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DESIGNING THE ORGANIZATION FOR USER INNOVATION

Peter Keinz
Institute for Entrepreneurship and Innovation
Vienna University of Economics and Business, Nordbergstraße 15, A-1090 Vienna, Austria
Tel.: +43 1 31 336 / 5979
E-mail: peter.keinz@wu.ac.at

Christoph Hienerth
Chair for Entrepreneurship and New Business Development
WHU - Otto Beisheim School of Management, Burgplatz 2, D-56179 Vallendar, Germany
E-mail: christoph.hienerth@whu.edu

Christopher Lettl (Corresponding Author)
Institute for Entrepreneurship and Innovation
Vienna University of Economics and Business, Nordbergstraße 15A-1090 Vienna, Austria
Tel.: + 43 1 31 336 / 4585
E-mail: christopher.lettl@wu.ac.at

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ABSTRACT

There is increasing consensus among practitioners and academics alike that we are in the midst of a paradigm shift from producer-centered and internal innovation processes toward user-centered and open innovation processes. This paradigm shift induces significant changes to the design of organizations. Even though the research field of user innovation has been developing over a period of more than four decades, there have been only occasional intersections with the research field of organizational design. In this paper we aim to provide an integrated perspective of the two fields. We first identify major user innovation strategies. We then derive the implications of each user innovation strategy on key dimensions of organizational design. We conclude with an outlook on symbiotic producer-user ecosystems and the corresponding implications for organizational design.

DESIGNING THE ORGANIZATION FOR USER INNOVATION

The point of departure for this conceptual article is the growing literature around the phenomenon that companies are in the midst of a paradigm shift from closed, producer-centered ways of innovating to open, user-centered innovation processes (Chesbrough, 2003; von Hippel, 2005). To improve innovation performance and increase competitiveness, more and more firms are employing user innovation strategies (von Hippel, 2005). Such strategies have proven to be of high value to almost every type of company; both start-ups and well-established companies, irrespective of the industry they are operating in, can benefit from incorporating the creative potential of "external" individuals and organizations into the innovation process (Bogers, Afuah, & Bastian, 2010; Hienerth, Keinz, & Lettl, 2011). Therefore, research has devoted a great deal of attention to describing particular approaches, such as the lead-user method (Lüthje & Herstatt, 2004; von Hippel, 1986), toolkits for user innovation and design (von Hippel, 2001; von Hippel & Katz, 2002), and the development and management of user communities (Füller, Matzler, & Hoppe, 2008; Schau, Muñiz, & Arnould, 2009). Despite the voluminous description and documentation, the implementation of user innovation strategies remains a challenging undertaking. Often, companies fail to benefit from these strategies because of a lack of organizational preparedness. For example, the "not-invented-here" syndrome of employees (Katz & Allen, 1982), as well as general organizational inertia (Kelly & Amburgey, 1991; Witteloostuijn, 1998), limit the absorptive capacity of companies (Cohen & Levinthal, 1990) and prevent them from effectively leveraging the input from external sources (Hienerth et al., 2011). Thus, opening up a company's core business processes, such as R&D, and product development and commercialization, calls for a substantial organizational re-design.

In this paper, we present a framework that encompasses different types of user innovation strategies and derive generic recommendations for the organizational design of

companies employing these strategies. In line with Burton and Obel (2004), we apply a multi-contingency information-processing view to address the specific challenges in designing an organization for user innovation. We theorize on both the structural and human components of organizational design (Burton & Obel, 2004; Burton, Obel, & DeSanctis, 2011) and carve out their specific importance with regard to the implementation of different types of user innovation strategies. We use the framework for organization design of Burton and Obel (2004) and Burton et al. (2011) as it is widely used by scholars and practitioners alike.

In the first section of our paper, we provide a comprehensive overview of the most important approaches to integrate users into a company's core business processes. We then present our framework of user innovation strategies and explore the need for organizational re-design dependent on these strategies. Based on these insights, we provide concrete recommendations on how to design the organization for each of the identified user innovation strategies. Finally, we discuss the generalizability of our framework and outline future research directions.

Existing User Innovation Approaches

Rationale of User Innovation Strategies

User innovation strategies are based on the insight that users are an important source of creative ideas for new products or services in many industries, ranging from IT solutions to sporting and medical equipment (Baldwin, Hienerth, & von Hippel, 2006; Franke & von Hippel, 2003; Herstatt & von Hippel, 1992; L. B. Jeppesen & Frederiksen, 2006; Lettl, Herstatt, & Gemuenden, 2006; Morrison, Roberts, & von Hippel, 2000; Urban & Eric von, 1988; von Hippel, 2005). What makes users such valuable sources of inspiration is their use experience. Users know best the strengths and weaknesses of a given product in daily use. Thus, if a product does not fit their current needs, users know which product attributes need to be changed or which novel functions should be integrated in order to improve the product. In

addition, some users have very urgent needs for a product that perfectly fits their requirements and start developing customized solutions on their own (von Hippel, 2005). Furthermore, users have also shown to be of high value in the diffusion of innovations (Hienerth & Lettl, 2011). User innovation strategies aim at exploiting these external sources of competitive advantage by systematically integrating users into the company's core business processes. There is already a decent body of literature on methods and instruments for the integration of users into corporate innovation and marketing activities. These methods are diverse and come with different value propositions.

