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Abstract

Contemporary information technologies enable firms to re-think and innovate with their service offerings. The difficult challenge with new service development (NSD) is how to engage the potential new service users in firm's NSD activities. The lead user method has been a promising approach to tackle this problem. However, the finding and recruiting of the lead users has been found very arduous for the firms. The paper designs and tests a method for identifying and contacting the lead users, and employs laddering interviewing for subsequent data collection. The data consists of 55 laddering interviews conducted in Finland and Hong Kong. Our findings demonstrate that the proposed method can be considered effective. The results of the study show that with the proposed method we can facilitate design activities between new service developers and potential new service users. Our study also reveals interesting differences in the data sets regarding how interviewees provide reasoning for their potential service use. This finding provides basis for future research in understanding how culture affects new service development.

Keywords: New service development, Lead users, Virtual communities, Snowballing, Consumers, Laddering, Personal construct theory, Global markets, Culture, Design science research methodology.

Introduction

The environment in which businesses have to operate has radically and very rapidly changed, along with the proliferation of the Internet and globalization. The service-dominant (S-D) logic [Vargo and Lusch, 2004] has been suggested as one way to deal with this turbulence. The S-D logic is departing from a traditional goods-dominant logic and it focuses more on the engagement of users in the new service development than on developing products or services for the markets [Vargo and Lusch, 2004]. Heinonen et al. [2010] have further emphasized the customer focus of service development by arguing that customers should be the focus of development activities and the fundamental source of competitive advantage.

A proposed solution for finding customers' needs is to tighten the relationship between firms and their service users by creating and/or making use of virtual community places in order to foster the collective creation and sharing of knowledge [see, e.g., Franz and Wolkinger, 2003, Füller et al., 2004, Nambisan and Baron, 2007, Nambisan and Nambisan, 2008, Sawhney et al., 2005, Verona et al., 2006]. Especially, we should be concerned of the "fuzzy-front-end" phase of the new service development activities [Alam, 2006, Herstatt and Nagahira, 2004, Kim and Wilemon, 2002, Montoya-Weiss and O'Driscoll, 2000]. This fuzzy-front-end has been extensively studied in the information systems literature, where it has been found that the mistakes at the early information systems development phases regarding e.g. understanding users' needs and requirements, may lead to catastrophic failures later on, and it is extremely expensive to correct the errors [Davis, 1990, Davis, 1982]. Thus, various approaches for user participation or user-centered development have been presented [Markus and Mao, 2004, Mathiassen et al., 2007].

Researchers have also long been discussing similar issues within the new product development literature. Nomura [2002] has presented that knowledge sharing and creation has been dysfunctional in organizations, and he has claimed that typical R&D people in particular are overwhelmingly lacking contact with their product users and communication with other companies. This is related to the problem of "sticky" local information coined by von Hippel [1998]. The development work is by nature complicated as the sticky need information (what the user wants) resides with the user, and the solution information (how to satisfy those needs) lies with the developers [Thomke and von Hippel, 2002].

This issue has become ever more complex due to globalization of markets. The literature tells that the rates at which consumers adopt innovations vary across cultures [Takada and Jain, 1991]. Furthermore, at the individual level, both national cultural and individual personal value orientations have an impact on consumer innovativeness [Hofstede, 1980, Hofstede et al., 2010]. Similar cross-cultural concerns have arisen in information system design [Ives and Jarvenpaa, 1991, Tractinsky and Jarvenpaa, 1995]. The fact that innovations, including information systems and services, are adopted at different rates across cultures is well accepted [Nakata and Sivakumar, 1996]. Consumer perceptions are influenced both by the individual's personal values and the context of product usage. Myers and Tan [2002] have suggested that information systems research needs to transcend the perspective of cultural difference and adopt models that recognize "the emergent and dynamic nature of culture." In addition, Steenkamp et al. [1999] and Daghfous et al. [1999] have studied how culture influences people's individual personal value orientations as explanatory variables for consumer innovativeness across cultures. Therefore, it seems that culture has an impact on consumer innovativeness and that it also differs between cultures. However, there has been relatively little research that has studied culture's impact on lead user behavior [Scheraga et al., 2000].

In this paper we are exploring ways of advancing the engagement of innovative users in the development of IT-enabled innovative services aimed at consumers – that is, to

every one of us – as users[1]. Examples of such products are embedded advanced applications for new generation mobile phones, digital TV applications and also the myriad of web-based services. We present a method for recruiting carefully selected users through virtual communities in order to invite them to participate in the new service development (NSD) activities. Our method fosters innovation by employing lead users [von Hippel, 1986] in the requirements discovery [see, e.g., Mathiassen et al., 2007] phase of new service development. Von Hippel [1986] has characterized lead users (LU's) as those who are among the first to adopt new products or services. Lead users' needs may be used for predicting what the masses desire later on. Our purpose is thus to actively engage the leading edge consumers in the development of new services. We believe that the active involvement and integration of the consumers is necessary to discover the sticky need information [von Hippel, 1998] that resides in them.

We utilize design science research [Hevner et al., 2004, March and Smith, 1995, Walls et al., 1992, Walls et al., 2004] as our research methodology. Hevner et al. [2004] posit that design science research can be used to develop constructs, models, methods, and instantiations. Our study designs and tests a method for recruitment of lead users from virtual communities to innovative IT enabled services for consumers. More specifically, we applied an early version of the design science research methodology (DSRM) [Peffers et al., 2008] to conduct our research. Consequently, we will also use DSRM to report our research. Therefore, we first review relevant literature to depict the motivation for the study, which culminates to presenting the objective of the study. This is followed by the description of the conducted field study that describes the design and demonstration of the developed method. The evaluation section presents results of testing the method against a de-facto method used in the field. Thereafter we discuss the findings, and finally, conclude and offer suggestions for future research.

Problem: Involving Users into Service Development

In the discipline of information systems, the involvement of users to development work has been a lively topic. In development process oriented literature, the issue has long been recognized in the form of getting feedback [Boehm, 1988]. However, we see that plain feedback is not enough for the involvement of consumers to new service development. As Wanninger and Dickson [1992] argue, this type of communication produce only only "local" views and fail to produce an understanding of the complete system with interactions involved and necessary tradeoffs to be made. McKeen et al. [1994] have argued that user participation improves the quality of the system in several ways, and they list the following: 1) more accurate and complete requirements, 2) information about how the organization supports the system, 3) avoiding unimportant features, and 4) improving user understanding of the system. Damodaran [1996] adds to the list improved levels of user acceptance and increased participation in decision-making in the organization.

