INNOVATION CO-CREATION WITH CUSTOMER AND USER NETWORKS

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Abstract

The concept of open innovation is getting increasingly popular. Unlike the traditional innovation models, it builds on innovation activity where customers and users proactively co-develop products and services with companies. The benefits of open innovation are claimed to include improved user value and innovation performance. However, previous literature predominantly considers firm's innovation development options as either closed or open. In this paper, we focus on the "grey area" between these options and investigate the alternatives of innovation co-creation from the perspective of firms' involving users into their innovation development. Based on an empirical research we identify four distinct modes of creating innovations with customer and user networks. Using excerpts from interviews, we describe these diverse and evolutionary modes, illustrate customers' and users' roles in each phase, and discuss the organizational challenges that a firm faces in entering the phases.

Keywords: Open innovation, Co-creation, Living labs

INTRODUCTION

Understanding customers has become crucial for firms' business and innovation development. Especially the Internet has radically altered the ways firms can learn from their customers. It is necessary as listening to the customers can help companies improve their products and services (Michel et al., 2008). Hardly any company can ignore some kind of customer input to its innovation process, and a growing number of firms pay systematically attention to their customers and users as a source of feedback, relevant use experiences, and new ideas. However, the benefits of traditional customer reclaim and feedback systems (Hauser, 1984) only enable partial understanding of the customer perception in regard to the product and service quality characteristics. Even occasional in-depth customer surveys or market research targeted to the clientele from time to time do not allow for accurate and timid tracking of rapidly changing customer attitudes and new development ideas (Ogawa and Piller, 2006). Firms are more and more involving their own customers in idea generation and screening only recently with the development of Internet-based tools (Toubia and Florés, 2007).

Complex technologies are increasingly innovated by networks of various actors. According to prior literature (e.g., Snow et al., 1992; Mele et al., 2009), many firms enter networks in order to exploit and develop their resources, and create and maintain the basis for their competitive advantage. Innovation networks are those linked organizations that create, acquire, and integrate diverse knowledge and skills required to innovate technologies. The concept of open innovation has recently gained interest in many industries (Wu and Lin, 2001; Paulson et al., 2004; Bonaccorsi et al., 2006) and its idea of involving users as co-developers in the innovation process has become popular. Users are recognized as co-innovators, often developing new functions for technologies, solving unforeseen problems and demanding innovative solutions (Moors et al., 2008). The benefits of open innovation include improved user value (Almirall and Casadesus-Masanell, 2010) and innovation performance (Chiaroni et al., 2010). Von Hippel (2007) also posits that user-driven innovation costs can be significantly lower than producer-driven innovation costs. As a result, traditional innovation networks are progressively transforming into open innovation networks. The simultaneous emergence of social media enables user communities to interact and co-create value with firms over the Internet. It leads to diverse forms of open innovation, such as open sourcing (von Hippel and von Krogh, 2003), crowdsourcing (Brabham, 2008; Whitla, 2009), and the living labs model (Mensik and Katzy, 2007; Schumacher and Niitamo, 2008; Ståhlbröst, 2008).

An organized collaboration among the participants involved is characteristic of all innovation networks (Gadde et al., 2003). This notion is valid also when user networks are tightly integrated to firms' R&D-processes. User involvement helps firms to understand better their customers' needs which reduce market risk in the launch of new products and services, and improves return on investment and time to market. However, the role and depth of integration of user networks in the open innovation model differs from the traditional view. The traditional avenue of listening users is called customer-centric approach, but they are now so intimately involved in the development and usage processes that they have become true co-creators of value (Möller et al., 2008) and the approach is called customer-driven. In order to co-create value, the firm and its user networks must reconcile their objectives and define both the role and effort required from each party and an equitable division of the returns (Chesbrough, 2003). Nevertheless, companies on average have little experience in open innovation and the literature is silent of what is required to make customer- or user-driven

innovation models work (Feller and Fitzgerald, 2002). In addition, previous studies predominantly consider firm's innovation development options as either closed or open (see e.g., Almirall and Casadesus-Masanell, 2010) without any alternatives between these two.

Our study focuses these identified research gaps by contributing to the discussion of co-creation from the perspective of firms involving customer and user networks into their innovation development. Specifically, our objective is to understand the paths and ways traditional firms can take to benefit from the open innovation model in order to transform themselves into innovators with users as productive idea pools and co-developers. In order to reach this objective, we aim to (1) describe the evolutionary modes of co-creation with customers and users, (2) identify the key roles of customer and user networks in different co-creation mode, and (3) analyze the organizational challenges in managing innovation co-creation process with customer and user networks in diverse modes.

