous literature (Pinto and Slevin, 1989; Reid and de Brentani, 2004; Verworn, 2009). To allow for a better picture of actions and effects within the front end, I consider front end success as an intermediate second-order construct between ideation portfolio management and project portfolio success (Alegre et al., 2006). The front end phase of innovation is mainly about information searches, exploration, and iteration of initial ideas; thus, performance measurement in this phase should be conducted with a certain set of criteria specific to the front end rather than to a standard development project (Artto et al., 2008; Poskela and Martinsuo, 2009). Measurement of success in the innovation context is a difficult and complex task; thus, much attention is dedicated to clarifying appropriate success measures (Manion and Cherion, 2009). Poskela and Martinsuo (2009) point out that more emphasis should be put on more immediate and perception-based criteria because of the complex nature of the front end. However, "evaluating success through perception sets evident requirements on the person judging overall front end performance" (Poskela and Martinsuo, 2009, p. 673). That is, they argue that persons with a central role in the networks of the company are likely to have a more balanced and knowledgeable view of front end performance than other employees.

I distinguish two classical constructs to describe front end success: ideation effectiveness and front end efficiency (Specht et al., 2002; Verworn et al., 2008). In addition to

these two, I propose a third construct of front end success, namely, the degree of innovation as a gauge for the innovativeness and creativity within the front end.

4.2.1. Ideation effectiveness

Because of the lack of objective measures, the assessment of the effectiveness of the front end of innovation is not as simple as measuring, for example, business success as there are no hard facts on financial performance and profitability on which to base the evaluation on. Neither can the actual return-on-investments be calculated nor can the actual market share be determined at this point in the project life cycle. Nevertheless, an estimation of the impact of the front end can be conducted if the appropriate people are involved. As Poskela and Martinsuo (2009) suggest, persons with a central role within the organization's networks – such as top managers or project portfolio coordinators – are more likely to be a good source for this estimation because of their role and networks within the company. To estimate the potential for value generation, the ideas must be assessed considering the revenue increase and cost cutting potential realized with the current front end pipeline over the next few years, whether the current idea pipeline has the potential to satisfy customer needs, and how the current pipeline will strengthen the competitive positioning of the firm (Ernst and Kohn, 2007). Poskela introduces the construct of product superiority to measure front end success and suggests determining whether the project outcome solves important problems for customers and whether it has a superior price/quality ratio compared with competitor products (Poskela, 2009). However, I consider the latter point to be somewhat ambiguous because, at such an early stage as the front end, often the price/quality ratio is still fuzzy and cannot be precisely determined. Moreover, an impact can only be created if the ideas are brought to a successful project closure. However, as there is a magnitude of potential reasons for the failure of ideas and projects in later development stages, it would be misleading to only examine new product success rates to estimate front end success. Thus, I argue that ideation has an impact if the generated ideas are – from what is known at this point in time at the end of the front end – realizable. On the basis of Verworn's assertion in her 2009 study (Verworn, 2009), I posit the following:

Proposition 1a. *Ideation effectiveness describes the impact of the front end and the idea pipeline. It is positively related with project portfolio success.*

4.2.2. Front end efficiency

As previously mentioned, we understand that the measurement of ideation effectiveness may prove somewhat difficult. Assessing front end efficiency, however, is a bit simpler. In their seminal work, Brown and Eisenhardt (1995) identified three different streams of research in the product innovation literature. One of these streams considers product development to be a disciplined problem-solving process. This stream of research stresses the significance of process performance as a success measure. Following this reasoning, performance and efficiency of the front end are based on speed and productivity, that is, input–output relations of the system (Alegre et al., 2006). Accordingly, Reinertsen

