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Field observations in a living lab context: constructing a framework for the observers' role based on a comparative case study analysis

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Field observations in a living lab context: constructing a framework for the observers' role based on a comparative case study analysis

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Abstract

When developing innovations, particularly media innovations, there is a growing interest in user involvement for innovation development processes (Bogers, Afuah, & Bastian, 2010). One way to structure and govern this user involvement for research and development processes is the Living Lab approach (Almirall, 2008). One of the key assets of Living Labs is the implementation of the innovation in an 'everyday life' and 'real-world' environment over a longer period of time, as opposed to a single exposure (Følstad, 2008). Observation research can be considered as an appropriate method to measure these contextual elements. Nevertheless, observations are under-exposed in Living Lab literature. Therefore, this paper elaborates on the theoretical foundations and practical use of observations during Living Lab field trials, integrating traditional ethnographic frameworks with long-term user-centric innovation research. This is studied by means of a multiple case study comparison, applied to four Living Lab projects. These cases are analyzed on multiple levels (practical organization and characteristics of Living Lab research). This allows an in-depth comparison, provides a deeper understanding of this method within a broader research process (Yin, 1984) and allows assessing the nature of observations within Living Lab research.

Keywords

Living Labs, Observation research, User-centric design, Ethnography, Innovation management



Introduction

Over the past decades, innovation became ever more essential for media organizations to survive in a high pressure market. Rapid technological evolutions caused increased competition and an overwhelming amount of media innovations. However, this also caused an increase in the number of *failing* media innovations. Therefore, media organizations needed to develop new strategies to find a solution to this problem. One such strategy is to abandon the traditional top-down approach in favor of a 'bottom-up' or 'market pull strategy', which involves end-users intensively in the innovation development processes (Bogers et al., 2010). In this kind of NPD processes, it is increasingly important to study the usage context and the domestication of media innovations to extend the knowledge base regarding these innovations with contextual user feedback (Pierson & Lievens, 2005). By doing so, the innovation management domain became closely related to ethnographic research traditions. In such interdisciplinary innovation processes, social sciences gained a central position in capturing and governing end-user data. To capture contextual data, social scientists have to systematically involve (potential) end-users in the innovation research and development processes. One framework to govern and structure such long-term and iterative end-user interaction is the Living Lab approach (Almirall, 2008). Living Labs are defined as open innovation ecosystems adopting a user-centered approach (Schuurman & De Marez, 2012). Within Living Lab research, multiple methods are used to capture the habits, opportunities, wants and needs from end-users. A central element in this research processes is observation research. However, the use of observation research as a method is under-exposed within Living Lab literature, while existing literature on observational research is rarely related to (media) innovation development processes. Therefore, the goal of this paper is to analyze the role of observation research within Living Lab research and development processes and elaborate on the strengths, weaknesses, limitations and best practices of ethnographic observations in the development of innovations.

First, this paper attends to the current academic insights concerning Living Labs and observation research. Second, there is a methodological section in which the methods, parameters and cases used in this research are explained. Third, the results of the research are discussed. Finally, in the discussion section, advice and implications for the research field are described.



Living Labs

Traditional innovation development processes are being challenged by new paradigms which emphasize the benefits and need of involving stakeholders outside the organization. This so-called 'open innovation' paradigm (Chesbrough, 2003) sprouted in the late 1970s to the early 1990s as a reaction to the traditional dominant 'top-down' or 'technology push' paradigm. Open innovation can provide valuable information for the industry and reduce the chance of failing in a highly uncertain market situation (Chesbrough, 2003; Følstad, 2008). Another reason for this paradigm shift is the increasingly important role of end-users, which are becoming ever more demanding and empowered (Levén & Holmström, 2008). Whereas the initial open innovation approach was mainly focused on a business to business collaboration, recent evolutions adopt these principles and apply them on user involvement as well. One approach within this 'open innovation with users' paradigm is the Living Lab approach. Living Labs are structured innovation ecosystems in which innovations are being developed in cooperation with all relevant stakeholders (Feurstein, Hesmer, Hribernik, Thoben, & Schumacher, 2008). This approach helps to structure and govern user involvement in the innovation development process (Almirall, 2008). Although there is still some theoretical discussion on the actual definition of a Living Lab, most authors agree that it is a way to involve end-users in the development of an innovation over a longer period of time using a combination of different research methods, following an iterative process (Schuurman, Lievens, De Marez & Ballon, 2012).