We employ a qualitative research approach in the collection and analysis of data. The perspective is that of producer; i.e., a firm that wants to transform into a co-creative enterprise. Our research questions address two major issues in co-creation: value/innovation co-creation and management/strategy co-creation, as suggested by Ramaswamy and Gouillart (2010). There arguably are diverse types of open innovation, which differ between their key characteristics such as the participation and governance levels (Pisano and Verganti, 2008), as well as the number of users involved and the mechanisms of partnership formation (Almirall and Casadesus-Masanell, 2010). In this study, we emphasize a firm's evolvement phases from an in-house innovator towards a customer-driven co-creator. Our empirical data includes firms and organizations that utilize or consider using the living labs model with a select group of participants involved in innovation co-creation.

This study is divided into three main sections. First, after a brief introduction to the study, we review the theoretical foundations of innovation co-creation with customers and the open innovation model. Second, we describe our research methodology and living labs as the research setting. Third, we present our research framework used in the analysis. The framework depicts the four modes of co-creation. We then provide the empirical findings of customers' and users' roles and characteristics in these different co-creation modes. Finally, we discuss our findings and make conclusions on the challenges of innovating and co-creating with customer and user networks in each co-creation mode.

CO-CREATION WITH USERS AND CUSTOMERS

Co-creation is a fashionable term among scholars of value creation. Such attention is comprehensible as the creation of value is the core purpose and central process of economic exchange (Vargo et al., 2008). In this approach, customers and users are seen as co-creators of value who help to conceptualize the innovation (Lusch et al., 2007). Value co-creation involves influential interaction between the innovators and can be extended beyond the customer-producer dyad to various intermediaries, thus involving many-to-many business relationships and networks (Gummesson, 2007; Ramaswamy and Gouillart, 2010). Co-creation opportunities in customer-producer relationships together with extended value creation relationships are claimed to lead to enhanced competitive advantage (Lusch et al., 2007). They give rise to innovation process efficiency, because the customer carries out tasks

that otherwise have to be carried out by the producer (Flieβ and Kleinaltenkamp, 2004). The outcomes of co-creation, i.e., superior value propositions that are relevant to customers, are likely to result in improved revenues, profits, and referrals. Ramaswamy and Gouillart (2010) stress that co-creation considers two important aspects: innovation/value co-creation and management/strategy co-creation, and that one of the main components in co-creation is networking with others.

Collaborative networks differ in the degree to which membership is open to anyone who wants to join. Pisano and Verganti (2008) posit that the costs of searching for, screening, and selecting contributors grow as the network becomes larger and can become prohibitive. According to them (ibid.), understanding when a firm needs a small or a large number of problem solvers is crucial, and closed modes, obviously, tend to be much smaller than open modes. Pisano and Verganti (2008) further stress that collaboration networks differ fundamentally in their form of governance. In some networks, the power to decide which problems are the most important, how they will be solved, what constitutes an acceptable solution, and which solutions should be implemented is vested in one firm in the network. Such networks are hierarchical, whereas other networks are flat; the players are equal partners in the process and share the power to decide key issues. Möller et al. (2008) describe the equal model of innovating in networks as the balanced mode of innovation co-creation. The flat and hierarchical governance options are extant in the ever more popular open innovation model.

The open innovation model has raised interest towards the changing roles of its participants. For instance, Chiaroni et al. (2010) emphasize the fact that open innovation requires the establishment of extensive networks of inter-organizational relationships with a number of external actors, including producers and their partners, customers and users, universities and research institutes, as well as other organizations and individuals. Innovation development, production, distribution and consumption networks that are distributed horizontally across many innovation users exist in many fields and industries (von Hippel, 2007). Fundamentally, they are at the heart of the open innovation model. The variety and heterogeneity of participants and the networks involved may be large, and networks offer loads of research opportunities for the researchers of open innovation. Huston and Sakkab (2006), for example, describe the different types of networks, either developed specifically to facilitate open innovation activities or already existing and joined by the firm and the strategic planning processes. Dittrich and Duyster (2007), in turn, focus on the way in which networks for open innovation are created and managed. Other studies investigate the relationship between the producer and customer and user communities.

Innovation user and innovation producer are the two general functional relationships between innovator and innovation. Users are firms or individuals that expect to benefit from using a product or a service. In contrast, producers expect to benefit from selling a product or a service (von Hippel, 2007). Concordant with von Hippel (2007), by user network we mean user nodes interconnected by information transfer links which may involve face-to-face, electronic or any other form of communication. User networks can exist within the boundaries of a membership group but need not. User innovation networks also may, but need not, incorporate the qualities of user communities for participants, where these are defined as networks of interpersonal ties that provide sociability, support, information, a sense of belonging, and social identity. In business-to-business context, customers and users of

innovation may be different people in the organization. Especially, they may be different individuals in certain forms of open innovation, such as in the open sourcing approach. However, even non-users may contribute to the work of what we call user innovation networks. We discuss user innovation networks in this study as customer and user networks.