(1999) suggests the following aspects to be of relevance: the time and the cost to screen an idea. Moreover, he suggests conducting a thorough examination of the process itself as two errors can be made in the selection process: good ideas can be incorrectly rejected and bad ideas can be incorrectly accepted. Incorporating these findings, I analyze front end efficiency along the dimensions speed of the front end process and cost efficiency of the front end selection process (Brown and Eisenhardt, 1995; Leenders and Wierenga, 2002; Reinertsen, 1999). During my practice check interviews, I found that while effectiveness measures are somewhat in place in practice (e.g., scoring methods or paired comparison of ideas), only a minor part of my interviewees investigated or measured the efficiency of the front end selection processes. Those companies that measured performance had target key performance indicators defined for the speed of the idea screening and selection process and for idea feedback. In light of this argument, I put the following proposition forward:

Proposition 1b. *Front end efficiency consists of speed and cost efficiency of the front end system. It is positively related to project portfolio success.*

4.2.3. Degree of innovation

The degree of innovation is one outcome of ideation portfolio management and describes the consistency of the portfolio—whether the projects within the particular portfolio are incremental or truly revolutionary. However, the differentiation between revolutionary and incremental should not be considered a dichotomy. The degree of innovation should rather be interpreted as a continuous measure between these two extremes (Green et al., 1995; Hauschildt and Schlaak, 2001; Kock, 2007). The degree of innovation is not limited to the technological aspects of a project. Rather, it should be considered in a more holistic way as the organization and the environment in which the innovation occurs also play a role. Therefore, the degree of innovation consists of the dimensions market, technology, organization, and environment (Danneels and Kleinschmidt, 2001; Hauschildt and Schlaak, 2001; Kock, 2007). However, as I focus in this paper on the product development environment, I concentrate on the dimensions market and technology as these two could be considered outcomes of the ideation and front end activities. Hence, the degree of innovation influences the necessary and helpful degree of ideation portfolio management, that is, of the formalization in the front end. For example, a study of Salomo et al. (2007) indicates that the more revolutionary an idea is, the more hindering formalization becomes.

Proposition 1c. *The degree of innovation is a dimension that characterizes front end success and mediates the relationship between ideation portfolio management and project portfolio success.*

In summation, I put the following proposition forward:

Proposition 1d. *Front end success consists of ideation effectiveness, front end efficiency, and degree of It is a mediating construct between the dependent construct project portfolio success and its antecedents of ideation portfolio management.*

4.3. Ideation portfolio management

In line with recent studies in the literature and as previously noted, ideation must ensure that a sufficient number of *good* ideas are generated and that there are efficient processes in place to develop these ideas further as well as to select routines to choose the most promising concepts (Ernst and Kohn, 2007; Koen et al., 2001; Poskela, 2009). The majority of my interview partners confirmed this challenge. Their organizations are able to generate a vast number of ideas, but the challenge is to generate and find the *good* ideas. To translate these findings into the multi-project environment considered here, I choose *strategic positioning of ideation* as one construct to explain the concept of ideation portfolio management in the project portfolio context.

In addition to this strategic aspect, several front end research contributions describe different phases in the front end and in the ideation process (Khurana and Rosenthal, 1997, 1998; Kim and Wilemon, 2002; Koen et al., 2001; Nobelius and Trygg, 2002). In this context, the organization of this process becomes an issue (Dietrich and Lehtonen, 2005; Salomo et al., 2008). Moreover, Barczak et al. (2009) point out that ideation in the front end seems to be rather poorly managed. Khurana and Rosenthal (1997, 1998) stress that there is a discontinuity between process steps, that is, integration is missing. In fact, a one-third of my interview partners complained that they see room for improvement in their management of the ideation process. Therefore, I focus on the overall organization of the ideation process within the front end with a focus on formalizing and institutionalizing ideation and analyzing how integration mechanisms within the PPM can be more effective. Thus, I name a second construct to explain ideation portfolio management in this paper *formalization and institutionalization of the ideation process* and a third construct *integration mechanisms*.