Within Living Lab research, two visions can be distinguished, the American and the European vision. In the American vision, Living Labs are seen as laboratories that are used as a real home environment where the routines and interactions of participants can be studied on a long-term to get more naturalistic user information (Eriksson, Niitamo, & Kulkki, 2005; Schuurman & De Marez, 2010). In the European vision, Living Labs function as ecosystems in which end-users are involved to test and co-develop new products that are in a development phase via a multi-method approach (Eriksson et al., 2005; Schuurman & De Marez, 2010). Opposite to the American Living Lab tradition, the European notion of Living Labs has a strong focus on the collaboration between different stakeholders and the testing of the innovation in the natural and everyday contexts (Schuurman, Mahr, De Marez, & Ballon, 2013). This paper focusses on the European vision. Within this European vision, Living Labs are characterized by six elements (Schuurman et al., 2013). First, as opposed to the American Living Labs, users are studied in their natural setting. Second, the innovation approach is user-centric. Third, Living Lab research implements multiple methods. Fourth, during the research the whole innovation ecosystem is involved. Fifth, Living Lab research is conducted on a medium- to long-term. Finally, Living Labs make use of material (physical networks, user devices & research equipment) and immaterial (end-users, stakeholders & environment) infrastructure (Schuurman et al., 2013). The three most important stakeholders within such living lab ecosystem are the researchers, the developer(s) and the end-users (Levén & Holmström, 2008).

Depending on the stage of the new product development process, end-users are involved in a different manner. When the product is in its idea phase, end-users can be involved to gather new ideas. This can for example be done during a co-creation session where users will tell about the problems they experience in their daily life practices and routines. When there is already a tangible



product (e.g. a mock-up or prototype), users are involved to test the product during a field trial. Hereby, feedback is generated to enhance the innovation. However, there are limitations to self-reporting methods, which is why Living Labs focus on a multi-method research design in which observation research is put forward as a way to confront what people *say* with what people *do*.

Observation research

The roots of observation research are unclear; some state the roots can be found in ancient times, others argue that the roots can be found in the nineteenth and early twentieth centuries (Baker, 2006). Some ambiguity also exists on the nature of observation research. Because observations can be implemented in a wide variety of research methods and traditions it is sometimes called a data collection technique (Williamson, 2000; Baker, 2006). Moreover, observation can be easily combined with other research methods (Adler & Adler, 1998). When studying definitions of observation research, Baker (2006, p. 173) argues that definitions about observation are scarce, but *'the need to study and understand people within their natural environment'* is a consistent characteristic of observation in the few existing definitions. According to Adler and Adler (1998), conducting observation research implies that the observation is systematic and has a purposive nature.

When operationalizing observation research, several aspects have to be taken into account (e.g. the duration of the observation, the recruitment of respondents and the tools and methods that will be used to collect the data). A central parameter when developing an observation based research design is the relation between the researcher and the observed subject. In this context, Gold (1958) set out four observer's roles: the complete observer, the observer as a participant, the participant as an observer and the complete participant. The **complete observer** remains outside the observed situation and the users are not aware that they are being observed. Consequently, the complete observer is a non-participant and the observation is indirect and covert. When the researcher acts as an **observer as a participant**, users are aware that they are being observed. The researcher is present during the observations, but does not participate with the users. The role of the **participant as an observer** is similar to the observer as participant, but in contrast with the latter, the researcher will participate during the observed interactions. Finally, the **complete participant** participates during the observation. However, the observations are covert (Gold, 1958). Depending on the research design, different approaches are needed for successful data collection.

Furthermore, three dimensions can be distinguished in observation research (Cooper, Lewis & Urquhart, 2004; Mechant, 2012). The first dimension refers to the degree of participation of the observer. The observer can participate during the observation and interacts with the user (participant observer) or he can observe without participating and interacting with the users (non-participant observer). The second dimension refers to the presence of the observer. The observer can be present (direct observer) or he can observe the users at another location by using for example cameras (indirect observer). The final dimension refers to the fact that the user is aware that he is being observed. When the user knows he is observed, the observation is overt. When the user isn't aware that he is being observed, the observation is covert (Cooper, Lewis & Urquhart, 2004; Mechant, 2012). These typologies allow constructing the framework presented in table 1.