However, there is no common definition how the users should be involved in the development process [Carmel et al., 1993, Iivari and Iivari, 2006, Isomäki and Pekkola, 2005]. The literature usually offers two main options, bottom-up and top-down approaches. In the bottom-up approach the decision-making is taken to "the floor", and this is thus said to be a democratic and participative way of involving users to the systems development [Bjerknes and Bratteteig, 1995]. With this approach, it is possible to unite the designer and user [Grudin, 1991]. Kujala [2003], e.g., offers a review of the benefits and challenges of user-involvement in the field of requirements engineering. In the top-down approach the view has been that the management knows what is best for the organization [Rockart, 1979]. Also the usability specialists may serve as "surrogate users" in the design process [Iivari and Iivari, 2006]. In this case, user involvement is informative or consultative at the most, as the users do not actively participate

in the process [Iivari and Iivari, 2006]. Lately, however, researchers have sought for building consensus on these approaches and they have recommended considering wide participation of stakeholders from different places of the organization or user-space [Peffers et al., 2003, Vidgen, 2002]. We concur with this view and see that we should encourage stronger user participation in the early stages of development.

We see a solution in using the lead user (LU) concept developed by Rogers [1995] and von Hippel [1986] for this purpose. Rogers has claimed that the diffusion of innovation follows a pattern, which can be used to forecast the entire diffusion. The key argument is that the recognition of what the lead users demand from innovative products could lead to forecasts of what the masses desire later on [von Hippel, 1986]. Gruner and Homburg [2000], among others, found in their study that the LU characteristics of the users involved in the development process increase new product success [see similar results also in Franke et al., 2006, Matthing et al., 2006]. The LU concept has been employed also within IS in combination with new emerging methods of information systems planning [Peffers et al., 2003]. Furthermore, it is very common in the software industry to use lead users for product testing and currently also for providing peer-to-peer online support [Franz and Wolkinger, 2003, Nambisan and Baron, 2007].

Finally, a related question to this - how to find the lead users - is a problem of its own, and the need for new approaches for finding them has been put forward [Nambisan and Wilemon, 2000]. The traditional approach for finding LU's has been the networking or snowball-selection of participants according to their knowledge [von Hippel et al., 1999]. However, the burden related to this process has been claimed to be as one of the barriers for organizations to adopt the LU concept [Olson and Bakke, 2001]. Furthermore, the lack of lead user studies in consumer settings suggests that it may be hard to identify lead users [Hoffman et al., 2009], and that lead user status may be specific to domain of use instead of being a trait-based characteristics [Droge et al., 2010, Spann et al., 2009].

In order to find solutions to the above problems, we see that the use of virtual communities could prove useful. Expert-based communities have existed already from the ancient times, but the Internet as a platform has enabled the explosion in their amount, and made them also much more transparent and accessible.

Proposed Solution: Virtual Community Driven Lead User Development

We have so far concluded that users should be involved in the early stages of the system or service development if we want to increase the success of them. However, how to establish and maintain an innovative relationship and collaboration between the firm and the users already in the early phases of the development is a question that benefits from further studies. Quite recently, several studies have preliminarily analyzed the utilization of virtual customer communities in new product or service development [Franz and Wolkinger, 2003, Füller et al., 2004, Nambisan and Baron, 2007, Nambisan and Nambisan, 2008, Sawhney et al., 2005, Verona et al., 2006].

An extensive literature on virtual communities and their role in social life exist [see e.g. Putnam, 1996, Renninger and Shumar, 2002, Rheingold, 1993]. Communities can be defined as "groups of people who share a concern, a set of problems, or a passion about a topic, and who deepen their understanding and knowledge of this area by interacting on an ongoing basis" [Wenger et al., 2002]. A virtual (or online) community may be defined to be an

> "*Aggregation of individuals or business partners who interact around a shared interest, where the interaction is at least partially supported and/or mediated by technology and guided by some protocols or norms*." [Porter, 2004].

Various concepts that adapt a special context (e.g. learning or knowledge creation) into

communities exist. The concept of "communities of practice" [Wenger, 1999, Wenger et al., 2002] stresses informal and practice-based learning, in which a set of people having mutually defined identities and shared stories learns. Zager [2002] presents coalitions as temporary collaborative forms constituting individuals and teams that are connected by shared interests. Nonaka and Konno [1998] have coined the Japanese term *Ba* to express this. *Ba* is defined as "…a shared context in motion, in which knowledge is shared, created and utilized" [Nonaka and Toyama, 2003].

Among others Sawhney and Prandelli [2000] and Sawhney et al. [2005] stress the shift from a perspective of exploiting user knowledge by the firm to a perspective of knowledge co-creation with the users. Prahalad and Ramaswamy [2004] add that informed, networked, empowered, and active consumers are increasingly co-creating value with the firm. Jeppesen and Molin [2003] have claimed that there are practically three types of consumers in virtual communities, the first type of which is best characterized as lead users: they use the product and develop innovative applications, they have relatively in-depth and specific knowledge of certain aspects of the product and they keep themselves up to date by interacting with peers. Franz and Wolkinger [2003] and Piller et al. [2004] confirm that virtual communities are a perfect source for lead users. However, designing such a community requires a careful plan and adaptation to the situation [Kristensson et al., 2008, Nambisan, 2002, Nambisan and Baron, 2007, Nambisan and Nambisan, 2008, Sawhney and Prandelli, 2000].

A number of researchers have presented preliminary results of employing lead users from virtual communities in new service or product development with promising results. For example, Franz and Wolkinger [2003] employed a web survey complemented with hybrid conjoint analysis [Dahan and Hauser, 2002] to differentiate between preferable product offerings. They found that community members and especially the identified lead users are very willing to provide the necessary information to develop new products. Füller et al. [2004], in turn, introduced the concept of Community Based Innovation, which is founded on social exchange and interaction theory. They have emphasized the importance of the selection process of lead users. Sawhney et al. [2005] highlight with two organizational examples how the Internet can serve as a powerful platform for collaborative innovation with leading edge users. They state that in virtual environments firms can better select lead users or, even, let them self-select.

Matthing et al. [2006], in turn, have explored the identification of innovative users and the effectiveness of employing them in generating new service ideas in a technology-based setting. They employed the 4-dimensional 'Technology Readiness Index' (TRI) of Parasuraman [2000], and discussed also its similarities with the lead user concept. For example, an individual with a high degree of 'optimism' and 'innovativeness', and a low degree of 'discomfort' and 'insecurity', is likely to be a lead user of new technologies. They found that such lead users with a high degree of TRI (so-called 'explorers') should be asked to participate in the user involvement endeavor, as

> "*They adopt technology-based offerings earlier than others, have a strong propensity to seek out new technologies and enjoy tackling problems associated with those technologies, and are willing to participate in the process of developing new technology-based services*".

Furthermore, Franke et al. [2006] have found that a high intensity of lead user characteristics (especially the dimensions of being ahead of the trend, and obtaining benefit from the innovation) displayed by a user has a positive impact on the likelihood that the respective user yields a commercially attractive innovation. Although there are several affirmative examples of employing lead users, the method has seemingly failed to catch on more industries and firms according to a longitudinal case study of Olson and Bakke

(2001). These researchers learned that finding, qualifying, and recruiting the lead users were seen by companies as the most burdensome tasks in lead user development. Olson and Bakke used in their case study traditional networking (mouth-to-mouth) methods for finding the lead users.