We anticipate that the role of customers differs in diverse forms of open innovation. Because our empirical data considers firms that have experience of using living labs, we emphasize living labs as the context of open innovation model here. Schaffers et al. (2007) stress that networking is an integral part of the living lab model, which allows a focus on value generation and distribution in a network of cooperating partners, including customers and users. In the same way, Ramaswamy and Gouillart (2010) state that network relationships are one of the main components of the co-creation principle. In a living lab, the technology is tested in the everyday real life context and end-users are important informants in the tests. In general, the active role of users through open innovation emphasizes company's business processes. To accomplish needs of the customer and how these needs could be satisfied, members of the living lab act as co-creators in the development of solutions for their problems. However, this active role is spread to other value creating and capturing functions of firms, such as marketing, which benefits both customers and the company (Chesbrough, 2003). Benefits and success will come using the experiences of each network member, to foster collaboration and communication through the various engagement platforms that enable contextualized interactions across the business network (Ramaswamy and Gouillart, 2010).

One interesting aspect is the notion that the role of networks may change in time. Based on their extensive study on firms pursuing open innovation, Chiaroni et al. (2010) augment that the role of networks change along with the firm and its innovation processes that get more and more open. For example, firms in their initials steps of becoming open innovators exploit their personal social networks in innovation creation, whilst later on they push the boundaries of their social networks in order to foster innovation adoption as well as build explorative networks. Ultimately, in order to act upon the open innovation principle, firms need to establish exploitative networks with their current and potential customers (Chiaroni et al., 2011). Also Ramaswamy and Gouillart (2010) argue that a key component of an organization's transformation into a co-creative enterprise is the extent to which its own strategy is co-created, and co-created strategy brings together multiple constituencies – employees, customers, regulators, and other stakeholders –in networks inside the process. These networks may change along the firm's transformation path towards an open innovator.

In comparison with the closed model, the open innovation model implies that the management and organization of innovation processes become more complex. That is, open innovation includes more activities than those that were assigned to a traditional R&D department (van de Vrande et al., 2009). Chiaroni et al. (2010) studied the anatomy of the organizational change process through which a firm evolves from being a closed to an open innovator. They found that the journey from closed to open innovation is stepwise and involves four main dimensions of the firm's organization along which change can be managed and stimulated. These are: inter-organizational networks, organizational structures, evaluation processes and knowledge management systems. In their subsequent work, Chiaroni et al. (2011) clarify that the dimensions are 'managerial levers for open innovation', and implementing open innovation requires a firm to act upon on these levers. According to van de Vrande et al.

(2009), firms with considerable customer involvement in their R&D operation emphasize new organizational culture required for open innovation as the biggest challenge.

Open innovation has risks and challenges. Arakji and Lang (2007) posit that the scale of risks involved differs depending on whether one outsources innovation development to partner firms or to a network of consumers. By default, sharing information and copyrighted content with a few trusted partners implies less risk than sharing the same information with large user groups and communities. Therefore, the greatest risk is using information divulged in a collaboration process for private gains outside the contractual agreement (Arakji and Lang, 2007). Nevertheless, Van de Vrande et al. (2009) augment that even bigger risk in customer involvement is related to customer fit of newly innovated products and services. In principle, co-creation helps to produce products and services that have a better match with the customer's needs and wants, but working in intense development collaboration with users may lead to dealing with too specific customer demand, and innovation does not fit the mass market. Other challenges for firms in applying the concept of open innovation are related to, e.g., incorporating external innovation into internal development, and motivating outsiders to supply an ongoing stream of external innovations (West and Gallagher, 2006). Failure in these tasks is a major risk when firms move on using the open innovation model.

RESEARCH METHODOLOGY

This study draws on an empirical research in investigating the different phases of innovation co-creation. In order to analyze innovation co-creation with customer and user networks from the producer's perspective, we utilize qualitative research approach. We are interested in cases where a firm initiated an open innovation development project – especially through the living labs model – with others in order to develop either a new product or service or a novel business concept. Firms were included as cases if their innovation development processes involved active co-creation work with the customer and user networks. Those firms that met the selection criterion were seen as fruitful cases in providing a retrospective view on their innovation co-creation evolution. We conducted a total of 27 semi-structured. The informants include senior management, such as CEOs, CTOs, sales directors, and project managers within various ICT companies. The ICT industry was chosen, because previous literature uniformly suggests that open innovation practices are most utilized in the high-technology industries (see e.g., Chiaroni et al., 2011). Therefore, we reason that the evolution in becoming an open innovator is most advanced among ICT firms, and they can offer information on their past and present co-creation models and how the models have changed.