Table 1. Mapping the dimensions of observation on the observers' roles

	Direct/Indirect	Overt/Covert	Participating/ Non-participating
Complete participant	Direct	Covert	Participating
Participant as observer	Direct	Overt	Participating
Observer as participant	Direct	Overt	Non-participating
Complete observer	Indirect	Covert	Non-participating



Methodology

This paper analyzes the role of observation research within Living Lab research and development processes by means of a comparative case study analysis. Because of the exploratory nature of this research domain, a multidimensional comparative case-study analysis seems the most suitable approach to make the assessment (Yin, 1984). Case study research excels at bringing an understanding of a complex issue and can extend knowledge or add strength to what is already known through previous research. On top of that, case studies are most suited for processes which are poorly understood and lack a (solid) theoretical foundation (Eisenhardt, 1989), allow to analyze the process open-ended and on multiple levels (Yin, 1984) and gain deeper qualitative insights. Yin defines the case study research method as an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used. Given the complexity of the studied phenomenon, the multiple levels of analysis and the participation of the author team in the studied projects, the multidimensional comparative case-study design seems most appropriate.

For this case study analysis, four Living Lab projects were selected using three criteria, the project had to (a) have the label 'Living Lab' project; (b) contain one or more observation research phases and (c) match one of the four observation roles defined before. As research partners in the selected projects, we were able to use research results (documents) as well as our own experiences (action research) and lessons learned (soft data). The following hard data sources were used for our analysis: (a) meeting reports of steering committees, (b) the initial project proposal and project reports and (c) deliverables from the projects.

The next section elaborates on the parameters that are used to analyze the role of observation research within the four selected Living Lab projects.

Research parameters

The first cluster of seven parameters is related to the practical organization of the observations. In the first parameter the *maturity of the innovation (1)* at the moment of the observation is discussed. The second parameter assesses the *goal of the observation (2)* research. Next, the *setting or context (3)* in which the observations took place, the total *number of participants (4)* that are being observed and the number of *observation moments (5)* are described. The sixth research parameter focusses on the *methods (6)* that are used by the observer during the observation. The last parameter focusses on the *moment of the observation in the Living Lab research process (7)*.

The second cluster of parameters is related to the characteristics of Living Lab research. Følstad (2008) identifies three dimensions concerning the characteristics of Living Lab research. The first dimension contains five parameters about the end-user contribution to the innovation and development process (research into user context; possible discovery of unexpected uses and opportunities; technical testing; co-creation with the users and evaluation). The second dimension describes the research context (real-world context and familiar user context). The third dimension covers the characteristics of the Living Lab project itself (medium and long term and large scale). These parameters are used to frame the observations within the Living Lab approach. This allows evaluating on which characteristics observation research can provide added value.



Research context

The data for this research are collected in the *Mediatuin Living Lab* and *LeYLab*. Mediatuin Living Lab¹ is a panel-based Living Lab focusing on the optimization, co-creation and validation of media and ICT innovations. LeYLab² is a Living Lab which offered fiber internet access to a panel of households and organizations in two geographically restricted areas in the City of Kortrijk, Belgium. The goal of LeYLab is to stimulate innovation and to measure the relevance of new services for the personal lifestyle and living environment of the test users. Both Living Labs are using the same Living Lab methodology performed by iMinds-iLab.o³.

Selected Living Lab projects

Future Legends (complete participant).

Project. The goal of Future Legends was to measure the media habits and consumption of urban youth and to map and stimulate their digital skills. 'Urbans' were defined as Flemish youngsters living in an urbanized area. They are rather low-skilled, are mostly of foreign origin and have a low family income. Music and culture are an important aspect of their lives. The measurement of the media habits was done by using different methods such as a survey, workshops and testing and development of new media products. One of the project outcomes was the development of a crowdsourced online radio station with specific attention for local DJ's and artists.

Observation. Project workshops were organized for the urbans at which they learned to make radio shows, create music on the computer, etc. The project researchers participated in these workshops as a full participant. This allowed capturing valuable data on attitudes, habits, practices and possible opportunities to stimulate culture production and consumption among urban youngsters. Since the urbans did not know that they were being observed and the researcher/observer participated during the workshops, the researcher acted as a *complete participant*.

Image 1. Urbans during the co-creation session



¹ <http://mediatuin.be/>

² <http://www.leylab.be/english>

³ <http://www.iminds.be/en/develop-test/ilab-o>



La Mosca (participant as observer).

