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This is the accepted version of a paper published in *The Journal of product innovation management*. This paper has been peer-reviewed but does not include the final publisher proof-corrections or journal pagination.

Citation for the original published paper (version of record):

Magnusson, P. (2009)

Exploring the Contributions of Involving Ordinary Users in Ideation of Technology-Based Services.

The Journal of product innovation management, 26(5): 578-593

Access to the published version may require subscription.

N.B. When citing this work, cite the original published paper.

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<http://urn.kb.se/resolve?urn=urn:nbn:se:kau:diva-10979>

Exploring the Contributions of Involving Ordinary Users in Ideation of Technology-Based Services

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Paper accepted for publishing in Journal of Product Innovation Management
The definitive version is available at www.blackwell-synergy.com
DOI: 10.1111/j.1540-5885.2009.00684.x

Acknowledgement: The author thanks the editor of JPIM and the two anonymous reviewers for their constructive comments on earlier drafts of this manuscript and acknowledges the financial support from the Jan Wallander and Tom Hedelius Foundation.

Exploring the Contributions of Involving Ordinary Users in Ideation of Technology-Based Services

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BIOGRAPHY

Dr. Peter R. Magnusson, is Assistant Professor of Marketing at the Service Research Center attached to Karlstad University in Sweden. He holds an MSc in electrical engineering from Chalmers University, an MBA in executive business administration from the University of Uppsala, and a Ph.D. from the Stockholm School of Economics. Dr. Magnusson has twenty years' experience in R&D in the computing and telecommunications industries.

His research focuses on new product and service innovation, the management of technology, and organizing and managing creativity. Dr. Magnusson has received several nominations and rewards for his research. He has been published in leading refereed journals and peer-reviewed conference proceedings, including *the Journal of Service Research*, *the European Journal of Innovation Management*, and *Creativity and Innovation Management*.

ACKNOWLEDGEMENTS

The author thanks the editor of JPIM and the two anonymous reviewers for their constructive comments on earlier drafts of this manuscript and acknowledge the financial support from the Jan Wallander and Tom Hedelius Foundation.

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Abstract

Lead users have long been acknowledged as important contributors to the market success of innovative products and services. The ability of lead users to be such effective innovators has been ascribed to a combination of adequate technological expertise and superior knowledge of the user domain so-called 'use experience'. Drawing on the apparent success of lead users in innovation, many companies are now attempting to involve other types of users, namely ordinary users, for ideation at the 'fuzzy front-end' (FFE) of new product and service development. However, ordinary users do not usually possess the technological knowledge of lead users, and the existing literature provides little guidance on how to manage such user involvement or its expected contributions. The purpose of the present study is, therefore, to contribute to scholarly knowledge regarding the benefits and management of user involvement during the ideation phase of innovation in technology-based services. More specifically, the study investigates the contribution made in this respect by 'ordinary' users, as opposed to professional developers. The research questions that are addressed are: (i) What contributions do ordinary users make when involved in the FFE for ideation of new technology-based services? and (ii) How is the contribution of the users affected by their knowledge of the underlying technology? The study addresses these questions through a literature review and conceptual analysis of the involvement of users in innovation in mobile telephony, followed by an empirical study utilizing a quasi-experimental design in which the independent variable is the users' technological knowledge of the underlying mobile telephone system and the dependent variable is the quality of the created idea-proposals from an innovation perspective. Various scenarios involving 'guided users', 'pioneering users', and 'professionals' are investigated. The study finds that the users' knowledge of the underlying technology has an effect on their propensity to contribute with incremental and/or radical new ideas. The ideas from guided users tend to be more incremental whereas the pioneering users' ideas are more radical. Contrary to the users in the 'guided user' scenarios, the users in the 'pioneering user' scenarios have a propensity to produce ideas that challenge the prevailing dominant logic of the company; these ideas can be utilized to assist the company to think in new trajectories. The article proposes that ordinary users should not be expected to contribute ideas that can be directly put into the new-product development process; rather, ordinary user involvement should be regarded as a process whereby a company learns about users' needs and is inspired to innovate. The article concludes that user involvement can actually be a stimulus for review of a company's business strategy.

Introduction

The ability to produce ‘good’ innovative products is decisive in ensuring a firm’s competitiveness. Moreover, because creative ideas in the so-called ‘fuzzy front-end’ (FFE) provide the seed for successful innovative applications, the process of generating ideas is vital to success (Barczak, 1995; Cooper, 1986). In their search for new ideas, many companies in a variety of industries are now turning to their end-users for assistance. In this regard, several authors have noted that so-called ‘lead users’ or ‘leading-edge customers’ can be important contributors to novel and successful innovations (Rothwell, 1992; von Hippel, 1986; Voss, 1985); in addition, it has been claimed that lead-users have a propensity to come up with more radical and useful innovations than those suggested by company innovators (e.g. Morrison, Roberts, and von Hippel, 2000; von Hippel, 1986). The ability of these users to be effective innovators has been ascribed to a combination of adequate technological knowledge and superior knowledge of the user domain—so-called ‘use-experience’ (Lüthje, 2004).

Despite the ability of end-users to provide ideas, there has been criticism of the involvement of customers in the innovation process. In particular, it has been argued that customers lack a full awareness of the capability of the underlying technology, and that they are therefore unable to utilize its full potential (Bennett and Cooper, 1979, 1981). According to this view, user involvement will lead to incremental innovation, rather than radical innovation.

The vast majority of research in the field of ‘user innovation’ has been conducted in the context of business-to-business (B2B) commerce, in which the technical knowledge of customer and supplier are fairly symmetrical. However, in business-to-customer (B2C) markets, knowledge symmetry is less common, which raises questions as to whether the technical knowledge of end-users is sufficient for them to make a useful contribution to the process of innovation.

Nevertheless, the literature contains much anecdotal evidence of success after involving end-users in the process of innovation (Lüthje and Herstatt, 2004). Examples include the successful development of ‘TipEx’ and ‘Gatorade’, and the success of the Japanese mobile telephony system ‘I-mode’, which has largely been ascribed to so-called “killer ideas” from users (Fujita, 2000). Empirical evidence of success from user innovation has been found in the development of equipment for various outdoor sports, including snowboarding, kayaking, mountain-biking, and kiting (e.g. Hienerth, 2006; Lüthje, Herstatt, and von Hippel, 2005). The ‘user-inventors’ who drove the development of outdoor sports equipment in these empirical studies can be classified as ‘leading edge users’.

