USER INVOLVEMENT AND ENTREPRENEURIAL ACTION

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Abstract: *Involving users in the innovation process is a subject of much research, experimentation, and debate. Less attention has been given to the limits to user involvement that ensue from specific organizational characteristics. This article explores barriers to the utilization of users' input in two small companies developing interactive digital applications. We contrast our findings to earlier research involving large companies to identify features of entrepreneurial sensemaking and action that influence the utilization of users' input. We find that the small companies follow a distinct action rationality, leading to rapid implementation of some user inputs, and defensiveness toward others. Both sets of data also reveal common features that are often overlooked in the literature. We reconceptualize user involvement as a form of interaction between users and innovating companies that is facilitated and constrained by micro-sociological processes, on the one hand, and the nature of the competitive environment, on the other.*

Keywords: *user involvement, new product development, information systems services, organizational sensemaking, entrepeneurial action.*

INTRODUCTION

User orientation has become a popular catchphrase in innovation research and practice. Studies have documented the dangers of generalizing product developers' own experiences to a broader population of users (Oudshoorn, Rommes & Stienstra, 2004) and identified user involvement as a key success factor (Brown & Eisenhardt, 1995; Craig & Hart 1992). Many authors and institutions are popularizing new methods to involve users more closely in the product development process (see Goodman, Langdon & Clarkson, 2006; Kaulio, 1998; Leonard & Rayport, 1997, for reviews). The underlying assumption seems to be that designers' lack of awareness and knowledge of how to involve users are the main impediments to user orientation. We have drawn on this assumption ourselves, as we are involved in a project aiming to enhance user orientation in small entrepreneurial companies

developing interactive digital applications. Yet there may be other reasons, apart from a lack of awareness of user involvement methods, for the current limited user orientation, and we believe these reasons should also be considered seriously.

This paper outlines some qualifications regarding user involvement emerging from different research traditions in business administration. (Different types of qualifications, such as those raised in the sociology of technology, have been addressed by others, e.g., Rohracher, 2005.) Within strategic management, the literature on *disruptive innovations*, that is, innovations that allow companies to open up new markets or to change value networks and industries, sometimes views customer orientation and innovation orientation as opposing poles. Users are often resistant to totally novel concepts that challenge their everyday practices, yet many disruptive innovations have transformed markets to the advantage of the companies introducing them. From a different perspective, studies in organizational behavior highlight the limits to organizational attention and sensemaking capacity. User orientation often implies a significant inflow of new information into product development, information that may be difficult to accept, process, or absorb. Information processing may also compete for scarce resources needed for action.

It is likely that these limits to user orientation might be most apparent in small companies dealing with new technologies. Such companies have limited resources in terms of time, funds, workforce, and sensemaking capacity. They also often deal with disruptive innovations, ones that are not meant to fit into existing usage patterns but actually to transform them. Such companies thus provide a critical case in which to test whether enhanced user involvement is helpful in similar entrepreneurial settings. Can the limits to user orientation be overcome by increased awareness and experience in user involvement methods and practices? Or are there cases in which user involvement is actually counterproductive, or at least a waste of time and money?

We start this investigation with a brief review of central points concerning user involvement raised in the strategic innovation management literature, and in the literature on organizational sensemaking and action. We then turn to investigate our research questions in the context of an ongoing project funded by the Finnish Funding Agency for Technology and Innovation (Tekes). We base our analysis on a survey of current sources of user information employed among technology entrepreneurs involved in the Tekes FENIX technology program for interactive computing, as well as on small-scale interventions to enhance user involvement conducted on our initiative with two of these companies. In order to understand some specific features of small entrepreneurial companies, we also contrast our findings with some previous experiences of user involvement with large companies. On the basis of these data, we identify circumstances and ways in which user involvement may be more or less pertinent for product development in different kinds of firms.

USER ORIENTATION IN NEW PRODUCT DEVELOPMENT

In recent years, methods and "tools" for user involvement have proliferated, and the community developing and propagating these methods has grown. In addition to conventional methods of concept testing and usability, product developers today employ field studies, participatory design, contextual design, and user participation (Beyer & Holtzblatt, 1998;

Greenbaum & Kyng, 1991; Kaulio, 1998; Kelley, 2000; Koskinen, Battarbee, & Mattelmäki, 2003). These methods involve intensified interaction between the world of designers and the world of users. Designers may go to visit the users at home or at their workplace, and use ethnographic observation to understand the users' world. Users may join designers "at the drawing board," for example, by participating in user groups (Tomes, Armstrong, & Clark, 1997). Workshops and various forms of idea-generating assignments for users provide a more streamlined version of intermittent or quasi-participation (Kristensson, Gustafsson, & Archer, 2004; Magnusson, Matthing, & Kristensson, 2003). Inventions by lead users are proposed as a source of innovation in both industrial products and some consumer products (Franke & Shah, 2003; Lüthje, 2004; von Hippel, 2005). For products like computer games, "user toolkits" even allow designers to outsource part of the software design to innovative users (Holmström, 2004; Jeppesen & Molin, 2003; von Hippel, 2001).

All this work on user involvement methods assumes that product designers are in need of a more intimate knowledge of their users. By launching these methods and experimenting with them in companies, academics and practitioners aim to promote and enhance user-involvement practice, and raise awareness among designers. Surveys and reviews (Bruseberg & McDonagh-Philp, 2002; Cassim, 2005; Goodman et al., 2006; Hanna, Ayers, Ridnour, & Gordon, 1995; Kujala, 2003) indicate that the available methods are often underutilized. Whether or not this results from a lack of awareness, however, is an open question.

