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Reframing Co-creation for Mobile Living Labs: The Mobile Value Core

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Abstract

This paper introduces the concept of the mobile value core that is based on Expectation Confirmation Theory. The mobile value core determines the value relationships between mobile technology provision and mobile technology usage with special regard to value expectations, value perceptions and actual value creation. Creation of mobile value requires mobile co-creation methods and tools to achieve better expectation-experience fit of usage and therefore higher value for both sides, users and providers of mobile devices and applications. The set-up of a mobile Living Lab and a corresponding research agenda is outlined according to the hypotheses drawn from the mobile value core concept.

Keywords: mobile Living Lab, co-creation, mobile value, mobile innovation

1 Introduction

Mobile technologies and services play an ever increasing role in people's everyday lives. Product life cycles are getting shorter and shorter and new devices and applications are crowding the market. In this situation it is inevitable for every stakeholder in the mobile value chain to fully understand what people are exactly doing with their mobile phones, which needs come into existence and which processes might benefit from being mobilized. Moreover it is necessary to include potential users of mobile devices and applications in the creation process as novel usage patterns are unforeseeable and not projectable. Use of technologies is an understudied construct as a whole (Straub and Burton-Jones 2007). Very often research relies on self-reported usage which significantly limits the value of research findings. It will be beneficial for all stakeholders to gain deep structure knowledge on technology usage that evokes novel and meaningful insights in actual value of usage (Straub and del Guidice 2012).

Living Labs seem to be an appropriate approach for this purpose as they are often described as co-creation facilitators or innovation intermediaries that provide an environment for user-

centric innovations. Recent research indicated a shift from emphasizing discovery and evaluation within Living Labs to actual co-creation with the user (Schuurman, Lievens, De Marez, and Ballon 2012). Current Living Lab research predominately focuses on realism when testing technologies or services but widely excludes the necessity to ensure realism also in the course of the co-creation process. The context of mobile devices and applications requires a new focus on real-life context during co-creation as they are used in various usage settings and contexts by various user groups.

We will therefore use a definition from (Bergvall-Kåreborn, Eriksson, Ståhlbröst, and Svensson 2009) that regards a Living Lab as “a user-centric innovation milieu built on everyday practice and research, with an approach that facilitates user influence in open and distributed innovation processes engaging all relevant partners in real-life contexts, aiming to create sustainable values” as a starting point. Based on this definition we want to define a novel concept of mobile value core that sources from Expectation Confirmation Theory (ECT) and emphasizes the assumption that co-creation of mobile devices and applications needs to take place in real-life context. This form of mobile co-creation requires a novel set of methods and tools and also a revised set-up of a mobile Living Lab that is able to provide a basis for co-creating mobile devices and applications.

In the remainder of this paper we conceptualize the mobile value core and transfer it into the mobile Living Lab set-up, which is outlined according to the five stage Living Lab set-up model (Pierson and Lievens 2005). The design is discussed regarding its abilities to enable contextual co-creation and embedded in a state-of-the-art analysis with special emphasis on mobile contexts. The paper concludes with some general remarks on mobile Living Labs and a research agenda derived from the concept of mobile value core.

2 Conceptual Framework: The Mobile Value Core

Usually there is a gap between technology providers' offers and users' perceptions that are largely influenced by initial expectation regarding the artifacts value. This gap results in uncertainty regarding user acceptance of the technology and consequently, its business value for the provider. Value in general and in the context of Living Lab research is not limited to monetary measures (Baida, Rukanova, Liu, and Tan 2007). A more holistic approach includes factors that benefit or constraint exchange of monetary and non-monetary value. Figure 1 depicts the value relations that occur in the context of mobile technology usage.