The vast majority of studies of user innovation are case studies that provide accounts of how successful ‘user innovations’ have come about. However, there is little analysis of the actual contribution of these end-user innovators compared with that of expert developers within the company. Furthermore, little attention has been directed towards an understanding of how user involvement in the FFE should be managed—that is, how the users are best involved.

Despite the uncertainties that surround the significance and management of the contribution of end-users in the process of innovation, there appears to be a trend towards companies involving potential consumers in idea-generation with respect to new products and services. This has certainly been the case in the mobile telecommunications industry, which is the focus of the present study. In this industry, so-called ‘ideas contests’ have been widely used to co-opt ideas for new applications from users. For example, a competition for Mobile Internet Student Awards (MISA) was held in Sweden in 2002 (MISA, 2002), and Sony Ericsson invited users to “create the leanest, coolest and most practical application” when it introduced its P800 mobile phone (Sony-Ericsson, 2002).

The paradox of such user involvement in the innovative processes of mobile telephony is that this industry is firmly based on advanced technology, about which ordinary users—that is, not lead users—are likely to possess little knowledge. It would thus seem that these ‘user innovators’ lack the technical skills ascribed to ‘lead users’ in the example of outdoor equipment noted above (von Hippel, 1988). Given this lack of technical expertise, the question arises as to whether these ordinary users of mobile telephony are able to contribute with any really useful ideas if involved in the ideation (idea generation) process of a company. If so, how should they be involved? Must they be taught about the underlying technology, or is it enough that they are experts on their own needs?

The purpose of the present study is, therefore, to contribute to scholarly knowledge regarding the benefits and management of user involvement during the ideation phase of innovation in technology-based services. More specifically, the study investigates the contribution made in this respect by ‘ordinary’ users, as opposed to professional developers. The research questions that are addressed from an innovation perspective are:

- What contributions do ordinary users make when involved in the FFE for ideation of new technology-based services?
- How is the contribution of the users affected by their knowledge of the underlying technology?

The remainder of this article is organized as follows. In the next section, the theoretical framework and hypotheses are proposed. This section includes a discussion of the nature of technology-based services, together with a review of the potential contribution of users in the FFE. The third section of the article describes the quasi-experimental methodology of the empirical study, including a discussion of the assessment measures and the analytical model used for evaluating the generated ideas. The fourth section presents the results and analyses, including the findings with respect to testing the hypotheses. The fifth section discusses the findings of the study, including a discussion of how user involvement can be utilized to review a company’s dominant logic. The article concludes with a summary of the main findings.

Theoretical framework and hypotheses

The nature of technology-based services

Three layers of a technology-based service can be identified: (i) the underlying technology platform; (ii) the application or service platform; and (iii) end-user services. According to Reid and de Brentani (2004), the first layer can be described as ‘generic technology’, whereas the third layer represents ‘application technology’. The same authors have noted that generic technologies are widespread and well known among the actors in the industry, whereas application technologies are built upon the generic technologies and developed within specific firms to distinguish them from the competition.

Figure 1 illustrates the structure in the case of mobile telecommunications. Most technology-based services are derived from standardized technical platforms (generic technology) that give rise to a virtually unlimited number of possible applications. In the case of mobile telephony, examples of standardized technical platforms include ‘universal mobile telecommunications system’ (UMTS), ‘global system for mobile communications’ (GSM), ‘general packet radio service’ (GPRS), and ‘Bluetooth’. The second layer is a type of middleware that facilitates the development of applications. This layer is usually comprised of various development toolkits to implement the end-user services. In some cases, application

platforms are ‘open’—that is, they are accessible to any persons who wish to create their own services within the scope given by the toolkit; this is indicated by the shaded field (‘User Application x’) in Figure 1. Users of an application platform need to be technically skilled to use a toolkit, thus excluding most ordinary users. These users can have worthwhile ideas for new applications, as indicated by the dashed boxes (‘Users Idea 1 and 2’).

Figure 1
Structure of technology-based services illustrated by mobile telecom

At least two knowledge domains need to be utilized to develop successful applications—(i) ‘technology knowledge’; and (ii) ‘use knowledge’ (Lüthje, 2004; von Hippel, 1994). The first, *technology knowledge*, is needed to understand and analyze the technical feasibility of the opportunities and limitations of a given technology. The second, *use knowledge*, is constituted by the users’ needs and wants, and an understanding of how the service creates value for the user.

Contribution from users in the fuzzy front-end

FFE and idea creation. This study concentrates on user involvement in the initial stage of innovation—the so-called ‘fuzzy front-end’ (FFE) (Smith and Reinertsen, 1991). The FFE, which precedes the formal product-development process, usually includes such activities as strategic planning, idea-screening, concept-generation, and concept-testing (Koen, 2005). Most authors have considered the FFE to be a rational decision-making process that aims to shorten lead times and differentiate between ‘bad’ ideas and ‘good’ ideas (Burkart, 1994; Cooper, 1994; Reinertsen, 1994, 1999). Other authors have adopted a more holistic view of FFE by including an assessment of capabilities (strategic, financial, and organisational) among FFE activities (Khurana and Rosenthal, 1997, 1998). There is also a stream of research that has characterized FFE as an ‘iterative irrational creative process’ (e.g. Koen et al., 2001).

Despite the fact that all innovation starts with an idea, little attention has been paid in the literature to understanding the phase of *idea creation* (Dahl and Moreau, 2002). Indeed, Khurana and Rosenthal (1998, p. 59), who are oft-cited authorities on this subject, did not even include the “creative act of idea generation” in their model; rather, they suggested that future research should explore the important question of how idea-generation can become an integral part of the FFE. Rather than trying to manage the ideation process, it seems that the most common approach has been to encourage the generation of a large number of ideas (Goldenberg, Mazursky, and Solomon, 1999).

Users and idea creation. Despite this lack of formal research into idea creation and FFE, several authors have noted that the involvement of users in idea creation can produce positive results (e.g. Alam, 2002; Gruner and Homburg, 2000; Kristensson, Gustafsson, and Archer, 2004; Mullins and Sutherland, 1998). In B2B industries for example, certain users have long been recognized as the actual innovators, and many successful innovations have been created by so-called ‘lead users’ who were outside the firms that ultimately exploited their ideas (e.g. von Hippel, 1977; von Hippel, 1986, 1988). Such ‘lead users’ can be understood as front-end users who identify market needs before the majority of users in the marketplace (von Hippel, 1988). In contrast to this evidence of user involvement in idea creation in B2B commerce, the phenomenon of user innovation is much less researched in the B2C context. The empirical evidence of lead users as innovators in B2C markets has been restricted to the rather narrow market segment of outdoor sports equipment (Hienerth, 2006; Lüthje, Herstatt, and von Hippel, 2005; Shah, 2000).