Naturally, various stakeholders with different roles – official roles, such as idea generators, development teams (Govindarajan and Trimble, 2010), and venture teams (Covin and Miles, 2007; Guth and Ginsberg, 1999; Sharma and Chrisman, 1999) as well as unofficial roles, such as promoters or opponents (Gemünden and Hölzle, 2006; Gemünden and Walter, 1995; Gemünden et al., 2007; Hauschildt and Kirchmann, 2001) – are involved in ideation. Stakeholders have a direct influence on success (e.g. Freeman, 1984) and are key factors in accomplishing that success. As one of my interview partners said, "… they make or break your idea". Thus, these stakeholders must not be neglected when developing a conceptual framework for success. Accordingly, *stakeholder management* is the third construct of ideation portfolio management.

In addition, the soft side of ideation should also be considered, as often suggested in the literature (Alves et al., 2007; Amabile et al., 1996; Weule, 2002). This soft side is conceptualized here with the construct of the *ideation culture* in which the ideation portfolio management is embedded. How well a company handles the challenges of innovation and internal barriers is decisively dependent on its culture (Beyer and Seidel, 2006), a finding consistent with my interview findings. The majority of companies in my interview sample agree with this academic view, considering culture to be an important building block to achieving success.

4.3.1. Strategic positioning of ideation

With the strategic positioning of ideation, the company sets the tone for its idea generation and pre-project phase. I draw on innovation literature where the concept of the innovation- or project-funnel is widely recognized among academia and practice alike (Barczak et al., 2009). Funnel geometry plays a significant role: the wider the funnel's mouth, the more ideas from the cloud of opportunities and ideas in front of the funnel that can be captured by the subsequent innovation and project management processes (Wheelwright and Clark, 1992). In this funnel context, a strategic positioning of ideation is vital for being able to generate a substantial number of *good* ideas (Ernst and Kohn, 2007). I suggest three dimensions within this construct: strategic search fields, idea origin, and idea balance.

It is not sufficient for an organization to simply generate a large number of ideas to succeed in the competitive environment of today. A firm also has to have the *right* ideas to perform and succeed in the long run. Boeddrich (2004) states that ideation without any focus is useless for organizations. Firms need to establish strategic arenas or search fields in which they look for ideas and opportunities. For example, Salomo et al. (2008) found that organizations have a more innovative product portfolio and are more successful than other competitors when they deliberately identify and manage innovation fields. Innovation search fields comprise various thematically associated innovation projects and therefore stimulate synergies among projects (Talke et al., 2010). These innovation search fields should be derived from the overall business strategy of the company to ensure strategic alignment of ideas (Weule, 2002). These findings are consistent with what I encountered at the more successful companies in my interview series. For example, a machinery engineering firm derived fields-of-development from the overall innovation strategy. The field-of-development-owner is responsible for fueling the field of development with ideas from various sources. Along these lines, I suggest the following proposition:

Proposition 2a. *The active setting of search fields for idea generation within ideation portfolio management is positively related to front end success.*

The idea-origin dimension addresses questions such as who are the people with the ideas and are the ideas born within the organization or fueled from outside the organizational boundaries. For the latter occurrence, Chesbrough (2003) coined the term *open innovation*. One of the most important external sources is the customer. Further external sources include, for example, cooperation or joint ventures, re-active ideation by mergers and acquisitions, or licensing-in. With respect to internal idea sources, one of my interview partners stated that every developer in his firm can dedicate up to ten percent of his working hours to creating new ideas. For his company, this investment into the capabilities of its employees pays off as the company is perceived as being a cutting-edge innovator. Chesbrough (2003) argues that companies must be open to

ideas from within and from without the organizational boundaries. Otherwise, they are "prone to miss a number of […] opportunities" (p. 37). I adhere to his view. That is, the more sources considered for idea origin, the higher the probability to not overlook an important concept. Following this line of argumentation, I propose:

Proposition 2b. *Diversification of idea origin is positively related to front end success.*