Empirical studies on new product development include those that detail the dangers of excessive reliance on designers' own personal experience, but also studies that illustrate its successful application. Especially in the field of sports equipment and other products with clearly defined user groups, designers can often successfully extrapolate user requirements from their own experience as users (Kotro, 2005; Kotro, Timonen, Pantzar & Heiskanen, 2005). Sometimes, designing for oneself or imagining the user is actually a quite good strategy. Obviously, this depends on the distance between designers and users: In some product groups, early users have similar skills and preferences to the designers of the product. Thus companies with limited resources may actually find personal experience a cost-effective source of user information. They may, however, run into problems when attempting to expand their business model into the mass market, where user contexts and requirements may be very different from the niche market (Christensen, Anthony, & Roth, 2003).

Yet a brief glimpse at other literature, outlined below, indicates that some companies may behave quite rationally by not devoting their energies to acquiring and processing user information. We outline briefly two other strands of research that could justify a somewhat contrarian perspective on user involvement.

Innovation-orientation vs. Customer-orientation

There is extensive literature on the potential conflict between innovation-orientation and customer-orientation. While customer-oriented companies focus on fulfilling existing needs of existing customers, innovation-oriented companies may manage to create new needs and find new customers. There is debate over whether this conflict is irreconcilable or not: Some argue that both orientations can be effectively combined through dialogue with current and future customers (Flint, 2002) or by adopting a "market shaping" approach (Berthon, Hubert,

& Pitt, 2004), or by moving from a reactive to a proactive market orientation (Narver, Slater, & MacLachlan, 2004).

Creating disruptive innovations is a large organizational challenge in its own right (Damanpour, 1991; Lichetenthaler, Savioz, Birkenmeier, & Brodbeck, 2004; McDermott & O'Connor, 2002). In this context, involving users in product development involves further complexities, because users do not know what their requirements are for products that demand changes in behavioral patterns or that open up new applications (O'Connor, 1998). The literature on radical and disruptive innovations has stressed problems arising, for example, from the use of concept testing as a "screen" for new product innovations. Users are often resistant to totally novel concepts that challenge their everyday practices. It is argued that really new-to-the-world products and radically innovative concepts are discarded because users fail to understand them and thus to appreciate their benefits (O'Connor, 1998).

Disruptive innovations allow companies to develop products for which there is no (or little) competition, and potentially even to transform entire value networks to their own advantage (Christensen, 1997; Tushman & Anderson, 1986). Disruptive innovations may be (a) new to the industry, (b) new to the firm, or (c) new to the customers (Garcia & Calantone, 2002). The last type of innovation, new to the customers, entails a specific type of problem. Its impact on users depends on the degree of learning and adoption efforts required of them, rather than on the newness of the technology itself.

In spite of their lack of customer-orientation, many disruptive innovations created by innovation-oriented companies have in fact been extremely successful, and managed to transform markets to the advantage of the companies developing and promoting them. Digital photography has become dominant over chemical photography, as has electronic mail over telegraphy. Compact disks overtook audio cassettes and LP records, only to be seriously challenged by downloadable compressed audio files. The companies that recognized these changes early obtained strategic advantage.

Christensen (1997) has argued that this is because firms with disruptive innovations find new customers, while those that fail to innovate continue ensuring the satisfaction of their existing customers. In the IT industry, at least, Christensen et al. (2003) claim that the markets for disruptive innovations are found among nonconsumers (people who lack access or resources to make use of existing products), or among "overshot customers," those who are unwilling to pay for further performance improvements and who are targeted by new entrants with disruptive business models that offer cheaper and simpler solutions. "Undershot customers" (those frustrated with the current products' limitation and are willing to pay for refinements) will typically be served by companies focusing on sustained innovation that is not disruptive.

Furthermore, users are not always the primary customers of disruptive innovations. So, apart from the potential conflicts between innovation-orientation and customer-orientation, there can be a further and separate conflict with user or consumer orientation, depending on the industry. There are examples in which user benefits and enhanced product performance are not necessary prerequisites for competitive advantage (Ivory, 2004). Users have been highly resistant to disruptive innovations, such as automated banking and workplace computerization, yet these innovations have brought significant efficiency gains to the banks and workplaces adopting them. Users have gradually adapted to these technologies, even though they might have adapted more quickly and with better grace had the applications been designed with more attention to user needs (Prahalad & Ramaswamy, 2000). Yet it is clear

that the usefulness of user orientation—at least in the short term—depends on whether or not users have a choice in adopting the technology. This, in turn, depends on the structure of the competitive environment and on the relative market power of different players.

Knowledge, Sensemaking, and Action

Much of the critical literature on user involvement has focused on users' limited capacity to contribute to competitive innovations (Duke, 1994; Heiskanen, Koskinen, Repo, & Timonen, 2006; Trott, 2001). Yet user involvement also stretches the firm's capacity to absorb and make use of new information. Surveys, workshops, and tests—perhaps even field observations of the user context—are conducted, and developers are expected to make use of all the new information. Empirical studies have shown that users' contributions may be rejected by design teams as irrelevant, incomprehensible, or too time-consuming to deal with (Bruseberg & McDonagh-Philp, 2002; Holmström, 2004; Kujala, 2003). This is not a special limitation of design teams: Research on organizational behavior, organizational decision-making, and knowledge management show that there are limitations to organizational attention and sensemaking capacity (Brunsson, 1985; Cohen & Levinthal, 1990; Starbuck, 1983; Vopel, 2003; Weick, 1995).

