

Harnessing the Creative Potential among Users*

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User involvement in the development of new products may offer a novel approach to improved methods of meeting customer needs. These users are considered to offer possibilities for generating original, valuable, and realizable ideas leading to successful innovation. However, the merit of users' ideas compared to ideas generated by the company itself has not been investigated empirically. In the present study, advanced users, ordinary users, and professional product developers were given the task of creating ideas for future mobile phone services. The main purpose was to examine the benefit of involving users in suggesting new product ideas in an innovation project. An experimental three-group design was used in order to assess the output in terms of its original, valuable, and realizable merit. The results indicated that ordinary users create significantly more original and valuable ideas than professional developers and advanced users. Professional developers and advanced users created more easily realizable ideas, and ordinary users created the most valuable ideas. The results were discussed from the viewpoint of divergent thinking. It was suggested that divergent thinking was facilitated through the opportunity to combine different information elements that appeared separate at the outset, such as personal needs coupled with the functionality of mobile phone services.

Introduction

Managing an effective new product development process constitutes one of the greatest competitive advantages for business companies today (Olson and Bakke, 2001). In new product development, fulfillment of customer needs has proved a difficult, time-consuming and critical event (Tidd et al., 2001). This is why researchers propose user involvement, during the development process, as a means of increasing the

likelihood of new product success (von Hippel, 2001). Users with close interactions and information regarding a corporate enterprise are considered to be capable of coming up with ideas for future products that are perceived as being unique and of value. Creative ideas of this type may offer a successful start to innovation, which is important since research indicates that most projects do not fail at the end but at the beginning (Khurana and Rosenthal, 1998). In spite of this, many firms do not bring the customer effectively into their new product development process (Alam, 2002; Martin and Horne, 1995). The reason may be a lack of empirical evidence regarding the merit of user involvement compared to what the research and development (R&D) department may accomplish. Furthermore, as if this were not enough, some avenues of research suggest that the converse situation may occur, namely that user input may weaken companies' attempts at being innovative (e.g., Christensen, 1997).

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It is reasonable to expect user involvement—since it is recommended so emphatically—to be grounded in theory and to be substantiated by data. However, since this does not seem to be the case (Alam, 2002; Ives and Olson, 1984), there is justification for a study that empirically examines the benefit of user involvement from an innovation perspective. In this exploratory research, the merit of user involvement is examined in an experiment whereby ideas for new mobile phone services generated by two different types of users are compared with ideas generated by a company's R&D department. According to current notions on creativity and innovation, ideas that instigate and facilitate innovation ought to be original, valuable, and realizable (e.g., Finke et al., 1992). Therefore, by assessing forthcoming ideas concerning these three dimensions, it has been possible to examine the merit of users' ideas and the evaluation of user involvement from an innovation perspective.

In this article, a brief description is given first of the merit of user involvement on the assumption that one important contribution of users applies to the idea generation phase. Then, since the contribution of user involvement in the early idea phase is in focus, a conceptual formulation of the content of a creative idea is presented, this being necessary in order to assess the merit of user ideas. Concurrently, a theoretical description of the underlying processes leading to creative performance is outlined. Before

introducing the empirical data and its implications, a careful description of the method is given; this is of special importance since previous studies have lacked a methodology that permits causal inference. The article ends with a discussion of how and why users may harness the innovation potential in a company.

The Underlying Logic of User Involvement

Developing new and valuable ideas is an important activity if a company expects to succeed in product development since innovation begins with creative ideas (Amabile et al., 1996). A unique idea for a new product represents an entirely new way of responding to heretofore unfulfilled user needs in a profitable manner. Unfortunately, it has proved difficult from a supplier perspective to conceive the needs of potential users, which makes innovation a hazardous process. Traditional market research techniques only manage to skim the surface of user needs and desires (Tidd et al., 2001). The difficulty of understanding customer needs becomes evermore manifested as many product and service offerings acquire incrementally greater technological complexity to their nature (Parasuraman, 2000). Faced with this scenario, researchers have started to emphasize the involvement of users in new product and service development. More specifically, a customer is thought of as a coproducer and idea generator of new products and services (Prahalad and Ramaswamy, 2000; Thomke and von Hippel, 2001). The reasoning behind this perception is that if users are the persons who decide whether or not a product idea represents a unique way of meeting their needs, then customers should be thought of as a valuable source to initiate exploitable ideas.