Idea balance covers aspects regarding time and content of the idea. Idea balance, in a temporal meaning, addresses the question of whether the ideas are typically targeted at the next product or technology generation or whether they are long term and aimed further into the future. A balanced mix of short-, medium-, and long-term ideas allows the organization to fill the *white spots* in the portfolio(s) and to be sustainably prepared for the future by closing early on potential future gaps in their project portfolio. The content side of idea balance describes the idea's proximity to the core business. Danneels and Kleinschmidt (2001) distinguish two aspects of distance: familiarity and fit. While familiarity takes a somewhat external perspective on how familiar an organization is with the market, competitors, and the technologies affected by the idea, fit refers to the internal perspective of the company's resources and capabilities, that is, does the company have appropriately trained personnel to perform certain tasks. For reasons of scope, I follow Strecker's (2009) approach and focus on familiarity when analyzing the proximity to the core business. However, empirical results on the effect of familiarity are mixed. While some scholars argue that proximity to the core business drives success (Cooper, 1984), others find no significant effect (Danneels and Kleinschmidt, 2001; Strecker, 2009). Thus, I conclude that one has to consider the balance of ideas that are close to the core and ideas that are non-core business as well, and I propose the following:

Proposition 2c. *A balanced idea portfolio is positively related to front end success.*

Interestingly enough, one of my interview partners from the machinery engineering industry stated that his company aims for a percentage of approximately 10 to 20% of ideas that are not closely related to the firm's core business to engage creative thinking among the employees. Moreover, my interview partners affirmed a trend that Gemünden et al. (2009) also determined, that is, methods and tools for idea generation become more and more sophisticated in creating a sufficient number of new ideas. Analyses of mega trends, establishing strategic innovation fields (Salomo et al., 2008), technology scouting (Rohrbeck, 2010), employment of lead users (Lilien et al., 2002; Luthje and Herstatt, 2004), and idea tournaments (Morgan and Wang, 2010) are just some of the techniques implemented by my interview partners.

4.3.2. Formalization and institutionalization of ideation process

With respect to the formalization and institutionalization of ideation portfolio management, Poskela and Martinsuo (2009)

point out that management can attempt to influence the activities that are crucial for innovation success by controlling the process. Management can set specific procedures to be followed and monitored. As depicted above, various process models have been introduced by researchers to decrease the fuzziness of the front end and to increase the systematic approach in the early phases of innovation (Cooper, 1998; Khurana and Rosenthal, 1997, 1998; Koen et al., 2001). In the ideation and innovation context, the empirical evidence of the impact of formalization on success is mixed. While some empirical studies foster the belief that formalization hinders innovation (Bonner et al., 2002; Cardinal, 2001), for other authors, process formalization has been found beneficial, providing managers the ability to intervene and provide guidance on project decisions, and providing the chance for replication, learning, and improved coordination (Shenhar et al., 2002; Tatikonda and Rosenthal, 2000). Furthermore, various research contributions suggest that innovation success depends, to a certain degree, on the quality and performance of the formalized front end process model (Cooper, 1998; Kim and Wilemon, 2002; Koen et al., 2001; Montoya-Weiss and O'Driscoll, 2000). However, the "benefits have often been identified without making a distinction among different types of innovations or between front end projects and development projects" (Poskela and Martinsuo, 2009, p. 675). Following studies that suggest differentiated front end processes according to project type (Nobelius and Trygg, 2002), I assume that one size does not fit all and suggest that there is the need for varying procedures during different stages of the innovation process. Moreover, I assume that in the early phases of the fuzzy front end, that is, during opportunity identification, formalization may hinder the creative process, and in later phases of the front end, that is, during the opportunity exploitation phase where an idea has to be converted into a project proposal, formalization may become increasingly more supportive. My practice check revealed a heterogeneous picture of the front end of my interview partners. While some firms engage in a formalized stage gate-like process, others have no formalization at all during their pre-project phase. Thus, there are reasons enough to investigate the impact of formalizing the front end further. Following these lines of argumentation, the following proposition is put forward:

Proposition 3. *The formalization and institutionalization of ideation portfolio management lead to increased front end success. However, this relationship follows an inverted u-shaped curve: at a certain degree of formalization an optimum is reached, and thereafter, a further formalization reduces front end success.*

4.3.3. Integration mechanisms

This construct incorporates the mechanisms of integration of IPM into the downstream processes of PPM. Focusing on integration mechanisms has the potential to explain a significant portion of variance in new product (and project portfolio) performance (Leenders and Wierenga, 2002). Thus, as a third construct in the ideation portfolio management context, I suggest,

in line with the approach of Kieser and Kubicek (1992) or Weule (2002) to investigate integration along the dimensions of personnel and technocratic integration. I add the dimension of financial integration to underscore the importance of funding ideas to shape promising concepts for projects (Cooper, 2009).

