The Front End of Innovation: Organizing Search for Ideas

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Introduction

Ideas matter for innovation. Thus, large firms—such as Allianz, Ericsson, DHL, GE, and Shell—use idea management programs to fertilize, capture, mature, evaluate, and manage ideas from internal sources to introduce innovation (Fairbank and Williams, 2001; Frese, Teng, and Wijnen, 1999; Van Dijk and Van Den Ende, 2002). Senior researchers ensconced in their labs developing new technologies, middle and product managers in production facilities, and employees undertaking administrative tasks—for example, secretarial work or ICT—are but a few examples of actors encouraged to participate in this quest to drive innovation. Firms not only search locally for good ideas, but increasingly they also seek to involve both external expert and hobbyist volunteers in their idea-generation processes, approaching them with a variety of tools, such as open calls, challenges, contests, and Internet-enabled communities (Alexy, Criscuolo, and Salter, 2009; Dahlander and Frederiksen, 2012). In today's competitive environment, idea-generating activities have become increasingly important for the firms' future competitive success.

Ideas constitute the lifeblood for firms in generating new products or services, new business models, new processes, and bringing about general organizational or strategic change. Ideas are the result of mental activity, and are formulated verbally so that they can be represented, shared, and refined. People who suggest ideas take a consultative or moderating role to management on issues they consider important (Kim, MacDuffie, and Pil, 2010). The benefit for firms resides in the assumption that innovations that promise to shape future opportunities or improve existing products, services, or organizational forms and strategies emerge out of new internal or external ideas. A continuous inflow of good ideas and their appropriate selection and management is therefore crucial to ignite the process toward a new product, process, or services, and so ideas are the starting point from where innovation begins.

We contend that two issues stand out when it comes to managing ideas for new products and services in firms. First, the dominant paradigm focuses developing approaches, tools, and methods that will allow a greater number of ideas to be generated and are thus aimed at creating variation. The objective is to select the best from these large sets. However, with the increasing specialization of scientific and technological knowledge, also supported by information technology-based tools, the numbers of ideas generated and acquired internally and externally may well become disproportionate to the computational and selective capacity of firms. For instance, a few years ago, in their so-called Innovation Jam, IBM invited both employees and external relations to come up with ideas, collecting over 40,000 contributions (Bjelland and Wood, 2008). Such numbers lead to two types of selection problem: selection becomes costly, but more importantly, the quality of selection suffers because good ideas need attention and consideration, which becomes virtually impossible in such high numbers.

The second—and even more important—issue concerns the proper management of the idea-generation phase that we label the *front end of innovation*. For good reasons, the early phase of innovation, in which ideas are born, is often considered the "fuzzy stage." The front-end process is indeed highly informal, knowledge-intensive, and erratic (Frishammar, Florén, and Wincent, 2011; Lingo and O'Mahony, 2010). These characteristics indicate that the outcome of the idea-generation process is highly uncertain. As a consequence, managing this phase of innovation is delicate and can turn out to be detrimental to firms' innovation processes and ensuing performance, unless strategically managed. In general, innovation management is a balancing act between creating a supporting and stimulating context on the one hand, and setting direction and focus on the other (Birkinshaw and Gibson, 2004). This balance seems needed even more in the front end of innovation than in any other phase. Stimulating and supporting refers to

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creating a culture of creativity that gives employees and external users the means to generate, select, and refine ideas. Control and setting direction refers to aligning ideas with the goals of the firm, for example, by setting criteria, providing processes, and eventually selecting the most promising ideas. Whereas the first objective aims at increasing the quantity and novelty of ideas, the second aims at reducing their number and at the same time increasing their quality and usefulness for the firm's strategy. Achieving both objectives simultaneously generates tension. Managing such tension properly may lead to more valuable outcomes of the front end for the firm. The challenge is therefore to strike the right balance between these two types of management activity. This special issue of *JPIM* will address both the quality of ideas in the front end of innovation and the delicate management balancing act required.