Ordinary users, who are the focus of the present study, differ from lead users in that they cannot be expected to possess detailed knowledge of the underlying technology. In one of the few studies of the involvement of ordinary users in innovation, Kristensson, Gustafsson, and Archer (2004) found that such users tended to produce ideas which, *on average*, were judged to be both more valuable and more original (but significantly less realizable) than the ideas of professional developers. Although these findings were interesting, such a comparison of group averages is insufficient from the perspective of practical innovation. Successful innovation requires consideration of several dimensions concurrently—because even *incremental innovation* requires an idea to be at least valuable and at least capable of being realized. If, in addition to having these characteristics, the idea is also original, the innovation can be considered *radical* or at least really new (Garcia and Calantone, 2002).

Criticism of user involvement. Some authors have challenged the benefits of involving users in the FFE; indeed, some have claimed that their involvement has adverse effects. For example, Bennett and Cooper (1981) contended that trying to satisfy the articulated wishes of customers will lead to a ‘stalemate’—because their perceptions are limited to their *current* experiences, rather than to innovative ideas. In addition, it has been argued that the ability of consumers to express and verbalize their needs is limited by their lack of knowledge of technical feasibility (see also Hamel and Prahalad, 1994). In a similar vein, Christensen and Bower (1996) argued that a strategy of remaining ‘close’ to customers might mislead suppliers into avoiding exploration of the opportunities provided by new disruptive technologies, thus producing only incremental innovations on the basis of suggestions from users.

These critiques actually represent a variation on the old debate between ‘technology push’ and ‘market pull’. Advocates of ‘technology push’ argue that users are incapable of understanding what new technology can do for them, and are therefore unsuitable for involvement in the innovation process (Bennett and Cooper, 1979, 1981; Christensen and Bower, 1996; Martin and Faircloth, 1995; Souder, 1989). Advocates of the ‘market-pull’ approach perceive customers as an active source of ideas in the development of innovations

(e.g. Foxall, 1986; Griffin and Hauser, 1993; von Hippel, 1978). In addition to these two polarized views, some scholars argue that supply factors and demand factors are both important in developing new technologies (Mowery and Rosenberg, 1979). According to this view, technology evolution arises from a reciprocal interaction between suppliers and customers.

The concept of the ‘non-passive customer’ has long been acknowledged in B2B commerce (Håkansson, 1987; von Hippel, 1978). Similarly, in B2C consumer markets, ‘non-passive users’ have been involved in the back-end of the innovation process for some time—for example, in ‘debugging’ or testing almost finished products (Iansiti and MacCormack, 1997; Prahalad and Ramaswamy, 2000). However, in these cases, the manufacturer has already decided which needs to fulfil.

In summary, previous research has found that interaction with *leading-edge users* can be beneficial in providing innovative ideas that are well adapted to the users’ needs. However, evidence regarding the contribution from *ordinary users* in the B2C context is much sparser.

Characteristics of ‘user innovators’

Regardless of the particular market involved, innovators are essentially people who are in a suitable position to suggest good ideas for new products (Lüthje and Herstatt, 2004). A review of the literature suggests that certain factors are important. These include motivation, use experience, and knowledge of the underlying technology. Moreover, in addition to these three factors, it seems that the interplay between supplier and customer can play an important role in achieving successful innovations. These factors are explored in greater detail below.

With respect to *motivation*, von Hippel (1982) has suggested that users innovate because they expect to obtain short-term benefits from their innovations. Such benefits are not necessarily monetary; for example, the sports-equipment ‘user innovators’ noted above might have wished to obtain valuable experience (e.g. Lüthje, Herstatt, and von Hippel, 2005). Motivation of this type (referred to as ‘intrinsic motivation’) has been recognized as an important factor in inducing creativity (Amabile, 1997; Collins and Amabile, 1999; Hennessey, 2000).

Regarding the second and third factors, *use experience* and *knowledge of technology*, von Hippel (1994) has noted that successful innovations require a combination of knowledge of use and knowledge of technology. This could be described as a combination of two domains—the ‘application domain’ and the ‘technology domain’ (Reid and de Brentani, 2004). Users constantly explore the application domain, during which they encounter needs (problems) that have usually not yet been satisfied (solved)—thereby increasing their use knowledge. The so-called ‘lead users’ described above also possess the required technical knowledge to develop a new solution to identified needs (Lüthje, 2004; Lüthje and Herstatt, 2004; von Hippel, 1986). In contrast, professional developers (company experts) have usually not experienced the needs of users, and they therefore lack use knowledge. Furthermore, experts tend to develop a ‘dominant logic’ that primes their thinking to apply old solutions to new problems (Prahalad, 2004; Prahalad and Bettis, 1986). The dominant logic is described as a “filter” through which management perceive relevant data (Bettis and Prahalad, 1995). Von Krogh et. al. (2000) expands the metaphor to include “a lens for viewing the future, thus restricting the range of imaginable options”. Such ‘dominant logic’ can ‘blind’ professional developers in terms of creativity; in these circumstances, expert knowledge of the prevailing technology domain can thus be a burden (Frensch and Sternberg, 1989; Marsh, Bink, and Hicks, 1999).

With respect to the *interplay between supplier and customer*, the involvement of users in front-end activities can become a reciprocal learning process, whereby the company can

learn about its customers' actual needs (that is, obtaining use knowledge) and customers can gain an understanding of the opportunities provided by new technologies (that is, gaining technology knowledge). Taken together, such reciprocal learning has the potential to bring up ideas for new products (Wikström, 1995). This interplay might also reveal the *latent* needs of users.

Hypotheses

As a result of the literature review presented above, certain hypotheses can be proposed with respect to the involvement of ordinary users in the innovation process.

It is apparent that ordinary users cannot be expected to suggest technical solutions to problems because they lack technology knowledge; rather, they can be expected to provide descriptions of the desired outcomes of a new product or service (Leonard and Rayport, 1997; Ulwick, 2002). The ideas of ordinary users can thus be expected to be in the application domain (see Figure 1). However, 'lead users' can also be expected to suggest technical solutions (in addition to descriptions of desired outcomes). In general, ideas suggested by users can be categorized as being primarily aimed at satisfying users' needs, and thus having a higher value for the users.

On the basis of the above discussion, the following hypothesis is proposed:

- *Hypothesis H1:* Users produce ideas that are characterized by having a higher perceived user value than the ideas of professional developers.