Personnel integration addresses the issue of *idea transfer through heads*, that is, the question of how idea generators participate in the evolution of their original idea. This entails the question of whether they receive any support to elaborate their idea, such as through a mentoring system. If so, what support is offered to them to develop the idea? Several authors suggest moving or rotating personnel (Moenaert et al., 1994; Weule, 2002). In the multi-project context, it is interesting to analyze the impact of the idea generator. That is, is he a part of the project team? Is he approachable and available for further inquiries be the project team? One of my interview partners from an industrial goods company explained that they try to staff the idea generator on the project team as long as it is economically reasonable.

While in the personnel integration dimension, the people aspect is the decisive factor, technocratic integration deals with the impersonal side (Kieser and Kubicek, 1992). Thus, I investigate whether specific rules of engagement and standard operating procedures are defined for the interaction between protagonists of the front end and the PPM (Moenaert et al., 1994). Furthermore, technocratic integration encompasses technological integration; thus, standardized workflows, databases, tools, document management systems, and IT support, in general, must be in place (Specht et al., 2002). This is consistent with my empirical findings. One important topic for at least one-third of my interview partners is to implement an integrated IT solution for the whole ideation process with a clearly defined interface to their portfolio management processes.

With regard to financial integration, I assess whether ideas are competing for the same budget or whether strategic buckets are used to differentiate resource-allocation processes and funding according to the type of idea. The latter is suggested by Terwiesch and Ulrich (2008) in their strategic bucket framework. Strategic buckets can be oriented according to the target portfolio of ideas and thus be a pivotal mechanism to integrate ideation and project portfolio management. From a portfolio perspective, certain ideas can be funded more goal-oriented by putting them into specific buckets. Cooper suggests leveraging strategic buckets to achieve the proper mix and balance of projects in the portfolio (Cooper, 2009; Cooper et al., 2004a). His suggestion can also be found in practice. For example, an interviewed company from the automotive industry derives innovation fields from the overall innovation strategy. Each innovation field has a dedicated financial budget or, in other words, a strategic bucket, and the innovation field manager is responsible for filling the idea pipeline of his innovation field with his dedicated financial budget. Moreover, some organizations set up internal venture organizations to ensure a holistic approach for finding revolutionary or even disruptive ideas, funding them, and introducing them successfully to the market (Covin and Miles, 2007; Guth and Ginsberg, 1999; Sharma and Chrisman, 1999). Two of my interviewed companies had

highly autonomous incubator teams to foster disruptive innovations. On the basis of the literature and mirrored by the practitioners, I propose the following:

Proposition 4a. *Personnel integration is positively related to front end success.*

Proposition 4b. *Technocratic integration is positively related to front end success.*

Proposition 4c. *Financial integration is positively related to front end success.*

4.3.4. Stakeholder management

According to the unanimous view of several scholars, stakeholders have a direct influence on success (on business success: e.g., Freeman, 1984; on program success: e.g., Lycett et al., 2004; on single project success: e.g., Assudani and Kloppenborg, 2010; Aaltonen and Kujala, 2010). In his seminal work, Freeman notes that each of these [stakeholder] groups plays a vital role in the success of the business enterprise […]" (Freeman, 1984, p. 25).

Thus, stakeholders have an impact in the project portfolio landscape. Consequently, we must better understand how stakeholders act in the ideation portfolio management environment, and we must identify the factors that determine stakeholder behavior. This is crucial to enable an effective stakeholder management in the front end of innovation (Bourne, 2009).