What makes it difficult to truly understand user needs is the “sticky” and difficult-to-transfer information that user environments contain (von Hippel, 2001; Thomke and von Hippel, 2001). Although environmental and personal characteristics are difficult to detect (even for the user himself), companies need to consider this in order to be successful (Johnson, 1998). In a customer involvement project, users are in contact with and may act within the environments and/or situations that a future innovation is meant to serve. Ideas generated by a user in the user's own environment therefore seem more likely to contain those unique features that companies seek but which are difficult to detect. Needs and requirements are likely to be, more or less consciously and

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deliberately from the user's point of view, automatically built into the ideas generated (Thomke and von Hippel, 2002). On this assumption, it seems quite obvious that a company should involve customers when developing new products. However, in spite of this, such a practice has proved uncommon among companies (e.g. Alam, 2002). One reason may be that the purported merits of user involvement have remained unclear, since the motivation for user involvement rests upon logical reasoning and anecdotal evidence rather than on empirical findings.

The Qualities of a Creative Product

In order to understand the intrinsic qualities of creative performance, researchers in the field have identified several dimensions as the distinguishing signs of creativity (Amabile, 1996; Besemer and O'Quin, 1987; O'Quin and Besemer, 1999). Dimensions are facets—aspects that together provide important perspectives on the quality of a creative outcome.

According to Besemer and O'Quin (1987) and O'Quin and Besemer (1999), dimensions that capture creative production, or creativity in general, commonly are characterized by novelty and usefulness. The dimension of novelty implies the degree of *originality* (O'Quin and Besemer, 1999). In the literature (e.g. Isaksen, 1987), originality is commonly referred to as the most obvious attribute of creativity in products. Runco and Sakamoto (1999), for instance, hold originality as the most respected trait in creativity. However, the element of newness is not enough to make a product unique: It must also contain the aspect of value and be appropriate for a specific person in a specific situation. In terms of usefulness, Besemer and O'Quin (1987) are concerned with the extent to which the product responds to or solves a problem that is tangible and vital for a person. This dimension is referred to as the *value* of the product (Ekvall, 1997). In line with these notions, a recent literature review on the subject defines creative performance as the production of an idea, action, or object that is perceived as both original and useful (Mayer, 1999).

In the present article, originality and value constitute two important dimensions of creativity. However, as creativity does not evolve into innovation automatically, there also is a need to consider the probability and ease of developing an idea into a final product. One dimension that appears useful from the innovation perspective is that of *realization*,

(MacKinnon, 1968). Such a dimension captures the capability and facility of transforming an idea into a commercial product. The dimension of realization focuses on the application of creativity to innovation and represents the degree of innovativeness of a generated idea. The dimension realization is employed in the present investigation. Furthermore, *number of new ideas* is used as a quantitative dimension that measures divergent thinking, thereby enabling creative production. The number of ideas generated indicates how easy it is for an individual to undertake divergent production. Since there are indications that creative production is correlated with originality (Paulus, 2000), it also is included in subsequent analyses.

To sum up, in the present study, a creative idea is defined as one that is original, valuable, and realizable. Creative performance, then, is operationalized as the ability to generate creative ideas. Quantity of ideas is an indication of the ability to think in a divergent manner that leads to creative performance. These four dimensions constitute the dependent variable of the study: (1) Originality, the element of newness of an idea; (2) Value, the extent to which an idea solves a perceived problem; (3) Realization, the ease of developing an idea into a commercial product; and (4) Number of ideas, a measure of divergent thinking.