Lead-user Method

The lead-user method is a systematic approach to identify and, in a second step, involve a very special group of highly advanced and progressive users into corporate innovation processes for the purpose of generating radically new innovations. Such progressive users – usually referred to as lead-users – have been found to be capable of developing truly novel solutions with high commercial attractiveness (Franke, von Hippel, & Schreier, 2006; Lilien, Morrison, Searls, Sonnack, & von Hippel, 2002). They possess two specific characteristics making them valuable contributors to corporate innovation processes: they have a leading-edge position with regard to an important market trend, and they have a high individual expected benefit from an innovation (Morrison et al., 2000; Urban & Eric von, 1988; von Hippel, 1986, 2005). First, lead-users are ahead of the mass market: they face certain needs much earlier than average users ("trend leadership"). Second, because of their specific need and a lack of available solutions, lead-users are highly motivated to engage in innovative activities on their own (literature refers to this aspect as "high expected benefit"). As lead-users anticipate needs of the mass market because of their trend leadership, their solutions are very likely to become attractive to large market segments (Lilien et al., 2002; Lüthje & Herstatt, 2004; von Hippel, 1986). However, lead user–generated solutions tend to be highly radical in terms of technical sophistication and viability; thus, demand for lead-user

innovations in the mass market usually emerges after a time lag along the diffusion curve (Hienerth & Lettl, 2011; Lilien et al., 2002).

Due to the high value proposition of lead-user generated concepts and solutions, an increasing number of companies try to tackle the creative potential of this source of innovation. Most of the existing initiatives for integrating lead-users follow the logic of the lead-user method as described by von Hippel (1986) and are designed as projects with limited time frame and scope. In a first step, the company defines a search field – a certain market calling for an innovative new product or a specific technological problem that is to be solved. In a next step, the field is searched for the most important trends (yet unsatisfied user needs), and consequently for lead-users that are ahead of those trends. Ultimately, the lead-users identified are invited to participate in a workshop together with a cross-functional project team consisting of employees of the company. The goal of these workshops is to generate a relatively small number of concrete and radical new product concepts (Herstatt & von Hippel, 1992; Lüthje & Herstatt, 2004; von Hippel, 1986).

Crowdsourcing and User Communities

Crowdsourcing denotes a user innovation approach that is very different from the lead-user method. Instead of looking for a very specific group of highly innovative users who generate radical innovations, crowdsourcing – also referred to as "broadcast search" (L. B. Jeppesen & Lakhani, 2010) or "innovation tournaments" (Terwiesch & Xu, 2008) – focuses on outsourcing innovation-related tasks such as idea generation for new-product design to the broad crowd of external users. The basic premise of crowdsourcing is that large groups of external problem solvers with highly heterogeneous backgrounds, skills, and abilities are more likely to provide a wide range of adequate solutions to innovation-related problems than the internal R&D department (Terwiesch & Xu, 2008). Very often, crowdsourcing initiatives take the form of a competition. The focal producer firm invites external individuals to participate and to compete for prices sponsored by the company.

A very special form of crowdsourcing is the collaboration of focal producer firms with so-called user communities. User communities are informal, self-organized (online) networks of users that exchange information and knowledge as well as innovative ideas and artifacts related to a topic or field of common interest (e.g., the product of the focal producer firm) (Franke & Shah, 2003; Harhoff, Henkel, & von Hippel, 2003; von Hippel, 2007). Instead of competing, users organized within a user community frequently interact and collaborate around a product of shared interest. In contrast to hierarchies or other forms of networks, exchange processes between members in user communities are not based on formal contracts but on "relational contracts" in the sense of trust, shared norms and values, and general reciprocity (Murray & O'Mahony, 2007). Support to individual user innovators from their peer community has been shown to be an important success factor (Baldwin et al., 2006; Franke & von Hippel, 2003; Hienerth & Lettl, 2011; L. B. Jeppesen & Frederiksen, 2006) as it allows for accumulative innovation, i.e., building on the solutions of others (Brown & Duguid, 1991; Murray & O'Mahony, 2007; von Hippel, 2007). Furthermore, user communities provide a setting for the identification of attractive ideas and for the effective identification of flaws. As Raymond (1999) puts it in his well-known quote, "Given enough eyeballs, all bugs are shallow." In addition, user communities provide support to the innovative activities not only in the ideation phase, but also in later stages of the innovation process. Prior research has also revealed that user communities help in the diffusion of an innovation and are vibrant arenas for new-firm creation by user innovators themselves, making them valuable from a marketing perspective (Baldwin et al., 2006; Franke & Shah, 2003; Shah & Tripsas, 2007).

Toolkits and Mass Customization

Toolkits for user innovation and design are user-friendly and integrated sets of product-design, prototyping, and design-testing tools intended for use by end-users (von

Hippel, 2005; von Hippel & Katz, 2002). The underlying idea of the toolkit approach is to shift innovation-related product-design tasks from the focal producer firm to the users by equipping them with online tools and enabling them to customize a product specific to their individual needs and preferences completely on their own (Thomke & von Hippel, 2002; von Hippel, 2005; von Hippel & Katz, 2002). The toolkit provides a selection of different characteristics for each product dimension (e.g., blue, red, or green). Users can then choose the preferred characteristic for each product dimension and thus configure their own products. The toolkit approach was first applied in the semiconductor industry (Thomke & von Hippel, 2002) and the computer games industry (L. B. O. Jeppesen, Molin, adot, & ns, 2003; Prügl & Schreier, 2006). Today, it is used in many different fields, including toys, foods, and financial services because of its high value proposition. For example, research has shown that the users' willingness to pay increases substantially if they are allowed to design their own solutions and/or products (Franke, Keinz, & Steger, 2009; Franke & Piller, 2004). Second, toolkits for user innovation and design can be used as highly valid marketing tools: Observing the interaction of users with the toolkit and tracking those design specifications chosen most often gives hints on how to design standard products for the vast majority of customers not using the toolkit (Franke & Piller, 2004). In contrast to the lead-user method or the collaboration with user communities in the course of crowdsourcing activities, the toolkit approach – as implemented by most manufacturers employing this method – aims at mass customization and does not focus on the generation of radical new solutions.