For conceptualization, I differentiate two groups of stakeholders in the front end stage of project portfolios. The first group comprises the *ideators*, the ones who actually have and generate the ideas. They can be either internal or external. One of my interview partners emphasized that it is essential to provide process-related support to idea generators, that is, information on how to proceed with an idea, where to post it, whom to inform, and so forth. The second group comprises the *promoters* or *opponents* who may or may not leverage their knowledge, position, and networks to foster or oppose an idea. Scholars have introduced innovator roles for these supporters and non-supporters, such as champions and gatekeepers, or expert, power, process, and relationship promoters (e.g., Gemünden et al., 2007). Some of my interview partners stressed the importance of those persons who have to implement and live with the outcomes of an idea, for instance project leaders of later projects. Thus, the buy-in and support of these project leaders during the early stages may prove beneficial as integrating these stakeholders lays the groundwork for the successful implementation of ideas. This view approaches Freeman's (1984) definition of stakeholders as he divides stakeholders into two groups: the ones who can affect objectives (i.e., ideation) and the ones who are affected by the achievement of objectives (i.e., the ideation outcome). Stakeholders are important in the ideation context as the full potential of the ideation phase can only be leveraged if the relevant stakeholders are identified and integrated early on. Buy-in must be created among the different types of stakeholders. The active management of stakeholders serves as a fertilizer, promoting the growth of ideas. Following these lines of argumentation, I propose the following:

Proposition 5. *Active management of relevant stakeholders, that is, the early identification, integration, and creation of buy-in of relevant stakeholders, leads to increased front end success.*

4.3.5. Ideation culture

Following Bain et al. (2001), the climate for innovation – or culture for innovation – as Cooper et al. (2004a) put it, is pivotal to success in new product development. I condense the dimensions that Cooper et al. discuss in the culture context and suggest ideation culture as a multi-facet construct that comprises employee autonomy, transparency of ideation process, and feedback culture.

The first dimension focuses on how organizations support and motivate their employees to create ideas and on how the organizations develop employee creativity and expand employee expertise; in short, are employees allowed to work autonomously. The removal of bureaucratic constraints (Ahearne et al., 2005) and the perceptions of autonomy are a crucial precondition for creative performance (Amabile et al., 2004; Zhang and Bartol, 2010). The delegation of authority to an employee enables him to implement actions and make decisions without direct supervision (Jung et al., 2003), which leads to a more entrepreneurial spirit. According to Specht et al. (2002), within the context of innovation it is beneficial for employees to work autonomously and have the freedom to choose their own approach to research topics. However, Specht et al. also state that it can lead to prolonged decision times if employees are too autonomous. Accordingly, Bonner et al. (2002) note that the risk of too much autonomy combined with a rather lax control by senior management may allow development teams to digress from the overall strategic track. Jung et al. (2003) revealed in their study among Taiwanese companies that organizations "which delegate more autonomy to employees are less rather than more innovative" (p. 539). I conceptualize these considerations in the following proposition:

Proposition 6a. *Employee autonomy leads to increased front end success. However, this relationship follows an inverted u-shaped curve: at a certain level, an optimum is reached, and thereafter, when employee autonomy in the ideation phase becomes too excessive, front end success is reduced.*

Transparency of the ideation process describes the impression that individuals have of the ideation system in place. Therefore it is a strong intrinsic motivational lever in a company. Is the ideation system perceived as fair? Idea evaluation criteria should be published to allow idea generators or innovators a first evaluation before passing on the idea. If these criteria are in place, ideas can be easily checked against them before resources are allocated (Boeddrich, 2004). Several interview partners confirmed that transparency of the process is one key for motivating employees to invest their time and to participate and engage in ideation. Consequently, I posit:

Proposition 6b. *Transparency of the ideation portfolio management is positively related to front end success.*