The Underlying Processes in Creative Performance

If, at least provisionally, accepting the notion that users are capable of generating unique and valuable ideas, the question of how these ideas arise originates. According to Ekvall (1997), the mental processes involved in creative action are conceived as the combination of “principles and elements of knowledge and insights that have not been connected before” (p. 195). A viable solution to a novel problem does not originate in a vacuum. In order for people to make new and valuable connections, it is necessary to meet and to receive new and unknown information and thereby to create new knowledge. Consequently, the larger the set of skills, information, and knowledge at hand, the more numerous are the alternatives available for producing something new. Guilford (1967) has described these processes in terms of divergent thinking, which is established by a flexible and somewhat unstructured problem-solving process whereby the introduction of a new element facilitates

the evolution of new alternatives that are combined with previously established principles. In conclusion, the key to creative thought appears to be the combination and reorganization of information and knowledge to advance new understandings and subsequent to this, a generation of ideas (Mumford, 2000).

Put into context then, that a deepened interaction between a user and a company may increase the likelihood of making new combinations of previously disconnected and unrelated informational elements. This is because a user who interacts with a company will gain access to the possibilities and limitations of that company and its resources and will have the opportunity of combining this information with the sticky information about the user's own needs and setting of use. If users are given information about need-related aspects of a certain product, then a user can incubate this knowledge and, if motivated, can combine it with personal needs in the environment. Through this procedure, the user, through the utilization of his or her product-developed ideas, may solve a problem situation applying personally. Tentatively, a user who has generated an idea for a new product on the basis of personal and sticky information in combination with newly acquired company information will suggest a product idea that is likely to be perceived as original, valuable, and realizable (i.e., creative). It may be original because it contains a combination of informational elements that usually are not available from a company perspective, such as sticky information on the user and user environment coupled with key need-related information for the design of future products. Furthermore, it seems likely to be valuable—because the generated ideas constitute a true answer to user needs (since developed by the user)—as well as to be realizable—because the idea leading to the product emanates and rests upon those central key instruments the company has shared with the user—thereby providing an important platform for the development of new products (von Hippel, 2001).

Method

The Research Context

The research context consisted of participants who were equipped with Global System for Mobile Telecommunications (GSM) mobile phones. All were

given the task of creating value-adding mobile phone services (see Procedure section). The instructions also explained that the service ideas created by the users should provide benefits and function in their own specific environment of use. This entailed bringing together idea generation for new mobile phone services and needs (i.e., sticky information), a task that ultimately was performed at a location where the latter was sensible (von Hippel, 1988).

Further, the research design in the present study constitutes a realistic way of organizing user involvement. The context chosen was the development of end-user services based on the GSM standard short message service (SMS). GSM is a pan-European standard for mobile telephony. The system was introduced in Europe in 1992 and is today the most extensive in the world. SMS is a technology-based service for sending and receiving text messages by mobile phone (Dabholkar, 1996). The platform used in the study is called Unified Services (US) and is essentially a converter between SMS messages (text messages via the mobile phone) in GSM and http calls on the Internet. From the user's point of view, the functionality of US was important since it enabled access to information on the Internet by sending and receiving SMS messages. Furthermore, US also can be used for remote control. For example, it is possible to create a service that can turn on stereo equipment or a radiator in a building or to check whether a door is locked simply by sending an SMS (Kristensson et al., 2002). At the time of the experiment, US was a prototype and had not been introduced to the market. This situation offered the opportunity of using the platform as a toolkit that, when outsourced to users, made it possible to examine the value of user/customer involvement.

Design

The complex nature of creativity suggests that meaningful research must take into account multiple influences and diverse forms of expression (Runco and Sakamoto, 1999). The present research undertakes a quasi-experimental three-group (user type) design with proxy pretest measures in the form of background data (Cook and Campbell, 1979). The dependent variable in the present study is represented by the ideas generated by the participants and the independent variable by the type of user engaged (see Table 1).