BIOGRAPHICAL SKETCHES

Dr. Jan van den Ende is a professor of management of technology and innovation at the Rotterdam School of Management, Erasmus University (RSM). He has a Ph.D. from Delft University of Technology. His field of expertise is the development process of new products and services in firms. His current research interests include firm-internal and firm-external idea management, control of new product development projects, design management, and sustainable innovation. Jan van den Ende has published in, among others, *Organization Science*, *Journal of Management Studies*, *Harvard Business Review*, *JPIM*, *IEEE Transactions on Engineering Management*, and *Research Policy*.

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Literature

The importance of idea management and of generating good ideas is increasingly recognized by scholars (e.g., Von Hippel and Von Krogh, 2003). Studies have identified abilities and motivations for online behavior as a driver for external idea generation (e.g., Dahlander and Magnusson, 2005; Hertel, Niedner, and Herrmann, 2003; Jeppesen and Frederiksen, 2006). Many of these studies belong to the psychology or organizational behavior literatures or apply these literatures (Shalley and Gilson, 2004). Whereas most studies were initially descriptive and simply registered the motivations of participants, later the effects of motivation on the behavior of participants (in terms of the quantity and quality of contributions) were included. However, the results were not always consistent. Some researchers found positive effects of intrinsic motivations on quantity (Füller, 2006; Nov, 2007; Shah, 2006), but these findings were not confirmed in other studies (Roberts, Hann, and Slaughter, 2006; Wasko and Faraj, 2005). Extrinsic stimuli to generate idea quantity were reported to have both positive and negative effects (Füller, 2006; Nov, 2007; Roberts et al., 2006; Shah, 2006; Wasko and Faraj, 2005). A possible explanation for the lack of consistent effects of extrinsic stimuli on motivation on external idea generation is that most of these studies did not take the presence or absence of rewards in their empirical setting into account (Burroughs, Dahl, Moreau, Chattopadhyay, and Gorn, 2011). A few studies included the effects of extrinsic motivation on quality (Wasko and Faraj, 2005) or innovativeness (Jeppesen and Frederiksen, 2006).

Other studies reveal how contributors' social networks affect the quantity and quality of ideas (e.g., Baer, 2012; Björk and Magnusson, 2009; Burt, 2004). This literature has also embraced a relational view to explain the quantity of contributions and quality of ideas (e.g., De Stobbeleir, Ashford, and Buyens, 2011; Kijkuit and van den Ende, 2010; Perry-Smith and Shalley, 2003; Ramírez, Roodhart, and Manders, 2011). The traditional view was that particularly weak ties and brokering network positions enhance creativity because they give access to new and nonredundant information (Brass, 1995; Burt, 2004; Perry-Smith, 2006; Perry-Smith and Shalley, 2003). Other studies have emphasized the contribution of strong ties and dense networks to improve the transfer of complex and tacit knowledge needed for new ideas and innovation (Hansen, 1999; Reagans and McEvily, 2003; Sosa, 2011), particularly in the context of complex knowledge. For internal idea management systems, research points to the importance of particular

characteristics and learning behaviors of the individual idea generator (e.g., Axtell et al., 2000; Deichmann and van den Ende, 2014) and also shows how different leadership styles may elicit creative behavior from individuals (Frese et al., 1999; Pieterse, Van Knippenberg, Schippers, and Stam, 2010).

To improve the quality of contributions, organizations employ various sorts of management practices (Alexy et al., 2009) such as rewards (e.g., attention and recognition, micro-level property rights, and financial rewards). However, the effects of rewards on participation and performance of contributors with different motivation profiles is still not well understood. The dominant view in the creativity literature is that rewards serve to control behavior that would reduce perceptions of self-determination and intrinsic motivation, and therefore result in lowered creativity (George, 2007; Hennessey and Amabile, 2010). Other scholars postulate that rewards serve to emphasize that creativity is the goal of the activity and should motivate individuals to work harder to produce a creative performance, therefore leading to enhanced creativity (Eisenberger and Armeli, 1997).