Organizations deal with these limitations creatively, yet quite differently from the prescriptions of normative decision theory. Weick's (1995) work on sensemaking shows that organizations make sense of the flow of activities in which they find themselves as an iterative process of identity-construction—reinterpreting situations involves a reinterpretation of oneself, and vice versa. Sensemaking draws heavily on earlier experiences and existing interpretation frames. Yet it is also future-oriented: Organizations enact sensible environments. By deciding and taking action, they also create their own environments for future action. Sensemaking is social, negotiated, and interpersonal: It occurs in interaction. Sensemaking does not occur at specific moments of decision analysis; rather, it is ongoing, based on extracted cues (i.e., special triggers on which attention is focused at the expense of other information), and it is based more on plausibility than accuracy. Thus, new information is irrelevant unless it finds a place in the sensemaking process and becomes a part of how the organization understands itself and its environment.

Brunsson (1985) has identified two kinds of rationality in organizations: decision rationality and action rationality. Decision rationality involves a solid information base and is the ideal mode for making reasoned decisions. Action rationality, on the other hand, is often based on biased information about a biased set of alternatives, and seldom involves analysis or a weighing of the information. Yet action rationality is a fundamental feature of organizational life and a prerequisite for effective action. Organizational ideology gives members a distorted, narrow but practical view of reality, facilitating coordinated action. In contrast, a comprehensive and balanced analysis of alternative courses of action will easily show that there are problems and risks in all alternatives. Team energies may be drained by elaborate decision analyses, leaving no energy for implementation.

Action rationality has been found to be especially pronounced among entrepreneurs. Entrepreneurs exhibit more cognitive biases than managers (Baron, 2004). Avoiding "decision anxiety" is important to sustaining decisive action, so entrepreneurs prefer to err toward risk-taking, intuition, and personal commitment rather than risk analysis and objective

data (Sarasvathy & Dew, 2005). Berglund (2005, p. 45) has shown that such features are important because they allow entrepreneurs to "act on personal visions, inspire others and carry novel ideas through in the face of uncertainty and negative feedback".

From an objectivist perspective, it might seem irrational to disregard new information that might be key to a new product's success or failure. Yet years of research on sensemaking and action rationality show that information processing and critical analysis of the available options may come at a high cost. Information processing and action may compete for the same resources. Thus, the speed and format of user information flowing into the company needs to be balanced with the organization's absorptive capacity (Cohen & Levinthal, 1990) and its dominant mode of rationality (Brunsson, 1985).

We have thus identified a number of company-external and company-internal factors that may limit the utilization of user information. We next turn to consider our empirical work with entrepreneurial small-to-medium enterprises (SMEs), and the potential of and limitations to user involvement revealed by our own interventions into these companies' innovation processes.

CRITICAL CASES: SMALL ENTERPRISES WITH DISRUPTIVE INNOVATIONS

Our interest in user involvement—and its limits—relates to an ongoing project we are conducting for Tekes. Its purpose is to test the usefulness of enhanced user involvement in the innovation process, with a special focus on experience-based user input. The project aims to test the usefulness of this input for small and medium-sized companies participating in a technology program on interactive computing called FENIX. The ultimate goal of the project is to develop recommendations about how to involve users and promote customer-orientation among small technology companies. Small enterprises dealing with disruptive innovations are a critical case for user involvement because they typically have limited resources in terms of time, funds, workforce, and sensemaking capacity.

The first stage of the project involved a survey of how 14 SMEs in the FENIX program obtain and manage user information. The survey was conducted in mid-2005 by interviewing one representative of each company (their FENIX program contact person), in most cases the CEO or marketing manager. The interviews were short and structured, and focused on gaining an overview of how the companies defined their users, how they obtained information about users, and what needs for improvement in user involvement they envisaged.

Perhaps unsurprisingly, we found that designers' personal experience and impressions gained from the media were dominant sources of user information. Customers and previous studies were also frequently used as a source of information about future users. Some companies did engage in formal user research efforts, such as focus groups, testing pilot products, or market surveys. Yet most companies viewed learning about their potential customers the largest challenge. Many were eager to test their products with a broader group of users, and considered it important to develop systematic means for collecting and managing user information. As was to be expected, financial resources and time were the most frequently mentioned obstacles to user involvement, but lack of capabilities did play a role. For example, the CEO of a computer game company stated, "*There is certainly room for improvement, but it hard to say exactly how.*"

We are now in the process of conducting four case studies that test the usefulness of enhanced user input for product development. We report here on two of these case studies: our cooperation with a company producing automatic speech recognition technologies and services and a company developing mobile blogging services for tourists. Both are potentially disruptive innovations in the sense that they can overturn existing dominant services. Automatic speech recognition has the potential of replacing manual call center services, which are labor-intensive; mobile blogging could potentially replace tourist guides and the sending of postcards. The services have been developed by entrepreneurial startups that are actively creating and commercializing new digital products for ordinary consumers. In this paper, we analyze the cases in terms of whether our interventions result in improvements in their design practice and whether increased experience with user involvement results in better design.

The case companies had recognized that consumer involvement was a key issue for the future successes of their innovations. We aimed to provide them with experience-based user information by having users test the service prototypes. Then we collected feedback and encouraged users to generate their own ideas about suitable applications or interesting variants of the services. In order to ensure the transfer of relevant knowledge to product development, complete product development teams were present in the focus group sessions we organized (cf. Bruseberg & McDonagh-Philp, 2002). In summary, the companies received a short-term intervention by knowledgeable consumers, and we conducted a short-term follow-up of how the companies made use of this intervention in their innovation process.