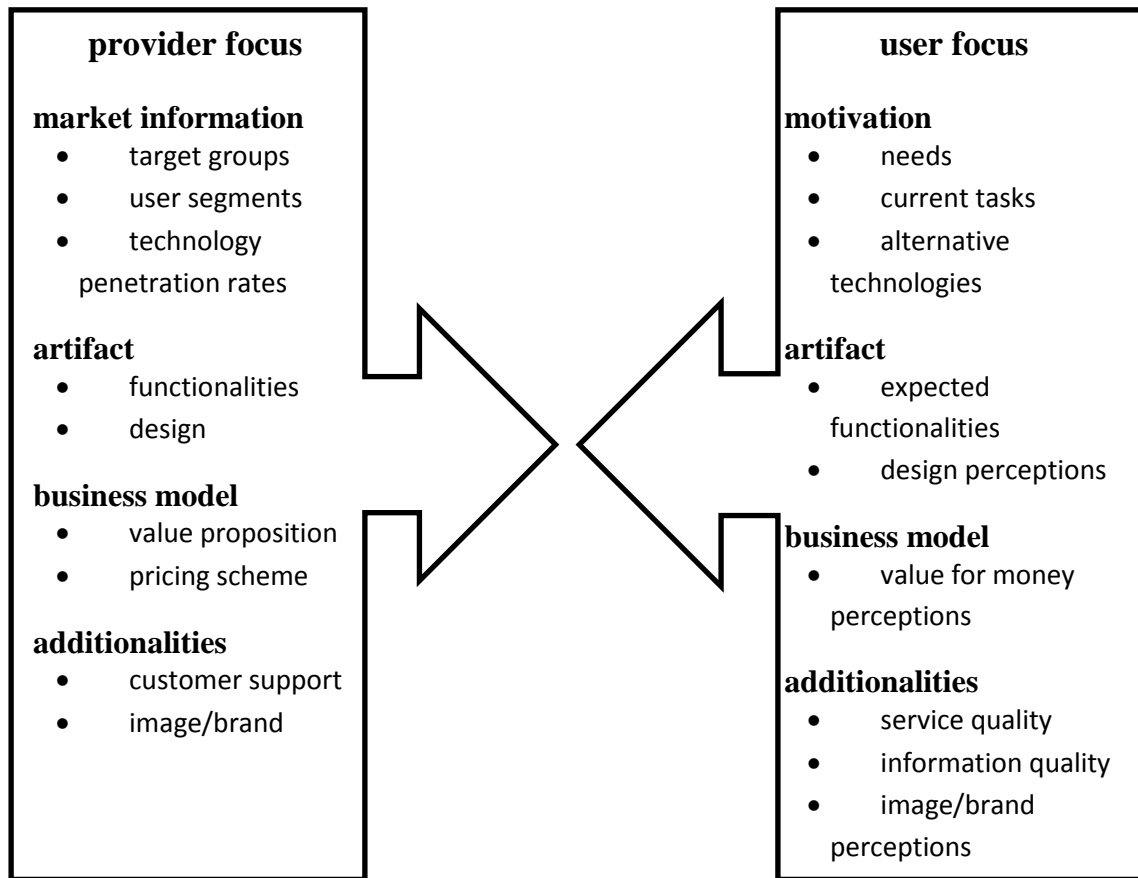


Figure 1: Value relations of mobile technology usage from providers' perspective and users' perspective.

The mobile value core defines the actual value of a mobile technology for its users and its provider. The concept of mobile value core consists of three levels and is based on Expectation Confirmation Theory (ECT) (Oliver 1980). The heart of ECT explains how expectations regarding an artifact that emerge before usage influence satisfaction after usage. The mechanism of this influence is determined by performance perceptions that either confirm or disconfirm initial expectations. Disconfirmation can be either positive (exceed expectations) or negative (underachieve expectations). Figure 2 outlines the main relationships postulated by ECT.