Some knowledge of the underlying technology is necessary to innovate. Nevertheless, such knowledge can also inhibit creative thinking (Frensch and Sternberg, 1989). Not having to consider how the actual service idea is to be implemented could be expected to increase the originality of ideas. On the basis of these arguments, the following hypothesis is suggested:

- *Hypothesis H2:* Users' technical knowledge of the underlying system is negatively related to their ability to produce original, technically based service ideas.

An incremental idea can be distinguished from a radical idea by the degree of originality of the idea. In view of the literature review (above), it can be expected that teaching users about the underlying technology's possibilities and restrictions (thus enhancing their technology knowledge) will produce ideas that are technically feasible and valuable, but less original—that is, incremental ideas. Conversely, not teaching the user about the underlying technology is likely to produce ideas that are less likely to be technically feasible, but highly original and possessed of a high perceived user value—that is, radical ideas. On the basis of these arguments, the following hypotheses are suggested:

- *Hypothesis H3a:* Teaching involved users more about the technical capabilities and restrictions favors the generation of more incremental user-ideas.
- *Hypothesis H3b:* Not teaching involved users about the technical capabilities and restrictions favors the generation of more radical user-ideas.

As noted in the literature review, there is a risk that experts evolve a dominant logic that can restrain their creativity as a result of their becoming entrenched in the current dominant logic. It can thus be assumed that ordinary users, who are less influenced by any such logic,

will not be as restricted in their ideation. On the basis of this argument, the following hypotheses are proposed:

- *Hypothesis H4a*: Experts have a propensity to generate ideas within the prevailing dominant design logic.
- *Hypothesis H4b*: Ordinary users generate more ideas that are outside the prevailing dominant design logic than do experts.

Methodology

Research setting

A comparative quasi-experimental design was used to simulate three scenarios of user involvement in innovation:

- no user involvement (referred to as the ‘professionals’);
- user involvement with users being provided with extensive teaching about the possibilities and limitations of the underlying technical platform (referred to as the ‘guided users’); and
- user involvement with users being provided with minimal teaching about the possibilities and limitations of the underlying technology (referred to as the ‘pioneering users’).

These scenarios are described in more detail below. The first scenario (of ‘professionals’) was implemented by a group of 12 professional service developers who were all recruited from Telia Mobile, Sweden’s largest mobile telephony operator and one of the driving forces in the development of the pioneering Nordic mobile telephony (NMT) system. The company’s commercial mobile telephony operation started in 1956; today it is the market leader in Sweden with about 45% market share in mobile telephony. All of the professionals were working in research and development (R&D), and were responsible for developing new non-voice mobile services based on short message service (SMS), wireless application protocol (WAP), general packet radio service (GPRS), and similar technological platforms. Their professional experience in the field varied from one to ten years.

The second scenario (of ‘guided users’) was implemented in two trials involving: (i) 16 technically skilled users (trial IIa); and (ii) 20 ‘ordinary users’ (trial IIb). These users were all provided with extensive information about the possibilities and limitations of the underlying technical systems. During trial IIa, the technically skilled participants did not receive any formal teaching with respect to the technology, but they were trained in using a developer’s tool-kit to implement their own ideas as working prototypes and thus gained considerable knowledge of technical feasibility. During trial IIb, the ‘ordinary users’ (in groups of about five) twice met with a professional developer. The professionals were instructed to provide feedback that was restricted to: (i) whether (or not) a proposed idea was technically feasible; and/or (ii) whether (or not) a proposed idea already existed on the market. This approach provided the participating users with an opportunity for more individualized learning with respect to the technical possibilities and limitations of the system.

The third scenario (of ‘pioneering users’) was implemented in two trials involving: (i) 19 ‘ordinary users’ (trial IIIa); and (ii) 17 ‘creativity trained users’ (trial IIIb). Both of these groups received only limited information regarding feasibility issues. The main difference between the two groups was that, before entering the trial, the participants in trial IIIb had

been trained in various creativity techniques (such as ‘brainstorming’, ‘slip writing’, ‘random input’, and ‘six thinking hats’).

Participants

As noted above, the ‘professionals’ were all professional developers working in R&D with Telia Mobile. The various user groups consisted of volunteer students from a Swedish university (Karlstad University). None of the students had taken any courses in technology, innovation management, or related disciplines. Because students constitute one of the largest groups of SMS users, the participants in the present study were likely to represent an acceptable sample of the wider population of users of these technological applications. The users in trial IIa were studying computer science and could therefore be regarded as reasonably technically skilled. The participants in trials IIb, IIIa, and IIIb were all ‘ordinary users’—that is, students taking non-technical courses (such as economics, teaching, and political science). Details of the participants are provided in Table 1.

Table 1
Set-ups implementing the various approaches

Approach	Trial	Knowledge of technical domain	Knowledge of application domain	No. of participants	No. of ideas
<i>Non-involvement</i>				12	55
	I. Professionals (no user involvement)	High	Low	12	55
<i>Guided users</i>				36	184
	IIa. Technically-skilled Users	Moderate	High	16	73
	IIb. Consulting Ordinary Users	Moderate	High	20	111
<i>Pioneering users</i>				36	190
	IIIa. Ordinary Users	Low	High	19	123
	IIIb. Creativity-trained Ordinary Users	Low	High	17	67

Pre-tests were conducted to check for the potential influence of certain variables (including previous mobile usage and personality traits) that might have influenced the results. These pre-tests included:

- assessment of previous mobile phone experience;
- the *FS test* of personal creativity (Holmquist and Ekvall, 1986); measures were standardized against the normally distributed stanine scale from 1 to 9, in which 1 is the least creative and 9 the most creative;
- the Life Orientation Test (*LOT*) for dispositional optimism (Scheier and Carver, 1985); this test consists of 12 items, 4 of them being filler items, ranging from 8 (the most pessimistic) to 32 (the most optimistic); the test assumes that optimistic people are better able to cope with problems that arise during goal-driven activities than those who are pessimistically disposed; and
- the Technology Readiness Index (*TRI*), indicating a person's willingness to adopt new technology (Parasuraman, 2000) on a scale from -20 to +20 (in which 11-20 indicates that subjects are "highly technology ready"; 0-10 "somewhat ready"; -10 to -1 are "somewhat resistant"; and -20 to -11 are "highly resistant").

A two-way ANOVA analysis showed significant differences among the three groups ('professionals', 'guided users', and 'pioneering users') with respect to experience with mobile usage. The 'professionals' had significantly greater experience than the users; however, no differences were found between the two user groups. With regard to the FS test, the 'guided users' scored significantly lower than the 'professionals' and the 'pioneering users'. No significant differences were detected among groups of participants with respect to the other pre-tests.