The data was collected during the years 2007 and 2010. Our case companies make benefit of customers and users or user-communities in their innovation processes, or, they provide user-centric or user-driven services to other companies. Furthermore, another 40 interviews were conducted among personnel in different organizational tasks and levels of selected living labs in Finland, Sweden and Spain. This additional endeavor was performed to gain insight into the use of the living labs method as an open innovation model. All interviews were carried out in face-to-face meetings with the researchers and the interviewees. Interviews were audio-recorded for transcription and analysis, and some issues that emerged from the interviews were detailed later via additional interviews by phone. In addition, our material comprises secondary data in the form of relevant web sites, bulletins, magazines, and case reports. We

are unable to reveal the identities of the informants or their organizations in the study due to confidentiality reasons. Therefore, we provide a short note of the informants' organizational positions and their areas of responsibility, as well as the type of their companies along with excerpts from the original interviews.

EMPIRICAL ANALYSIS AND PRELIMINARY RESULTS

According to Silverman (2005), the best way to start analyzing the data is to review it in the light of the research questions. We constructed a preliminary framework on the basis of prior literature to guide the analysis (see Figure 1.) The framework draws on two dimensions: the degree of openness and the type of co-creation, because their relevance is obvious and their use in prior research is well-established. Previous literature puts forward the degree of openness in the contexts of open innovation and co-creation in several ways. For instance, the study on open innovation by Teirlinck and Spithoven (2008) suggests the degree of openness includes distinctive modes such as in-house innovator and co-developing innovator. We see that these modes describe the types of innovator rather than the degree of openness of innovation. Hence, we use the dimension in a way familiar from other open innovation studies (e.g., Almirall and Casadesus-Masanell, 2010). That is, the degree of openness is a dimension with 'closed' in one end and 'open' in the other end. Our view is similar to that of Pisano and Verganti (2008), who emphasize the importance of the degree to which membership is open to anyone who wants to join as a key dimension in their collaboration typology. However, we add the assumption that any value between these the closed and open ends is possible, suggesting that collaboration can be more or less open for others to join.

In opposite, we use the type of co-creation to proclaim whether innovation co-development is predominantly firm-lead or customer-lead. The type of co-creation has been suggested in previous literature in a variety of ways. For example, Möller et al. (2008) discuss the types of co-creation in services based on whether innovation co-creation is provider-driven or client-driven. They argue that both ways may turn out to be successful, and suggest that there may be other viable ways between these two modes. We share this view and see that the two modes represent the purest forms of operation, but in reality many firms lie somewhere between them. O'Hern and Rindfleisch (2010) put forward a slightly similar framework to identify diverse types of co-creation, but they use firm-lead and customer-lead terminology to refer to the selection of ideas and features for further development in collaborative vertical relationships. Our definition of the type of co-creation refers to the "leadership" in innovation co-creation, pointing to who leads the R&D collaboration and who has the power over important decisions (see e.g., Pisano and Verganti, 2008). Together the two dimensions, the degree of openness (open/closed) and the type of co-creation (firm-lead/customer-lead) form a framework, where we identify four different modes of innovation co-creation: producer driven; user centric, closed; user-centric, open; and user driven. It should be noted, that other scholars of open innovation have identified modes of open innovation, which resemble our framework. For example, using partner variety and the number of phases in innovation process, i.e., the complexity of innovation process as dimensions, Lazzarotti and Manzini (2009) found four basic ways to collaborate. These are: low partner variety and few phases (closed innovators), high partner variety and many phases (open innovators), high partner variety and small phase variety (specialized innovators), and low partner variety and large phase variety (integrated innovators).