Need for Organizational (Re-)Design when Employing User Innovation Strategies

A Typology of User Innovation Strategies

In the previous section, we presented the most important user innovation methods. Obviously, these methods differ greatly from each other with respect to their value proposition as well as their sustainability and the number of company-external individuals

integrated in the company's core business processes. For example, the lead-user method is often organized as a project of limited time with only a few external contributors. Such initiatives are independent of the company's organizational routines and standard core business processes. In contrast, toolkits for user innovation and design for example are intended to involve a high number of people in corporate innovation processes. They are usually implemented for an indefinite period of time since their construction is a costly and timely task and regarded as an investment. Thus, companies providing such online design platforms for customized products often decide to set up a mass customization strategies.

Naturally, these differences between the user innovation methods affect the need of organizational re-design in companies employing these approaches. In the former case, the need for organizational re-design will be comparably low and to the biggest part limited to the human components of our organizational (re-)design framework (including work processes, people, coordination and control, and incentive mechanisms). In the latter case, it will be significantly higher and more comprehensive and also include the structural dimensions of organizational design (goals, strategy, and structure). Figure 1 illustrates these considerations:

- - - Insert Figure 1 about here - - -

User Innovation Strategy: Searching

Companies in the lower left corner apply what we call "searching" user innovation strategies. These strategies build on user innovation initiatives that are of limited duration and involve only a small number of external individuals. The typical user innovation methods applied in such a setting are the collaboration with elite circles (Pisano & Verganti, 2008) and the lead-user method. The challenges of the lead-user method with regard to organizational design are manifold but limited to the human components of our multi-contingency

information processing view on organizational design: First of all, the company has to find employees (from different functional areas within the company; e.g., R&D and marketing) willing to participate in a project with unknown external individuals and an unpredictable output in addition to their day-to-day tasks. These internal project team members need to be open to inputs of external users that sometimes might be perceived as lacking an expert status. If the company-internal project members do not believe in the value of lead-user projects and fail to act as internal ambassadors of this initiative, lead-users' concepts are very likely to suffer from a lack of acceptance within the focal producer firm and can become victim of the "not-invented-here" syndrome. Thus, the "people" component of our organizational design framework does play a major role for companies employing the lead-user method.

Another aspect regarding the human components deals with the recruiting of the lead-users. The lead-users themselves are the most crucial success factor in lead-user projects. If the company fails to identify real lead-users (trend leaders with the ability and willingness to contribute to corporate innovation processes) or invites the "wrong" individuals, the whole project may be compromised. Thus, the company has to implement a new type of business process, the systematic search for lead-users, such as by means of pyramiding or broadcast search (von Hippel, Franke, & Prügl, 2009). If identified, lead-users have to be willing to participate in the project. Usually, lead-users do not claim any monetary rewards for their contribution from the outset. Because they have an urgent need themselves for an innovative solution, they are willing to collaborate with the focal producer firm and freely reveal their needs-based knowledge (von Hippel, 2007; von Hippel & von Krogh, 2006). However, if the cooperation continues after the actual lead-user workshop (e.g., when certain lead-users are invited to participate in the development of a prototype), monetary incentives as well as IP rights become an issue. In this case, the company has to think about control and incentive systems as well. However, isolated lead-user projects and other short-term user innovation

initiatives involving only a small number of external individuals (e.g., elite circles, see Pisano and Verganti (2008)) do not affect the company's goals, strategie,s and structures.

User Innovation Strategy: Harvesting

The same is true of companies pursuing activities that can be referred to as "harvesting" user innovation strategies. Companies following a "harvesting" strategy also only occasionally engage in user innovation activities; they can be differentiated from companies following "searching" strategies by the number of external users involved in corporate innovation processes. Usually, "harvesting" strategies take the form of crowdsourcing activities with a limited time scope, e.g., innovation contests, to which a large number of people are invited. The higher number of external contributors in innovation contests (as compared to isolated lead-user projects) increases complexity of the user innovation initiative and calls for a more comprehensive organizational re-design. However, as in the case of the "searching" strategies, the most important challenges in preparing the organization for "harvesting" user innovation strategies primarily address the human components of organizational design. For example, conducting an innovation contest might bear the risk of loss of control of the producer firm with respect to the new product development. When inviting a large number of unknown people to contribute ideas and concepts, it is difficult to align the creative activities of the crowd with the focal producer firm's strategy (Hienerth et al., 2011). A good example was the innovation contest sponsored by "Pril" (a brand of the Henkel group) in which the company offered an award for a new bottle design for dish liquid bottle. Participants submitted thousands of designs, among them a high proportion of designs that were perceived as being inappropriate by Pril because of a misfit with the corporate strategy and values. Pril refused to award those designs, although the customers had rated them very high. As a result, Pril ran into a PR disaster and was accused of ignoring their customers' wishes (Breithut, 2011).

A final issue is that users might perceive a company's crowdsourcing activities as "unfair" exploitation of their work force. Thus, organizational design activities also have to comprise the set-up of the crowdsourcing initiative. The focal producer firm has to develop routines and processes with regard to dealing with IP rights issues, and develop incentive systems based on monetary and non-monetary rewards (like gains in reputation of the contributors) if the company actually builds on user-generated content (Franke, Klausberger, & Keinz, 2012b). On the other hand, employees (especially members of the R&D and the marketing departments) of the focal producer firm might perceive the outsourcing of ideation processes as a threat to their competences and responsibilities. Organizational design has to address this aspect in order to foster the acceptance of the content and ideas generated and prevent the crowdsourcing initiative from becoming a cosmetic marketing event.

The proportion of companies pursuing "searching" and "harvesting" user innovation strategies is rather high in practice. Research shows that many companies engage in lead-user projects or crowdsourcing activities only on the occasion of a special problem which could not be solved internally (L. B. Jeppesen & Lakhani, 2010; Lilien et al., 2002). In such cases, the company does not intend to employ the user innovation approach on a continuous basis. Due to the short term-perspective and the project character of the initiative, the company's goals, strategies, and organizational structures do not need to be adapted. However, as soon as the integration of users becomes an ongoing and more systematic business activity within the company, structural components of our organizational design framework become more important. Companies following "cooperation" and "ecosystem" user innovation strategies have chosen to employ user innovation methods and instruments with a long-term perspective.