Case 1. Automatic Speech Recognition: Introducing the Users' Viewpoints

Speech recognition technology is being used more frequently for telephone applications, such as travel booking, financial account information, customer service call routing, and directory assistance. In practice, callers communicate with computers. What they speak takes them to predesigned sequences and further cues for spoken input that computers can recognize and process. Unlike in many English-speaking countries, such telephone applications are not yet widespread in Finland: Developing the necessary technology is complex and needs to be done separately for each language. The company we cooperated with, Suomen Puheentunnistus Oy, had developed small-scale speech-recognition services and service prototypes, in partnership with IBM. A common feature in these services was that they were aimed at organizational customers. Thus, the customers of the services would be companies or public-sector organizations wishing to improve the efficiency of their telephone services. The users of the services would be consumers or employees of other companies making use of these telephone services. Our case company had close contacts with its customers, but was enthusiastic about gaining more input from users.

This product development stage involved a mixture of concept development (new services) and refinement of existing service prototypes. There was a need to test the basic functionality of the speech recognition product, which required testing by a wide range of speakers representing different modes of speech and pronunciation. On the other hand, there was also a need to test the usability of the service: How logically did the service process proceed, and how easy was it for users to accomplish their tasks. The company was also interested in improving the acceptability of its service in different applications, and gaining

users' ideas on new applications. Finally, there was a need to gain feedback quickly in order to integrate it into the rapidly ongoing service development process.

Due to this wide scope of needs and expectations, we used fairly conventional methods in user testing, that is, prototype testing, an e-mail survey, and focus groups. These conventional methods allowed us to design and implement the user involvement in a timely manner, and to address the variety of rather basic information needs for the company. Furthermore, using simple and well-known methods allowed for transparency vis-à-vis company representatives: It was easy for them to understand what we were doing and how the results were obtained. We combined them into a three-layered study design.

- Testing of a service prototype. This stage served, firstly, to test basic service functionality. Members of the National Consumer Research Centre's consumer panel (845 members with Internet access) were asked to try out a service prototype for booking an appointment at the local healthcare clinic that involved a number of speech recognition elements. Respondents phoned a free-of-charge test service number on their own phones, on their own time, and followed the instructions given on the line. This also allowed us to build user experience, enabling users to take a more informed stand on the technology and its applications.

- Questionnaire survey. After trying out the service, users were asked to fill in an e-mail questionnaire within a week. This included both structured and open-ended questions about the ease-of-use and convenience of the speech-recognition-based service as compared to alternatives services, such as phoning a clerk or using the Internet, as well as about the users' evaluations of the suitability of speech recognition for different applications. The response rate to the e-mail questionnaire was 45.6 %, with a total sample of 408 respondents.

- Focus group discussions. In line with Boddy (2005), focus groups were employed to gain qualitative data on broader aspects of service acceptability and gain users' suggestions for improvements. Their ideas for future application areas were also solicited. We invited participants for the focus groups in connection with the questionnaire survey, and organized two focus groups in Helsinki and one in Tampere. Altogether 22 consumers participated, including both men and women from different age groups and with different educational backgrounds.

It turned out that users viewed the technology quite favorably. In the questionnaire study, 79% of the respondents rated using automatic speech recognition for the service as "rather" or "very" convenient. This figure compared favorably with alternatives such as using the Internet (67%) and phoning a clerk at the appointment desk (66%). Healthcare, of course, was a fairly convenient choice of service from the point of view of automatic speech recognition, as people are frustrated with queuing on the phone to access public healthcare services (Taloustutkimus, 2006). Open-ended questions in the questionnaire and the subsequent focus group discussions confirmed that people were happily surprised at how well the service prototype seemed to work. They saw a number of benefits in the technology, such as the possibility of around-the-clock service and a speeding up of the service process. Participants suggested a large number of applications for which the technology would be suitable, spanning from making reservations, renewing loans for library books, or booking a vehicle roadworthiness test to subscribing or unsubscribing to magazines, purchasing movie

tickets, or registering for a course. Yet both the questionnaire and the focus group discussions also brought up a large number of reservations and improvement needs:

- The service prototype involved a number of problems, encountered even by some people not trying to really test the limits of the service, and certainly identified by those who really tried to see how well the automatic speech recognition could work. So basic functionality issues remain. Many users also complained about lacking instructions and usability (e.g., slowness, misunderstandings). Improvements were suggested on how logically the service proceeded, its usability, and the way the service was presented.

- Concern was voiced about people with speaking disabilities or poor Finnish skills. People also questioned what users could do if the service doesn't work, and worried about potential failures. People hoped that automatic speech recognition would not become the only way to make appointments for healthcare services. Different alternatives (e.g., the Internet) should be available for different needs.

- The social impacts of the technology provoked extensive comments. People were concerned about whether traditional, personal services would be kept on as new alternatives are developed. In general, there was concern that automatic speech recognition would probably lead to job loss. Some feared that people would be, as one participant noted, increasingly "connected to wires," and that automatic services might reduce social contacts.

Close contact was maintained with company management and the product development team throughout the intervention, and each part of the study was discussed extensively before implementation. Two product development team members were present in two of the three focus group discussions. This proved to be the memorable part of the intervention, as direct interaction with users was a novelty for them. As the observations piled up, company representatives were encouraged by the positive outcomes of the studies, and focused on finding out more about why their service was appreciated.