Therefore, our research objective is to develop a *virtual community based recruitment method* (VICOR). In the following section, we depict the method design process and demonstrate the use of the VICOR method. After this, we present test results that compare the VICOR and snowballing methods in order to evaluate the developed method and to investigate the differences between two culturally different research sites, namely Finland and Hong Kong.

Field Study: the VICOR Method Design

The field study explores the new service potential of mobile presence technology in connection with a research program that was under the auspices of a larger DiViA[2] research project of LTT Research, Inc., a commercial research firm owned by the Helsinki School of Economics. The research program included 15 researchers from four continents. So far it has involved some 450 participants in Auckland, Helsinki, Hong Kong, and Las Vegas. The overall design process of the method is summarized in Figure 1. The recruitment of lead users consisted of five distinct phases, which were run in parallel in Finland and in Hong Kong.

The *presence technology* allows mobile device users to share information about their current availability and status in terms of their own concepts or those of a presence based application with subscribers to that information. For example, a basic presence service could allow users to publish their information and share it with others in order to make mobile communication and services more sensitive and personal. This information may include the availability of the subscriber, the preferred means of communication, the subscriber's whereabouts, as well as visual content for self expression of one's emotion, in order to guide other users' communication decisions while controlling their own information [Nokia, 2005]. Examples of presence information might include, “sleeping,” “in a meeting—leave voicemail,” “bored—call me,” or “at leisure and looking for fun.”

As the presence technology was new to us and to the markets we first planned to listen to industry experts’ opinions to provide us with a focused application scope within the domain. Therefore, we recruited 13 marketing professionals from firms participating in the DiViA project to help us with this, and designed a group support system (GSS) session for defining the scope and the target for the project; *Mobile Presence Services*. The results included recommendations for three application areas for mobile presence based services: 1) presence-enabled mobile travel services while being en-route; 2) presence-enabled mobile service while being out and about in the city; and 3) presence-enabled mobile information service for special interest group members / community. We added one extra stimulus to the final list: a presence-enabled mobile service “for you”. With this research premise we continued towards the actual participant recruitment regarding the potential lead users of such services.

The lead user recruitment phase was designed to consist of a virtual community based recruitment effort in Finland and traditional snowballing based efforts in Hong Kong and Las Vegas. In this paper, we focus only on two of the research sites, namely Finland and Hong Kong, as the experience of the researchers involved in these two sites were comparable to each other (regarding the specific interview method used). The demographic information of the study participants is depicted in Tables 1 and 2. They show that the distributions for both age and education differ somewhat from each other.

Snowballing relies heavily on the first few perceived lead users before branching out towards their contacts. This bias is evident in the demographics of the Hong Kong participants, which are clustered around two major

groups both regarding age and education. The Finnish participants were more evenly distributed among the categories although we do not claim a normal distribution of the sample nor representativeness of the Finnish population. However, as we illustrate in the next two sections when we demonstrate both of the methods in more detail, we felt that this was not a serious limitation for our research. In summary, the recruitment process resulted in a panel of 55 participants: 28 from Finland and 27 from Hong Kong.

Virtual Community Recruitment Method

Figure 2 summarizes the Virtual Community Recruitment method, which we applied for the lead user recruitment in Finland. The method comprised first selecting the virtual communities that would be of interest to potential lead users of the new services envisioned. Posting a survey invitation in the virtual community's bulletin board or a similar space followed this. When potential participants answered the invitation he or she was first directed to answer a web-based survey enquiring several lead user characteristics, and the final selection of the lead user participants for the subsequent interviews were done according to cut-off values for these survey results. In below, we illustrate the method in more detail.

The recruitment process thus began with the selection of suitable virtual communities. We