Project. The *La Mosca* project aimed at developing an innovative location based game in which people play an interactive role-playing game in the city. A rapid increase in people owning a smartphone opens new opportunities for this kind of games. The project's goal was to test and develop new smartphone-based games and to optimize and test them with end-users.

Observation. The final research phase consisted of a large scale field trial. For this field trial seven Lead Users were selected and invited to come and test the beta version of the game in a real city environment together with three friends. The project researchers participated and conducted pre- and post-in-depth interviews with the participants. On top that, a GoPro camera filmed some of the groups during the game. Since the project researchers were not incognito, the researchers acted as a *participant as observer*.

Image 2. Participants that were observed during the field trial



WeePeeTV (observer as participant).

Project. This project investigated the opportunities, expectancies and domestication of over-the-top television services. OTT television makes it possible to watch television content on tablets, smartphones, (smart) TV's as well as computers. Research was conducted on the ability of such services to meet the current needs and frustrations. By means of a multi-method panel-based living lab approach, the end-user was actively involved in the development process of these services. In the final phases of the project, co-creation was used to further develop the concept and a prototype of the innovation outcome was implemented in the houses of 20 panel members.

Observation. During the four month long field trial all twenty participants were observed using data logs. To enhance insights in usage patterns and domestication of the innovative technology, two complementary real-life observations were performed. Two households were visited by the project researcher, who was their guest for one evening. The observation started with a visualization of their usage patterns in- and outside house. Next, the respondents were asked to continue their evening as they would normally do, while the researcher took notes and asked an occasional question (QAP). Finally, an in-depth interview was conducted to add a deeper understanding to the observed data. The researcher in this project was not incognito, but did not actually participate, which is why the researcher in this project acted as an *observer as participant*



Image 3. The use of the WeepeeTV application in the houses of the participants



Twickey (complete observer)

Project. The Twickey project aimed at developing an innovative platform to manage direct debts. Both changing regulatory frameworks and current end-user frustrations hold opportunities for innovation in this domain. The Living Lab project focused on current habits and practices, with specific attention for existing barriers and determinants for non-adoption. After a co-creation phase, the seven end-users were confronted with the beta-version of the developed innovation.

Observation. This observation took place in simulated living-room laboratory, equipped with multiple cameras, microphones and screen capture infrastructure. Behind plate-glass the developer and a researcher could observe the respondents. The developer could make rapid iterative adaptations to the innovation which allowed experimenting with different setups. The selected respondents had to run through different scenario's while using the think aloud protocol. During these observations the respondents were not aware of the plate-glass, and the researcher did not participate in the activities, therefore the researcher had the role of a *complete observer*.

Image 4. Testing the user experience for the Twickey case with observation behind plate-glass





Table 2. Four cases mapped on the observers' roles and the dimensions of observation

	Direct/Indirect	Overt/Covert	Participating/ Non-participating
Complete participant (Future legends)	Direct	Covert	Participating
Participant as observer (La Mosca)	Direct	Overt	Participating
Observer as participant (Weepee TV)	Direct	Overt	Non-participating
Complete observer (Twikey)	Indirect	Covert	Non-participating



Results

The practical organization of the observations

This first group of parameters that will be discussed is related to the practical organization of the observations. By studying these parameters it becomes clear that observation research can be applied in different situations, in different manners and for varying purposes. Observations can be used for media innovations in their idea phase as well as innovations that are close to launch or even products or services that are already launched. However, when relating the maturity of the innovation to the goal of the observation, some differences exist. In the Future Legends case the main purpose of the observation was the creation of ideas and policy advice while the observations for Weepee TV were used to estimate the adoption potential. For the other two cases, observations were used to optimize the user experience before the product launch. Overall, the goal of the observation research is focused on opportunities and enabling factors when the innovation is in an early stage (inspiring), while the focus shifts towards marketing and ‘superficial’ elements when the innovation is maturing (fine-tuning and preparing for market).