Case 2. Mobile Blogging: Developing a Service for Ordinary Tourists

The other completed intervention in our project involved a small company, SeeFinland Ltd., which had been in operation for a few years. This company had successfully launched a mobile phone-based service for business customers. This service consisted of a guided tour via mobile blogging. The mobile application provided instructions for the tour and information on the sites to visit. Tourists participated by taking pictures and posting messages and comments on the Web site. The original service involved planned tours of the Finnish forest for the client company's employees, with a teambuilding activity involving assignments to be conducted with a camera-phone, a contest, and a Web site for viewing the collective achievement of the group. The service thus enhances an ordinary guided tour by adding interactive elements, group dynamics, and a Web-based record to be viewed after the tour. In essence, product development targeted social dynamics more than cutting edge technology (see McGuigan, 2005). This was in line with the basic service offered to consumers, which is a social, tourist activity and access to a personal Web gallery.

Our cooperation with this company focused on the company's desire to expand this business-to-business leisure service into a service for ordinary tourists, that is, individual consumers (Repo, Hyvönen, & Saastamoinen, 2006). The planned service was designed to target tourists wishing to get to know a location. Using the service, the tourists create documentation, as well as interact with other tourists during the service tour. The mobile phones would be used as tour guides and documentation devices. The service is first meant to be sold at places tourists frequently visit, such as hotels and travel agencies, to ensure that tourists receive the assistance they need to start their tour. The aim of the company is to design a number of different tours to address the different preferences of tourists.

With the first version of the consumer service, we piloted a sightseeing tour in downtown Helsinki. The tour consisted of visiting eight locations within walking distance of one another, and of completing assignments appointed at each site. The basic assignment was to use the camera-phone to take a picture of the site, comment on it, and send the picture to an Internet photo gallery. A picture of the sight and a brief description of it preceded each assignment. The photo assignments were playful, aiming to promote interaction between the tourists and the sights they were visiting.

We designed the pilot testing of this service in the following manner:

- Pilot groups, consisting mostly of members of the National Consumer Research Centre's consumer panel, took the tours with the purpose of testing the basic functionality and usability of the service. The tours were conducted in the city center on two occasions. Altogether, 19 users participated in the trial in groups of 2-5 persons, for a total of three groups on the first trial and four on the second. In addition to technical testing and introducing the users to the service, the tours served the purpose of participant observation for our researchers.

- Focus group discussions were organized immediately after the tours, in which all tour members participated. Here, we focused on unearthing the experiences of the participants, including both their views on basic functionality and technical performance of the tour, and the enjoyability and acceptability of the service idea itself.

- Individual questionnaires were handed out after the focus group discussions in order to assess each participant's individual viewpoints on both technical issues and the overall desirability of the service.

Product development team members were present throughout the pilot group tours, observing and providing technical support when needed, as well as during the focus group discussions. As the first pilot tour started, it became immediately obvious that a number of issues in the basic functionality with and usability of the service existed. Operability on the participants' mobile phones had not yet been accomplished and data transfer was unreliable (for sending the photos to the Web site). The users considered the use of the service technically difficult. Difficulties arose especially early in the tour, but they were evident throughout the trial. Part of the difficulties resulted from using an unfamiliar mobile phone provided by the service developers, but a number of usability problems also were identified in the user interface and the logic of the software application. The participants were Finnish and rather familiar with Helsinki, but they could successfully relate their experiences to traveling abroad.

The product development team responded to these problems very forcefully. In the discussion after the tour, there was some initial defensiveness about the unavoidability of the

problems. However, the product development team immediately set to work to improve the identified problems, and some additional ones, and made extensive changes to the service during the 11 days between the two trials. All in all, technical problems and suggestions for improvement were received very well, and gave rise to extensive efforts to solve the problems.

The users' overall evaluations of the service were quite favorable: The idea was considered fun, interesting, and up-to-date. Most participants thought that there was potential in using a mobile phone as a tour guide. The service was considered an active way to experience sights and obtain information on them. Some of the test users also liked the interactive and group elements of the service: They thought it might be a pleasant way to get to know new people by collaborating on assignments while taking the tour. Although the originality of the service concept was welcomed, its implementation received criticism—even among those who liked the concept:

- The basic usability required more development. In a business context, participants would have guides helping them use the service. Ordinary tourists would require a much simpler user interface, and better user instructions.

- The participants in our trials emphasized that there are many other ways to spend leisure time, and that they could do something more interesting with the time and money than use it for this service. From this point of view, the transfer of the service to a leisure context clearly called for more development of the basic business model. Suggestions included involving other tourist companies in the business network—that is, site operators, shops, and restaurants—and perhaps even having them subsidize the service in order to attract new visitors.

- Many of the assignments met with criticism. They were designed to create a playful atmosphere, and involved doing silly things in public, such as photographing a group member riding an imaginary horse beside the statue of a war hero riding his horse. Here, the transfer from the business leisure service did not appear to be successful: In the original service it was acceptable and even desirable to act foolishly in a "team spirit" exercise. However, the leisure service was used publicly in the city center and most of the participants were not happy with the performative tasks. Therefore, they suggested that the service should be redesigned with more intellectual tasks and theme tours.

Thus, while there were some encouraging findings, some fundamental features of the business idea required reconsideration. Linking the mobile tourism service to the overall tourism network of the location seemed to be an important challenge, which would flesh out the technology-based idea into a full-scale tourism service.

Company Responses to the Users' Contributions

The companies gained obvious benefits from the user involvement exercises that we organized for them. In the case of the mobile tourism service, product developers could enhance their product already during the study. Developers of the speech recognition technology obtained voice samples and recognized issues related to technological scalability. In other words, technical improvements were eagerly sought for and easily accepted by the firms.

Both companies also gained encouragement for further development of their services. Especially in the speech recognition technology case, company representatives were happily

surprised with the positive response their service prototype received, and with the wealth of ideas for new applications that the users suggested. Engaging in the user tests energized the companies to devote additional efforts to developing and improving the service prototypes, and to finding ways in which they might evoke positive responses among the test users.

Face-to-face interaction between users and developers was highly appreciated by the service developers. It has been previously noted (Kujala, 2003) that externally produced studies may be difficult to integrate into the service development process. It seems that direct interaction provides information that is more actionable. Tacit knowledge is transferred, and face-to-face interaction produces memorable and meaningful experiences.

Yet the limits of user involvement also became clear in the actual testing situations and in our follow-up sessions. Users' critical comments often met with defensive explanations of why a solution was the only feasible one, or how the technology was unaffected by the types of problems feared by the users. The technology developers were certainly not prone to problematization or self-criticism: Users' comments evoked gut reactions, and our later discussions with the companies centered on those reactions, rather than a comprehensive analysis of all the information obtained.

The technology developers were most impervious to fundamental criticisms of the service idea. This is understandable: The idea is what their company is about, and it is very difficult to accept that some people find it questionable or simply silly. In many instances, fundamental criticism was thus met with a deaf ear; it was simply disregarded. We see here entrepreneurial action rationality at work: These kinds of companies are extremely good at collectively fending off criticism toward the company's business idea, and thus combating the inherent uncertainties of entrepreneurship. Yet this strength can also be a weakness, if limited user acceptance turns out to be an important market factor and the company is unable to embrace the new, independent knowledge.

CONTRAST: USER INVOLVEMENT WITH LARGER COMPANIES

It is interesting to note some differences between our recent experiences with SMEs, and our earlier experiences with larger companies. We have previously been involved in testing and evaluating user involvement exercises with larger companies in the field of eBusiness (retail chains; Heiskanen, 2005) and mobile video streaming (a telecom company; Repo, Hyvönen, Pantzar, & Timonen, 2006). In many ways, we found very different benefits and problems in those cases. Our experiences are in line with previous research suggesting that larger companies can accommodate uncertainty and ambiguity in R&D, but are slow in implementing disruptive innovations at the operational level (Damanpour, 1991; McDermott & O'Connor, 2002).

In the following sections, we provide two brief examples of our experiences with larger companies in the fields of electronic grocery shopping and mobile video streaming. They serve to illustrate some contrasts to the previous cases dealing with small entrepreneurial companies.

Case 3: Electronic Grocery Shopping

Our previous user involvement intervention in electronic grocery shopping provides experiences of the ways in which large companies—in this case, retailer chains—deal with

users' suggestions for improved service design. The intervention was designed to promote user involvement in the development of environmentally and socially sustainable electronic grocery shopping services. User involvement was organized as an interactive, multistakeholder process involving representatives of two large retail chains (as well as a third retail chain not participating directly, but maintaining contact via e-mail). The intervention consisted of a 2-day workshop in spring 2002 attended by 31 consumers, eBusiness developers, and other stakeholders (NGOs and experts). Before the workshop, participants were sent an information package on the existing alternative operating models and studies on societal effects. At the workshop, participants worked in small groups with representatives from different interests, using group-work techniques, such as a modified SWOT analysis and brainstorming, to identify key problems on the first day, and then develop ideas for better designs on the second day. On both days, the groups' conclusions were shared at plenary sessions, and the entire process and its outcomes were transcribed in a memo distributed to all participants.

Some of the ideas developed at the workshop were actually not totally original, such as the various user interfaces (e.g., mobile phones and kiosks), new delivery solutions (combined deliveries of goods from different suppliers), and new solutions for supporting local food production. Other ideas were more novel, such as the "Internet-Supported Local Grocery Shop" and the "Suburban Delicatessen." These ideas centered on using eBusiness technologies to promote the competitiveness of local corner shops by reducing inventories (and hence costs) and increasing the range of products offered.

The eBusiness developers of the participating retail chains were interviewed about 6 months after the workshop. These companies had experimental eRetailing services running, and were wondering how to proceed from this experimental stage. For them, the best thing about the workshop had been how it had challenged their customary way of thinking. Their view was that electronic grocery shopping had been discussed in a much broader context than they were accustomed to within their own organization. One eBusiness manager contrasted the workshop with a large consumer survey they had conducted earlier. The workshop had supported some of their earlier findings, but had also alerted them to new issues, such as the ability of eCommerce to provide more product information, the problems of trust, and the impact of eCommerce on urban structure and corner shops. In his words, it helped combat the tunnel vision that organizations develop as they mature. Another noted that the workshop had raised some social impacts he had not been aware of, and concluded that, "*It was actually quite good that there were some people there from the extreme end of the spectrum.*"

Although the knowledge sharing that occurred at the workshop was appreciated by the eBusiness developers, its long-term impact on actual service development was negligible. It was obvious that the two larger retail chains were not very serious about electronic grocery shopping. They were involved in eBusiness merely for the sake of experimentation, and to make sure they can keep up with the future competition if necessary. Yet they had spent quite a lot on R&D in the different distribution models, portals, and surveys. In the same vein, the results of the workshop were stored as a complementary learning experience. The third, slightly smaller company was more serious, due to a large captive investment in small retail outlets. As a result of the workshop, it refined and published a preliminary plan for an "Internet-supported local grocery shop," but the plan never materialized due to financial and competitive constraints. The market strategy of investing in large hypermarkets thus kept its

dominance, as the more alternative approach of combining eBusiness with local shops did not fit into the strategy of the incumbent firms.

Case 4: Mobile Video Streaming

This case of user involvement stemmed from a need to explore meaningful uses for the novelty service of video streaming on a mobile phone. Streaming is a way of providing multimedia, such as radio shows, television shows, and home videos over information networks. In 2002, we carried out a trial, in conjunction with a mobile operator, regarding individuals watching streaming video on their mobile units. Thirteen users of various ages, gender, and backgrounds from the Helsinki metropolitan area were provided appropriately configured mobile phones, with the request that they watch a set of preselected, streamed video clips on the phone over a 1-week period. They were encouraged to watch videos in various situations and instructed to report on their experiences, routines, and activities in a diary.

Two distinctly different contexts in which users considered it natural to view mobile video emerged. First, users were able to avoid boring situations by entertaining themselves. Second, mobile video made it possible to share experiences with other people by watching cartoons with children and by singing karaoke together. This second context of communal watching was something that product developers valued because it had not emerged in small-scale trials among industry professionals, nor did it comply with the stereotypical, solitary use of mobile phones.

It is important to note that a trial such as this was a rare experience. The ICT industry has a long tradition of involving in-company users or users from important customer bases—so-called friendly users—in their user studies. However, these user groups are typically professionally knowledgeable about the services they test. This might be the reason why the social context of use had not previously emerged as clearly. Professionals knew better what was expected of them, and had not been particularly encouraged to experiment. The results from such typical trials relate more to technical functionality and usability.

The results of the case study trial were discussed a number of times with product developers The knowledge sharing that took place was appreciated by product developers, but it did not lead to essential changes in the video service. It was rather obvious that streaming video was only one of several potential future multimedia services. Nor was streaming video expected to generate revenue in the near future. The mobile operator was involved in the video service for reasons related more to the scanning of future technologies and keeping up to date than with technological development. The case was the same for the mobile industry at large. Only recently has next-generation mobile multimedia, such as mobile television, video streaming, and mobile blogging, attracted any sizeable user base.

Similarities and Differences

All four cases provided here involved users who were not given strict instructions on how to behave during the trials. In other words, involvement was broader than in conventional usability testing or market research. The settings were explorative because the developers sought to learn something more than a technical understanding of users. The aim was to

produce usable knowledge that could synthesize contexts, reasoning, experiences, and action in product development.

The innovations were differently disruptive in the four cases (Table 1). Users were the target of disruption in all cases and the industries in two (Cases 1 and 4). The cases reflect well that the developers of disruptive innovations need not only to convince users. They themselves are drivers for disruption and have to convince their respective industrial partners, industrial customers, and even their own management. Disruptive innovations lead to a dynamic two-way sensemaking process. Developers need to understand the service and its new users. This is more challenging than conventional product development in which developers usually know more about existing products and existing users.

Both the small and large companies considered the user involvement exercise a positive experience. The benefits they gained, even though they were used differently, revolved around the intensive interaction with a group of users. Thus, the outcomes of the exercises were not merely (or even mainly) the information imparted, but rather the kinds of encounters created. In the process, the companies learned as much about themselves as about their users.

Additionally, both sets of cases also reveal that the need to respond to users depends on the competitive environment and the nature of the value chains. This aspect arose both in one of the small and one of the large company cases. Users may not be the principal customers of the service, and may be unable to obstruct its adoption (as in the case of automatic speech

Table 1. Comparison of User Involvement Cases with Entrepreneurs (SMEs) and Large Companies.

	Case 1: Speech recognition	Case 2: Mobile travel	Case 3: eGrocery	Case 4: Mobile video
Setting of involvement	Trial of a service provided by a SME	Trial with two SMEs	Workshops with large retailers and other stakeholders	Trial with large mobile operator
Description of involvement and innovation	Scheduling a doctor's appointment on a server using speech recognition	Using the mobile phone as an interactive tourist guide on a walking tour in the city center	Workshop focusing on alternative ways of developing electronic grocery shopping.	Watching videos on mobile phone for one week and reporting experiences in diary
Main target of disruptive nature of innovation	Industry, users	Users	Users	Industry, users
Sensemaking	Test of implementation	Assessment of commercial interest	Articulation of different needs & possibilities	Exploration of new ideas
Action	Better grounds for marketing	Further development of service concept	Improvement of personal expertise	Better understanding of service content
Overall assessment	Convincing business partners in value chain	Direct improvement of service	Understanding the possibilities and limitations of the service	Getting to know a novelty better

recognition). Users' desires and ideas can run counter to dominant producers' strategies (as in the case of electronic grocery shopping). Hence, there are clearly instances in which users' viewpoints have more significance and ones in which they are less influential, and companies may behave perfectly rationally in recognizing this situation.

Yet the cases also illuminate some distinct differences between SMEs and large companies. The large companies appreciated the alternative interpretations and novel uses that users made of their technologies. In fact, the critical and unconventional perspectives that users brought to their products were in many cases viewed as the most valuable input of user interaction. For those large companies, user involvement provided an opportunity to learn about the possibilities and limitations of their technology, that is, to expand their horizons, to get to know new kinds of users (and nonusers), and to envision alternative scenarios for technology and service development (see also Magnusson, 2003). On the downside, the results of our user involvement interventions disappeared into these alternative, potential future worlds, never to be heard of again (see also Olson & Bakke, 2001; Vopel, 2003). It seems as if for the large companies, adept at dealing with equivocality and ambiguity, the new experiences and new knowledge have intrinsic value irrespective of whether they lead to concrete action.

In contrast, the SMEs developing travel and speech recognition products shared a direct approach to user involvement. User involvement was expected to contribute something of direct commercial value. This focused the user involvement on practical issues, and also led to rapid implementation of a number of improvements. On the other hand, the SMEs were highly reluctant to question their points of departure, and they placed great value in their own experiences and personal convictions. User involvement was used to recognize potential issues, solve them (or forget them, if unsolvable), and promote products. Sensemaking and action were closely intertwined. Users were not valued so much for the full range of knowledge that they imparted, but rather for the possibility they provided the company for enacting new roles and relationships.

Overall, the cases with firms primarily seeking implementation of information (Cases 1 and 2) certainly show that user involvement can be used for practical aims as part of a regular product development process. On the other hand, the other two cases (Cases 3 and 4) show that many strategic questions may remain unanswered when firms take such a pragmatic approach.

DISCUSSION

The idea that increased knowledge about users leads to better design is implicit in much of the writing on user involvement (Hanna et al., 1995; Leadbeater, 2006). While not everyone would subscribe to such a simple interpretation explicitly, it is often assumed that raising companies' awareness of methods and approaches for user involvement will help them to get closer to users, to learn more about them, and hence to produce more successful innovations. If the exercises in user involvement do not appear to have been useful or to result in any changes, then the problem is attributed to the methods, and a call is raised for more sophisticated methods for user involvement.

Our experiences in promoting user involvement in SME innovation processes have highlighted some of the problems involved in such an objectivist perspective on user involvement. The interpretive and sensemaking processes that new knowledge and new

interactions give rise to in companies are too often considered unproblematic. From a sensemaking perspective (Weick, 1995), such processes involve reinterpreting what the company itself is, and enacting new user relationships. In our SME case studies, user testers helped to identify simple problems and hitches: things that anyone would have noticed—in many cases, even the product developers themselves. Yet it seems that having "real users" test the products made the feedback more urgent and provocative. This increased the company representatives' commitment to and accountability for the service prototype, which in turn provoked two types of slightly contradictory responses. The designers felt the need to defend their solutions, but they also felt urged to make improvements quickly. Interaction with users served to energize the product development process, to push it forward to the next stage, and to stimulate thoughts about the market launch of the product.

Thus it seems that user involvement can also be utilized in the context of action rationality, as defined by Brunsson (1985). When designing appropriate user involvement approaches for high-tech startup SMEs, it is important to understand that the companies are often highly committed to a narrow application of technology in which they have invested their work and their energies for years. At this stage, companies often are not interested in learning about the alternative visions of the user, and will often resist any fundamental critique of their chosen path. Larger companies can have more alternatives because they are not driven by such entrepreneurial action logic. They usually have multiple (even mutually competing) innovation projects, and are used to the idea that some projects are screened out and never materialize (Lichtenthaler et al., 2004; Product Development Institute, Inc., 2006).

In terms of organizational sensemaking, however, there was one fundamental similarity between the SME cases and our experiences with larger companies. Interaction between product developers and users was the most beneficial and important experience gained from the user involvement exercise. Much knowledge was transferred that is tacit by nature, and impossible to transcribe or report (see "sticky information"; von Hippel, 1998). This type of knowledge relates to key features of sensemaking: identity-construction, enactment, and plausibility (Weick, 1995). Accordingly, if firms wish to involve users, they should be prepared to involve themselves.

The cases also provide evidence on the more strategic-level limits to user involvement. The user involvement movement seems to assume a fundamental alignment between the users' and producers' interests. Our experiences (with both small and large companies) show that this is not always the case. Users can be more or less important for different kinds of companies and in different market situations. Companies, especially ones involved in disruptive innovations, can therefore disregard some user input for long-term strategic reasons (see Ivory, 2004).

Practitioners and researchers who wish to promote user involvement might draw two implications from this analysis. Better utilization of user involvement can be achieved by a better understanding of company-internal and company-external barriers to user involvement. In terms of internal factors, more attention should be devoted to the role of action rationality and sensemaking processes in integrating user inputs into product development. We have shown here which types of user input were helpful for SMEs developing interactive digital products. Other kinds of companies will likely have different needs.

In terms of external barriers, a close analysis of the nature of technological evolution and the competitive environment could help us identify situations in which user involvement is

more or less likely to be utilized. Our cases show that even though there may not be a fundamental gap between innovation-orientation and customer-orientation, there is no automatic alignment between these perspectives either. There may be genuine conflicts of interest between innovators and users, and user involvement will not make them go away. Thus, practitioners of user involvement may need to consider the broader circumstances in which they launch their interventions (see Kensing & Blomberg, 1998): Can they select contexts in which innovators' and users' interests are relatively easy to align, or can they change the innovators' operating environment through their interventions?

We thus conclude that the way the user involvement process is designed is important, and that different kinds of companies may benefit from different forms of user interaction. The SMEs in our study followed a distinct action rationality, leading to rapid implementation of some user inputs, and defensiveness toward others. By contrast, the larger companies in our prior studies were more open to user input yet less determined to implement it in product development. Yet good design of the user involvement exercise can promote, but not ensure, the implementation of users' suggestions and requirements. Firms also need to have an interest in implementation, and this depends on the competitive position of the company. Based on these findings, we have reconceptualized user involvement as a form of interaction between users and innovating companies that is facilitated and constrained by microsociological processes, on the one hand, and by market power and the competitive environment, on the other.

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