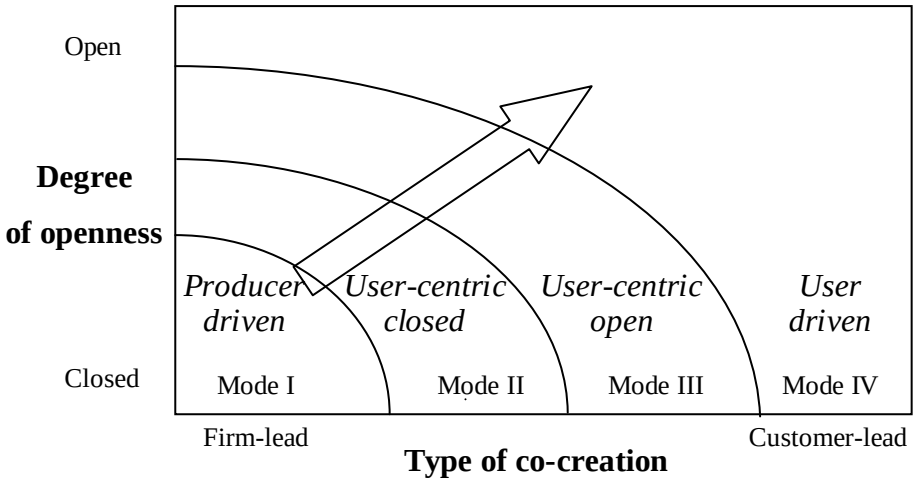

Figure 1. Preliminary framework: four evolutionary modes of innovation co-creation

We state that the modes of co-creation are often evolutionary by their nature. That is, if a traditional company with in-house innovation experience pursues utilizing user-driven forms of innovation, the firm goes through a series of steps. These steps advance in phases, and it is unlikely that a traditional company would become an open innovator quickly and conveniently. Previous research shows that for a firm becoming an open innovator may take a long time and the change process includes lots of challenges (Chiaroni et al., 2011). However, similar to the notions by Möller et al. (2008), we see that one phase or mode of co-creation is not necessarily more successful than the others. The user-driven innovation co-creation mode may not be better than the provider-driven mode, and there is not a must for firms to evolve from one phase into another. Aspects defining if a specific mode is more suitable for a firm in specific situation than another include, e.g., industry and market, the state of competition, the type of innovation; and, whether the firm can identify, attract, and consistently motivate its customer and user networks to co-create innovations. Buganza et al. (2011) suggests that such differences descend from a number of industry-level variables involving R&D intensity, strength of the appropriability regime, turbulence and uncertainty. We anticipate that it is more important for a firm to recognize and understand the different phases of co-creation and then make decisions on the best mode, than take quick steps towards customer-driven innovation. Next, the four different modes are discussed in more detail.

Mode I - Producer driven

"Producer-driven co-creation" mode describes a situation where research and development is strictly managed and owned by the producer. Typically it comprises activity, where technology leads the development process. It also can be called a push-strategy, since the innovation originates mainly from the company's ideas and patents. Innovation development is guided by a policy keeping all knowledge, information, and activities, as well as intellectual property rights (IP) within the producer firm. Users are considered merely as customers and buyers whose role is to purchase and consume the firm's products and services. Interaction with customers is faint, and company management and employees have little communication or contacts with the end-users, whether they are private customers or individuals in business-

to-business customer firms. The direct contact in customer firms can be someone else than the actual user of the product or service. As one of our interviewees put it:

> *"Typically, our customer interface is our direct customer. We never meet and discuss with the end-users, except [in the rare case] when we purposely aim to organize and establish a test situation with them.*" *[Consultant, User Experience, ICT Service provider]*

Arguably, in a development process involving minimal contacts with customers, also users' knowledge and experiences, as well as potential development ideas will not spread within the producer organization. Although the producer collects customer feedback by conducting market research, customer surveys or even limited interviews with the customers, the producer-driven innovation culture of the company may restrict this information from flowing around the firm and its departments. Hence, the information will not be used in the development work. This is somewhat paradoxical, as firms with producer-driven development approach often recognize the importance of knowing and understanding their users and taking users' experiences and ideas into account in the development process. The notion is illustrated by the following except from our interviews:

> "*You won't be able to become successful in digital services, if you don't understand your end-users and take their needs and wants fully into account… it's because they will just retain or stop using the [deficit] service and you won't gain any benefits. The [traditional] way be operate is organizing a workshop within our firm, where we discuss with our key employees about the market needs. In addition, we may conduct some market research in the form of [a few] customer interviews." [Director, Development, ICT Service provider]*

Because genuine user co-creation is almost non-existent in the producer-driven innovation development approach, firms do not have skills, experience or resources to interact with their customers or end-users in a way that would benefit the parties involved. Hence, there is an intermediary, such as a consultant, involved in the process, if a producer-driven firm pursues obtaining customer feedback or development suggestions. The consultant acts as an agent between the producer and the user in collecting and disseminating user's needs and wants, as well as his/her previous use experiences and potential development ideas. According to our informants, the reason for using agents is their ease of use from the producer perspective. Our interviewees pointed out the problem as follows:

> *"Involving users in the development process is highly challenging in a tightly organized and managed business-pipeline [such as ours]. We just produce what we sell; something that customers pay for, something with a clear price and customer benefits… It [=the use of agents] is [reasoned] because our customers don't know how to buy usability from us… and because measuring and showing explicitly the perceived benefits of involving [such] users in the development process is very difficult for us." [Consultant, User Experience, ICT Service provider]*

Mode II – User-centric, closed

"User-centric, closed co-creation" mode describes a phase, where the producer's innovation development process is closed, but the role of customers and users is clearly more visible and

remarkable in the development process than in the first mode. Such a firm incorporates its customers' and users' voices in the process. Ideas and needs from customer and user networks are gained, e.g., through diverse types of customer and user studies or surveys. These studies are more comprehensive, detailed and systematically targeted to selected users than those in the first mode. They also are typically conducted by the producer or its partners. Some users are involved already in early stages of the development process, whereas some are included in later stages. Newly developed innovation is often tested thoroughly with the help of pilot users. However, not all pilot users are customers; in fact, they also consist of producer's employees, as is illustrated in the following excerpt:

> *"We have a large number of customers; therefore, we organize many kinds of activities for those people [=customers] whom we want to involve in our product development process. They are involved in as test users who give first-hand suggestions and development ideas for our R&D staff. We also arrange numerous intra-organizational activities, where our very own employees become the test users for the first alpha-versions of our products for an extended period of half a year or more." [Director, Research, ICT-company]*

In this mode, the involvement of customers and users, as well as making use of their experiences and ideas are not the primary objectives in the producer's innovation activity. This is especially true when one considers user involvement from the business unit point of view. Some business units and departments may have lots of experience of this approach, whilst others have none. Bearing this notion in mind, it is obvious that involving customer and user networks in the producer's innovation activity is not an organization-wide phenomenon for firms in this second mode of co-creation. The firm usually has the resources and at least some experience required for utilizing such a method; perhaps through small-scale user studies and surveys, or experience with users closely related to the firm. Such user studies are often conducted in the producer's premises, where producer-side is represented by the producer and its established partners, and users are sometimes, but not always, represented by producer's selected employees or their family members. One of our interviewees depicted the notion as follows:

> *"We use both insiders and [totally] outsiders. Sometimes we don't want to reveal the test users that it is us [=our company] who would be launching something new to the market. In that case, we always use totally outsiders." [Manager, User centric project, ICT-company]*

The producer typically lacks procedures, practices, or managed processes for involving customers in the development work. Moreover, the firm's organizational culture does not support high degree of openness in the innovation process, and the firm puts a lot of effort in maintaining its IP rights along with all important information related to the R&D strictly inside of the organizational bounds. The following excerpt shows how authoritarian firms may be regarding this issue:

> *"We have extremely strict rules; it means we will never, ever reveal these activities or show this information to anyone [outsider]." [Manager, User centric project, ICT-company]*

Mode III: User-centric, open

In the third stage, "user-centric, open co-creation", the producer seriously involves the customers and users of its products and services into the development work. This mode takes a major step towards customer-driven operation in terms of the openness of innovation. Relevant processes and procedures required for the task are wide-spread within the organization. It can even be argued that customer involvement is part of the firm's daily routines. Here, the producer understands the value of customer knowledge, and its prior experiences of involving customers in the development processes are predominantly positive.

Producers in this mode consider their customer and user networks as important sources of information. R&D work undertakes in quite an open environment, where users represent both the firm's current and potential clientele. A striking notion is that the producer only involves the users in certain phase(s) of the innovation process. This means that same users are not included throughout the whole product or service innovation process. They are selected and involved purposely in a certain innovation stage or activity level on the basis of producer's needs. After the task is accomplished, the producer sends the users home with nothing but warms thanks and 'forgets' them. Innovation co-creation in this phase is not based on sustainable long-term relationships with the users, as it does not involve same users in the process for an extended period. The following stages of development will include different users and customers in the process. In a way, the process becomes a play between the open and closed forms of innovation; yet, the principle strongly supports open innovation.

> *"We need to understand how the idea is enriched in a development pipeline, where open and closed forms continuously change; open/closed, open/closed, open/closed etc. That is, we should comprehend what part of the idea is developed in the open innovation domain, and when it is closed. It is very important, as we are a for-profit organization who is responsible to our stake holders. We should get to know when to innovate [only] internally, and how both value added and the firm's value may increase when the idea develops via open/closed, open/closed, and open/closed. Innovation does not realize before it is in the hands of customers and users."[Director, Strategy, ICT-company]*

The same customer or user is rarely allowed in multiple stages of the innovation process, because they learn quickly how to use the newly-developed service or process. Familiarity of the product or service may cause the customer get too used to the technology, which discourages comprehensive feedback and suggestions for further improvements. However, the consistent need for "fresh test users" becomes a real problem for the company. Oddly enough, the challenge for the producer is how to motivate the users for a long-term involvement, which is required especially in the living labs model.