User Innovation Strategy: Cooperation

This strategy builds on a relatively low number of external contributors (e.g., in the course of lead-user projects) on a continuous basis. Companies employing cooperation strategies face the same challenges for organizational re-designs as those following "searching" strategies. In addition, the decision to integrate lead-users on a continuous basis is often accompanied by a shift in the global corporate strategy towards innovation leadership within the respective industry. The company has to be open to and prepared for the development and marketing of truly novel and disruptive solutions with a high commercial potential but also a limited technological feasibility (Lilien et al., 2002; Lüthje & Herstatt, 2004). Furthermore, the company's organizational structure has to adapt to the new business processes (as described in the section on the lead-user method) associated with conducting lead-user projects.

User Innovation Strategy: Ecosystem

This strategy focuses on the collaboration with a high number of company-external individuals (e.g., by employing toolkits for user innovation and design or collaborating with user communities). The "ecosystem" user innovation strategies (in the upper right corner of Figure 1) usually cause the highest need for a fundamental organizational re-design, as user innovation methods typically used in such settings (e.g., toolkits for user innovation and design or the long-term collaboration with user communities) almost inevitably tackle the organization's structural dimensions. As indicated earlier, providing a toolkit for user innovation and design for example almost always goes along with the implementation of a mass customization strategy on the corporate level. But offering customized products instead of or in addition to standard products means to target new customer segments, as the value proposition to the customer changes (Pine, Bart, & Boynton, 1993). Mass customization strategies also affect the organizational structure and the core business processes. For example, the production system, as well as the distribution system, has to be re-organized in

order to deal with "markets of one" (Bardakci & Whitelock, 2003). If companies fail to adapt structurally to this new strategy, they are likely to run into trouble, as the cases of some industry leaders – including Toyota, Levi Strauss, Dow Jones, Mattel, and Motorola – that have tried to employ mass customization strategies have shown (Franke & Piller, 2004; Pine et al., 1993). Thus, companies have to reorganize themselves with respect to strategy and structure. The same is true for companies constantly cooperating with user communities. The scope of their organizational activities increases as they have to manage external, informally organized social entities. On the other hand, the responsibilities as well as the scope of the activities of the R&D and the marketing departments within the company might change. These changes need to be considered in the organizational structure of the focal producer firms.

Table 1 provides an overview of the challenges of different user innovation strategies with regard to organizational re-design. In the next section, we will build upon these insights and develop generic design principles helping the company to internally prepare for user innovation.

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Design Principles for Companies Employing User Innovation Strategies

Based on the challenges of user innovation strategies for organizational design discussed in the previous section, we present design principles that help to prepare the firm for user innovation.

Design Principles for "Searching" Strategies

As described earlier, user innovation strategies of short duration and the involvement of a low number of external individuals do not call for fundamental changes within the

organization. However, to prevent lead-user projects from failure, the following design principles should be applied.

1.) *Convince employees by demonstrating the potential of user-generated content and by creating appropriate incentive systems.*

One of the biggest obstacles against lead-user projects or other initiatives of integrating external individuals lacking an "expert" status into corporate innovation processes is the reluctance of employees to engage in such endeavors (see Table 1). Psychological barriers like the "not-invented-here" syndrome as well as the fear of having to fulfill new tasks in addition to the daily work cannot be overcome by command from the top management. Instead, producer firms need to convince the middle management (e.g., the head of the R&D department, or the division managers) of the high creative potential and solution-related know-how lying outside the company. Research has shown that the middle management plays an important role in establishing innovative processes as people on this management level often play the role of innovation champions (Hauschildt & Schewe, 2000; Witte, 1977), making them capable of asserting user innovation initiatives. A good means of convincing the middle management of the integration of external individuals into the innovation activities is to collect evidence of the high quality of external inputs. Companies like Coloplast or Lego have confessed to open innovation strategies only after the management had been presented with concepts (including detailed and highly sophisticated construction plans of user-generated innovations) that were freely circulating in user communities without the company even knowing about them (Hienerth et al., 2011). Another important aspect is to establish incentive systems that reward truly novel ideas and concepts. As has been shown, lead-user generated innovations on average are radical innovations developed in-house (Lilien et al., 2002). Last, devoting a certain percentage of the employees' regular working time to the lead-user project might motivate them to engage in such projects and underline the strategic importance attributed to such initiatives. Industry leaders such as Google, 3M, and IBM have

allow their employees to work part-time on creative activities and have perceived such activities to be successful (Vise & Malseed, 2005).

2.) *Development of competencies with regard to identifying lead-users and moderating lead-user workshops.*

Conducting an R&D project together with external individuals is associated with tasks novel to the organization. Lead-users that are capable of contributing solutions to a specific internal problem have to be identified and, when found, put into a specific workshop setting in which they jointly develop solutions together with company representatives. Both activities, searching for lead-users (usually based on social search methods like pyramiding and/or broadcasting, see von Hippel et al. (2009)) as well as organizing and moderating the lead-user workshop (Hienerth, Poetz, & von Hippel, 2007) are challenging tasks that are quite different from those within traditional innovation projects and call for experienced "facilitators." Thus, it is important to acquire these new competencies, either by building them internally or by hiring external project managers possessing specific experience with such projects.