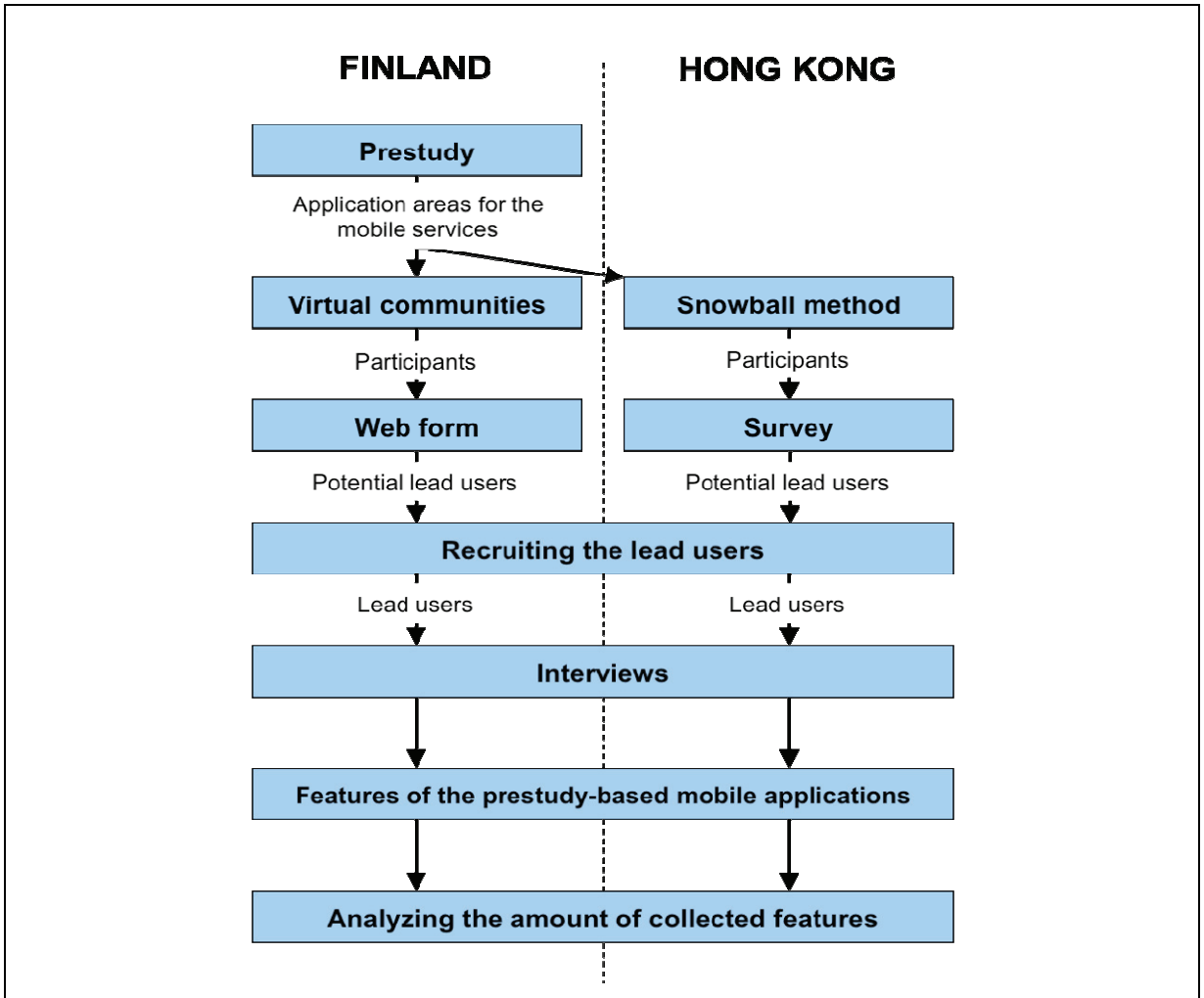

Figure 1 - Method Design Process

Table 1 - Comparison of Participants' Ages in Finland and Hong Kong

	Finland		Hongn Kong	
Age	**Frequency**	**%**	**Frequency**	**%**
Under 20	3	11 %	0	0 %
20-24	12	43 %	2	7 %
25-29	5	18 %	14	52 %
30-34	2	7 %	7	26 %
35-39	0	0 %	2	7 %
40 or over	5	18 %	0	0 %
Missing value	1	4 %	2	7 %
Total	28	100 %	27	100 %

Table 2 - Comparison of Participants' Education in Finland and Hong Kong

	Finland		Hong Kong	
Highest degree earned	**Frequency**	**%**	**Frequency**	**%**
Primary school	3	11 %	0	0 %
High school	13	46 %	0	0 %
Vocational school	5	18 %	0	0 %
Undergraduate degree	4	14 %	10	37 %
Graduate degree or higher	2	7 %	16	59 %
Missing value	1	4 %	1	4 %
Total	28	100 %	27	100 %

eventually ended up with twelve virtual communities[3] These vary from mobile, gaming and home entertainment to travel related communities, which were perceived by the researchers to potentially consist of consumers that would be interested in mobile presence type of services. The selection of the sites was iterative in the beginning and it lasted seven weeks in total. The initial contact was always first made with the administrator(s) of the given virtual community as suggested by Füller et al. [2004]. We contacted the administrators first by email or private message via the virtual community. We did contact a selected number of administrators by telephone if they did not respond to the email or private message. This was, however, done only with a handful of people and not all administrators that we tried to contact were reached. Those whom we managed to reach all allowed us to post our recruitment invitation to their bulletin board. The invitation messages were removed from the web site when the recruitment of the interviewees was completed.

The virtual community members that demonstrated interest in the study were sent an email with a hyperlink to access the web-based pre-survey. The original survey items are presented in Table 3. The survey constructs for questions one to four (Q1-4) have been derived from Agarwal and Prasad [1998], and they are considered to measure the general innovativeness of the participants. The fifth [Parasuraman, 2000] and the sixth questions were added to measure how participants perceive themselves to disseminate their knowledge on innovations and how their peers consider this. All these questions employed a five-point Likert scale with response "Very True" valuing five (5.00) and "Very False" valuing one (1.00). We also provided the participants the possibility of indicating that they were "Unsure" of the question, which was given the value of null (0.00).

Finally, we wanted to understand how the participants used mobile services instead of only asking them about their *perceived* use, and also whether they were using similar Internet-based services than the mobile presence concept would offer for mobile users.

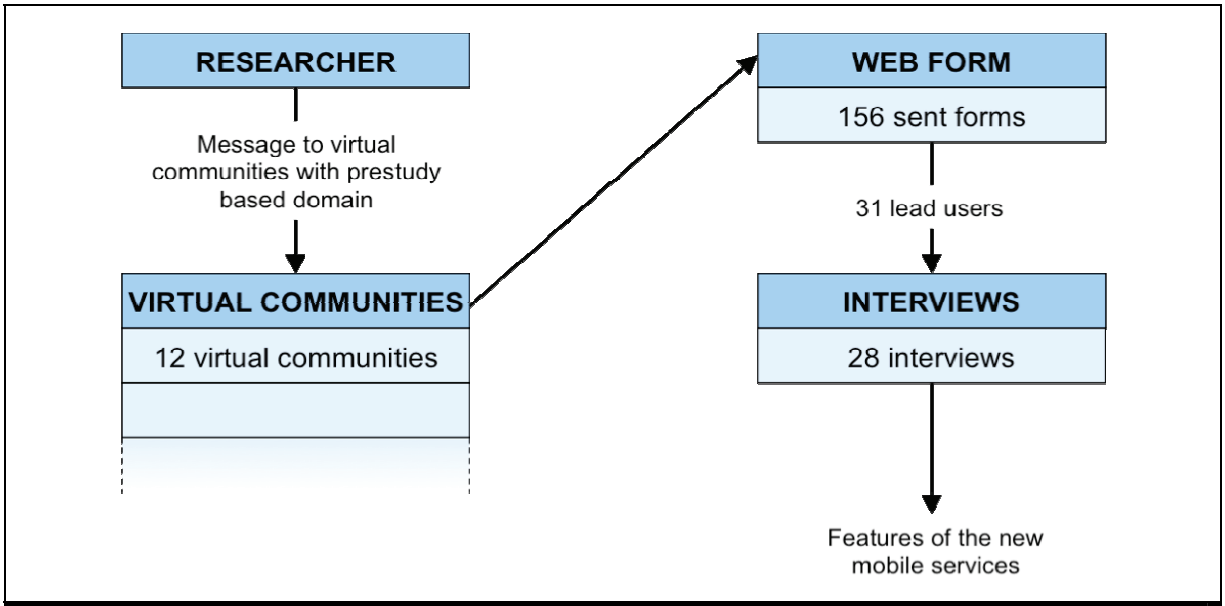

Figure 2 - Virtual Community Recruitment Method Used for Lead User Recruitment in Finland

For the questions about actual mobile services or Internet-based services we valued the usage patterns per service type as follows: value of five (5.00) for daily use, value of four (4.00) for few times a week, value of three (3.00) for once a week, value of two (2.00) for few times a month, and value of one (1.00) for once a month or less frequently. For this question, we also provided a null value option in case the participants were uncertain or did not use the service at all. The results of the survey were automatically stored to a Microsoft Access database. In order to recognize possible double entries the IP address and time and date for the responses were additionally recorded.

The next step was to decide what would be an appropriate cut-off point for assessing the participants' responses on lead user characteristics. For this purpose we recruited five mobile experts known by the researchers, and asked them to fill in the survey. A similar process was done in the other data gathering location in order to adjust the cut-off values for each research site. From these responses we derived the following selection criteria that were used to evaluate whether a participant was considered a lead user or not:

1. For questions one to six the value of the all responses should be four (4.00) or five (5.00), with the exception of allowing one response a value of three (3.00).

2. For questions about the mobile service and Internet use the sum of the answers should be at least equal to the average of the responses of the expert mobile users, i.e. 25.80 out of the maximum of 50.00 (10 services times 5.00 points).