> *"One of the greatest challenges is that, if we keep on doing innovation this way, where shall we find more and more new people for the operation? I believe external actors might just be helpful here. Anyway, we use external professional help (=agents) even for organizing simple focus groups; the agents can arrange certain type of people for our needs in focus groups. Why not use their help in providing us 'fresh meat'? A major problem is, however, that we consistently need new, highly motivated people. Another issue is how to utilize all the expertise that has accumulated during the project. After all, it is not economic for*

us – as a firm – to maintain our own test user networks, and using the same people time and again for testing in our projects is not smart. It's like them creating careers as test users. After being involved into ten different projects one is not as fresh and innovative anymore as he/she was in the beginning. We need new blood." [Director, Research, ICT-company]

Mode IV - User driven

"User-driven co-creation" mode evolves when the producer exerts long-term, intense collaboration with its customers and users, and the majority of its business is based on user-involvement. In this approach, the users' true needs and wants, as well their motives for changing things will rise up and become explicable through his/her efforts. Such intense co-creation with customers and users can be conducted organization-wide, thus, suggesting that the approach is well established. However, it seems that at the moment there are not established methods or proven best practices to exert user-driven innovation development approach. Our informants conversed of the problem as follows:

"We utilize customer-centric methods in 97% of our development work. The border between customer-driven co-creation with end-users and customer-centric development is very thin and often difficult to pronounce… however, the common problem remains: how can we manage such a process, and how can be deliver experiences from our prior development projects for the use in the subsequent projects? In all, I have seen very few managerial tools to help with these problems. It's a shame, since understanding our customers and end-users, and their needs and wants, is crucial and could save us a lot of money." [Director, Research, ICT-company]

Innovation development within the producer is rapidly changing in this phase. Development work and any product- and service-, concept- or operation model improvements are advanced through continuous trial and error. The producer is interested to try new ways of innovation, and if it does not meet with the requirements, the firm tries something else. Yet, the customer-driven development process is truly challenging. The following excerpts provide good examples of the challenges that firms face with customer-driven innovation approach:

"This [customer-driven development work] is continuous trial by error. And, we have completely failed. It makes me sad to say that we have failed... Time to market this way took too long time; it's like a valley of death, and we were too slow. Moreover, the next challenge is what's beyond the process. What's the next paradigm?" [Director, Strategy, ICT-company]

In the user-driven approach the firm opens up its processes and procedures. Organized activities and events – the major of which were targeted to familiar, firm-related people in the earlier phases – are open to any interested parties. However, the way of operation is still unorganized; it amends and adapts according to the interests of the participants. Therefore, it is difficult to find good examples of this mode.

DISCUSSION AND CONTRIBUTION

In this paper, we investigated the modes of co-creating innovations with customers and users. The open innovation model is getting increasingly popular, because – unlike the traditional innovation models – it builds on innovation activity, where user networks proactively co-create products and services with companies. Previous literature predominantly considers the forms of a firm's innovation development as either closed or open, but there seems to be a "grey area" between those two options. Our idea was to describe the various co-creation modes and participants' roles in them, as well as the challenges for a firm that involves its users as co-creators in the innovation process. In other words, we pursue showing the path from a closed innovator towards an open innovator. Using the degree of openness (with closed and open as the distinct ends) and the type of co-creation (with firm-led and customer-led as the distinct ends) as dimensions, we established a framework to help our empirical analysis. Our analysis revealed four different modes of co-creation: provider-driven; user-centric, closed; user-centric, open; and user-driven co-creation. The findings suggest that these modes differ by their key characteristics and practices from each other. We also argue that the modes or phases are stepwise and evolutionary by nature, and it is difficult for a firm to make a quick jump from the closed to open modes of co-creation.

The idea of "producer-driven co-creation" mode is similar to that of in-house innovation. Development work is based on strong technology push and interaction with customer and user networks is sparse. The producer lacks the skills, experience or resources needed to acquire good knowledge of customer needs or their development suggestions and ideas. Therefore, co-creation activity – the little that may take place in the user-producer relationship – is typically conducted through an agent such as a consultant. However, dissemination of information on customer needs and wants or any ideas does not take place well in the organization. This is mainly due to the closed organization culture in respect to its innovation practices. Another reason is that there is not direct interaction and information exchange with the user network and the producer. Instead of customers and users, there are typically consultants available at the firm's innovation seminars telling what they have learned of the customers. Hence, the knowledge of user needs flows to the firm through an agent, which suggests that some of the crucial information will be filtered, misunderstood or even ignored.