A Pearson correlation was carried out to check for the influence of mobile usage and FS on the dependent variables. This showed that neither FS nor mobile usage correlated with any of the three dependent variables ('originality', 'user value', and 'producibility'). The differences in the background variables were therefore not expected to influence the dependent variables. The participants' background data are presented in Table 2.

Table 2
Background data regarding the participants

		A Pro- fessionals (N=12)	B Technically Skilled Users (N=16)	C Ordinary Users (N=19)	D Consulting Users (N=20)	E Creativity Trained Ordinary Users (N=17)	All Groups (N=84)
FS-test	M	5.92	3.94	6.37	4.55	5.76	5.29
	SD	1.56	1.61	1.77	1.23	1.86	1.83
LOT	M	23.08	20.88	24.53	23.50	23.47	23.17
	SD	3.70	4.13	4.34	3.75	5.04	4.31
TR	M	8.00	3.88	5.79	4.65	1.88	4.68
	SD	4.11	6.09	5.92	4.97	6.06	5.73
Age	M	36.50	25.63	23.79	22.10	27.53	26.31
	SD	8.13	5.62	2.18	2.02	9.07	7.31
Gender	Females	2 (17%)	4 (33%)	4 (21%)	8 (40%)	9 (53%)	27 (32%)
	Males	10 (83%)	12 (67%)	15 (79%)	12 (60%)	8 (47%)	57 (68%)
Mob. tele. experience (years)	M	10.42	2.97	3.60	3.88	4.32	4.67
	SD	6.04	2.17	2.33	2.50	3.28	4.02

Assessment measures

The literature mentions numerous criteria to evaluate the ‘goodness’ of an idea; however, there are no uniformly accepted criteria (Balachandra and Friar, 1997; Cooper, 1993), and it would seem that criteria should be chosen according to the context (Hart et al., 2003; Hauser and Zettelmeyer, 1997; Tzokas, Hultink, and Hart, 2004). According to Balachandra and Friar (1997), the relevant criteria can be decided by three contextual variables: (i) nature of innovation (incremental/radical); (ii) nature of market (existing/new); and (iii) nature of technology (low/high). However, there are few empirical data to guide the appropriate choice of criteria in the early innovation phases—such as the idea-generation phase being studied here. According to Hart et al. (2003), the most frequently used criteria in the phase of idea screening have been: ‘technical feasibility’, ‘product uniqueness’, ‘market potential’, ‘customer acceptance’, and ‘intuition’. Lynn, Morone, and Paulson (1996) noted that market-related criteria are difficult to use in the early phases of development because of the uncertainty associated with new products or services. Other scholars have noted that the issue is not how big the market is, but whether the market is ‘big enough’ (O'Connor, 1998; Rochford, 1991). The lack of established criteria for assessing ideas for products and services reflects the fact that an idea can be perceived as the ‘most innovative’, or the ‘easiest to use’, or the ‘cheapest to implement’, and so on. In the ultimate, what is judged most ‘important’ depends on the business context.

To enable a comparison of ideas without taking different business contexts into account, the present study derived criteria that were product specific, irrespective of context. This was achieved using a focus group of five experts from Telia Mobile who were experienced in assessing mobile telephony services. Following a discussion of the intrinsic factors that

differentiate successful mobile telephony services from less successful services, the participants individually and collectively suggested the following dimensions:

- *originality*: representing the innovative dimension; a positive relationship has been shown to exist between the originality of a product and the consumers' willingness to pay for it (Dahl and Moreau, 2002);
- *user value*: representing the user's perspective of whether the implemented service idea create will create value for its users; and
- *producibility*: representing the producer's perspective regarding the ease with which the service can be produced.

The suggested dimensions corresponded well with those previously identified in the literature. Furthermore, the suggested dimensions corresponded well with the criteria used in the above-mentioned MISA awards (which utilized the dimensions of 'user-friendliness', 'producibility', 'user-benefit', 'estimated market size', and 'user choice') and the Sony Ericsson contest (which used 'innovation', 'practicality', 'ease of use', and 'coolness').

Analytical tool

To analyze all three dimensions simultaneously, the present study developed the Eight Idea Zones (EIZ) tool. As shown in Figure 2, this tool was essentially a Venn diagram encompassing the three dimensions. Each circle in the diagram represents one dimension's 'area of acceptance'. For example, for an idea to enter the 'originality circle', it had to be assessed as being above the threshold value for originality. After three assessments, the ideas could be placed in one of eight zones (numbered 0 to 7 in Figure 2).

Figure 2
The eight idea zones

A service idea must meet at least two basic criteria to be of commercial interest. It must be producible, and the implemented service must create value for its users; this corresponds to an intersection between user value and the producibility areas encompassing zones *seven* and *four*; these two zones form the *value-delivery space*, i.e. the space wherein value can be delivered to the users.

Incremental or Radical. Innovations are in the innovation literature often classified according to their grade of innovativeness. Often two types are used to distinguish this, e.g. incremental/radical, continuous/discontinuous, etc (e.g. Crawford and Di Benedetto, 2000; Tidd, Bessant, and Pavitt, 2005). Garcia and Calantone (2002) mean that these dichotomies are often ill defined and too binary. They therefore introduce the term ‘really new’ which is in between. Callahan and Lasry (2004) prefer the term ‘very new’ instead. The rationale behind the division is that both types are necessary for a company. The incremental have a lower risk and better short term profitability, whereas the radical have a risk and are aiming for the future (Tushman and O’Reilly III, 1996). The EIZ framework can be used to classify the ideas into either incremental or really new. We can discern that incremental ideas can be found in zone 4 and the really new ideas in zone 7, this will be further elaborated below. The significance of the zones can be summarized as follows.

- *Zone 0* contains ideas that are assessed as inferior in all three dimensions.
- *Zone 7* contains ideas that are assessed as good in all three dimensions
- *Zone 4* contains ideas that share the qualities of those in *Zone 7*, apart from the fact that they are assessed as being not especially original (thus being of an incremental nature).

The remaining five zones (1, 2, 3, 5, and 6) are not of any direct interest because these ideas are perceived to lack user value or not be producible. These zones include ideas that are rejected in a traditional idea-screening process.

Procedure

The experimental procedure consisted of four stages: (i) initiation; (ii) idea creation; (iii) delivery; and (iv) evaluation. Each trial lasted for twelve days.

Initiation stage. In the *initiation* stage, participants were given an assignment to create one or more ideas for SMS-based services. Users were asked for proposals for new services that would be of value to them, whereas the professionals were asked for proposals that would be of use to the participating users (that is, students at the university).

Participants were free to collaborate if they wished; if so, the co-creators were noted. The ideas were expected to include at least one new service idea that utilized the existing application platform (AP), which was essentially a converter between SMS messages and http calls on the Internet; that is, the AP enabled access to information on the Internet by sending and receiving SMSs.

To give the participants a sense of how these services worked and to provide inspiration, users were given access to a sample of about ten implemented services. They were also equipped with a mobile phone with pre-paid card allowing approximately 150 SMSs. All participants received hands-on training in how to use the phone by testing the sample services.

Idea-creation stage. The *idea-creation* stage of the study lasted for 12 days. The only group having any interaction with the researchers was one of the guided user groups (Group IIB), as previously described. The other groups managed the creation process without assistance.

Delivery stage. After the 12-day trial, each group was gathered together and the ideas were delivered.

Evaluation stage. The Consensual Assessment Technique (CAT) (Amabile, 1996) was used in the evaluation stage. Six experts, all of whom were experienced in evaluating service

ideas for mobile communications, independently assessed the service ideas. Three of the judges were engineers employed in the R&D department of Telia Mobile. All three had more than five years of experience from assessing mobile services; all three were engineers employed at the R&D department. The other three judges had a mix of technical and marketing experience outside Telia Mobile.

The ideas were ranked on a scale of one to ten on all three dimensions. (originality, user value, and producibility)—with a score of one representing the least original, least valuable, and hardest to produce, and a score of ten indicating the most original, most valuable, and easiest to produce.

A test round was conducted to calibrate the judges' assessments. In this test, five ideas were chosen for individual assessment by the judges, followed by a discussion of the results among the judges. If any individual assessment was found to differ markedly from the others, this was discussed and anomalies in judgment were addressed. After completion of this test round, the service ideas of the participants were formally evaluated. Each assessment was made individually, and no discussions were allowed among the judges.

Results

Reliability among judges

The average correlation (Pearson's r) among the judges showed significant agreement in all three dimensions. The average correlations for each dimension were: 'originality' ($r = .399$), 'user value' ($r = .301$), and 'producibility' ($r = .542$). It was thus apparent that the *mean score* of all judges' assessments could be utilized as a reliable measure in further analysis.

Assessment of dimensions

Table 3 presents the descriptive data from the assessment of the three dimensions. Using a one-way ANOVA test, the variables were tested for significant differences across the three scenarios ('professionals', 'guided users', and 'pioneering users').

Table 3
Approaches and dependent variables

Approach	Number of ideas	O Mean	O SD	U Mean	U SD	P Mean	P SD
I. Professionals (N=12)	55	2.99	1.07	4.05	1.22	6.84	1.48
II. Guided Users (N=36)	184	2.91	1.20	4.48	1.46	6.74	1.99
III. Pioneering Users (N=36)	190	3.74	1.73	4.70	1.71	5.46	2.37
Total	429	3.29	1.50	4.52	1.56	6.18	2.21
All users, merger of groups B-E (N=72)	374	3.33	1.55	4.59	1.59	6.09	2.28

O = Originality; U = User value; P = Producibility

User value Regarding the dimension of 'user value', the ANOVA test displayed significant differences among the three scenarios ($F_{2,426} = 3.82$, $p = .023$). A *post hoc* comparison using Scheffé's test (Scheffé, 1959) showed that the 'pioneering users' scored significantly better than the 'professionals' ($p = .026$). The 'guided users' also scored better than the 'professionals', but the differences were not statistically significant ($p = .204$).

Hypothesis H1, which proposed that users produce ideas that are characterized by having a higher perceived user value than the ideas of professional developers, was thus partly supported.

Originality. With respect to the dimension of ‘originality’, the ANOVA test displayed significant differences among the three scenarios ($F_{2,426} = 16.83, p < .001$). A *post hoc* comparison using Scheffé’s test showed that the ‘pioneering users’ scored significantly better than both the ‘professionals’ ($p = .003$) and the ‘guided users’ ($p < .001$).

Hypothesis H2, which proposed that users’ technical knowledge of the underlying system is negatively related to their ability to produce original, technically based service ideas, was thus supported.

Producibility. With respect to the dimension of ‘producibility’, the ANOVA test displayed significant differences among the three scenarios ($F_{2,426} = 20.28, p < .001$). A *post hoc* comparison using Scheffé’s test showed that that the ‘pioneering users’ scored significantly worse than both the ‘professionals’ ($p < .001$) and the ‘guided users’ ($p < .001$).

The findings thus indicated that users can be taught about the underlying limitations of the technological platform and adapt to these restrictions in their ideation; however, this seems to come at the cost of reduced originality.

Idea distribution

The above results indicate that knowledge about the underlying system could affect the types of ideas that users propose. However, this analysis is based on average values for the various groups, and, as previously discussed, a successful innovation requires a more holistic approach to analysis.

Table 4 shows the idea distribution of the different scenarios in the eight zones of the EIZ Venn diagram (using the median value of the measures for each dimension as threshold values). The table also includes the adjusted residuals to analyse whether an area contains significantly more (or fewer) ideas when no differences between the scenarios were expected.

Table 4
Idea distribution across the eight EIZ zones (0-7) for the different approaches

Approach		oup 0	oUp 1	ouP 2	Oup 3	oUP 4	OUp 5	OuP 6	OUP 7	
Professionals	O	5	0	20	9	9	4	5	3	55
	E	4.1	4.5	12.3	9.5	7.4	10.0	4.6	2.6	55
	Adj. R	.5	-2.4*	2.7*	-.2	.7	-2.2*	.2	.3	
Guided Users	O	11	20	47	24	33	25	17	7	184
	E	13.7	15.0	41.2	31.7	24.9	33.5	15.4	8.6	184
	Adj. R	-1.0	1.8	1.4	-2.0*	2.3*	-2.1*	.5	-.7	
Pioneering Users	O	16	15	29	41	16	49	14	10	190
	E	14.2	15.5	42.5	32.8	25.7	34.5	15.9	8.9	190
	Adj. R	.7	-.2	-3.2*	2.1*	-2.8*	3.6*	-.7	.5	
Total		32	35	96	74	58	78	36	20	429

NOTE: O = Observed; E = Expected; R = Standardized residual

*Significant contribution when absolute value of R is greater than 2.00 (Hinkle et al., 1998, page 581).

To make the patterns clearer, the significant residuals between the approaches are illustrated in Figure 3. A plus sign indicates a significant positively adjusted residual—which means that the scenario produced significantly more ideas for the indicated zone. Conversely,

a minus sign indicates significantly fewer ideas. If the absolute value of a residual was between 1.5 and 2.0, this is indicated by a plus sign or a minus sign in brackets.