Table 3. The practical organization of the observations

	Complete participant (Future Legends)	Participant as observer (La Mosca)	Observer as participant (Weepee tv)	Complete observer (Twickey)
Maturity of the innovation at the moment of the observation	Idea phase	Pre-launch	Post-launch	Pre-launch
Goal of the observation	Creation of a service + policy advice	Technical testing + user experience optimization	Adoption potential estimation	User experience optimization
Setting/context	Workshop environment	In the field (outdoor use-context)	At home	Lab
Who was observed? # of observed persons?	4 groups of youngsters (23 respondents)	7 groups (26 respondents)	2 separate observations of a single family	6 separate observations of a single individual
Methods used by the observer	- Workshop - Field notes	- Interviews - Camera's - Field notes	- Interviews - Field notes - Photos	- Scenario's - TAP - QAP - Camera - Plate-glass
Moment of the observation in the LL research	Just before the end of the LL research during a workshop	At the end of the LL research during a field trial + technical test	At the end of the LL research	At the end of the LL research during a technical optimization

Observation research is an appropriate method to measure the contextual elements related to media innovations, because it allows the researchers to observe the behavior of end-users in the usage-



context. For example, in the Weepee TV case, people were observed in their own houses and during the observation of La Mosca, end-users were observed while testing the innovation in the use-context. Since it is important to take into account the users' social context, one must observe the end-users together with their peers (e.g. family or friends). For example in the Future Legend case, the youngsters were observed together with their peers and in the Twikey case only one person was observed each observation, because the innovation has no social aspect and is related to personal information. Thus, the level of analysis is closely related to the social nature of the innovation. When researching innovations with a strong social component, it is not possible to isolate the observation in a simulated laboratory environment since the social environment is a crucial dimension of the end-user behavior. Depending on the context, different methods can be used by the observer to capture the behavior of the observed persons. For Twikey for example, the observation was done behind plate-glass and in the La Mosca case cameras captured the behavior of the end-users. As opposed to long term observation research, in these Living Lab cases the observations were short term. Moreover, observations were mostly implemented at the end of the Living Lab research. This can be explained by the fact that, as described above, observation research is a suitable method to measure contextual elements. Because of the iterative and gradual development of the innovation idea, product or service during the Living Lab research, a tangible result that can be used and further optimized by end-users is often only available near the end of the project. In the next section, observation research will be discussed within the specific context of a Living Lab.



Observations in Living Lab research

The second group of parameters that is used to compare the four cases focusses on the characteristics of Living Lab research. Table 4 shows the presence of the Living Lab characteristics for the overall Living Lab research (denoted by 'X') and for the observation research (marked in grey).

Table 4. Characteristics of Living Lab research applied to the four cases (Følstad, 2008)

		Complete participant (Future Legends)	Participant as observer (La Mosca)	Observer as participant (Weepee TV)	Complete observer (Twickey)
Living lab contributions to the innovation and development process	Research into user context	X	X	X	
	unexpected uses and opportunities	X	X	X	X
	Technical testing		X	X	X
	Co-creation with users	X	X	X	X
	Evaluation		X	X	X
The Living Lab context	Real-world context	X	X	X	
	Familiar user context	X	X	X	X
Characteristics of Living Lab studies	Medium and long term	X	X	X	
	Large scale	X	X	X	X
<i>X = applicable to the Living Lab case</i> = applicable to the observation research					

Research into user context. As described above, one of the main contributions of observation to the overall Living Lab process is the collection of data on the usage context of the innovation. When a social component is inherently connected to the innovation, observations provide valuable data on social behavior and processes. For Future Legends, this data mainly concerned insights in the urban youth culture and allowed tailoring the innovation to the social factors that connect urban youngsters. While the project tried to obtain similar insights by means of self-reporting methods, observations overcome troubles with bias (e.g. conformity or being able to express yourself) and allow relating the innovation and the user context with less friction. In this context, it is important to mark that for the data to be valid, the social construction in which the innovation is implemented should be native (as opposed to an artificial construct). As discussed in the previous section, observations in a labo setting do not allow research into the user context (e.g. Twickey case). This means such observations can only be performed when there is no social component related to the innovation. Insights concerning the user context can be *validating* (e.g. preparing market launch, marketing campaigns or fine-tuning) as well as *inspiring* (e.g. looking for opportunities to stimulate culture and social cohesion in the Future Legends case).



Unexpected uses and opportunities. All selected Living Lab cases focused on the possible discovery of unexpected uses and opportunities, but observations in a laboratory setting make it hard to gather such insights as the innovation is not implemented in the daily routines and social reality, laboratory behavior is mostly artificial and hard to generalize. In a real time environment however, observations can provide valuable information. During the observations of WeePee TV, it became clear that OTT TV had a hard time beating traditional viewing patterns. The service was mainly used when a family had a fight over what to watch on the main screen in the living room, whereupon one family member (the one who lost the fight) was banned to another room to watch the content he or she preferred. In the La Mosca case, for example, players of the game removed the battery of their smartphone when danger was near, so they could not be harmed. While some of these unexpected usage patterns could be captured using interviews, focus groups or even data logging, observations have the benefit of being all inclusive in terms of behavior. It is able to capture social dynamics, overcome technical issues and provides insights in unconscious behavior.