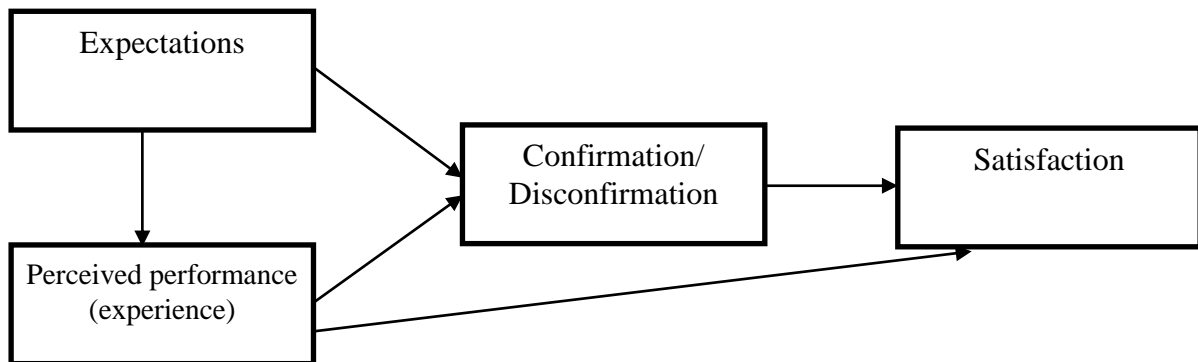


Figure 2: Theoretical model of Expectation Confirmation Theory (ECT)

Integrating ECT and value relations in the mobile value core concept result in a circular chart where the leftmost circle depicts the provider's expectation regarding the offered value and the leftmost circle depicts the user's expectation regarding the value of the artifact. The centered area of overlapping circles delineates the realized value of the artifact and therefore both, its business value and its perceived value for the customer. Users experience only a part of the offered value as they are not aware of aspects and do not perceive them in the intended way. Revenues on the other hand are only realized in case of actual usage.

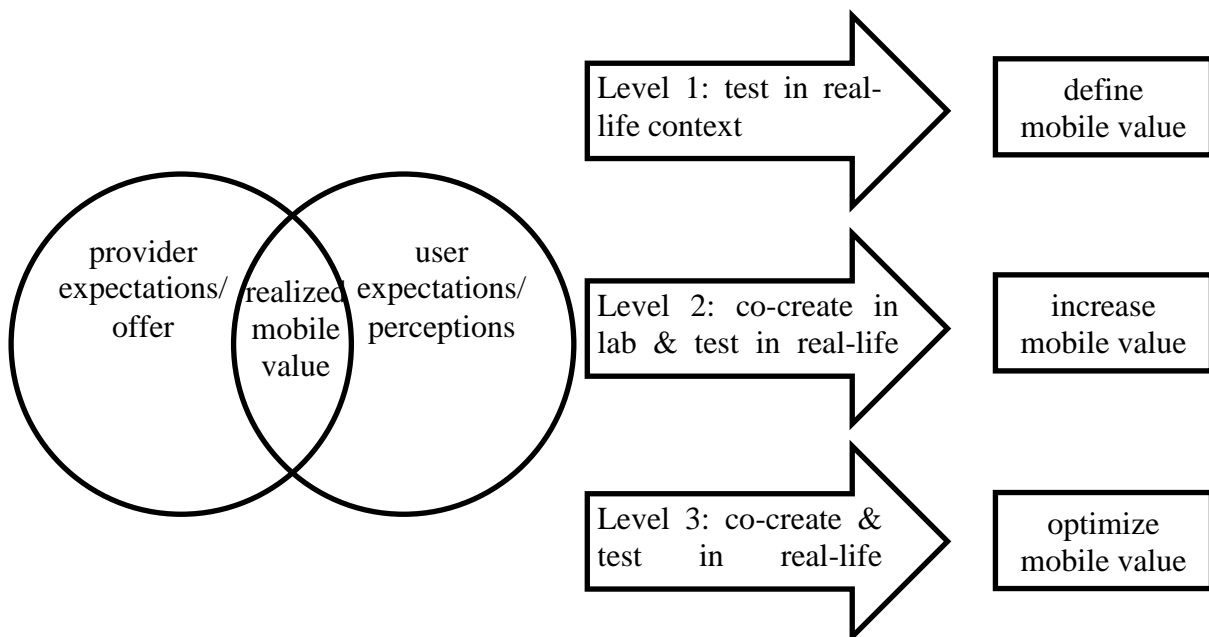


Figure 3: The conceptual frame of the mobile value core concept.