An important practice to set direction and improve the quality is ideas selection. Ideas can be generated by firms through searching either for "known unknowns" (i.e., solutions to existing problems or new problems to which existing solutions can be applied), or for "unknown unknowns" (i.e., through more ambiguous scanning for ideas in areas where the organization is aware neither of problems nor solutions). Irrespective of the idea-generation tools employed, firms need to have "selection knowledge" and thus resources and cognitive attention that enable them to pick the quality ideas that are most appealing in relation to novelty, strategic fit, and feasibility (Kester, Griffin, Hultink, and Lauche, 2011). Moreover, the selection process must be organized in such a way that the really promising idea is identified while less ambitious or useful ideas are screened out (Girotra, Terwiesch, and Ulrich, 2010). And regardless of how the selection process is designed (i.e., when, who is involved, etc.), it should be carried out so that it does not affect the contribution quantity and quality of future search activities (Bayus, 2013).

From a more traditional innovation perspective, the literature on the front-end processes of innovation has been consistent in underlining how ideas feed into the standard funnel for developing new products, processes, or services, or may lead to novel organizational designs or strategic reorientation (e.g., Axtell et al., 2000; Brentani and Reid, 2012; Frese et al., 1999; Khurana and Rosenthal, 1998; Kim and Wilemon, 2002). Part of this literature is primarily practitioner oriented while less has been done in the area of linking internal and external ideas management (Neyer, Bullinger, and Moeslein, 2009; Whelan, Parise, De Valk, and Aalbers, 2011).

Special Issue

This special issue has two intersecting aims. First, it seeks to develop new theoretical and empirical insights in the field of internal and external idea management systems at the front end of innovation. Researching the processes and activities in the front end of innovation can contribute to both the general organization literature and knowledge on the front end itself. In sum, the special issue strives to be interdisciplinary. The perspectives applied in the papers stem from social psychology (e.g., motivation, creativity, and identity), social network, organizational learning, and innovation studies (Globocnik and Salomo, 2015; Kock, Heising, and Gemünden, 2015; Langer and Seidel, 2015; Salter, Ter Wal, Criscuolo, and Alexy, 2015). In addition, we seek to find more insight on the aforementioned tension—and the balance needed—between creating support and setting direction. The question is how internal and external search activities and sourcing of ideas interact, and how management efforts at idea generation and selection relate to aspects of organizational design and strategy. Second, we highlight the management implications of the idea-generation process in order to point out alternative ways of improving the organization of the idea management process and its outcomes.

Overview of the Special Issue

The opening paper by Salter et al. (2015) focuses on the effects of individuals' openness to idea implementation. Drawing on a data set of research and development scientists and engineers working in a large, innovative organization, they find that this type of relationship is curvilinear. Theoretically grounded in theories of combinatorial search, this result resonates with earlier work on the costs and benefits of openness—for example, Laursen and Salter (2006). On the one hand, openness benefits individuals' ideation process as it provides access to a broader set of new ideas—to put it differently, openness is instrumental to generating variety. On the other hand, openness may have negative returns because—beyond a certain threshold—the integration of an increasing number of sources of external knowledge requires mounting cognitive efforts and ensuing coordination costs. Interestingly, Salter et al. (2015) also address the effects

of managerial action in this relationship and find that contacts with upper management does improve the quality of ideas, but not the effects of openness. This points to an important corollary to their results: management attention helps to improve the front-end process but does not enhance the effects of outside knowledge.

The paper by Globocnik and Salomo (2015) addresses the balance between supporting idea generation and setting formal procedures for a specific type of idea-generation and development activities: bootlegging. Bootlegging refers to the development of ideas underground, away from managerial intervention. The authors show that, although regarded with suspicion by management, bootlegging can be an important source of ideas and innovation for companies. They also show that autonomy and rewards in general have a positive effect on bootlegging. Front-end formality has opposite effects—a negative direct effect but a positive effect through self-efficacy—resulting in an overall negative effect. By addressing these seemingly contradictory management actions, the paper contributes to our understanding of the balance between support and directive interventions.