Figure 3
EIZ diagram showing the residuals between the three approaches

Figure 3 shows that: (i) the ‘professionals’ scored relatively worse than the users in the dimension of ‘user value’ (Hypothesis H1); and (ii) the ‘pioneering users’ contributed relatively more original ideas than the ‘guided users’ (Hypothesis H2). Some interesting patterns can be noted.

First, the ‘guided users’ scenario appears to be the preferable approach for incremental ideas (Zone 4); see Table 4. This scenario produced ideas that had greater user value than those of the ‘professionals’. These findings support Hypothesis H3a, which proposed that teaching users about the underlying technical capabilities and restrictions favors the generation of more incremental ideas.

Secondly, the major advantage of the ‘pioneering users’ approach is the production of more original ideas. However, 64% of these ideas were assessed as not being readily producible.

Incremental vs radical

To test Hypotheses H3a (which proposed that teaching involved users more about the technical capabilities and restrictions favors the generation of more incremental user-ideas) and H3b (which proposed that not teaching involved users about the technical capabilities and restrictions favors the generation of more radical user-ideas) it was necessary to operationalize ‘incremental’ ideas and ‘radical’ ideas using the three assessed dimensions. This was done by computing an index for each type of idea—whereby the three dimensions were given different weightings, depending on the type of innovation. This can be formally expressed as follows:

$$\text{Type of innovation} \leftrightarrow (\alpha * \text{Originality}, \beta * \text{Producibility}, \gamma * \text{User value})$$

The coefficients α , β , and γ were determined according to the type of innovation (incremental or radical). The rationale can be summarized as follows.

- For *incremental* innovations, ‘producibility’ and ‘user value’ are most important (that is, the service should be both easy to implement and valuable), whereas ‘originality’ is (by definition) low.

- For more *radical* ideas, ‘originality’ is the most important factor, at the cost of ‘producibility’; ‘user value’ is not unimportant, but this dimension can be accorded a lower weighting (compared to an incremental innovation) because the actual user value can be rather difficult to establish in the idea stage of a new original idea.

On the basis of this rationale, the following values were assigned to the coefficients for the two types of innovation:

$$\text{Incremental_index} \leftarrow 0.475 * \text{producibility} + 0.475 * \text{user value} + 0.05 * \text{originality}$$

$$\text{Radical_index} \leftarrow 0.10 * \text{producibility} + 0.35 * \text{user value} + 0.55 * \text{originality}$$

As shown in Table 5, an ANOVA, followed by a post hoc analysis using Scheffé’s test, yielded significant differences among the scenarios with respect to both the ‘incremental index’ ($F_{2,426} = 8.69, p < .001$) and the ‘radical_index’ ($F_{2,426} = 12.38, p < .001$).

For incremental innovation, the post hoc analysis showed that the ‘guided users’ scored significantly better than the ‘pioneering users’ ($p < .001$). However, there were no significant differences between the ‘professionals’ and the ‘guided users’ ($p = .669$); nor were there any significant differences between the ‘professionals’ and the ‘pioneering users’ ($p = .168$).

For radical innovation, the ‘pioneering users’ were significantly better than both the ‘guided users’ ($p < .001$) and the ‘professionals’ ($p = .001$). No significant difference was found between the ‘professionals’ and the ‘guided users’ ($p = .796$).

These findings support Hypotheses H3a and H3b. The ‘guided users’ scenario was more conducive to the production of incremental ideas than the ‘pioneering users’ scenario. However, for more radical ideas, the ‘pioneering users’ scenario was more conducive.

Table 5
Market indexes of the different approaches

	<i>Number of ideas</i>	<i>Incremental</i>		<i>Radical</i>	
		Mean	SD	Mean	SD
Professionals (N=12)	55	5.33	0.89	3.75	0.77
Guided Users (N=36)	184	5.48	1.04	3.84	0.72
Pioneering Users (N=36)	190	5.01	1.18	4.25	1.06

Dominant logic

The dominant logic of a company is rooted in its past experiences. In the present study the Telia Mobile company offered two general types of services: (i) ‘person-to-person communication’ (telephony and text-messaging); and (ii) ‘information storage and retrieval services’ by using a mobile phone as a means of storing and/or accessing information. These two types of services formed the basis of the dominant design logic in the present study.

Hypothesis H4a proposed that experts have a propensity to produce ideas within the prevailing dominant design logic, whereas Hypothesis H4b proposed that ordinary users generate more ideas that are outside the prevailing dominant logic than do experts. To test the hypotheses all ideas were examined and classified as being within or outside the dominant design logic; that is a logic that restricts the created ideas to the ones which could be seen as a natural extension of the company's current business. Five persons were asked to make an independent assessment of 100 of the ideas and to allocate them into categories that best described their content. This resulted in twelve different categories, of which four were related to the two general types of company dominant logic identified above ('person-to-person communication' and 'information storage/retrieval services'). The four categories that were related to these were as follows: (i) 'communication and telephony'; (ii) 'self-service and reservation'; (iii) 'public information handling'; and (iv) 'private information handling'. Ideas belonging to these categories could thus be tentatively expected to be within the dominant design logic.

Having established a workable classification of the content of the ideas and how this might be related to the dominant logic of the company, all ideas were individually analyzed by three persons (one researcher and two company experts) to assess whether they were 'within' or 'outside' the dominant logic of the company. A Chi-square test was then conducted, which yielded significant differences among the three scenarios with respect to the distribution of ideas. The results are shown in Table 6.

Table 6
Comparison of different approaches' distribution of service ideas –
inside or outside dominant design logic

Approach		Inside/Outside Dominant Design		
		Outside	Inside	
Professional	O	10	45	55
	E	22.9	32.1	55
	Adj. R	-3.8	3.8	
Guided User	O	61	123	184
	E	76.8	107.2	184
	Adj. R	-3.1	3.1	
Pioneering user	O	108	82	190
	E	79.3	110.7	190
	Adj. R	5.7	-5.7	
Total		179	250	429

Items with an absolute value greater than 2 for the adjusted residual are regarded as significant (Hinkle, Wiersma, and Jurs, 1998, p 581). A plus sign in the residual indicates significantly more ideas than expected; whereas a minus indicates significantly fewer than expected.

As can be seen in the table, the 'professionals' produced significantly more ideas that were classified as being within the dominant design, thus confirming Hypothesis H4a. The table also shows that the 'pioneering users' generated more ideas that were outside the current dominant design logic than did the experts (in accordance with Hypothesis H4b), whereas the ideas of the 'guided users' had a propensity to be classified within the dominant design logic (which did not support Hypothesis H4b).

A further analysis of the results showed that the ideas outside the dominant logic were, on average, more original ($t = 9.72, p < .001$), and that they had higher perceived user value ($t = 6.90, p < .001$).

Discussion

The results of the present study demonstrate that the approach that is used to involve users in the generation of ideas affects the type of contribution that they make. The ‘guided users’ (who were taught more about the underlying technology) produced significantly different types of ideas from those produced by the ‘pioneering users’ (who did not receive such teaching). It is thus apparent that the users’ knowledge of the underlying technology has an effect on their propensity to contribute incremental and/or more radically new ideas.

In contradiction to the view that involving ordinary users in the innovation process hampers innovation because such users have an inferior knowledge of the underlying technical system (e.g. Bennett and Cooper, 1981), the results of the present study reveal that the creative potential of users is actually dependent on their *not* knowing too much about the technical restrictions; indeed, a relative lack of knowledge enables ‘pioneering users’ to think outside the dominant logic and thus be more creative. However, the present study also reveals that users do need *some* knowledge of the underlying technology to ensure that their suggestions are technologically feasible. The question of exactly *how much* knowledge is optimal remains a moot point; the methodology of the present study did not allow for this question to be examined in detail.

Despite the above findings, it is not appropriate to conclude that users are better innovators than the professionals. An innovation is always an *implemented* idea, and ordinary users do not possess the level of technical knowledge that is required to propose ideas that are capable of being implemented; rather, their output is more likely to be in the form of functional descriptions of how ideas are supposed to work from a user perspective. To become real innovations, users’ ideas must thus be processed by company experts. In this sense, the innovative capacity of ordinary users differs significantly from that of so-called ‘lead users’ (von Hippel, 1988), who are capable of also producing practical solutions that can be implemented.

Figure 4 illustrates the variations in the mix of ‘technology knowledge’ and ‘use knowledge’ that exist among ordinary users, experts, and lead users.

As illustrated in the diagram, ordinary users exploit their superior ‘use knowledge’ in making their suggestions, which results in their ideas scoring better in the dimension of ‘user-value’; however, their relatively low ‘technology knowledge’ has an adverse effect on the ‘producibility’ dimension of their ideas. In contrast, lead users, as described in the literature,

possess both types of knowledge, and would therefore seem to be well placed to provide useful ideas. However, there are two problems associated with the utilization of lead users in practice (Olson and Bakke, 2001). First, identifying and integrating lead users is a complex process, although there are some studies describing how this can be undertaken (Lüthje, Herstatt, and von Hippel, 2005; von Hippel, Thomke, and Sonnack, 1999). Secondly, lead users are typically innovators and early adopters (Rogers, 1995), and they therefore represent a minority of all customers in B2C markets; that is, the ‘use knowledge’ of lead users might not be valid for ordinary users.

From Figure 4 it is tempting to assume that teaching the ordinary users more about the underlying technology would increase their innovative capacity (that is, the ‘guided user’ scenario of the present study). However, the present results demonstrate that quite the opposite is likely to occur; learning more about the technology is likely to induce users to discard ideas that are obviously impossible to realize or to adapt them to the available technology. In both cases, some degree of originality is lost. Furthermore, the average score in the dimension of user value was lower among the ‘guided users’ than among the ‘pioneering users’. Given that the ‘guided users’ had the same degree of ‘use knowledge’ as the ‘pioneer users’ at the beginning of the experiment (as reflected in the fact that no significant differences were found in the background data), it would seem that increasing the ‘technology knowledge’ of users causes them to underutilize their ‘use knowledge’ when creating the ideas.

The findings of the present study suggest that it is important not to have erroneous expectations of user involvement. Ordinary users are rarely aware of the technological limitations of their ideas; rather, they are experts in their own domain of user needs, and they can describe the desired outcome of a new product or service. It is thus quite unrealistic to look for ‘ready-made’ solutions from ordinary users and to expect them to be concerned about the implementation of their ideas. A more realistic approach is to treat the ideas of ordinary users as an *inspiration* for the innovation process, rather than a *solution*. If this perspective is adopted, the creative ideas of users can actually cause a company to become more innovative by breaking the current dominant logic.

However, the present study has shown that certain approaches to user involvement can actually reinforce the dominant logic of a firm. In particular, the ‘guided users’, who learnt more about the underlying technology, appeared to adapt their idea creation to the prevailing dominant design logic; in effect, their ideas tended to conform to what the company already produced by itself. This indicates that an appropriate strategy is required in managing the contribution of users if their involvement in the innovation process is to be effective in breaking outside the dominant logic of a firm. The findings of the present study suggest that an appropriate strategy is that reflected in the scenario of the ‘pioneering users’. These users are capable of producing ideas that challenge the prevailing dominant logic, and these ideas can be utilized to assist the company to think in new trajectories.

However, because the ideas are outside the prevailing dominant logic, they might well be discarded as being unsuitable for the company. This is more likely to happen if the company regards user involvement as a simple ‘market-pull’ strategy—that is, asking the users what services they want and then simply putting the suggestions into the new-product development (NPD) process. In contrast to this view, it is necessary to understand the *strategic* importance of innovation involving ordinary users.

From a strategic perspective, user involvement is neither an exercise in ‘market pull’, nor an exercise in ‘technology push’; rather, it is an interplay between the two. It is thus a strategic learning process that aims to augment a company’s ‘technology knowledge’ with vital ‘use knowledge’. Involving ordinary users in innovation does not imply that a

technologically proficient company has become 'user-led'; on the contrary, in the case of technology-based services, it is obvious that ordinary users cannot produce relevant service suggestions before the technology is present in the first place. From a strategic perspective, a technologically competent company thus aims to become 'user-inspired', rather than 'user-led'. By learning more about the actual needs of users through an interpretation of their suggestions, companies can be inspired to seek radical innovations and, in some cases, perhaps even discover a radical redirection of the company itself.

Conclusion

The present study has provided useful insights and practical guidance for managers with respect to the involvement of ordinary users in idea generation for technology-based services. The study finds that the users' knowledge of the underlying technology affects the users' propensity to contribute incremental and/or radical new ideas. If the objective is to obtain a greater number of feasible suggestions, managers should teach the users more about the underlying technology—that is, a 'guided users' approach. However, managers should be aware that doing so is likely to reduce the originality of the ideas that are produced. On the other hand, if the company is aiming for more radical innovation, a 'pioneering' approach is preferable. However, managers should not expect the ideas of ordinary users to be immediately suitable for introduction into the NPD process; rather, their ideas should be used as inspiration for further innovation. Indeed, further elaboration of their ideas has strategic importance in reviewing the dominant logic and direction of the company.

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