3.) *Development of cooperation incentives.*

As explained earlier, users innovate for the purpose of satisfying their own, very specific and urgent needs. As they usually do not start their innovative activities with the intention to commercialize their solutions and concepts, they freely reveal their ideas (von Hippel, 1986, 2005; von Hippel & von Krogh, 2006). If invited to a company's lead-user workshop, the interest in the topic, the prospect of meeting and exchanging with other people with similar interests, the enjoyment of jointly developing ideas that could be useful for themselves, or just the honor of being regarded as an "expert" by the company motivates lead-users to participate in such projects without any monetary compensation. However, as soon as the company takes-up a lead-user generated idea and decides to prolong cooperation after the lead-user workshop (e.g., for the purpose of getting support in the development of a prototype), it has to

think about incentives for the lead-user to enter such a collaboration. Because of their intrinsic motivation, lead-users are very often not satisfied with traditional consulting contracts including fixed daily consultancy fees. In addition to such contracts, lead-users very often claim the right to use and commercialize the invention on their own if the company – for whatever reason – fails to market it. Furthermore, the reputational gain by being named as the original inventor in the case of successful commercialization also plays an important role for lead-users. Interestingly, the incentives for lead-users to collaborate with a focal producer firm are quite similar to those of contributors to open-source projects (von Hippel & von Krogh, 2006).

Design Principles for "Harvesting" Strategies

Involving a large number of external individuals into corporate innovation processes, even if the project runs only a short period of time, as in the case of innovation contests, comes with a broad range of problems (see Table 1). The following design principles help to overcome these obstacles.

1.) Clear descriptions of the problem and solution parameters as well as implementation of incentive and control systems.

Innovation contests are open calls (hosted by a company) to an unknown group of potential problem solvers to work on a specific problem and to submit adequate solutions. The company then chooses the best solution for the purpose of commercializing it and awards the submitter of the winning solution a prize. In contrast to employees, participants in crowdsourcing activities do not know the company's strategy and innovate independently without any guidance from the company. Thus, as the "Pril" example above illustrated, user-generated solutions might be inadequate from a corporate perspective. To reduce the proportion of unfeasible solutions, the company needs to align the users' problem-solving activities with the goals of the innovation contest. The most obvious way to do so is to provide potential contributors with detailed information on what an adequate solution makes.

The requirements communicated to the users must be those dimensions applied when it comes to selecting the winner. As L. B. Jeppesen and Lakhani (2010) point out, choosing a harvesting strategy means that the company withdraws from the "driver's seat" of problem solving. Rather, the company has to develop competencies in the right way of formulating and broadcasting the challenge.

Besides incentive systems, control systems also play an important role in aligning the participants' innovative activities with the corporate strategy. For example, in its innovation jams, IBM tries to guide the contributors' activities in predetermined directions by providing them upfront with the jam's goals, rules, and materials to familiarize them with current solutions (including descriptions of their problems) as well as emerging technologies that could be of interest in solving the problem (Hienerth et al., 2011). A clear problem description has been shown to have another important advantage: The better the problem is described (on an abstract level), the more heterogeneous the crowd participating in problem-solving activities will be, which is an important success factor in innovation contests as it affects the quality of ideas submitted (L. B. Jeppesen & Lakhani, 2010). Another way of limiting the solution space is to provide participants with a toolkit that only allows for solutions in a predetermined design space. In addition to a better alignment of generated solutions with the company's requirements, the toolkit also acts as a problem-solving "assistant," enabling novice problem solvers to participate in innovation contests (Franke, Keinz, & Schreier, 2008).

2.) Consideration of users' fairness perceptions in the design of innovation contests.

The design of the innovation contest heavily affects the number of participants, which in turn is positively correlated with the quantity and quality of the solutions submitted. To attract as many participants as possible, companies usually offer monetary prizes for the best solutions. These prizes must be valuable enough that they are likely to compensate the average participant for the effort put into the generation of a solution. For example, in the case

of Threadless, a U.S.-based producer of T-shirts designed by users via innovation contests, the originator of the winning design received a prize of up to USD 2,500. The fairness rationale is based on social exchange theory which says that users participate in innovation contests if they expect to derive greater benefits than costs (Blau, 1964). Although self-interest plays an important role for users participating in innovation contests, it is not enough to compensate them for their effort. Research shows that users – beyond self-interest – evaluate whether the crowdsourcing activity is a "fair deal" with regard to the distribution of benefits arising from the innovation contest as well as the organization of the crucial processes (Franke et al., 2012b). For example, the submitter of a T-shirt design is likely to perceive a prize of USD 2,500 as unfair (even if the generation of the design took only one hour), if the submitter learns that the company makes a few hundred thousand dollars by selling T-shirts with that design (Franke et al., 2012b). Thus, for example, a certain share of the sales (even if it is rather low) is perceived as being more fair than a fixed compensation (Füller, Jawecki, & Mühlbacher, 2007). Furthermore, non-monetary benefits (as a gain of reputation) by naming the user as the originator on the product or the company website increases fairness perceptions of users (Füller, Faullant, & Matzler, 2010; L. B. Jeppesen & Frederiksen, 2006). In addition, the company should take care for procedural fairness, which also affects the willingness of users to participate in innovation contests. Many participants wish to take part in the process of evaluating the designs and choosing the winners. Companies should think of integrating user ratings into their decision-making processes (Franke et al., 2012b).

3.) Involvement of the focal producer firm's middle management and employees by the implementation of appropriate incentive systems.

As in the case of lead-user projects, the outsourcing of innovation-related tasks always rouses the fear of losing competencies and responsibilities among employees. In order to ensure the employees' and the middle management's interest in the innovation contests and to

avoid a “not-invented-here” attitude toward the externally generated solutions, the company should employ incentive systems depending on the outcome of the crowdsourcing activity. Again, the novelty of new product ideas might be an adequate measure as well as time-to-market of innovations, as crowdsourcing activities have been shown to propel the processes of developing marketable products. Procter & Gamble has employed such an incentive system successfully (Huston & Sakkab, 2006).

Design Principles for “Cooperation” Strategies

“Cooperation” strategies call for organizational design activities similar to those of “searching” strategies. Because of the sustainability of “cooperation” strategies, some additional challenges regarding the structural components need to be resolved.