While much research on incentives for user participation in online communities has explored the importance of intrinsic and extrinsic motivation, little is known about how "softer" forms of incentives affect innovative behavior by users. The paper by Langer and Seidel (2015) concerns the dual social identity that external idea providers develop due to their feeling of belonging to a user community of fellow product users and being in part "emotionally attached" to the firm hosting the community. Based on this foundation, Langer and Seidel focus on how a dual social identity of this type can sustain users' participation in online communities and thus ensure that these communities also are sustained over time. They specifically discuss which types of managerial actions may promote external idea generation through, for example, the creation of a dual social identity. The paper takes a qualitative approach, comparing two different firm-hosted communities from which ideas for innovation are sourced. Thus, zeroing in on creating and capturing ideas beyond the firm's boundaries, Langer and Seidel (2015) try to understand how the contributors' self-perceived social identity influences their activities in online communities. In addition, they demonstrate that direct involvement by top management in posting in online communities is important for establishing and ensuring users' dual social identity.

The paper by Kock et al. (2015) addresses the last phase of the front-end process—that is, the selection of ideas. The authors distinguish among three types of managerial activities, that is, formulation of an ideation strategy, process formalization, and creative encouragement. The first two are control oriented, and the last is support-oriented. Drawing on a cross-industry data set of medium-sized and large German firms, they show that all three activities have positive effects on front-end success. Interestingly, their study highlights a complementarity effect among these three activities, suggesting that firms should dynamically manage their balance—and therefore the variety-generation vis-à-vis selection-implementation dichotomy—in order to increase the likelihood of success of the front end of innovation. To conclude, the study by Kock et al. (2015) indicates that taking a portfolio approach during the ideation stage may have positive effects on the later stages of innovation. This echoes early innovation studies—for example, Kline and Rosenberg (1986) and Rothwell et al. (1974)—that put forward the unitary nature of the innovation process and suggests that innovation should be considered as a strategic, cross-cutting activity.

Emerging Themes

Jointly, the four contributions highlight new and emerging themes in the wide research agenda addressing idea generation, sourcing, maturing, selection, etc. While Langer and Seidel (2015) begin the journey toward better understanding the role played by the individuals' perception of their social identity, and while also Fosfuri, Giarratana, and Roca (2011) have explored this domain of social identity in community-based innovation strategies, we still need more insights into why and how such feelings of identity emerge and how it may become a liability for some firms to have a strong community identity among their product users and others involved in their online community. Studies in neighboring academic fields such as research on consumer behavior could potentially be helpful here.

Second, the paper by Salter et al. (2015) underlines the emerging theme that attention from the upper echelons in the organization is important for the quality of ideas generated internally, but that at the same time there are other important areas of idea generation where this has no effect. Nevertheless, and as also Globocnik and Salomo (2015) and Kock et al. (2015) show, we need to know much more about how managerial attention works in terms of encouraging more and better ideas from employees.

Third, a few final observations based on reading all the papers submitted for this special issue are that three particular aspects of idea management systems have not

been given sufficient attention. First, we need to work out how to improve our understanding of the process from idea-generation activities to implementation into prototypes and testing, etc.—to understanding more, for example, about the often precarious route a selected idea can take into a firm's innovation funnel. From our own research, we have anecdotal evidence that moving from selected idea to implementation in a traditional innovation funnel system is not easy and often fails. Hence, we call for process studies of how successfully to implement ideas generated from idea management systems. Second, we call for studies that investigate the antecedents of how such idea management systems are developed and thus what types of strategic assumptions or external and internal search for legitimacy drive the set-up of these systems with regard to incentive mechanisms and participation architectures. And finally, we need additional studies that provide convincing evidence of the real economic value that firms can accrue from the various forms of idea management systems.

As such, we believe that while the domain of the fuzzy front end of innovation may be mature and well recognized in studies on new product development and innovation management, new technologies as well as emerging management practices and paradigms, both within firms and at their boundaries, may challenge established insights. Thus, we contend that there is plenty of room for important new research contributions in how firms organize their search for ideas. We hope that this special issue not only reviews existing knowledge, but also opens up new avenues for discussion among researchers and practitioners in this exciting domain.

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