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Exploring user-involvement in technology-based service innovation

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The ICE-project investigates user driven innovation processes in service businesses. The project aims at developing new tools and scripts that service companies can apply in order to introduce or enhance such innovation processes.

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Further information about the ICE- project can be found on the project's web-page **(**www.ice-project.dk**).**

Exploring user-involvement in technology-based service innovation

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User-involvement in technology-based service innovation

Customers are more and more asked to provide services for themselves using internet based technology (Meuter et al. 2000). This technology comprises software that becoming increasingly easy to customize by software development (Bitner, Brown and Meuter 2000). Hence it becomes important to find out how users derive value from different software/service applications. Therefore, the involvement of users and customers into the innovation process has recently become a top priority (MSI: 2004). This has been referred to as co-creation, that is the collaboration with customers with the purpose to innovate as such. The distinguishing aspect between co-creation and customization is the degree of involvement. Co-creation refers to an active part of the involvement of the customer from the very beginning of the innovation process, whereas customization denotes a reactive involvement at the end of the innovation process (Kristensson et al. 2008). The idea of co-creation aligns well with the service-dominant logic in that value can only be determined by the actual use and consumption of a service or good and by sharing knowledge during co-creation (Lusch et al. 2007). Alam (2002) has suggested four types of user involvement related to the objective, stage(s), intensity and mode of involvement. Hence, the user may be more or less deeply involved depending on the type of involvement planned.

The early findings of user-involvement in services seem to support positive innovation outcomes (Magnusson et al.). For example, Kristensson et al. (2004) found that involving users produced

ideas that were more creative, more easily implemented and more highly evaluated by customers. Normal users also generated more original ideas with greater user-value than professional developers but they were, on the average, less producible. The issue then becomes to select the kind of users to involve. Matthing et al. (2006) suggest that users with a high level of technology readiness be selected for technology services as user value lies in learning by doing. This is similar to advocating that lead uses (von Hippel 1986; von Hippel 1988) be selected for involvement with their own user-friendly "toolkits" to design new products or services (von Hippel and Katz 2002). However, few studies have studied the process *as such* of user involvement in services (Kristensson et al. 2008). Their study of the mobile services of two Swedish telecom companies generated a number of strategies to involve normal users in co-creation of mobile services such as; derivation of ideas from the *user situation* and the taking of different *user roles* and by focusing on *personal benefits*.

Method

Magnusson et al. 2003) conclude that the involvement of users needs to be moderated as mode and intensity of involvement affected the outcome: Ideally, users should be given a technical platform and monitored when producing their own services (e.g. von Hippel and Katz (2002). Hence, the involvement process per se should be in focus to probe the effects of user involvement.

This study is intended to fill this gap in the literature by investigating the outcomes of user-involvement in developing a cutting-edge face recognition software www.polarrose.com . Internet-based companies have special problems in designing effective business models for their operations because the only have indirect (virtual) contact with their normal users and customers. This necessitates an experimental approach to gauge how users apply and learn the software features freely available on the Internet. The idea is to find out the latent needs and the value of using the service for normal users in order to build a sustainable business model. Consequently, we focus on the "service and process design" stage (of the internet service) of user involvement (Alam 2002) with the aim to investigate how users apply (and value) an internet-based application and the outcomes in terms of innovation ideas generated. The intensity of involvement is rather high because users are asked to test-use and comment on features during and after an

experiment. Information is obtained in a relevant context by tracking online behaviours both in terms of virtual and behavioural traces (by means of Silverback software: www.silverback.com with video and audio data) and by follow-up interviews and a brief survey after the session.

We conducted an experiment with a software application called *Name Tagger*. After a brief introduction and an ex ante survey, respondents were asked to use the application (prototype) in an experimental setting. This was monitored by the Silverback tracking software. Two researchers followed the assignment from an adjacent room. After the completion of the test a few judgemental variables were first measured in an ex post survey. Thereafter, in a follow-up taped interview, testers were asked questions about a few key aspects of the application. The ideas and suggestions for improvement given during the test were of particular interest. The duration needed for respondents to complete the assignment ranged between 300 to 603 seconds.

The ex ante survey included questions about the web photo sharing literacy of the respondents. Items covered what kinds of digital photo handling (*Pict*), and social web interaction (*Inte*) and problem solutions (*Prob*) testers were active with. Different levels of proficiency were given higher scale values (see appendix). An aggregated variable *Lite* was created by summating the scores for these three other variables. In a similar way, three different scores for performance outcomes; number of stops (*Stop*), mistakes (*Mist*) and the ability to complete the assignment (*Comp*) were summated into a global performance variable *Perf*. These latter scores were manually calculated form the Silverback video recordings of each respondent.

The constructs used in the ex post survey were attitude to website (Kumar et al. 2000) and usability and ease of use (Gefen and Straub 2000). All items were rated on a five point Likert-type scale from “strongly disagree to strongly agree”. Only three items from the usability/ease-of-use scales were applied and two items form the attitude to website scale (see appendix). The main reason for this was the unfinished state of the software being tested. It was deemed difficult for respondents to evaluate the entire website as only a part of it was up and running as a demo.

Results

Correlations. The test sample consisted of N=11 and were selected from the adjacent offices in communal technology hub in a southern Swedish city. Five were males and six were females. Ages ranged from mid 20's to early 60's. Because of the small sample only simple correlations (Pearson) were calculated. We found significant correlations for *Time* and *Mist* (0.741; Sign. 0.009) and also between *Time* and *Stop* (0.746; Sign. 0.008). This signals the importance of having a smooth flow in the software interface. Duration is a signal of communication problems. A positive corroborating result is that the correlation between *Time* and *Perf* is significant (0.638; Sign. 0.035). Hence, the shorter the time for completing the tasks the less mistakes and other problems.

Also we have a correlation between *Inte* and *Pict* (0,768; Sign. 0.006). This translates into; the more integrated you are on the social internet sites, the better is your photo handling capacity. Hence, the target users of this kind of face recognition software should be found on those sites. There was further a significant correlation between *Prob* and the items of Ease-of-use (0.797; 0.788 both Sign. at 0.003). The more problem proficient the user in general, the easier users perceive this face recognition software to be.

Follow-up interviews. Interviews lasted between 3-6 minutes and were focussed. These simple statistical results indicate that the interface should be made as simple as possible in order to increase ease of use. Let us concentrate on the areas where users had problems as they come out in the videos recorded by Silverback. The main hurdle was to merge photos of the same person into groups at the end of the exercise. When clicking on the second (and similar) photo a small label came up which is to be clicked in order to bundle them. (see figure 1) This small label was not noticed by all users. "I did not find it at first" says one tester (no. 2 male) "and I have no idea of how to use this software".

Another user (no. 3 male) finds the same operation "a bit confusing" and "which photo to start with". He does not find the label to click to merge the photos. The main reason to use this application would be "to get an overview of my photos… we stuff all our photos on the hard-drive".

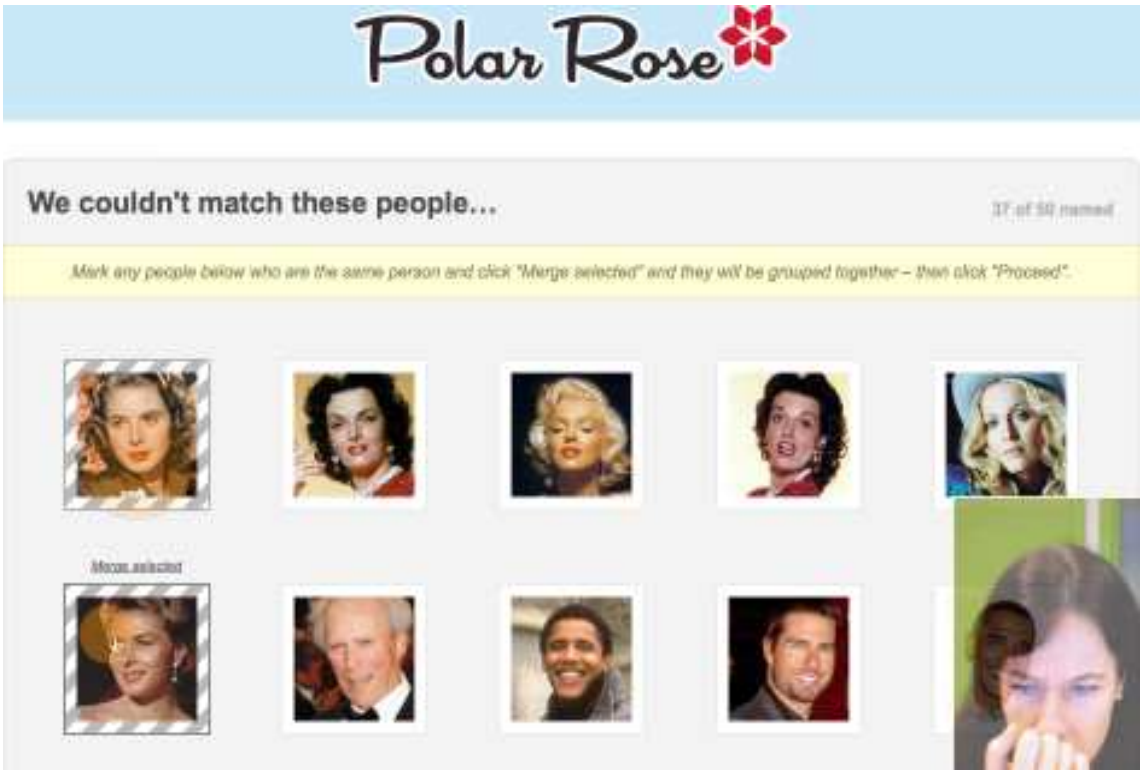

Figure 1: The hurdle of merging photos

The issue is also how users process the written instructions on the top of the webpage. The instruction informs about the label to merge the pictures. User no 3 “presumed that the instructions were the same after reading them 2-3 times”. But when seeing the many photos on the merging page he stops and reads it twice. Still it is difficult to find the label.

A third user (female no 4) manages to complete all of the tasks. She says: “ it was quite easy to use”. The label was a minor problem “because I thought something will show up of what to do, but first I looked around… it was a bit confusing”. A fourth user (male no 6) starts out by not reading the instructions and sorts the wrong photos. He discovers his mistake and reads the instruction and corrects his choices. He does not notice the label to merge photos at the end. Female (no 7) does not complete the tasks and does not like “crossing people out” when sorting pictures. She prefers clicking on pictures to include, even though it may mean more work (because in your personal album you are most likely to have people you know). Female (no 8) completes all tasks and has many comments on the colour of the interface. She suggests that more of the brand elements (red polar rose) be included on the pages to highlight the brand of

the software. Bottom line: “Make it more unique for you with more and brighter colours”. Male (no 9) also completes all tasks. He “searched an option to click to merge the photos… I did not see the label…the instruction was not so obvious”. Female (no 10) is also successful but she has problems with naming a photo, but understands that she is not required to put a name to a person she does not know. She considers the layout of the website “very simplistic” and sees this software as a back up of your photos on the web. The final user in the test (female no 11) thinks the Name Tagger easy to use and completes the tasks.

Discussion

Several areas of concern spring from this pilot test. First, the basic idea of Name Tagger is understood. Most users complete the tasks. All of them rate it easy to use and say so in interviews. In the sequence the real hurdle, for all users, is the merging page. It is clear that the instructions are not clear enough. The label has to be visible before the click on the second photo. Users now have to look around and wait for some clue to show up. The long instructions are not read after the third time. It could be better to have a symbol or to shorten instructions to a command only. The merging page must be clearly marked as “here comes something new, beware”. This could also be done with a command at the top of the page.

An interesting finding is that several users did not like to “cross out people”, that is removing by clicking those photos that did not match the photo of comparison at the top. Instead, they suggested a positive way to mark those who did match. This could have something to do with the strong red cross being put on the photo. For practical reasons however, it is more effective to remove the non-matching photos than the matching ones because of the content of a normal photo album (with similar persons in many versions).

From a design perspective comments were given about colours and command buttons. The size of photos were considered all right. Very few ideas about how to use Name Tagger were suggested. Mentioned were backup (on the web) or having an overview of digital pictures. None of the testers gave a concrete suggestion for improvement excepts for those visual and instructional elements already discussed. This is noteworthy. One reason could be that the underlying mechanism of face recognition was not explained (to the testers before the

experiment), or for that matter not understood. Hence, users only completed the flow of tasks in a mechanical way to get to the end. One of them obviously thought it was a personal test (of speed).

The pilot test served a purpose in that it pinpointed the “hurdles” in the software. These can easily be fixed. The main design problem is to virtually failsafe (Chase and Stewart 1994) is an antecedent to usability for software. Nevertheless, the theoretical results from this study are few. A pilot test with more than five testers are normally considered enough from a practical point of view. This was evident in this study. The main hurdle was hindering all testers to one extent or another and was obvious from the start (figure 1). However, from a theoretical perspective a more in-depth analysis of how to involve testers/users even more would be highly relevant. Advanced developers want testers to become more of co-creators of the service than involved in a general sense. Co-creation, being different from customization by the more proactive role of users (Kristensson et al. 2008), means that users initiate and act out their own new ideas in a relevant usage situation by integrating their resources with the firm. This has not been the case here. Firstly, testers were involved with the features and functions of the interface only. The underlying mechanism of how to learn how to recognise a face/picture was not explained and made evident for testers. Second, although we selected lead-users (von Hippel 1986) as suggested in the literature, we did not give them “tool-kits” or similar means to elaborate new service ideas (von Hippel and Katz 2002). When the entire website is operational online, however, it may be possible to use parts of the application to investigate how users embed face recognition in other software applications.

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Appendix: Scale items

First survey (ex post)

Do you regularly do any of the following? *Pict*

Email photos to friends/family? (scale value 1)
Upload photos to an online photo album (scale value 2)
Publish photos on a blog or personal website (scale value 3)

How do you interact with friends/family online? *Inte*

I do not interact with people online (scale value 0)
I send instant messages (scale value 1)
I am a member of an online community or forum (scale value 2)
I have joined a social network (scale value 3)
I have my own website or blog (scale value 4)

When there are problems with an online service or software: *Prob*

I often ask friends/family and or colleagues for help and advice (scale value 1)
I know where to find help online in support forums and pages (scale value 2)
I usually manage on my own (scale value 3)
I often help others with their problems (scale value 4)

Lite (literacy) was the summated variable for Pict + Inte + Prob

Time was measured as the time in seconds to complete the entire tasks

Stop was measured as the number of stops in the program with duration of more than five seconds

Mist was measured as the number of mistakes made in classifying photos

Comp was measured as being able to complete the process of merging similar photos at the end of the trial run. Success has scale value of 0, non success has scale value of 1.

Perf was the summated variable of Stop + Mist + Comp (ranging from 0-9)

Second survey (ex post)

Ease of use

I easily understood how to use the Name Tagger website (strongly disagree to strongly agree, 1-5)
The Name Tagger website was easy to use (strongly disagree to strongly agree, 1-5)

Attitude to website

I liked using the Name Tagger website (strongly disagree to strongly agree, 1-5)
The Name Tagger website had a nice appearance (strongly disagree to strongly agree, 1-5)

Intention to return

I would consider the Name Tagger to name people in my photos (strongly disagree to strongly agree, 1-5)

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