The role of feedback should not be neglected. Constructive feedback is closely related to intrinsic motivation and, eventually, to success. Pinto and Slevin (1989) highlight the importance of feedback as one of the critical success factors for research and development projects. Are employees motivated to engage sustainably in idea generation? How does management handle the rejection of ideas? Though it is seldom noted, the refusal behaviors of management are actually a rather significant factor in innovation management. According to Barczak et al. (2009), less than 35% of initial ideas make it to the development stage of a project. This mortality rate implies that actually 65% of the ideas were rejected. How can employees be motivated to submit their next idea if their last one was just rejected? According to one of my interview partners from a media firm, this is one of the most critical factors in the ideation process for this particular firm, and it can only be accomplished when adequate reasons for the rejection of an idea are given in a constructive way. Thus, I postulate:

Proposition 6c. *Constructive feedback to idea generators is positively related to front end success.*

4.4. External dynamics as moderating factor

While the front end of innovation is marked by uncertainty,[1] it also faces uncertainties from the external technology and market environment (Danneels and Kleinschmidt, 2001; Poskela and Martinsuo, 2009). Environmental, external dynamics, mainly triggered by market and technology uncertainties, are, in general, considered to have a substantial impact on organizational constructs (Dess and Beard, 1984; Lichtenthaler, 2009).

Sethi and Iqbal (2008), in their study based on 120 new product development projects, determined that organizations in a turbulent technological environment must rely on different formalization mechanisms in their ideation and project phase than organizations in a calm environment. In turbulent environments with high dynamics, flexibility in the processes is important. This flexibility entails implementing not only gating mechanisms at the stages in the front end and the subsequent PPM process but also means to collect a sufficient number of good ideas. This, too, is a question of the culture of the company. It is the culture that sews the company together. In turbulent environments, the impact of the ideation culture as it relates to employee autonomy on front end success will be even stronger as it will favor the entrepreneurial spirit of employees. Therefore, the moderating effects of external dynamics can and should not be neglected in any study design dealing with ideation. On the basis of this, I propose:

Proposition 7. *External dynamics have a moderating effect on the relationship between ideation portfolio management and front end success. The higher the dynamics …*

- *7a: … the stronger the effect of strategic positioning of ideation on front end success.*
- *7b: … the weaker the positive effect of formalization of the front end on front end success.*
- *7c: … the stronger the impact of employee autonomy on front end success.*

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[1] Front end uncertainty is based on uncertainty theory; cf. e.g., Gifford et al. (1979).

Fig. 1 illustrates the relationships of the here presented constructs of the conceptual framework.

5. Discussion and conclusion

Project portfolio management and ideation are not new research fields. Nevertheless, the majority of contributions that consider the front end still perceive it as a *single* project management task rather than a project *portfolio* management challenge. Only a small fraction of the thousands of interesting ideas, concepts, and project proposals of a company can and should be selected, since resources are limited and choices have to be made. It is wise to invest more money, time, and intelligence in the earlier stages of innovation projects (Reid and de Brentani, 2004; Verworn et al., 2008), but this cannot be implemented for every innovative venture. Therefore, not only the execution stages of new products and service innovations but also the early and evolutionary stages, where new opportunities are discovered and new options are developed, require a professional portfolio management system. I call this the ideation portfolio management. We face a discontinuity between ideation and project portfolio management as there is a lack of integration between these two phases (Khurana and Rosenthal, 1997). With this paper, I contribute to the existing body of project management literature by investigating and conceptualizing the linkage between these two concepts in the project portfolio environment.

This paper focuses on the meaning that ideation has for project portfolio management. This focus is accomplished by integrating, for the first time, the two streams of research in the literature: ideation and project portfolio management. Many scholars focus on resources and their allocation when analyzing project portfolio management issues and project portfolio success (Cooper et al., 1999; Engwall and Jerbrant, 2003; Payne, 1995). However, the integration of new ideas into the project portfolio seems to be underexposed (Khurana and Rosenthal, 1997, 1998). This, in turn, means that we must place more emphasis on the early phases of the front end of projects and their integration into project portfolio management. The contribution of this paper aims at integrating the loose ends into a testable framework and identifying the relevant adjustment levers.