Table 1. The Design of the Present Experiment That Studied the Effects of Type of User on Aspects of Creativity

Independent variable	Process	Dependent Variable
Type of User	Idea Generation of	Creativity
Professional	New Services for	Originality
Developers	Mobile Telephony	Value
Advanced Users		Realization
Ordinary Users		Number of Ideas

Since the research question concerns the creative performance of users versus professionals, different kinds of participants constitute the independent variable. The first group consists of “technology- and computer-trained” users (henceforth “advanced users”). Persons with a technological education probably are more inclined to use and to understand the benefits of new technology and therefore also are less likely to feel restricted and insecure when facing it. Consequently, 16 computer science students who had mastered Java programming constituted the “advanced” type of user in the present study. These students possessed advanced knowledge of mobile phone technology and also of the computer programming language that enables mobile services in a GSM system. Thus, due to their university education, these students were skilled enough to create and to implement their own mobile service. The second group consisted of 19 “ordinary” users. These were university students, mainly with a major in business administration or in social sciences, who had not attended any course that would enable them to program a new mobile phone service. The third group consisted of 12 “professional” service developers at the leading telephone operator in Sweden, Telia Mobile. The ideas from the professional developers made it possible to examine the relative value of the ideas from the two user conditions.

Procedure

The experimental procedure comprised four phases: start-up, idea generation, termination, and evaluation. As stated, the aim of the experimental procedure was to try to emulate a typical project sequence in product or service development.

Start-up. In the start-up phase, participants were provided with information on the project and on the scope of the study. To initiate a start-up, a number of new mobile phone services already implemented were shown, and the application platform (US) for the study was demonstrated. The task was handed out to participants in written and verbal form. All of the participants, with the exception of the professional service developers, were presented with the task of creating service ideas that would generate added value for them. The experts, on the other hand, were instructed to design services that they considered would add value for the customer target group (i.e., university students). By treating the groups in such a manner (in accordance with the independent variable), not only was the experiment made more realistic and important to each participant, but also the output of the experiment in terms of ideas for new services was made comparable, since all groups sought to satisfy the same target group.

All participants were instructed to document the idea generation process in a diary that was handed out. By underlining how important it was to “report all ideas no matter how irrelevant they may seem,” actions were taken both orally and in writing in order to minimize the acknowledged threat to reliability of using a reactive data-gathering technique.

At the end of the initiation phase, the participants were equipped with a mobile phone, a prepaid card loaded with about \$30¹, and a chat board. The chat board is a small keyboard that, connected with the mobile phone, facilitated the sending of SMSs.

Idea generation. The idea generation process lasted for 12 days. During this period, participants were expected to create ideas for new mobile telephony services and to log them in their diary. A period of 12 days was considered suitable since participants needed time to familiarize themselves with the equipment and to reflect upon its possibilities and limitations. A pilot test with three participants was performed over a period of seven days, and this proved to be too short.

Termination. When the idea generation period was concluded, all participants were asked to transcribe their ideas from the diary into a more detailed service description. These service descriptions were based on what they had written in their diaries and followed a predefined format. In the service description, the participants were asked to write a brief description of the service idea before stating the way(s) in which the service would create value for them. They also were asked to name their service idea. To make sure the idea

¹ The cost for sending an SMS message was about \$0.19.

Table 2. Background Data on the Participants within Each Group Condition

	Professional Developers	Advanced Users	Ordinary Users
Essential Feature of Participants within the Condition (i.e., Inclusion Criteria)	Professionals Working with Service Development at a Telecom Company	Computer Science Students Mastering Java Programming	Business Administration or Social Science Students
Number of Participants (Men/Women)	12 (10/2)	16 (12/4)	19 (14/5)
Age	36.50**	25.63	23.79
FS (range 20 to 80)	55.45	49.37*	57.95
LOT (range 0 to 32)	23.08	20.88	24.53
TRI (range –20 to +20)	8.00	3.88	5.79
Mobile Phone Use	10.42**	2.97	3.60
Academic Competence	129.50	95.80	96.53

* < 0.05.