1.) Adaptation of the corporate strategy to deal with radical/disruptive innovation.

Continuously integrating external lead-users into the new product–development process will increase the proportion of radical and disruptive innovations that promise a high market potential but low technological feasibility (Lilien et al., 2002; Lüthje & Herstatt, 2004). Such radical innovations might also affect the business model of the producer as they change the way a customer need is satisfied (Hienerth et al., 2011; Lettl, Hienerth, & Keinz, 2012) and open up new markets and applications. However, many well-established companies are reluctant to change their existing business models or entering completely new and unknown markets. In order to overcome organizational inertia, the top management has to anchor innovation leadership in the corporate strategy. Good examples for such efforts are Lego and IBM. A few years ago Lego realized that some lead-users were inventing on standard Lego bricks in order to make them usable in their daily professional lives. For example, some architects invented Lego brick kits specifically designed for architectural models of complex buildings. Also, psychological therapists used new, self-designed Lego toys for visualizing family constellations. Lego soon realized the commercial potential of specific product lines for professionals. However, lacking the specific knowledge (e.g., architecture, psychological

therapy) to enter these industries, Lego launched a user entrepreneurship program. As a part of its corporate strategy, Lego allows selected users to become entrepreneurs themselves and sell their self-generated products under the Lego brand, supporting them with highly favorable purchase prices, advice on legal issues, and co-marketing. In 2008, the company even established an incubator at its Billund, Denmark headquarters. IBM has chosen a similar approach. The innovation jam has become an important business activity and central part of the company's strategy. IBM also devotes generous budgets to the winners of the innovation jams in order to bring their ideas to life (Hienerth et al., 2011).

2.) *Appointment of persons responsible for the relationship management with lead-users and external experts.*

Clearly, the lead-users are the most important success factor in lead-user projects. As identifying progressive lead-users is a costly and timely task (von Hippel et al., 2009) and many lead-users ahead of a trend might be valuable in more than just one innovation project, it is advisable to establish sustainable relationships to lead-users. For successfully managing the long-term relations with lead-users, persons officially assigned with this task are needed. Thus, the company should appoint one or more persons in charge of taking care for lead-users. For example, Coloplast and Lego have established new organizational sub-units responsible for managing the relationship with lead-users (Hienerth et al., 2011). These persons are comparable to what the organizational science literature calls "gatekeepers" (Allen, 1967). They are expected to foster the dialogue between internal and external individuals involved in innovation processes (Allen, 1967; Hauschildt & Schewe, 2000). Another important function of these actors is to facilitate project-to-project learning (Koners & Goffin, 2007). If involved in lead-user projects on a continuous basis, gatekeepers accumulate valuable procedural know-how and skills with regard to the search for lead-users and the management of lead-user workshops (see design principles for "searching" strategies).

Design principles for "Ecosystem" Strategies

"Ecosystem" strategies come with the most fundamental challenges for organizational design. In addition to all the design principles presented previously, the following recommendations are offered.

1.) Design the organization as part of a user innovation ecosystem and adapt the organizational structure.

Companies constantly integrating a large number of external individuals into their core business processes have to realize themselves as being only a part of a user innovation eco-system consisting of the corporate partner, user communities, and lead-users. These three types of actors co-exist and are able to jointly contribute to the development of innovations by using synergies emerging from their interplay (Lettl et al., 2012). For example, a company might foster innovative activities within a user community by introducing a toolkit for user innovation and design. Such an online platform can become the nucleus of a vivid user community and trigger the interaction between users (Franke et al., 2008). In turn, members of the user community could help to further develop the toolkit (Hienerth & Lettl, 2011; Prügl & Schreier, 2006). In addition, a vivid user community attracts lead-users as they can get support in terms of feedback and work power from other users, reducing the risk of failing with their innovations (Dahlander & Wallin, 2006; Franke & Shah, 2003). In order to allow for such synergy effects, the company has to fully commit to user innovation as integral part of its strategy. Furthermore, the company has to structurally adapt to this new strategy. Generally speaking, flat hierarchies allowing the middle management (e.g., product or division managers) to independently collaborate with external problem solvers positively affect the success of user innovation strategies. Consequently, responsibilities as well as required capabilities should also be shifted to the middle management. In the case of Coloplast, a Danish producer of stoma products, the division managers are free to start cooperations with lead-users on their own. They receive special training provided by a person

experienced in collaborations with users and are then asked to manage the R&D project on their own.

Besides flat hierarchies, incentive systems applied by the top management have to take into account the nature of user-innovation strategies. Especially in the short term, user innovation strategies are characterized by large investments but low monetary return on investment. In order to underline the strategic importance of user innovation initiatives, companies like Coloplast, Lego, and IBM have opted for some more intermediate and non-monetary measures (e.g., the number of new patents, "buzz" in their user communities, and positive spillovers into the company's reputation) instead of monetary ROI when evaluating the success of their user innovation efforts (Hienerth et al., 2011).

Last, when pursuing a user innovation strategy, internal processes such as manufacturing and distribution need to be reorganized. Mass customization strategies for example call for a modular product architecture.

2.) Appointment of persons responsible for proactively participating in and managing the community.