The three levels of the mobile value core concept and the corresponding influences on the value of a mobile artifact are conceptualized in the remainder of this chapter.

First level - testing mobile technologies in Living Lab settings

The initial expectation forming process is disregarded and therefore, the outcome (satisfaction and usage behavior) not projectable in advance. The product is experienced by the Living Lab members in their real world context and projections are possible after the test. The mobile value is defined after testing in real-world settings.

Second level - creating mobile technologies by means of traditional co-creation methods and testing them in real-life environments

In general Living Labs should act as accelerators of acceptance of innovations by means of collaboration during development (Schaffers and Turkama 2012). Co-creation will provide users with means to influence the functionalities, design and business model of the artifact itself. Traditional tools and methods used for co-creation require on-site presence of users. Workshops, creative sessions and other settings typically take place in a laboratory-like environment that hampers realism (Schuurman, Lievens, De Marez and Ballon 2012). The initial expectation forming process is integrated in the set-up of the development process as users create the product according to their expectations. This procedure reduces uncertainty regarding the gap between expectations and performance experience. Nevertheless, expectations might change in the course of real-life usage situations as they might not be fully anticipated in the context of a laboratory-like co-creation setting. The mobile value is therefore increased in comparison to traditional product and service development procedures.

Third level - co-creating and testing mobile technologies in real-life environments supported by mobile co-creation tools

Current empirical research is promoting the aspect of the context integration. Rogers et al. (Rogers et al. 2007) conducted a research study demonstrating the benefits of in-situ studies while developing a mobile learning device. After finding out that the tool was not used in the intended way envisioned, a following contextual analysis provided a better understanding of the user and the context of use, why certain function were used or not used, improving the tool massively after a general redesign. In the Living Lab research the context is getting more crucial too. According to Mulder and Stappers (Mulder and Stappers 2009) existing Living Lab approaches rather demonstrate reactive users instead of active co-creators as users and they recommend to promote concentrating on in-situ and during use phases: consequently, successful Living Lab methodologies must be implemented, especially, context mapping or generative tools, e.g. (Sleeswijk Visser, Stappers, van der Lugt, and Sanders 2005), should be suitable for gathering more realistic knowledge about the users and their context, and showing the added value of a Living Lab.

IT supported tools are already used as mediators that connect physical reality and online reality (Bergvall-Kåreborn, Eriksson, Ståhlbröst, and Svensson 2009). The unobtrusive fashion of internet-supported co-creation turned out to enable users to take part in innovation processes without leaving their everyday life context (Schumacher and Feurstein 2007). The expectation forming process is initiated in the real-life context of the user and the creation of the artifact starts subsequently. The congruence of realism during expectation forming and artifact creation reduces the uncertainty regarding performance that will be perceived in later

tests and actual usage. The mobile value is optimized according to the boundary conditions of real-life setting.

These conceptual considerations lead to a set of hypotheses:

- Co-creation in users' real-world context results in mobile artifacts with higher expectation-experience fit than artifacts that were co-created in laboratory-like settings.
- Co-creation in users' real-world context results in mobile artifacts with higher acceptance value in terms of usage behavior than artifacts that were co-created in laboratory-like settings.
- Co-creation in users' real-world context results in mobile artifacts with higher acceptance value in terms of fulfilling user needs than artifacts that were co-created in laboratory-like settings.
- Co-creation in users' real-world context results in mobile artifacts with higher business value in terms of economic success fit than artifacts that were co-created in laboratory-like settings.
- Co-creation in users' real-world context results in mobile artifacts with higher business value in terms of user retention fit than artifacts that were co-created in laboratory-like settings.

3 Design of the Mobile Living Lab

The mobile Living Lab is outlined according to the set-up stages provided in (Pierson and Lievens 2005). The implementation stage is extended by an additional co-creation cycle as this aspect is not covered in the initial stage model:

1. contextualization
2. selection
3. concretization
4. implementation
 - a) co-creation of artifact
 - b) intermediate measurement
 - c) test of artifact
5. feedback

The relationships and processes that are necessary to establish and maintain the mobile Living Lab are outlined in figure 4 below.

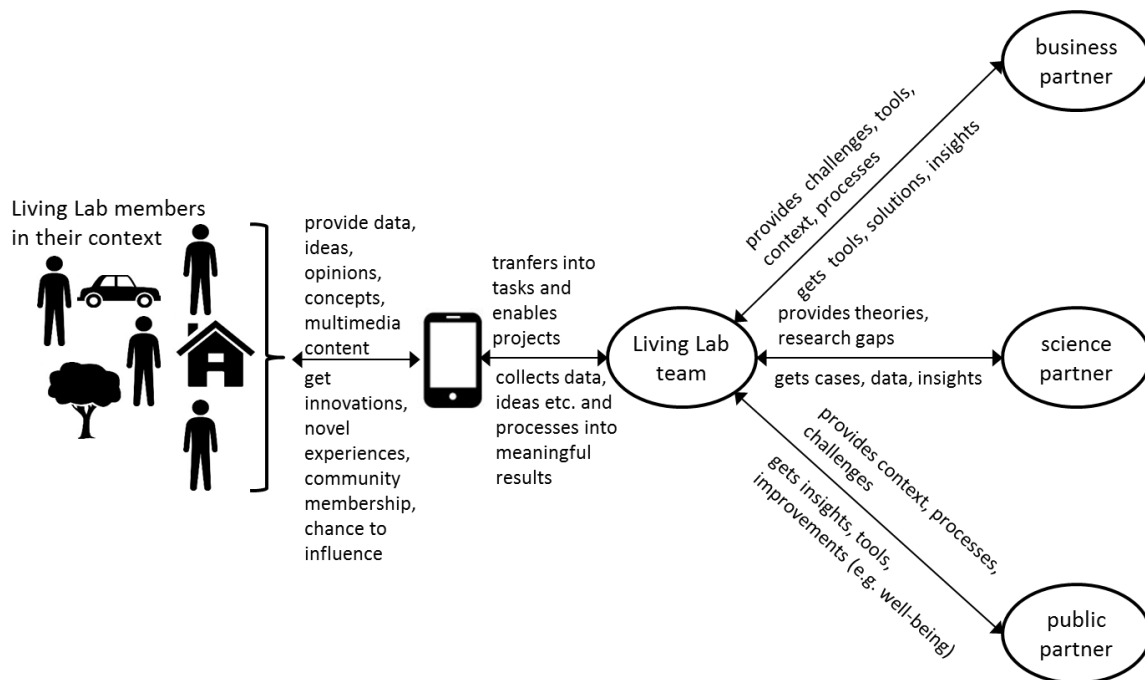


Figure 4: The relationships and processes within the mobile Living Lab.

Contextualization

The mobile Living Lab is not applied for one specific purpose but is designed as a permanent Living Lab infrastructure to create and test various mobile technologies and services. Mobile devices and applications imply highly dynamic usage contexts (Kjeldskov and Stage 2004). Users of mobile technologies move between private and public space not only between two usage situations but also during one single usage situation which causes significant changes of context (Blom, Chipchase, and Leikoinen 2005). This changing context during usage necessitates a critical review of processes that have already been analyzed for stationary technology usage but might differ for mobile technology usage (Turel 2006). The complex ecosystem, in which mobile value is created, delivered, perceived and consumed by the various stakeholders is outlined in figure 5.

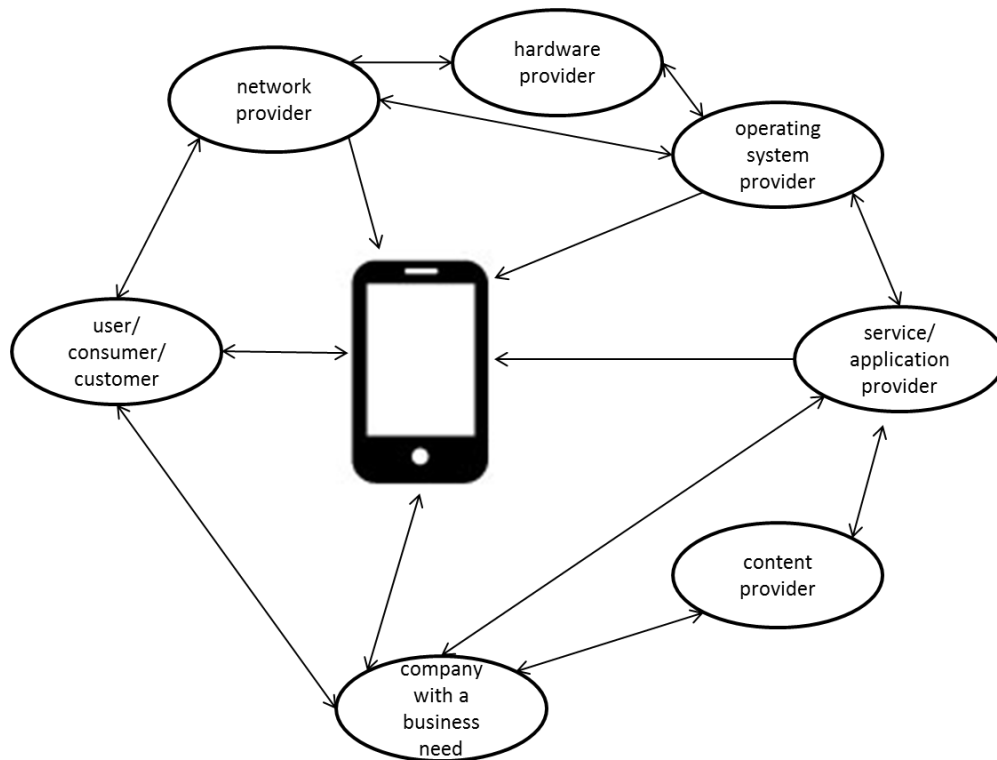


Figure 5: The mobile Living Lab eco system and its stakeholders.

Selection

Selection usually means identification of potential users or user groups. As the mobile Living Lab is established for creating and testing a variety of mobile devices and applications and the penetration rates of mobile phones are extremely high, virtually everybody is a potential user. Nevertheless, selection criteria are applied to identify Living Lab members who will probably contribute more than others. The recruiting of Living Lab members focusses on young people showing above-average levels of technology affinity. They usually own one or more smart phones and use them intensively. They adopt new devices and application before others do and act as lead users in their social environment.

Concretization

The initial measurement of behavior or characteristics is usually done regarding a certain research focus. In the case of the mobile Living Lab the research focus is constantly changing, which necessitates dynamic iterations. According to the concept of mobile value core, the initial measurement will include all aspects of user expectations regarding the artifact in question. Besides the measurement of aspects that are in the focus of the present project, it is also planned to collect long term data on media usage behavior in general. The purpose of this unfocussed data collection is detection of unexpected changes and shifts of usage patterns as well as in-depth knowledge regarding usage contexts.

Implementation (co-creation – intermediate measurement – test of artifact)

Taking a look on the design process, especially of mobile services and the various methods used in this context, Marco de Sá et al. (de Sa, Carrico, and Duarte 2008) investigated traditional methods involving the user in the stages of information gathering, prototyping and user evaluation such as contextual inquiries or low-fidelity prototyping in respect of their suitability for mobile application development and collection of context data. To better depict usage context and gather information on pervasive activities on the field they conducted several experiments, e.g. attaching a camera at the users shoulder while testing, and derive requirements for an in-situ prototyping tool that they later developed. The tool (de Sá and Carriço 2009) is able to support designing applications out of the lab in their natural usage context and focussing – in comparison to existing prototyping tools such as SketchWizard (Davis, Saponas, Shilman, and Landay 2007) – especially on the needs of prototyping for mobile devices and testing in the actual field situation. Gathering realistic user experiences in early stages has proved to have a great impact on design applications including quick context-based user experiences, it promotes creativity and leads to shorter design cycles. Further features should include gesture recognition and location-triggered events (de Sá and Carriço 2009).

In the mobile Living Lab we include those aspects of mobile context-based prototyping and enlarge the present tool set of mobile co-creation by tools for all phases of product and service development. Schumacher and Feurstein (Schumacher and Feurstein 2007) provided an overview of user involvement methods that are applicable in Living Labs. They opposed traditional methods and methods that are supported by information and communication technologies. Mobilization of ICT supported tools will result in a variety of methods and tools for each phase of the process:

- Product/service idea: e.g. mobile idea pool, mobile survey, mobile creativity group
- Product/service concept: e.g. mobile conjoint analysis, mobile design, mobile concept test
- Product/service development: e.g. mobile user toolkit, mobile prototyping, context-sensitive usability testing
- Market launch: e.g. mobile test market, mobile prototype test, mobile acceptance testing

The intermediate measurement takes place after the co-creation part is completed and before testing starts. The main topic addressed is the difference between initial expectations and current expectations regarding the artifact. The expectations might have changed in the course of the co-creation process.

In future it is planned to enhance the tool set by additional features such as a sensory framework that captures the context of the user during co-creation and during usage. Furthermore, we gain in-depth knowledge about the actual usage situation integrating the co-creation process into the mobile Living Lab approach. Provided with Living Lab participant demographics, motivations, and attitudes in connection with context logging data, contextual user behavior and survey data, it is possible to identify context-based decisions which leads to a better understanding of how features are used and the motivation causing usage behavior.

Feedback

Measurement of the same indicators that were captured during initial measurement is not possible in the case of expectations that change dynamically by nature. The ex-post measurement therefore emphasizes usage experiences and the corresponding expectation-experience fit that will result in satisfaction and subsequent usage behavior according to ECT. Moreover, the context information that was gathered during implementation phase (co-creation and testing) is analysed regarding patterns. In order to finally evaluate the artifacts that were co-created it is necessary to obtain data that serve as benchmark. This is achieved by testing comparable artifacts that were not co-created in the mobile Living Lab and comparing the results.

4 Conclusions and a Research Agenda of Contextual Co-Creation

In order to verify the hypotheses drawn from the mobile value core concept it will be necessary to conduct comparative studies using traditional co-creation methods and their mobilized counterparts. Comparing the differences regarding the value of the obtained artifacts will show whether mobilization is necessary and whether its effects are measurable. Moreover, it will unveil the contribution of context-sensitive methods and tools to the process of detecting novel insights in actual usage situations. Choosing the right methods is crucial for obtaining valuable results in the course of comparative analysis. Currently the supply of mobile tools for co-creation is still limited. It will be inevitable to develop instruments that support co-creation in all phases of the development process and to mobilize existing methods and tools. The comparability will require rigorous testing in real-world and laboratory settings.

The three main research questions for the future are therefore:

- What are comparable traditional and mobile methods?
- What are operational target values (e.g. satisfaction, usage frequency, revenue streams) of co-creation?

- What are comparable context effects respectively when creation context and usage context are similar?

Besides evaluation of the mobile value core concept it will be possible, as a side effect of extensive testing, to gain interesting insights regarding effects on Living Lab research that might be caused by using mobile co-creation methods. It is most probable that different people are willing to participate in mobile co-creation than in traditional on-site co-creation. The member attachment in the Living Lab community might also change due to more flexible options of participation. Another interesting field of future research will be incentive schemes for motivating members to contribute in co-creation. The traditional monetary and non-monetary incentives might be enhanced by gamification and virtual rewards. These effects will require further analysis.

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