For academia, this conceptual paper paves the way for further structured research on this topic. Following the call for further research in this field by Kahn et al. (2003) and Schulze and Hoegl (2008), this paper and the herein developed conceptual framework can be considered a basis for further quantitative and quantitative studies. I have identified first constructs, validated the framework in a preliminarily practice check by a series of interviews with practitioners from various industries, and posited various propositions. These should be tested empirically in a next step. Because of the conceptualization the framework allows for a dual informant design of a large scale quantitative questionnaire-based empirical study among companies who engage in product development PPM. Questions on portfolio success can be addressed by respondents from top management and decision makers in hierarchies, as these persons more likely have a balanced and knowledgeable view of front end and portfolio performance (Poskela and Martinsuo, 2009). Project portfolio coordinators, on the other hand, could serve as respondents for the more operative questions on ideation portfolio management as they are closer to the more operative levels in the company. Moreover, the two dimensions, *stakeholder management* and *ideation culture*, could well be addressed in a qualitative interview study focusing on the ideation phase. Thus, this paper can add significant knowledge for building a holistic academic view on PPM. Furthermore, this study addresses Söderlund's (2004) call for extended research in the field of portfolio management to better understand modern firms.

For practitioners, the implications of this paper are also interesting. It underlines the need for managers of project portfolios to pay attention to the front end. It may be beneficial for portfolio
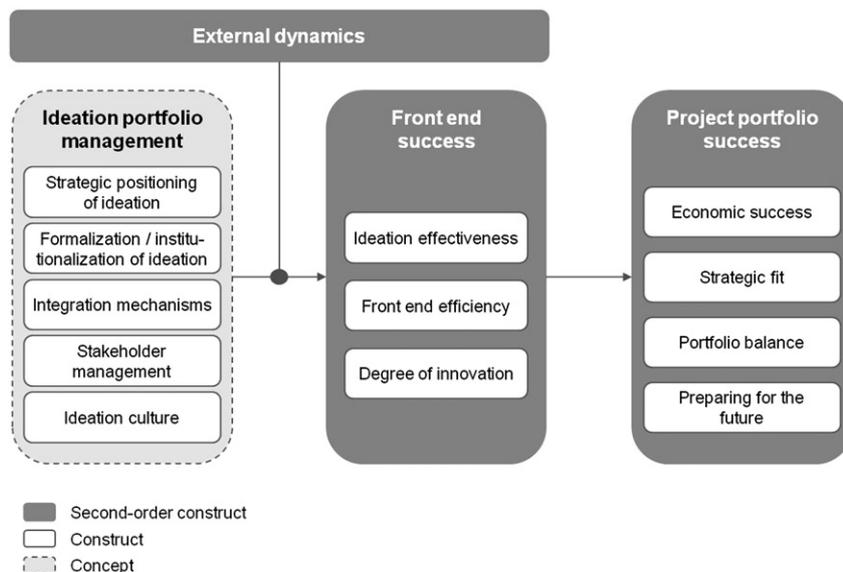

Fig. 1. Detailed conceptual research framework for the integration of ideation and project portfolio management.

managers to adopt a holistic view and include the front end activities in their managerial consideration. Managers should examine the ideation phase through a portfolio lens and introduce ideation portfolio management. This paper suggests the areas on which to focus on in the front end: the strategic setting of ideation, the formalization and institutionalization of the ideation process, integration mechanisms, stakeholder management, and ideation culture.

Nevertheless, there are limitations to this paper that have to be considered. Although I develop a set of constructs within the conceptual framework presented here, a conceptual approach, by its very nature, cannot prove significant effects. While I conducted practice verification by interviewing practitioners of various industries to validate face validity and the relevance of constructs, a confirmation of the significance of the effects must be conducted by a separate empirical study. However, this study can well be based on the constructs developed herein. Furthermore, this study was not targeted at scale development. Its goal was to contribute a framework and constructs for the assessment of effects of ideation portfolio management on project portfolio success. Actual scales must be developed within the scope of a separate study. These limitations, however, are a good starting point for further research. To address Montoya-Weiss and Calantone's (1994) call for more longitudinal research in this field, this study could serve as the starting point of a recurring longitudinal research endeavor.

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