The second phase, "user-centric, closed co-creation", is a minor increase towards openness. The challenge is that the producer's organizational culture may not support the augmented openness of innovation process, although the firm has some experience of benefiting from customer and user knowledge. This experience is due to some small-scale testing of new open innovation practice in a fairly closed environment with firm partners and employees as users, but for that purpose the firm has allocated resources, which will be available for user-centric and user-driven innovation co-creation in the future. However, new practices are not spread organization-wide.

Once the producer employs "user-centric, open co-creation", its customer and user networks will take a more remarkable role in the innovation process. The firm now has resources and processes required for intense user involvement, but customers and users are carefully selected for different phases of the innovation process. Once the phase is over and the firm pursues different phase these users will be "forgot", as each phase involves different users.

Hence, the challenge is to consistently find new "fresh" users for the innovation co-creation. Another challenge is related to how the producer can motivate and ensure that the users will be committed in the collaboration. Many living labs actually operate in this way.

The fourth mode is "user-driven co-creation", where customers' and users' embedded needs and motives for a change will be emphasized and revealed. The operation is based on establishing a practice that provides long-haul benefits for all parties involved. The big difference here, as compared to the other modes, is that customers and users – as well as other participants involved – are not necessary familiar to the company. In fact, the way of operation and the innovation process are communicated to a number of actors in the market in the hope that they would become interested in joining the innovation co-development. There are not preset methods or techniques to co-create within this mode; rather the participants join together to try if something interesting could be borne of the collaboration. The method is principally based on the trial and error method. However, at least in the context of living labs, this mode does not seem to be well-organized, and finding case examples is rather difficult.

In all, the findings suggest that customers and users have various roles depending on the phase of innovation co-creation. The way of integrating customers and users as a part of firm's business operations varies a lot in the phases studied. The differences are in the way companies involve their customer and user networks in the innovation co-creation. Producer-driven, i.e., technology-driven innovation co-creation is the dominant genre in the development. It means a method that applies technical knowledge or tools for innovation development. The user-driven approach brings up a fundamental change; opening up the innovation process and co-developing products and services with users connects firms with large communities where users compete in innovating novel ideas and concepts for the benefit of the firm. Open sourcing enables users to take lead in the development of the product or a technology. In addition, the nature and form of networks in open and closed innovation models vary remarkably. The key dimensions are the type of co-creation and the degree of openness. However, companies benefit of the intense collaboration in different ways. Involving customers and users provide them with knowledge resources, experience and best practices that further foster the success of the development. Firms face different organizational challenges depending on their mode. Addressing and solving these problems enables the firm "mentally" grow and advance into the next phase, where co-creating with user networks may be more intense than in the previous phase.

The study has important implications to scholars and business practitioners. The study suggests that opening up firm's innovation development may be slower than many would expect. Innovation research has mainly focused on either traditional, closed forms of innovation, or the open innovation model as a new paradigm. Similarly, scholars of innovation show an interest in understanding how firms transform from an in-house innovator to open innovator. Our study suggests that there is a "grey area" between the closed and open forms, and the shift may take several evolutionary steps. Despite the undisputable benefits of traditional customer feedback systems (see e.g., Hauser, 1984), customers and users are increasingly considered as co-creators of knowledge and value, and not as objectives of market research. Furthermore, their role is turning into more active through co-developing current business and the co-creation of totally new business. The shift from traditional innovation networks to open innovation communities requires firms to acknowledge that

instead of ‘following the customers’ they now must ‘dance with their customers’. Whereas closed innovation refers to processes that limit the use of internal knowledge within a company and make little or no use of external knowledge, open innovation builds upon the collective design and production of value, goods and knowledge. It enables an organization to leverage new potential for creating and capturing value with customer and user networks (Chesbrough, 2007).

Our study has several limitations. First, our investigation considers two dimensions, the degree of openness and the type of co-creation, in the framework. Although our initial findings imply that the findings are rather similar to some of those of previous research, we acknowledge that different dimensions might produce different outcomes. Second, due to that our empirical data was collected among firms that have operated or are planning to operate through the living labs model, there may be some bias in respect to the open innovation issue. Despite the living labs model obviously is a type of open innovation, it represents a form where the number of external innovators is smaller than in, e.g., crowdsourcing, and the governance model is more firm-driven. Other forms of open innovation might provide different results. Considering these identified limitations, we are able to suggest some avenues for further research. As our study identifies challenges for the transformation towards an open innovator through different phases, future research should focus on what kind of organizational capabilities firms need in order to make the transitions successful.

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