As a part of a user innovation ecosystem, the company has to define ways of collaborating with the other parties (lead-users and user communities as such). As users are not contractually related to the organization, they are not dependent on directives. This means that a company cannot "manage" the user community in a traditional sense. In order to align innovative activities in such user communities and with the strategy of the corporation, the company needs to build a sustainable relationship with the community in addition to employing incentive and control systems (as described above). There are different alternatives of doing this. Some companies, like EA, a German producer of PC games, have employed a VIP program. They proactively target the most active and best-networked users in their user communities and try to tie them to the company by inviting them to test new games as BETA

users prior to all others or by granting them a special VIP status at trade fairs and other corporate events. The purpose of such activities is to frequently interact with those individuals as they have key positions in the user communities and are likely to influence the general attitude towards the company within the community. If the community was started by, or is more centered around the company, a good strategy is to have corporate representatives participate in the community. Those representatives often have the status of administrators, guiding discussions and influencing general trends and innovative activities within the community. For example, IBM appoints "facilitators" responsible for organizing its jam activities. One of the facilitators' tasks is to monitor ongoing discussions during a jam and to gently remind participants of the jam's purpose if they stray off topic or into "dead-end" discussions (Hienerth et al., 2011). A third option would be to "have an agent on the inside" (Dahlander & Wallin, 2006). Current research has proofed firm-controlled individuals disguising their affiliation with the company (e.g., employees pretending to be independent community members) to be highly effective in influencing the user community's activities and the attitude towards the company among the community members (Dahlander & Wallin, 2006; Franke, Funke, Keinz, & Taudes, 2012a; Miller, Fabian, & Lin, 2009). Irrespective of which of the alternatives presented here is chosen, the company has to appoint a person officially in charge of coordinating the activities described. The position that is to be created somehow equals the role of a "gatekeeper"; thus, it aims at systematically taking-up, processing, and exchanging innovation-related information from internal and external sources (Allen, 1967; Katz & Tushman, 1979).

Discussion

There is rich empirical evidence that the locus of innovation is increasingly shifting from producer firms towards users of products and technologies, i.e., that innovation is becoming increasingly democratized (von Hippel, 2005). This shift is accelerated by new

information and communication technologies that allow users to share information and knowledge at low cost. At the same time, scholars and practitioners alike have developed a comprehensive set of methods that allow producer firms to leverage the creativity of users for their new product–development efforts. Such methods include the lead-user method, innovation contests, collaboration with user communities, and toolkits for user innovation and design. Even though the research field of user innovation has been developing over a period of more than four decades, there have been only occasional intersections with the research field of organizational design. In this article, we attempt to provide an integrated perspective of the two research fields. We first discriminate different user innovation strategies by distinguishing two dimensions: the number of users that are involved in the innovation efforts of a company and the sustainability of user involvement. This allows us to distinguish four different user innovation strategies that a focal producer firm can employ. Based on the organizational design framework of Burton and Obel (2004), we then analyze the implications of each of the four user innovation strategies on key dimensions of organization design.

Key Insights

Our analysis reveals that user innovation strategies that are executed as "one-shot games" (such as "searching" and "harvesting") primarily affect the human components of organizational design. For the "searching" strategy, processes, incentives, and competencies need to be developed that allow the focal producer firm to identify and collaborate with an elite circle (Pisano & Verganti, 2008) of progressive users. With respect to the "harvesting" user innovation strategy, processes, incentives and competencies need to be developed that allow the focal producer firm to leverage the creative potential from a large number of geographically dispersed users and to align the creative contributions with the corporate strategy. For example, R&D employees need to accept and master the fundamental role shift from problem solvers to problem formulators and from idea generators to idea collectors. In

this respect, R&D employees also need to develop the ability to frame problems in a way so that they attract a large number of experts from many different fields. Both "searching" and "harvesting" strategies require R&D employees to overcome a "not-invented-here" syndrome, and they require the design of exchange processes that are perceived as fair by the users.

Another key insight from our analysis is that the more a focal producer firm aims to involve users in its new product development efforts on a sustainable basis, the more it needs to complement changes in the human components with changes in the structural components of organizational design. For the user innovation strategy of "cooperation" to be sustained, firms need to adapt their strategy and structure to deal with radical and disruptive innovation on a continuous basis, and they need to appoint employees that are responsible for relationship management with lead-users and external experts. Here, producer firms also need to develop a double-loop learning capability to reflect on prior projects and processes and to set up an organizational memory so that the insights (both procedural and fact-based) from prior projects are disseminated to relevant stakeholders inside the firm. The "ecosystem" strategy implies the most fundamental changes to organizational design. It implies that the boundaries between the producer firm and users become increasingly blurred. For this strategy, focal producer firms need to view and design themselves as part of a collaborative user innovation ecosystem, and they need to create organizational units responsible for community management. According to Miles et al. (2009), this implies that the focal producer firm increasingly develops and applies community-based organizational designs and facilitative management approaches. The authors refer to such organizational designs as the I-form (Innovation-Form) as it responds to the economic era of innovation that most firms face today. Such community-based models require fundamentally different coordination and control mechanisms than their traditional counterparts such as (a) shared interest, (b) collaborative values such the willingness to share knowledge and the seeking of fairness in community contributions and the distribution of rewards, (c) community-oriented leadership

with a focus on facilitating community growth and sustainability, (d) protocols and infrastructure that support collaboration, and (e) expandable commons based on knowledge-sharing processes by general reciprocity that allow cumulative innovation (Fjeldstad, Snow, & Lettl, 2012; Miles, Snow, Fjeldstad, Miles, & Lettl, 2010).

Toward Synergistic Approaches

We observe that pioneering firms such as Procter & Gamble, LEGO, and IBM experiment with "harvesting," "cooperation," and "ecosystem" strategies simultaneously and increasingly aim to leverage synergies from the three strategies. This requires an integrated approach over all divisions, functions, and management levels of the focal producer firm, which calls for top management commitment and a company-wide strategy for user innovation. For example, Procter & Gamble has over a period of five years fundamentally changed its company-wide innovation approach from R&D to "C&D" – Connect and Develop (Huston & Sakkab, 2006). The "C&D" strategy comprises a mix of approaches such as the lead-user method, innovation contests, entrepreneurship programs, and various communities. According to Procter & Gamble, this new strategy requires a senior executive who has day-to-day accountability for its vision, operations, and performance. At Procter & Gamble, it is the vice president for innovation and knowledge who is appointed to this responsibility. Each business unit has C&D leaders who have dotted-line reporting relationships with the vice presidents. Managers responsible for specific communities and networks report directly (Huston & Sakkab, 2006). Also, there needs to be a process where all incoming ideas are collected and distributed across the entire organization. In the C&D approach, product ideas are stored on P&G's online "eurekacatalog" through a template that documents related facts (e.g., current sales of existing products or patent availability for a new technology). The document is then disseminated to relevant managers such as general managers, business line managers, brand managers, and R&D teams worldwide (Huston & Sakkab, 2006).