Technical testing. Living Labs originated as a user-centric addition to testbeds (Ballon, Pierson & Delaere, 2007). Therefore technical testing is still central in a lot of Living Lab cases, especially when a technological solution is central to the Living Lab project (which was not the case for Future Legends). In the three technology-central cases, technical testing was implemented in the Living Lab research. Despite the attention for technical testing in Living Labs, observations only add limited value to this research dimension. Only in the La Mosca case (e.g. battery lifetime versus game duration, data connections in the city) and Twikey case (e.g. error messages and pages, damaged chips on the participants ID) observation research was used during the technical testing. Although social dynamics and offline behavior are hard to grasp using data logging, such technical monitoring is able to capture technical issues. On top of that, technical issues are relatively easy for respondents to self-report. Although observations could provide insights on frustrations or contextual causes of the technical errors, none of the selected cases implemented the observations this way. When looking at the project documents, this is mainly due to the goal of the observations and the strong focus on the user instead of the technology.

Co-creation with users. As discussed before, co-creation is one of the core elements in the European notion of Living Labs. Not surprisingly, all the selected Living Lab cases implemented co-creation in their processes. However, only in the Future Legends case observation research was used during a co-creation. While observations provide a valuable data source in Living Lab research, it is hard to implement for co-creative purposes since it embodies no act of creation by the respondents, but rather focusses on usage and behavior. For La Mosca, the observation was performed as a sidetrack of the creation. While the focus of this project was to co-develop a cultural product parallel observations allowed capturing social dynamics. Thus, co-creation is not the goal of the observations within Living Labs, but the act of creation within a social structure allows gathering additional insights on the target population by means of observation techniques.

Evaluation. The evaluative dimension of Living Labs is related to the maturity of the innovation. The more mature an innovation is, the more a Living Lab shifts from exploration to evaluation. Concerning the role of observations for this research dimension, interesting differences can be observed between what people say (e.g. questionnaire or interview) and what people do. Observations within a NPD-process might enhance insights in behavior and help to overcome



tensions between conscious behavior and attitudes on the one hand and unconscious usage patterns and latent attitudes on the other. Therefore, when evaluation was subject of the Living Lab project, observation contributed to this for all cases. Such enhanced insights proved to be very valuable. Based on an initial survey for WeePeeTV, for example, the adoption potential estimation was very positive (high percentage of innovators and early adopters), while the observations revealed that this potential was heavily overestimated since some crucial determinants were not matching the end-users expectations and usage patterns. The main contribution of observations to the evaluation of an innovation within a Living Lab lies in the provision of a deeper understanding of previously identified problems and opportunities (e.g. error messages of deviant patterns in the log data).

Real-world context and familiar user context. As described above, observation research is an appropriate method to measure contextual factors. Observations outside a real-world environment provide only limited value since important technical, environmental and social parameters are excluded and are therefore undermining the main strength of observations. A lot of potentially interesting information could come from a real-life contextual observation. Nevertheless, the Twikey case took place in a simulated living room. Because of that, this real-life contextual data was not captured. However, this case only focused on the interaction between the end-user and the computer interface. Because of this individual nature of the innovation (administration of direct debts), insights were still valuable. On top of that, isolating the observation in a controlled environment allowed for manipulation of both usage patterns (by means of scenarios) and the interface itself (the developer was editing the code real-time behind the plate-glass). Depending on the nature of the innovation (presence of a social component) and the goal of the observation (interface only, no research into usage patterns or context), observations outside a real-world context might provide valuable information, albeit of a different nature.

Medium and long term. While three out of four Living Lab projects ran longer than one year, observations are in all four cases limited to a single moment in time. For all three cases this can be explained due to the nature of the Living Lab processes. All Living Labs followed a phased research and development track in line the five stages of a Living Lab described by Pierson and Lievens (2008) which consists of a sequence of (1) contextualization (2) selection (3) concretization (4) implementation and (5) feedback. In this phased process implementation and feedback is situated at the end of the project. Due to limited resources, the pressure to launch innovations as quickly as possible, the wide variety of research questions within a Living Lab and the relatively large cost of observations (compared to other research methods within a Living Lab), observations are mostly limited to a single measurement. Finally, the data that is gathered through observations is less directly related to the innovation itself, since it covers contextual data, latent attitudes and behaviors and more peripheral parameters. Although these insights need translation in order to be operational for developers and organizations, its value is often underestimated and therefore limited in its application. Besides this, short observations allow researchers and developers to iterate and amend their innovation more quickly.

Large scale. Finally, it is noticeable that all Living Lab cases were conducted on a large scale. However, observation research is mostly applied on a smaller scale, during one phase of the Living Lab research. This can again be explained by the fact that within a high pressure market, there is only little time for large scale observations. But the most important determinant for this is the lack of



resources. Large scale observations are very time consuming (both the collection and the analysis). While some research methods have meanwhile digitalized (e.g. online surveys), enabling a larger reach, observations as discussed in this paper are not (yet) possible to conduct in a digital environment. Some might argue that data logging and online discussions can be considered digital forms of observation, but in the light of iterative innovation development processes, these formats are not (fully) able to capture the contextual information that is at the heart of observation research. While it certainly has value to upscale observations within a Living Lab context, digital methods have not (yet) been able to provide valuable alternatives.



Conclusion

This paper shows that Living Lab research implements observation research in different ways. When taking into account the different groups of parameters, observation research can be used for different goals during the whole new product development process (idea phase, concept design, product design, launch and post-launch) of media innovations. Observation can be used to generate ideas at the beginning of a development process (idea phase) as well as to validate the effectiveness and efficiency when the product is already launched (post-launch). In the cases whereby a tangible product is available, observation research is mainly used for the technical testing of products and services during field trials (e.g. La Mosca). Mostly, observations are used to gather more contextual information about the end-users during another method (e.g. co-creation or field trial). As such, within a Living Lab context, observations are rather used as a data collection technique (Williamson, 2000), than as an individual research method.

In a Living Lab context, observation research mostly has a validating function at the end of the research. However, this research step is very valuable because it allows researchers to take into account contextual factors. The participants are mainly observed in the user context together with the persons who are supposed to use the product or service. This observation of people in their natural environment is consequently the main characteristic and advance of conducting observations during innovation research. Depending on the use context, different tools are implemented to capture information during the observation sessions.

Living Labs are known for their multi-method approach. Mostly, observation research is conducted during a co-creation or field trial. Together with the limited resources and the pressure to launch media innovations as quickly as possible, this explains why observations in a Living Lab context are rather short term and involve a limited group of users.

We can conclude that the observation design during a Living Lab innovation research differs. Depending on the maturity of the innovation, different methods are used to generate more information about the innovation. Observations can play an important role during those methods to register the contextual elements, to validate the innovation and to examine the difference between what people say and what people do.



Discussion

This paper is an exploratory study in which observation research in four Living Lab cases are compared. The main goal of this paper is to bring observation in innovation research under attention. Within this paper we argued that observations can be used as a complementary method to gather additional data about the use-context, to validate the innovation and to examine the difference between what people say and what people do. During this paper we didn't dig deeper into this latter characteristic of observation research. However further research that focusses on this behavior of end-users would be interesting.

Within this exploratory research, four Living Lab projects are compared. The observations within these projects differ in maturity of the innovation, methods that are used and context. Because of this diversity it was possible to give a broad view of the opportunities of observation research, but at the other hand, it would be interesting to compare more cases to each other to reveal some recommendations for other innovation researchers.

Those cases were selected according the roles set out by Gold (1958). However, with only one case per role, it is difficult to draw conclusions on the level of the roles. Therefore it would be interesting to conduct the same research with multiple Living Lab cases in each role.

This in-depth analysis is an added value for user-centric innovation researchers who want to conduct ethnographic observations within their Living Lab research since the insights enable to select the most appropriate approach for Living Lab field trial observations and broadens the understanding and possibilities of this research method

When comparing the observation research with the Living Lab characteristics, we conclude that observations are mostly short-term and they involve few participants. Therefore it would be interesting to study digital observation (netnography) within Living Labs. By using digital observation techniques it is less time intensive to observe more participants. However, we can still ask the questions to what extent the use-context, one of the main advantages of observations, will be taking into account during these digital observations.



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