The details of the differences between responses of participants considered to show lead user characteristics and the others are provided in Table 3, which resulted into 81 participants meeting the first selection criterion, and 57 participants meeting both selection criteria as seen in Table 4. From these 57 potential participants to be invited to the subsequent laddering interviews we selected 35 persons who lived in the Helsinki or Tampere metropolitan areas as potential interviewees. Finally, 31 persons were reached and they accepted the invitation. Due to 3 cancellations we were able to complete the interviews with 28 persons. The interviewees were given a 50€ gift voucher as a token of appreciation of their time.

Table 3 - Survey Results in Finland

Question or argume t *	Lead users	O hers	Difference
1. When I hear about new information technology I'm used to explore it.	4.28	3.25	1.03
2. Among my friends I'm usually the first one to try new information technologies.	4.42	3.13	1.29
3. I'm hesitant to try new information technologies. **	4.19	3.70	0.50
4. I want to try new information technologies.	4.72	3.92	0.80
5. Other people ask my advice related to technologies.	4.47	3.40	1.07
6. I have a thorough knowledge on current mobile technologies and the services they enable.	4.14	3.06	1.08
7. On how many days per month (30 days) you use the following services?			
SMS (text messages)	4.49	4.09	0.40
SMS-based services, ring tones, logos etc.	2.26	1.59	0.68
MMS (multimedia message)	2.39	1.32	1.06
Email via telephone	3.09	1.38	1.70
Downloadable phone applications	2.89	1.52	1.38
Wireless Internet (WAP)	2.84	1.66	1.19
Use of internet via mobile browser	3.11	1.45	1.65
Discussion forums / message boards	4.40	3.81	0.60
Chats	2.93	1.99	0.94
Instant messengers (e.g. Messenger, ICQ)	3.96	2.71	1.26

*) Scale of answers was Likert 1-5.
**) Question 3 was a control question with points given in reverse order.

Table 4 - Survey Participants in Finland

Total number of participants n=156				
Requirement for Lead users	Questions 1-6		Question 7	
	At least 4 points per question (max 1 question with only 3 points)		Minimum total of 25.80 points	
Respondents exceeding the limit *	81	51.9%	57	36.5%
From capital area and Tampere	36			
Lead user respondents reached	31			
Interviews	28			
Cancelled interviews	3			

*) The number of replies exceeding the limit in question 7 was counted from persons also exceeding the cut-off value of questions 1-6. The percentage is calculated based on total number of respondents.

Snowballing Based Recruitment

In Hong Kong we applied the more traditional snowballing method for recruiting the lead users to the study. An overview of this research process is illustrated in Figure 3. The process started with the local researcher first identifying among her peers six potential experts in mobile service use in Hong Kong. These experts were asked to answer to our survey questions (see Table 4) to measure their lead user characteristics. As the outcome we gained the cut-off values for Hong Kong recruitment, which are presented in below:

1. For questions one to six the value of the all responses should at least be three (3.00).

2. For questions about mobile service and Internet use the sum of the answers should be at least equal to the average of the responses of the expert mobile users, i.e. 15.00 out of 50.00.

We then continued the snowballing recruitment with persons that the six initial experts indicated to us. In total, the local researcher contacted 45 potential lead-users, and in the end 32 persons met the selection criteria. All of the contacted participants agreed to participate in the subsequent interview phase of the study, although 27 interviews were ultimately conducted due to scheduling problems. All in all, the lead user recruitment was considered to fare well using the snowballing method. A summary of the participants' statistics is presented in Table 5. It shows that 71% of the potential lead users contacted met the inclusion criteria. More detailed survey results of the interview participants are summarized in Table 6. The results are similar to previous experiences with lead users [Peffers et al., 2003, Peffers and Tuunanen, 2005, Peffers et al., 2006] and the literature in general about the applicability of the lead user method [Olson and Bakke, 2001, von Hippel, 1986, von Hippel, 1998, von Hippel et al., 1999].

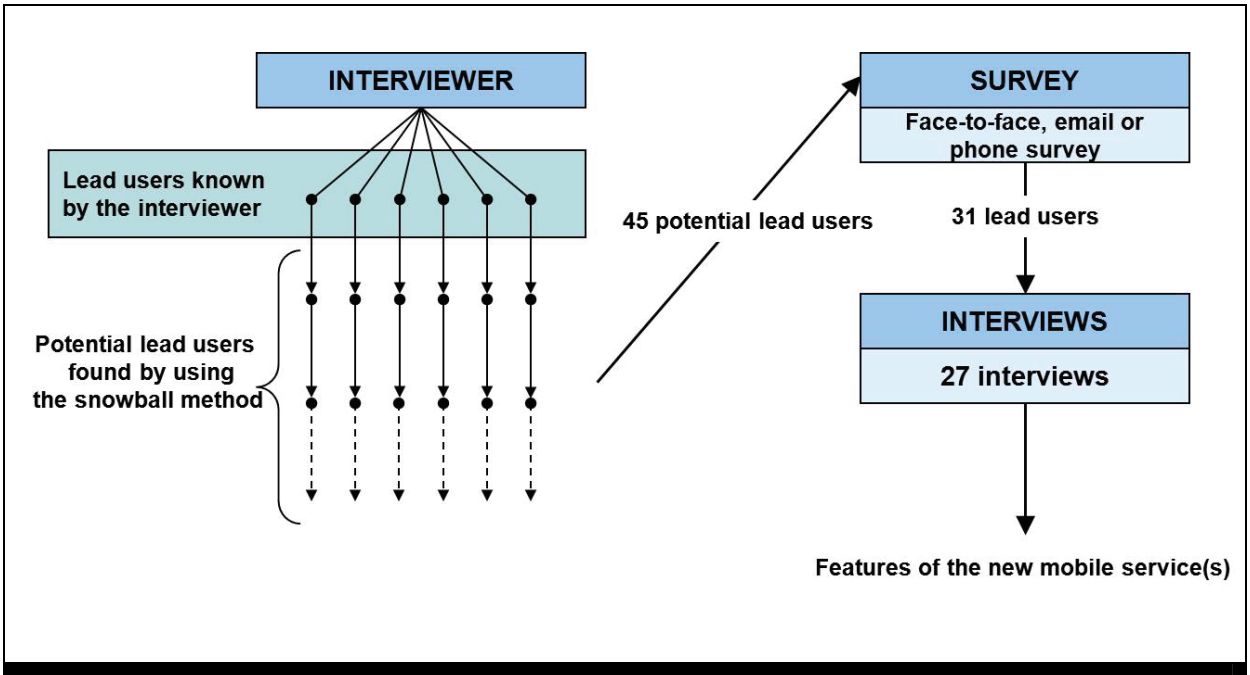

Figure 3 - Lead user recruitment in Hong Kong

Table 5 - Survey Participants in Hong Kong

Total number of participants n=45		
Requirement for lead users	Questions 1-6	Question 7
	At least 3 points per question	Minimum total of 15 points
Respondents exceeding the limit *	71%	
Lead user respondents identified	32	
Conducted interviews	27	
Cancelled interviews	5	

*) The threshold in question 7 was so low that only questions 1-6 remained as eliminating factors.

Table 6 - Survey Results for Interview Participants in Hong Kong

Question or argument*	Average Results
1. When I hear about new information technology I'm used to explore it.	4.18
2. Among my friends I'm usually the first one to try new information technologies.	3.79
3. I'm hesitant to try new information technologies**	3.89
4. I want to try new information technologies.	4.54
5. Other people ask my advice related to technologies.	3.96
6. I have a thorough knowledge on current mobile technologies and the services they enable.	4.00
7. On how many days per month (30 days) you use the following services?	
SMS (text messages)	3.30
SMS-based services, ring tones, logos etc.	2.56
MMS (multimedia message)	1.70
Email via telephone	2.07
Downloadable phone applications	1.30
Wireless Internet (WAP)	2.30
Use of internet via mobile browser	2.00
Discussion forums / message boards	4.00
Chats	4.33
Instant messengers (e.g. Messenger, ICQ)	4.63

*) Scale of answers was Likert 1-5.
**) Question 3 was a control question with points given in reverse order.

Interview	Chain number	Part of the chain								
		1	2	3	4	5	6	7	8	9
HELSINKI 24	1	A	A	A*	C	C	C	V		
	2			A	C	A	C	C	V	V
	3	A	C	C	C	V				
	4	A	C	C	V					
HELSINKI 25	1	A	A	C	C	V				
	2	A	C*	V						
	3		A	C	C	V	V			

A = Attribute, C = Consequence and V = Value

*) Branching chain

Figure 4 - Laddering Interview Examples

Laddering interview data collection

After the recruitment phase of the study in both locations was concluded, we interviewed each of the participants individually and in-person. During the interviews, the interviewers made digital audio recordings and took notes with an electronic spreadsheet application or using pen and paper. Before the interviews began, the participant was shown a flash demonstration of mobile presence technology. After the demonstration the participants were encouraged to think outside the presented example of using the presence technology, and think of some other use cases that could employ the new technology.

The interviews were conducted with the laddering interviewing technique [e.g., Browne and Ramesh, 2002, Browne and Rogich, 2001, Peffers et al., 2003, Peffers and Tuunanen, 2005, Reynolds and Gutman, 1988]. The participants were presented with a list of the stimuli developed in the pre-study and asked to rank order them in terms of their importance to them. Then, one at a time, for the two highest ranked stimuli, the interviewer asked the participant to describe a feature that would be important to him/her. The interviewer then asked "why would that be important to you?" to elicit consequences that the participant expected from the feature. The interviewer then continued with a series of "why would that be important?" questions to elicit a chain of consequences the participant expected to result from the feature, and values or objectives that were furthered by the feature. To elicit more concrete service attributes, the interviewer asked the participant a series of questions about "what would there be about the system that would make you think that it would do that?" This data was recorded in the notes as a series of chains and individual ladders as demonstrated in Figure 4. The example also illustrates one of the characteristics of the laddering technique, i.e., the branching out of the interviews that is depicted by chain number two regarding interview 24 and chain number

two regarding interview 25 in Figure 4. It is often so that the interviewer sees that there are several 'lines of thought' emerging from system attributes which may have different reasoning and goals or values as drivers.

The outcome of the laddering interviewing in all research sites was a data set, which consisted of 597 chains of individual requirements and 3113 specific requirements of potential presence service users. The data was aggregated to produce a meaningful, and smaller, set of rich, unified and aggregated models, which makes it easier for managers and designers to comprehend the data. Finally, the aggregated data was used for creating network maps by transforming the clustered chains in each theme into a network map[4].

Evaluation

The data that resulted from the laddering interviews was entered to a spreadsheet application according to the example given in Figure 4. Namely, each ladder chain was entered as one row in the spreadsheet and these chains were coded into attributes of the service features, reasoning behind them (consequences), and values or goals driving the use of the services. The interviewees expressed their preferences and reasoning, using unique language. In the analysis that follows we only concentrate on the service feature attributes found.

Two researchers independently coded the laddering data set in order to standardize what was assumed to be a service feature in the data set. We defined that a service feature should be something that describes in a concrete manner a functionality of the service, or the potential use of it. Those data items that illustrated the interviewees' considerations of the perceived costs of the use of the services were excluded. The coders' initial agreement level was 87.14% on the service features. Cohen's Kappa [Cohen, 1960] value for this is 0.7428, which indicates a very good or a good level of agreement between the coders. After the initial round a consensus approach was used to find out agreement for the conflicting data items.

We analyzed the data in order to investigate whether there are statistically significant differences in the number of service feature attributes, consequences and values between the Finland and the Hong Kong data sets, and therefore, the perceived quality of the data sets is similar. To normalize the length of the laddering chains we first weighed the results. As weights we used the average of the six first screening questions (see Tables 3 and 6). These were 4.37 for Finland and 4.06 for Hong Kong. Dividing the length of the each ladder chain with an assigned weight for the location provided us the normalized lengths of the laddering chains. We used these for conducting the analyses[5].

First, we tested the normality of the weighted ladder items using both Kolmogorov-Smirnov and Shapiro-Wilk tests (see Table 6). Both tests indicate that we can assume normal distributions for the data sets (sig. 0.000). Then, we used Levene's test of variances to assess the equality of variances in the samples, see, e.g., [Brown and Forsythe, 1974]. Second, we used t-test to investigate the differences between means of the weighted lengths of the laddering chains in both locations according to the attribute, consequence and value constructs. The test results are presented in Tables 7-9. Our results indicate that we can assume that that there is a difference between the variances. When inspecting the t-test results for two of these three constructs, we can argue, however, that there is no statistically significant differences between the attribute constructs, i.e. service features, (sig. 0.555) or the value constructs, i.e. drivers for service use, (sig. 0.755) for the two data sets. The test was conducted with the assumption that the variances of the samples are non-equal as suggested by the result from the Levene's test of variance (see Tables 7-9).

Therefore, we can argue that the VICOR method produced equally good or similar

results as the traditional snowballing method for recruiting lead users, which provides a 'proof-of-concept' level validation for the efficacy of the VICOR method. In this paper, we have however not analyzed the possible content differences in terms of, e.g., what is utility of the data gathered from different locations for developing prototypes of services or services for the market place. Nevertheless, for the 'proof-of-concept' validation of the efficacy of the developed method, we consider the level of analysis sufficient as a justification to continue research and the development of the VICOR method.

The results for the consequence constructs, i.e. the reasoning why the participants want to use the particular services that came up during the interviews, however, do not follow the above results regarding the attribute and value constructs. In previous literature the main emphasis of the analysis, especially regarding user requirements, has been with these two construct types [Peffers et al., 2003, Peffers and Tuunanen, 2005]. The consequence constructs have thus not played an active role in the analysis. The t-test results show that the reasoning between the Finland and Hong Kong participants is significantly different (sig. 0.000). Next, we discuss the results and also consider potential reasons for these unexpected results regarding the consequence constructs.

Table 7 - Test results for attribute constructs (service features)

Group Statistics

Grouping Variable			Statistic	Bootstrap[a] Bias	Bootstrap[a] Std. Error	Bootstrap[a] 95% Confidence Interval Lower	Bootstrap[a] 95% Confidence Interval Upper
Attributes (with weights)	Helsinki	N	192				
		Mean	.3444	.0000	.0156	.3127	.3766
		Std. Deviation	.21074	-.00169	.01848	.17272	.24776
		Std. Error Mean	.01521				
	Hong Kong	N	236				
		Mean	.3319	.0001	.0152	.3024	.3628
		Std. Deviation	.22808	-.00060	.01148	.20700	.24926
		Std. Error Mean	.01485				

Independent Samples Test

		Levene's Test for Equality of Variances F	Levene's Test for Equality of Variances Sig.	t-test for Equality of Means t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference Lower	95% Confidence Interval of the Difference Upper
Attributes (with weights)	Equal variances assumed	4.225	**.040**	.586	426	.558	.01256	.02143	-.02956	.05467
	Equal variances not assumed			.591	419,125	**.555**	.01256	.02125	-.02922	.05433

a. Unless otherwise noted, bootstrap results are based on 500 bootstrap samples.

Table 8 - Test results for consequence constructs (reasoning)

Group Statistics

Grouping Variable			Statistic	Bootstrap[a] Bias	Bootstrap[a] Std. Error	Bootstrap[a] 95% Confidence Interval Lower	Bootstrap[a] 95% Confidence Interval Upper
Consequences (with weights)	Helsinki	N	192				
		Mean	.4314	.0003	.0239	.3853	.4809
		Std. Deviation	.32845	-.00157	.02508	.27747	.37708
		Std. Error Mean	.02370				
	Hong Kong	N	236				
		Mean	.8224	-.0015	.0288	.7659	.8812
		Std. Deviation	.44028	-.00129	.02714	.38471	.49426
		Std. Error Mean	.02866				

Independent Samples Test

		Levene's Test for Equality of Variances F	Levene's Test for Equality of Variances Sig.	t-test for Equality of Means t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference Lower	95% Confidence Interval of the Difference Upper
Consequences (with weights)	Equal variances assumed	17.267	**.000**	-10.208	426	.000	-.39096	.03830	-.46624	-.31568
	Equal variances not assumed			-10.512	422.960	**.000**	-.39096	.03719	-.46407	-.31786

a. Unless otherwise noted, bootstrap results are based on 500 bootstrap samples.

Table 9 - Test results for value constructs (drivers for service use)

Group Statistics

Grouping Variable			Statistic	Bootstrap[a] Bias	Bootstrap[a] Std. Error	Bootstrap[a] 95% Confidence Interval Lower	Bootstrap[a] 95% Confidence Interval Upper
Values and Goals (with weights)	Helsinki	N	192				
		Mean	.2586	-.0015	.0125	.2325	.2817
		Std. Deviation	.17027	-.00117	.01019	.14872	.18970
		Std. Error Mean	.01229				
	Hong Kong	N	236				
		Mean	.2547	.0001	.0032	.2485	.2616
		Std. Deviation	.05012	-.00065	.00741	.03536	.06289
		Std. Error Mean	.00326				

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Values and Goals (with weights)	Equal variances assumed	140.137	**.000**	.341	426	.733	.00397	.01166	-.01894	.02688
	Equal variances not assumed			.313	217.992	**.755**	.00397	.01271	-.02108	.02903

a. Unless otherwise noted, bootstrap results are based on 500 bootstrap samples.

Discussion

Our literature review and the proposed method for lead user recruitment from virtual communities provide evidence that making use of communities is a worthy option for involving consumers in new service development. Although this approach is not without caveats, we believe that the advantages of the community-based lead user recruitment - emphasizing how to design together with innovative users and the utilization of the Internet's possibilities as social media - are much larger than the disadvantages related to increased amount of preparation and coordination work.

Matthing et al. [2006] have reviewed the various strongly allied concepts of user involvement (lead user method, co-development, co-opting customer competence, user involvement, consumer involvement and customer interaction). Based on their review, they claim that user involvement especially in service research is preached but not so often practiced, even if the collaboration with users has become a foundational premise of the service-dominant logic [Kristensson et al., 2008, Lusch et al., 2007]. Our study proposes one way to go forward with involving users into the design of services.

The results show that virtual community-based recruitment of lead users can potentially provide promising results when compared to the traditional approach of snowballing-based recruitment, which has been criticized as time-consuming and thus burdensome for firms [Olson and Bakke, 2001]. Especially the difficulties in establishing a continuous practice of employing lead users in co-development has been found challenging [Olson and Bakke, 2001]. The virtual community based method, like the proposed one, can potentially help companies in the recruitment phase and thus provide means to avoid the problems found in practice. Moreover, inviting lead users to service development may enable companies to remove 'the fuzziness' of front-end service development [Alam, 2002, Alam, 2006] by promoting further interactions with their service users.

Naturally, in some cases there does not exist virtual communities from where to start searching for the lead users. In that case it is possible for firms to make an initiative by setting up a virtual community first, if it does not exist ex ante. This strategy takes more time, which can be seen as a limitation of the proposed method. However, companies launching products or services without customer contacts are taking risks that are partially avoidable by capturing user needs wisely. It is quite customary that companies regularly read and extract ideas from the discussion forums concerning their products

and services. Nevertheless, this may not suffice in today's competitive environment, which demands going beyond merely importing the "voice of the customer" through traditional market research mechanisms [Sawhney et al., 2005].

When taking a closer view to the results, we can find a very interesting result regarding the potential influence of national culture. The comparison between the Finland and Hong Kong samples did not show differences among the numbers of attribute or value constructs in the data set. However, the results do show a difference between the sites regarding the consequence constructs. The Hong Kong participants provided approximately twice as many consequence constructs compared to the Helsinki participants. Since the numbers of attribute and value constructs were similar we can assume that in both locations we did recruit potential lead users. The reason may therefore be elsewhere. The second alternative could potentially be in the way the interviews were conducted. However, we did pay attention in making sure that this would not cause any bias into the results. The laddering interviews were conducted in a similar manner in both locations and the interviewers were trained similarly. Thus, it seems that national culture is a likely reason that may explain this difference between the locations.

Hofstede et al.'s research on national cultures [Hofstede, 1980, Hofstede et al., 2010] has been considered seminal in this field. Hofstede presented that culture has four dimensions, namely power distance, uncertainty avoidance, individualism, and masculinity. These four dimensions have been extensively used in interpreting culture's influence in human behavior and decision making in organizations. Later, two additional dimensions extended the original four: long-term orientation and indulgence vs. restraint [Hofstede et al., 2010]. In information systems literature, the Hofstede model has been critiqued by Myers and Tan [2002]. They suggest that the concept of national culture is problematic as there is not always a clear alignment between culture and the nation-state. This is especially evident if we look at the historical events of how nations and national identities have developed, e.g., in our research locations (Finland, Hong Kong). The notion of the Finnish nation became a lively topic in the country after it became a part of the Russian empire in 1809 and which culminated into a declaration of independence in 1917. The Hong Kong culture, in turn, can be seen a result of Imperial Chinese, Colonial British and modern Hong Kong heritages. Moreover, Myers and Tan have argued for a more dynamic view of the culture, i.e. looking beyond the original model of Hofstede, and seeing culture as contested, temporal and emergent phenomena in the society. In another study researchers question the implicit assumption that all individuals within a given cultural unit will respond in a consistent fashion based on the group's cultural values [Leidner and Kayworth, 2006].

When going back to our findings, we can see that it was important for the Hong Kong participants to reason their service feature use more than the Finnish participants. If looking at the Hofstedian dimensions of culture, one particular dimension may be of interest. According to Hofstede [1980], Finland as a national culture is more individualistic compared to Hong Kong. One explanation for the difference in the results might be that the more individualistic Finnish participants did not see necessary to provide as much reasoning, or justification, for their service use as the Hong Kong participants. An alternative explanation can also be that the Finnish discussion culture tends to favor going straight to the point and generally the concept of "small talk" is not part of the Finnish culture. The latter view would perhaps be closer to the Myers and Tan school of thought than to the Hofstedian view of the culture. Based on the results presented in this study, however, we can infer only that there seems to be a cultural aspect(s) in the data set that impacts the results. This, however, raises interesting future research ave-

nues that we depict in the following section after first concluding the research.

Conclusions

In this paper we examined whether there is a difference between the perceived qualities of requirements of lead user interviewees who have been recruited either by snowballing or virtual community based methods. The results of the study are promising in a way of thinking how we can facilitate design activities between new service developers and consumers who are considered to be lead users of a given field of technology or IT-enabled services. This mobile technology related study showed that 1) we were able to recruit qualified lead users through virtual communities, and that 2) the recruited participants provided a comparable amount of service feature ideas to the users recruited using the traditional snowballing method.

We gathered data for this study employing the laddering interviewing technique [Peffers et al., 2003, Peffers et al., 2006] to elicit user requirements. Our data set consisted of 55 interviews conducted in Finland and in Hong Kong. Two researchers coded this data set independently to provide a standardized set of service feature related requirements. After the coding we had 192 of such service feature requirements in the Finnish data set and 236 in the Hong Kong data set. The resulting data was then analyzed using Levene's test for equality of variances and t-tests to see whether there were differences among the average weighted number of service constructs between the research sites. We found that there was no statistically observable difference between the means for service attributes and values. The developed method, therefore, seems to provide equally good results as the traditional snowballing method. This is an encouraging result. Interestingly, there was a statically significant difference in the provided reasoning, i.e. in the consequence constructs, between the two locations. The Hong Kong participants provided about twice as many consequence constructs to explain their reasoning for the potential service use compared to the Finnish participants.

Our study contributes to the literature by proposing a method for virtual community based recruitment of lead-users to enable co-design of innovative IT enabled services with consumers. We see that our study directly addresses issues raised by Olson and Bakke [2001] and Nambisan and Wilemon [2000]. Namely, the traditional snowballing method for recruiting lead-users is very time consuming and burdensome, and this has been found as one major obstacle for companies' in establishing a continued practice of lead user involvement in their new product development activities. We believe that the proposed VICOR method is considerably more efficient when taken into continuous use – in addition to providing less biased lead user samples as in our case - and thus offering one solution to the problem.

Secondly, we see that our study presents how consumers could be involved in new service development activities in more general terms, especially when thinking of developing IT-enabled services for global markets. Our results show that in terms of requirements specification the VICOR method accompanied with laddering interviews performed well for this purpose. This, in turn, should be of interest to practitioners who consider engaging their users, especially consumers, to new service development activities. The use of the VICOR method can potentially help firms to overcome the challenges in finding interested lead users to different development projects repeatedly, something that has proved difficult with snowballing both in academic research and development projects in industry. Furthermore, what's interesting is the finding that the reasoning, or consequence constructs of the laddering interviews, seems to capture the cultural aspects in the data set. If we would understand better the underlining causes for this, it could potentially increase the understanding of the development of IT-enabled services for consumers in different cultural regions.

Even though our findings offer a good starting point for further research, there are some limitations in the presented work. Firstly, there are foreseeable challenges in engaging the recruited lead users into the service development process. For example, what kind of rewards companies should offer to the participating lead users, and how we can retain their interest enough to ensure continuous participation to a company's service development efforts [Füller, 2010]. Moreover, we can see that users might not be as receptive to firms' invitations to participate in commercial development efforts as in academic research. We also see that there is a need to study more about what we can learn from the marketing literature and the use of focus group participant pools for creating a big enough reservoir of lead users for continuous use [see discussions e.g. in Klein et al., 2005, Kontio et al., 2007]. Moreover, we also recognize that the method should be tested further in a more controlled environment. This would most likely provide a better opportunity to empirically evaluate the method's efficacy against other methods and also further enhance the method itself. Especially, when considering the unexpected finding of differences in reasoning between the locations, it would be highly interesting to conduct a follow-up study that would use both the VICOR and snowballing methods in two or more locations. This would most likely shed more light on the causes that influenced our results. One basis for choosing the locations would be to look at the individualism dimension of Hofstede as a way to culturally differentiate the research locations [Hofstede, 1980, Hofstede et al., 2010].

In future research, we would also like to investigate alternative ways of conducting interviews with the lead users. For example, companies could use social networking environments, such as Facebook or LinkedIn, for this purpose and invite the lead users to a gated virtual community [Nambisan and Wilemon, 2000, Sawhney and Prandelli, 2000] and then utilize web-based Group Support Systems (GSS) tools for the service design activities [Bragge et al., 2009]. Although the use of GSS tools has been extensively researched in groupwork and innovation settings, it remains yet to be seen whether these tools would suit for engaging the lead users in a gated virtual community as well. There are also other techniques, tools or platforms that might be equally feasible or even better, especially if the community members are more accustomed to some other advanced or Web 2.0 collaboration technologies. This research could result into a hybrid method that would combine the strengths of using virtual communities and/or social media and the traditional snowballing technique where personal contacts are vital for successful lead user recruitment efforts.

Footnotes

In this study we use the terms "user" and "consumer" interchangeably throughout the paper.

[2] http://www.divia.fi

[3] Full details available from the corresponding author.

[4] Further details of the maps are available from the corresponding author.

[5] We thank the anonymous reviewer for making this suggestion.

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