** < 0.01.

could be understood clearly from the written text, all participants were interviewed one on one regarding the ideas they had generated.

Evaluation. After all the trials were concluded and the service descriptions were collected, an evaluation phase followed (see Scoring section).

Instruments

Participants. The experiment was conducted as part of the CuDIT [Customer-Driven Information Technology (IT) development] Research Project in cooperation with Telia Mobile Sweden. The 47 participants were either professional members of the R&D department at Telia Mobile or were university students at Karlstad University, Sweden. University students were chosen on the grounds of representativeness, since they are considered the most frequent group of users of the mobile phone services in focus in the study (GSM/SMS). Participants were assigned, based on their type of user background, to each of the three experimental groups, which constituted the independent variable.

Pretest measures. In quasi-experimental research, it is important to rule out the potential influence of extraneous variables as extensively as possible (Cook and Campbell, 1979). Therefore, as a pretest measure, a check was made on background variables, such as previous experience with mobile phones and demographic information as well as personality traits, across the independent variable (user type). The pretest measures are displayed in Table 2.

There were significant differences using one-way analysis of variance (ANOVA) between the conditions of the independent variable regarding age ($p < .01$) and the use of mobile phones ($p < .01$), but

there was no significant difference regarding academic competence and were no interactions.²

In addition to background data, a check on personality was made. The first test, the FS (Change and Stability) test, measured attitude-to-creativity with respect to change and stability (Holmqvist, 1986).

The second test, the Life Orientation Test (LOT), measured dispositional optimism (Scheier and Carver, 1985). The third test, Technology Readiness Index (TRI), measured willingness to embrace new technology (Parasuraman, 2000; Parasuraman and Colby, 2001). All three personality inventories measured traits that were considered to entail a risk of influencing user performance in the present study. A two-way ANOVA, controlling for age and sex, showed a significant difference regarding FS, indicating that the advanced user group scored lower than the ordinary group. There were no differences among groups regarding LOT and TRI.

Panels. Four panels of scorers, labeled A, B, C, and D, were set up to judge the creative product using the three different dimensions of creativity described in the introduction (originality, value, and realization). The judges on all the panels were experts in a given domain (Amabile, 1996). Panels A and B consisted of six judges representing a technology perspective in the study. Panel A consisted of judges employed at a telecom operator who held a master's degree in engineering. Judges in panel B were consultants in the telecom field, employed

²The unequal distribution of sex in the present study is unfortunate. This was especially so since a number of researchers have found gender differences regarding creative performance (cf. Amabile, 1996). Although it would be of interest, the imbalanced distribution precludes any statistical calculations on the influence of gender in the present study.

outside the telecom company. Panel C consisted of six judges and represented the customer perspective in the study. Accordingly, panel C consisted of three students with a computer science orientation in their studies and the other three with a business administration and social sciences orientation. Finally, panel D consisted of three judges representing the marketing perspective in the study. The judges in panel D were employed at the same telecom operator as the judges in panel A.

Scoring—Assessing the Creative Merit of the Produced Ideas

The judges on panels A, B, C, and D were instructed to rate each idea in accordance with three selected dimensions of creativity (Besemer and O'Quin, 1987; Guilford, 1967; Kristensson and Norlander, forthcoming). Due to the need for technical knowledge, only panels A and B carried out evaluations of the realization dimension. The rating procedure is referred to as the “consensual assessment technique” and has been proposed by Amabile (1996). In the rating process, the judges used typed service descriptions, originally filled out by the participants at the termination phase. All service descriptions, that is, ideas, were rendered unidentifiable in respect to the inventor and the independent variable. The judges performed all scoring completely independently of each other. Every judge had been instructed to rate the ideas on a scale from 1 (lowest) to 10 (highest). Each service description was analyzed by at least two judges, and there were at least three judges rating each dimension. The judges rated only one dimension at a time.

Results

Interjudge Reliabilities

In accordance with Amabile (1996) and Blackman and Funder (1998), all ratings from judges on each

panel were averaged. The average correlation (Pearson's r) for the panels were as follows: panel A ($r=.52$); panel B ($r=.42$); panel C ($r=.24$); and panel D ($r=.27$). Overall, the judges' evaluations of the dimensions of the creative product showed significant agreement and were perceived as adequate. Therefore, it was considered permissible to average the individual scores to a mean score in order to expedite further statistical analysis.

Intercorrelations

To illustrate the concordance among panels, the overall correlation among all panels for each of the different variables was calculated. Cronbach's alpha showed significant reliability ($p<.001$) regarding originality (.72), value (.60), and realization (.73) across the four panels and the 251 ratings. As the panels proved congruent in their perceptions of creativity, the assessments of the panels were aggregated into a total.

Regarding intercorrelations between dependent variables, realization showed a negative correlation with originality ($r=-.63$; $p<.001$) and value ($r=-.16$; $p<.05$). No other relationships were found.

Dependent Variables

Table 3 presents the means and standard deviations for professional, advanced, and ordinary users regarding the dependent variables originality, value, realization, and quantity of ideas. The dependent variables, the dimensions of the creative product, were tested by means of a one-way ANOVA across the three groups of participants.

Originality. In terms of the dimension of originality, there was a significant difference among groups [$F(2,248)=6.15$; $p<.002$] at the aggregate level. A post-hoc comparison [Tukey's least-significance difference (LSD) test] indicated that the ideas produced by ordinary users

Table 3. Means (Panels A, B, C, and D aggregated) for the Four Dimensions of a Creative Product with Regard to User Group (Professional, Advanced User, Ordinary User)^a

	Originality	Value	Realization	Number of Ideas
Professional (n=12)	4.00	4.38	6.82**	4.58
Advanced User (n=16)	3.85	4.75	6.94**	4.56
Ordinary User (n=19)	4.48**	4.85*	6.01	6.47

^a The scale range for originality, value, and realization was 1 (lowest) to 10 (highest). The number of ideas is calculated as a mean per participant.

* <0.05.

** <0.01.

were judged as more creative in terms of originality than ideas produced by professionals ($p < .025$) and ideas produced by the advanced user group ($p < .001$).

Value. Regarding the dimension of value, there was a significant difference [$F(2,248)=3.50$; $p < .032$] among groups. A post-hoc comparison (Tukey's LSD test) indicated that the ideas produced by ordinary users were perceived as more valuable than the ideas from the professional group ($p < .009$). The ideas from the advanced user group also were judged as more valuable than the ideas from the professional group, but the difference was not statistically significant ($p < .061$).

Realization. Regarding the dimension realization, there was a significant difference among groups [$F(2,248)=5.79$; $p < .003$]. A post-hoc comparison (Tukey's LSD test) indicated that professionals produced more realizable ideas than the ordinary users ($p < .015$). Also, the advanced user group produced more realizable ideas than the ordinary users ($p < .002$).

Number of Ideas. Regarding the number of ideas produced, there were no significant differences among the user groups ($p = .198$).

Discussion

The present study investigated the creativity of users' ideas for new mobile telephony services. If users are capable of producing creative ideas for the eventual generation of new products, then users ought to be viewed as a resource for companies that aim to satisfy, and even anticipate, customer needs. In order to answer the question of whether or not users may contribute more innovative ideas for a new product than the company itself, an experimental comparison between two groups of users and a group of professional developers was carried out. Overall, the experiment produced three main results:

- (1) Ordinary users produced more original new service ideas, indicating a more divergent style of thinking.
- (2) Ordinary users produced ideas that were assessed as significantly more valuable.
- (3) Professional developers produced the most realizable ideas, together with the advanced users.

Previous theories have suggested that users ought to be considered as valuable sources of creative ideas (e.g., Prahalad and Ramaswamy, 2000). There are some indications that users have been used as a source

of innovation (von Hippel, 1988), but the issue of whether users are able to contribute more creative ideas than the company itself remains unresolved. The overall findings from this study support the notion that users are able to create unique ideas in terms of the original and valuable merit of the ideas.

Since a potentially important benefit of user involvement is improved ideas for successful innovation (Alam, 2002; Gruner and Homburg, 2000), the results are analyzed from a psychological perspective on creativity, particularly regarding divergent thinking. According to Mednick (1962) and Ekvall (1997), it is necessary to consider any conditions that may have facilitated a connection of different information elements in order to explain creative performance. In terms of this study, then, a tentative explanation for the empirical data is that ordinary users may have had a greater opportunity to derive new and valuable connections. It is possible that a critical element of information that is incubated may be the newly acquired knowledge about the potential of mobile phones and related services. If this information is to result in some form of novel and valuable service, it ought to be combined with information concerning users' basic needs as well as the situation in which users will function. In present terms, the combination of these two elements of information may occur when a user suddenly experiences a situation in which mobile communication may in fact be of benefit. Previously, products with high precision levels for solving user problems may have been difficult to present since product development occurred on the basis of largely superficial customer information, often the result of weak market research. Through user involvement, the approach is changed; users work with information from the company instead of vice versa. As in the study presented here, this result indicates more original ideas for the benefit of future products and/or services.

Ostensibly, the relation among different information elements, before they were connected, is also of interest. According to Ekvall (1997) and Fasko (1999), the more mutually remote the considered informational elements are at the outset, the more original the new configuration will be. In terms of this study then, it would appear that the ordinary users had access to informational elements that were further apart, whereas the professional developers elaborated with informational elements that were not as "cognitively" remote. It is possible that provision

for user involvement, therefore, creates conditions for the association and combination of different information, which may result in unique ideas. In terms of divergent thinking, the reason why the ordinary users produced original ideas, while advanced users and professionals did not, may be that the former were presented with new information that was separate from but could be applied together with information that originated from a situation in the user's life.

Regarding the advanced users, the same pattern as that observed for ordinary users ought to have been observed. However, advanced users generated less original ideas than the ordinary user group, possibly due to the restrictive effects of their greater prior knowledge of mobile phone systems. Examining the realization dimension, it seems likely that the knowledge of considerations such as the difficulties of programming an original idea restricted advanced users from deriving such ideas. The fact that the capability of divergent thinking may be inhibited by aspects of earlier knowledge and experience—in terms of what was more or less technically producible—is confirmed in earlier research (Amabile, 1996) and is in agreement with the previous explanation of the originality results for the professional group. Convergent thinking restricts cognition from “diverging” into multiple directions and is coveted much because it implies the ability to sort out the most logical or rational solution among various possibilities (Runco, 1991). In such a way, professional service developers and advanced users may have seen technology grow from an initial state to a more mature and advanced platform over the years. At the same time, development of an intimate understanding of the technology itself may present an obstacle to creative thought (cf. Veryzer, 1998). Such knowledge induces a limitation in thinking style as the professional developers only in rare cases are able to or have reason to think outside the current capabilities of the technology (cf. Leonard-Barton, 1992). Since users, primarily those with average capabilities (i.e. ordinary users), do not possess the same technical skills, they may be more likely to be able to generate divergent ideas that in a novel fashion integrate technology with their personal environments (which contains needs and requirements). Thus, as a result of the users' lack of awareness of how current technology operates, a convergent style of thinking seems not to have been activated and accordingly they have been able to present more original, but less realizable, ideas. As

soon as a new information element has appeared to the professional developers and advanced users, logical thinking about the possibilities of transforming this idea into an innovation prevails.

If original ideas appear to be facilitated by divergent thinking and realizable ideas by convergent thinking, it is suggested that the dimension value has been promoted by the probability that users have incorporated information from their own environment into the ideas generated. The information under integration is of the kind that is difficult to grasp or to identify. In a market research situation, for example, such personal information is difficult for the user to express (Thomke and von Hippel, 2002). Nevertheless, the opportunity of acting within one's own environment during a period of time offers a possibility of identifying “sticky” environmental information, a person's needs and desires, and then connecting it with the newly acquired information about the possibilities and limitations of mobile technology.

User Involvement for the Sake of Customization and Innovation

Viewed in a broader perspective, these findings suggest that users may contribute original and valuable ideas in future product development efforts. Extending previous management proposals, which have mainly focused on user involvement for the sake of customization, this study suggests involvement also for the sake of innovation. In the experiment, the ordinary users generated more original ideas than the professional developers—which, interestingly enough, proved to be the case even when the professional developers (panel A) assessed the ideas themselves ($p < .01$). Concurrently, empirical evidence maintains that service development is an activity kept within the company rather than one introduced from the outside (Alam, 2002). From a managerial point of view, it therefore is suggested that companies in need of original, customized ideas for future products should involve their users in the creative phase of their innovation process. According to this study, such a procedure would yield unique and valuable ideas, although at the price of a more costly and time-consuming production (i.e., realization) process. According to Prahalad and Ramaswamy (2000), companies that already have implemented such managerial practice not only provide their customers

with higher quality benefits than before but also save time, effort, and money through coinvolvement, according to financial estimates.

Limitations

A careful examination of the mean values presented in Table 3 may raise a question. At the same time as users' ideas are found to be more original, it is evident that the scores actually could be perceived as fairly low (mostly below 5 on a scale from 1 to 10). However, this does not imply a lack of originality necessarily but rather that this phenomenon may be explained through the fact that the assessments were carried out about 10 months after the first group of participants entered the study. What appeared as nonexistent but useful for a user simply may have been launched by the fast-moving telecom market during this period of time. Consequently, the ideas emerging from the user then were judged to be less original. In addition, the more the service ideas generated, the greater the likelihood that some ideas related to more or less the same area. Therefore, the perception of what is original decreased among judges, even though such ideas would be considered original in the market. Accordingly, in this study it is the difference in level that is of interest rather than the absolute numbers.³ However, future studies should seek to avoid the effects of such delays as these (Cook and Campbell, 1979).

One final limitation of the present study concerns the trade-off between external and internal validity. In the study, the possibility for control was given high priority since studies of the contributions of user involvement are lacking. On the other hand, the trade-off may have influenced the motivational status of the participants. Amabile (1996) has shown the importance of intrinsic motivation for creative performance, while different levels of intrinsic, as well as extrinsic, motivation may account for some of the behavior in this study. Some users, for example, may be motivated extrinsically by being given a mobile phone with no user charges, while others may be motivated intrinsically by the fact that they are given the opportunity to share their ideas and perhaps influence the services of tomorrow. Since intrinsic and

extrinsic motivation may vary over conditions in this experiment, future user involvement efforts, whether concerning research or real-life projects, should seek to control motivational aspects so that a favorable state of intrinsic motivation can be obtained.

Despite these limitations, the present study offers data in areas where previous empirical evidence regarding the contribution of user involvement remains weak. Besides experimentally controlled findings, this study provides an example of how user involvement may be pursued and achieved. The latter is important because the managerial practice of user involvement has proved difficult to understand and, even more so, to accomplish. The message of any user involvement practice, as understood in the light of the present study, is that it may inform an enterprise what a user may do in a new set of circumstances with a product that so far is relatively unknown to the respondent (Trott, 2001). Therefore, by involving users to suggest new product ideas that seem unthinkable in advance, market researchers and consumer psychologists can avoid the common dilemma of seeking to understand consumer behavior in a retrospective manner instead of looking to the future.

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³ An additional possibility, pointed out by one of the anonymous reviewers, is that the scaling procedure also may have contributed to the relatively low scores. As the scores are clustered around the center of the scale (ranging from 1 to 10), this possibility does not seem unlikely.

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