LEGO is leveraging synergies by its lead-user entrepreneurship incubator. LEGO selects lead-user entrepreneurs who fit both with their personalities as well as with their ideas to the LEGO strategy and values. Those selected lead-user entrepreneurs can then use the complementary assets of LEGO (brand, know-how, distribution systems) to exploit the identified business opportunities. The user community provides support in the early stages of the entrepreneurial process in the form of feedback to the business idea, technical expertise, and as a first-sales market. The emerging symbiotic ecosystem of the lead-user entrepreneurs, the LEGO company, and the various user communities allows to leverage synergies such as reduced risk for the LEGO company and the lead-user entrepreneur, the continuous identification and exploitation of business opportunities, and growth and sustainability of the user communities (Lettl et al., 2012). Consequently, this emerging symbiotic ecosystem has similar features to the organizational design that Miles, Miles, and Snow (2005) envision as a collaborative entrepreneurship where a large number of loosely coupled actors with diverse knowledge bases engage in a process of continuous opportunity recognition and exploitation. Besides the lead-user entrepreneurship incubator, LEGO is able to leverage synergies from its user ecosystem by (a) identifying lead-users via specific innovation contests, (b) integrating those lead-users into concrete new product development projects, (c) leveraging lead-users to further develop toolkits for user design, and (d) identifying trends by observing communication and design activities in its various user communities. In order to create and leverage such symbiotic user innovation ecosystems, a focal producer firm needs to understand the critical interfaces between different user innovation strategies, and it needs to change its capability from acting as an orchestrator (using its hierarchical power in a network of actors to enforce intended processes and outcomes) to a facilitator of collaborative innovation processes (by facilitating collaborative infrastructures and by facilitating a collective process for developing shared vision, protocols and expandable commons) (Miles, Miles, Snow, Blomqvist, & Rocha, 2009).

IBM has developed a dynamic capability to develop collaborative innovation communities, such as Blade.org (Snow, Fjeldstad, Lettl, & Miles, 2011) or the Eclipse Foundation, for continuously executing innovation contests inside its firm referred to as the IBM Innovation Jam (Bjelland & Chapman Wood, 2008), and by involving elite experts from outside the firm referred to as the IBM Global Innovation Outlook.

The symbiotic settings between focal producer firms and users as illustrated above provide interesting new perspectives to the research strand on organizational ambidexterity (Tushman & O'Reilly, 2006). After all, they open up new opportunities for producer firms to become ambidextrous, i.e., to explore and to exploit simultaneously, as multiple users can be a source of continuous and simultaneous exploration of business ideas (that the firm may not be able to recognize itself) and their exploitation. Consistent with Miles et al. (2009), we expect companies in knowledge-intensive industries increasingly to be able to apply all of the user innovation strategies skillfully and simultaneously. To develop meaningful frameworks and guidance for managers who need to master this transformation, we believe researchers in the area of user innovation and organization design need to form a collaborative community. We hope that our article helps to trigger this development.

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Figure 1:

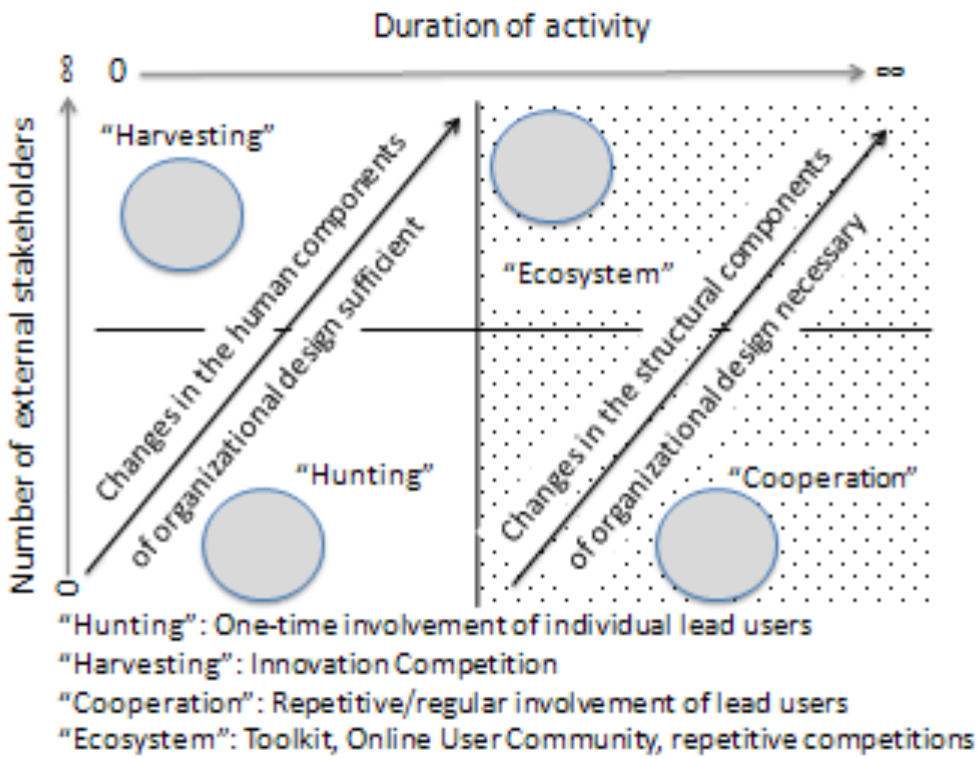

Figure 1: Types of user innovation approaches

Table 1: