

Identifying Lead Users in a Living Lab Environment

Lynn Coorevits
iMinds-MICT-Ugent
Korte Meer 7
Gent

Dimitri Schuurman
iMinds-MICT-Ugent
Korte Meer 7
Gent

Aron-Levi Herregodts
UGent
Korte Meer 7-11
Gent

Abstract

This paper emphasizes the identification process of lead users within a living lab environment. Lead users are seen as important contributors to the living lab methodology since they express needs before the general market does. Additionally they generate ideas with a high level of novelty. Living Lab researchers have focused on the added value of involving these users in their research, but research on how to identify these lead users is still lacking. Therefore this paper will focus on the identification process of lead users by means of a Living Lab case study in the world of movie theaters.

Keywords: Living Labs, Lead Users, User-Centric Innovation

Introduction

Innovation is widespread in society, entailing the search for new products and services delivering an added value to the customers. Companies are continuously seeking for possible ways to innovate, trying to keep up with the changing trends in the market. Nevertheless, there is a high risk associated with new product and/or service development (Luthje & Herstatt, 2004), making the possibility of risk reduction an important determining factor in the decision to innovate. In the past, companies mainly focused on their internal processes to innovate, frequently resulting in higher failure rates. The end-users were not taken into consideration until researchers and practitioners recommended their involvement to reduce risk and failure. They suggested the alignment of key activities with the needs of actual and potential customers. This customer focus would then translate in quality, reliability and uniqueness of a product and as such a better market performance (Luthje & Herstatt, 2004). The Living Lab movement emerged from those closed innovations contexts, including end-users in the process. Real life environments and involvement of end-users are central to the living lab methodology. They contain different

stakeholders such as research organizations, companies and public industry to collaborate and develop new products and services (Ståhlbröst, 2008). The concept of lead user involvement can be traced back to Von Hippel in the late seventies. He suggested the importance of involving lead users in innovation, initially in a B-to-B context, later on also in a B-to-C environment. According to Von Hippel, lead users face specific needs months or years before they appear in the general marketplace and expect to benefit significantly from obtaining a solution for their needs (Von Hippel, 1976, 1986). These lead users can be found in the market that is under investigation or in other markets facing similar problems. A major problem related to these lead users, is the fact that they are relatively rare and sometimes hard to trace. A significant amount of research has been conducted on the importance of using lead users in the innovation process for various sectors, but there is a lack of research showing how to identify them. This paper will tackle the process of identifying lead users in a living lab environment by means of a case study in the movie theater industry, the iCinema-project.

Living Lab

Living Lab-research is a state-of-the-art methodology aiming at the involvement of end-users in the innovation process. Living Labs are experimental platforms where end-users can be studied in their everyday context (Eriksson, Niitamo, Oyj, & Kulkki, 2005). Living Labs confront (potential) users with (prototypes or demonstrators of) products and/or services in the innovation process (Schuurman & Marez, 2012). This approach has three main advantages. First it assists in developing more context-specific insights on development and acceptance processes and especially the interaction between both. Second these experiments inform us about possible conditions for stimulating the societal and economic embedding of technology. Third embedding it in real life situations generates images of potential societal impacts of innovation (Frissen & van Lieshout, 2004).

They function as an ecosystem with different stakeholders, where end-users are subjected to a variety of research methods, quantitative as well as qualitative. They illustrate that users not only initiate the process of innovation, but can dominate the subsequent phases of product development as well. Within those end-users, lead users have been suggested as the users to incorporate in the living lab methodology

(Schuurman & Marez, 2012), especially because their innovations are commercially attractive (Luthje & Herstatt, 2004).

Pierson & Lievens (2005) identified five stages in the process configuration of living lab research. The case 'iCinema' follows those stages to develop a new product.

1. **Contextualization** is an exploratory phase. Different research methods are applied to provide the required background and insights. The research is done on two levels, technological and social, resulting in a technological scan and state-of-the-art study. The contextualization allows us to define the selection criteria and profiles of end-users.

2. **Selection** is the identification and selection of end-users that will be involved in the living lab research. In the selection phase non-probability sampling is used, such as maximum variation based on socio demographic variables or criterion sampling trying to understand the different factors and their configuration.

3. **Concretization** is the initial measurement of the selected users before the technology or service is introduced. Specific characteristics of the users are measured such as their behavior and perception on the technology. This is often done via a (semi) structured questionnaire, measuring user specific and case specific components.

4. **Implementation** is the operationally running test phase of the Living Lab. There are two major research methods being used: direct analysis by registering user actions remotely (e.g. logging) or indirect analysis by researching the motivations via focus groups, interviews and self-reporting techniques.

5. **Feedback** happens at the end of the living lab. It exists out of an ex-post-measurement detecting evolutions in the perception and attitudes towards the introduced technology or service. Additionally technological recommendations are deduced from the implementation phase.

We will only discuss the contextualization and selection phase of the living lab, because these two phases focus on user identification. Within iCinema one of the objectives was to identify lead users in the domain of cinema and interactivity for future participation. Researchers have reached consensus on the importance of involving lead users in the innovation process, but do not agree yet on how to identify them (Bilgram, Brem, & Voigt, 2008; Lilien, Morrison, Searls, Sonnack, & Von Hippel, 2002). This paper will fill this gap in the literature by means of a concrete

case study, applying the lead user theory within the contextualization and identification phase of the living lab. The finding and lessons learned will be summarized into an identification model for lead users.

Lead Users

Research has indicated that the type of innovation, incremental versus radical, requires different users to be involved (Luthje & Herstatt, 2004). When innovating incrementally, a company can apply a variety of proven market research methods such as the assessment of current and future needs. Regular consumers can easily participate in this research because of their product knowledge and lack of barriers to think about their needs. For breakthrough innovations however, the situation is very different. It is rather impossible to determine the demands of tomorrow's market via traditional research methods. One of the limitations seems to be that most market research techniques try to ensure representativeness by randomization of the customer sample. Another limitation is that the opinion about new products is constrained by real life experiences. In order to forecast their new needs and potential solutions, the customers will have to integrate the potential product into a use context that does not exist yet, which is a mentally challenging task. Therefore the familiarity with current products, often inhibits the conception of novel product attributes (Lin & Seepersad, 2007; Von Hippel, 1986). A third limitation is that most market research techniques do not offer appropriate ways to discover new product attributes. They rarely assist in revealing emerging needs and identifying (new) solutions for those needs (Von Hippel, 1988). Therefore companies are increasingly working with the so-called lead users in the early phases of innovation (Herstatt & Hippel, 1992; Luthje & Herstatt, 2004). They are the 'leading edge', well qualified and motivated to make significant contributions to the development of new products and services. These lead users are different from ordinary users and can be identified by two main characteristics:

Lead users face new needs of the market and this significantly earlier than the majority of the customers in a market segment. They will profit strongly from innovations that provide a solution for those needs. Lead users do not just experience any new need, but those needs that most customers will face in the future. The incentive of satisfying those needs can become so strong, they will be motivated to dominate all stages of the innovation process (Von Hippel, 1986).

Different methods have been developed to detect lead users (Luthje & Herstatt, 2004), but there is still no consensus in how to identify them correctly (Schuurman & Marez, 2012). In theory and practice, mass screening is the primary method used to uncover lead users. It is a standardized, quantitative approach, screening a large number of potentially relevant users (Belz & Baumbach, 2010). Other methods have been suggested as alternatives to identify lead users, such as netnography, but the principal method remains screening. The major challenges to identify lead users appear in a business to consumer market, because of the distance between the products and the consumer (Hoffman, Kopalle, & Novak, 2010; Spann, Ernst, Skiera, & Soll, 2009). In addition the detection of these users is often situation specific and not based on user characteristics (Von Hippel, 1976). As a result, the elaboration of lead user identification methods is still a major challenge. By studying the iCinema project, we propose a combination of a dimensional scale with an open-ended question to identify lead users.

Methodology

iCinema is a project with different key players in the cinema environment. It intends to change the traditional cinema experience and workflow from linear to interactive. The main idea is to stimulate a higher involvement and participation of the current movie theatre visitors, trying to connect the movie theatres with the new digital world. The different stakeholders are brought together in a living lab environment aiming at the development of a new concept that should represent the cinema of the future. An added value has to be created for the different stakeholders involved: namely the consumer, the cinema exhibitor, the technical suppliers, broader film and media industry players and content partners. Since a new concept will be developed with these stakeholders (= radical innovation), the need for involving lead users arises.

During the identification process of the lead users we followed the process (step I, II and III) of the lead user method suggested by Luthje en Herstatt (2004). Step IV will not be discussed because this is part of a later stage in the living lab and is of no relevance for the lead user identification. The lead user method was integrated into the different phases of the Living Lab methodology according to Pierson & Lievens (2005).

Following figure demonstrates the research flow:

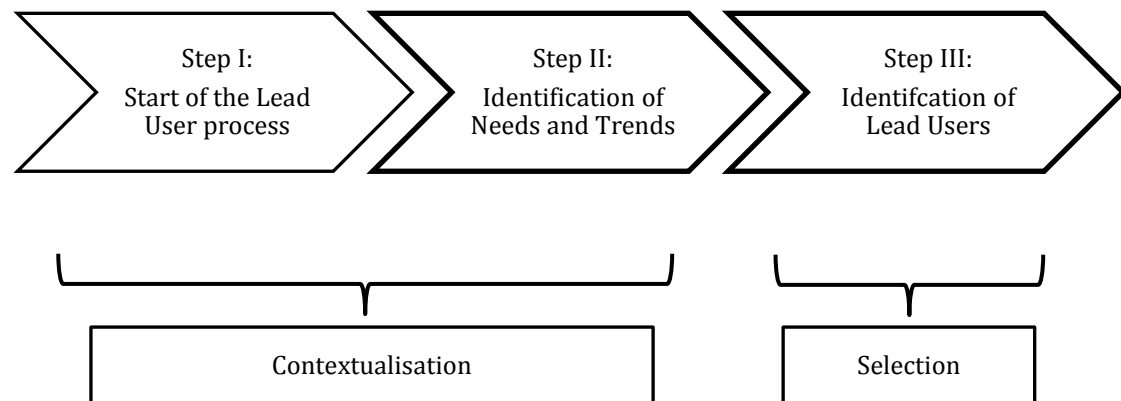


Figure based on (Luthje & Herstatt, 2004; Pierson & Lievens, 2005)

Figure 1: Identifying Lead Users in a Living Lab Environment

During the first phase of the lead user method an interdisciplinary team was set up with cinema exhibitors, technical suppliers, technical developers and academic researchers. The boundaries and requirements for the outcomes of the research project were established in several meetings and a project outline.

In a next phase the academic researchers made a state of the art by scanning the literature and the Internet to discover the most prevailing trends in the movie theater industry. Additionally, several experts were interviewed of which a script writer and movie producer, a product manager of hardware materials, a national spread movie theater and a transmedia consultant. They provided us with some extra practical feedback and information. During the entire phase insights were gained regarding the current trends, a critical aspect for identifying progressive or lead users since they are ahead of the market (Luthje & Herstatt, 2004).

Subsequent to the previous two steps, the indicators to identify lead users were determined in a third step. There are two basic procedures to identify lead users, either the quantitative, standardized screening approach, or the qualitative, non-standardized networking approach. According to Lüthje & Herstatt (2004) the screening method is appropriate in a manageable market with existing product users. It is a form frequently used (Herstatt & Hippel, 1992; Luthje & Herstatt, 2004) in the form of a written survey, asking a large number of potentially relevant users (e.g. loyal customers) to answer questions regarding user innovations and lead user characteristics (Belz & Baumbach, 2010). Considering the availability of a panel and customer database provided by the movie theatres involved, we opted for this

screening method. Based on a literature review (Belz & Baumbach, 2010; Luthje & Herstatt, 2004; Oosterloo, Kratzer, & Achterkamp, 2010), six constructs: having new needs, user expertise, expected advantages, user experience, opinion leadership and being ahead of trends were developed in a scale to identify lead users. Having new needs is a construct deducted from Von Hippel's (1986,1988) lead user definition and Schuurman, Mahr, & De Marez (2012) suggest it as a main characteristic for classical lead users. The focus should be on the word 'new', meaning every consumer has existing needs, but only lead users demonstrate new needs. Furthermore, these lead users are ahead of a trend/the market. In other words, detecting trends in the market, helps identifying lead users (Luthje & Herstatt, 2004; Oosterloo et al., 2010; Von Hippel, 1986). Additionally, research has shown that lead users innovate, to acquire an advantage out of that innovation, namely the satisfaction of their new needs (Oosterloo et al., 2010; Spann et al., 2009; Von Hippel, 1986). A higher expertise and experience means a higher familiarity with the product and service and as such a better level of comprehension and ideation (Bilgram et al., 2008; Luthje & Herstatt, 2004; Schuurman & Marez, 2012). Opinion leadership is often referred to as the central characteristic of lead users (Bilgram et al., 2008; Luthje & Herstatt, 2004; Von Hippel, 1988), implying other consumers will ask opinion leaders for information and advice. By using these six dimensions, a scale was developed and the different items were scored on a 5-point Likert scale ranging from 1 (=strongly disagree) to 5 (=strongly agree). Two open questions were added, to identify current frustrations and first ideas to innovate the movie theater industry. They serve as a verification of the survey results (Belz & Baumbach, 2010) and to identify the true lead users.

The following model was developed to identify lead users:

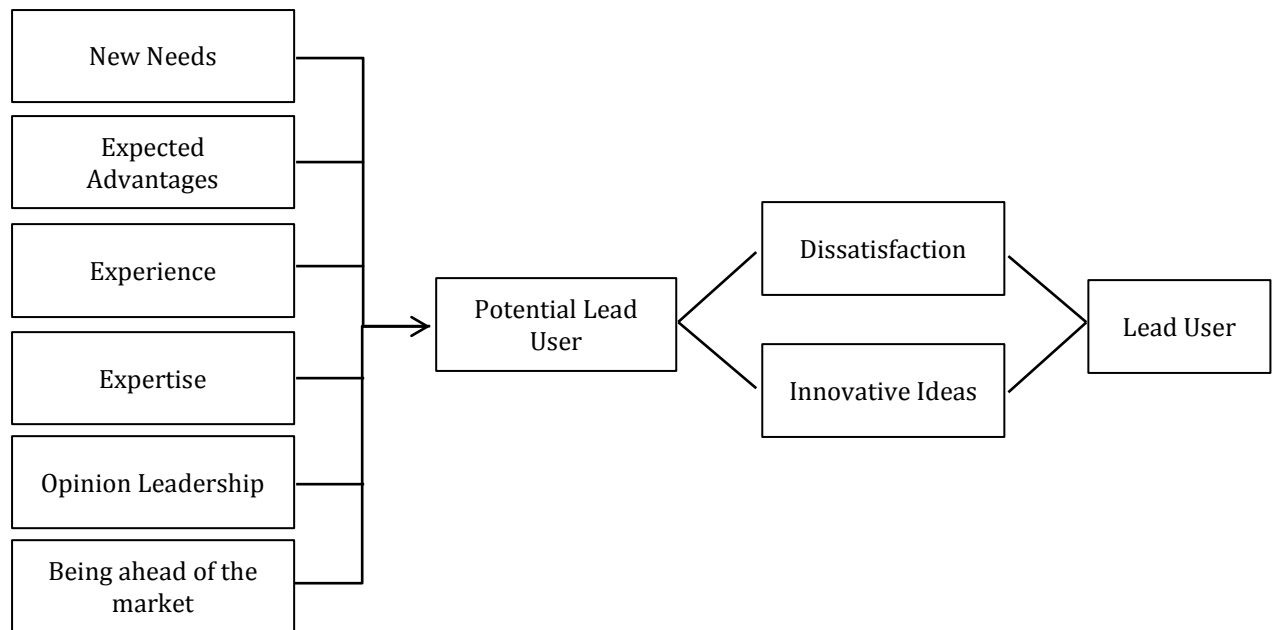


Figure 2: Conceptual model to identify lead users

A factor analysis was done to uncover the different dimensions/ characteristics of lead users. A score above average on the different dimensions resulted in a potential lead user. Afterwards the results of the open questions were coded. They serve as an indication whether a potential lead user is a true lead user or not.

Results

The literature review and environmental scan indicated the major trend in movie theatres nowadays is the pursuit for audience involvement during the movie experience. Different products and services have been launched in the market to create participation before and during the movie as well online as offline (= interactivity). However, research has shown that creativity is key within participatory involvement, because boredom and annoyance are just around the corner (Phillips & Noble, 2007). The expert interviews gave us some deeper insights into the interactivity of the movie theatre industry. Experts believe the iCinema concept will work, as long as the emotional experience of the audience is enhanced and technological barriers stay low for the audience as well as the stakeholders. They mention the audience will not be prepared to pay for any changes in their experience. It will be a matter of accomplishing more and in a more efficient way, resulting in lower costs. Although interactivity is a new trend, they all claim that it will never accomplish the same level of experience one has when watching movie. In other

words the entire experience needs to be enriched and not just one part of this experience.

Both techniques were necessary to gain insights in current trends, but we comply with Luthje en Herstatt (2004) that the expert interviews were the most valuable source to identify trends.

In the next phase, a survey was spread in Flanders, trying to identify lead users with the developed 'lead user scale'. A response of N=2006 was generated, consisting of mainly younger people (<35) and more males (60%) compared to females (40%). These results are consistent with previous research of movie theatre visitors in Flanders (www.digimeter.be). The scale was analyzed via factor analysis (PCA) with varimax rotation to detect the underlying dimensions. After deleting the items with a factor loading below .30 (Wijnen, Janssens, De Pelsmacker, & Van Kenhove, 2002), four factors were found with KMO .922 and Bartlett ($\chi^2(231) = 14.468,888$; $p < .05$). The total variance explained is 60%. In other words the pre-assumed conceptual model with six dimensions didn't stand after the factor analysis. Some of the dimensions showed strong correlations. When looking at the four dimensional model, the Crohnbach Alpha proved high enough to continue with the model. Factor 1 ($\alpha=.88$) is a combination of the constructs experience, expertise and opinion leadership. Factor 2 ($\alpha=.88$) comprises the constructs having new needs and high expected advantages. Factor 3 ($\alpha = .77$) defines the construct being ahead of the market. Factor 4 ($\alpha = .70$) contains items that relate to domain specific knowledge.

The factor scores were calculated by averaging the score per factor. The potential Lead user score was designed by summation of the four factor scores. Considering the items were measured on 5-point Likert scales, a maximum score of 20, minimum of 4,13 and M=9,56, SD=2,4 was established. Only respondents with a score of 14 or higher were selected as potential lead users, meaning they have an average score of 3,5 or higher on the different factors. When following this procedure, we identify 54 respondents as potential lead users. They are predominantly male (98%), with an age of M=28 years. Often they have no children (80%) and are more motivated (98%) to participate in the entire innovation process compared to the non-lead users (50%) ($\chi^2=39,120$, $df = 1$, $p<0.05$). This is in line with previous findings of lead users being more motivated to participate in the innovation process compared to their counterparts (Herstatt & Hippel, 1992; Luthje & Herstatt, 2004).

In a following step the open questions of frustration and idea generation were analyzed to verify the lead user concept. When looking at the frustration question: ‘Give the reasons why you would not go to the movie theatre’, we did not find any qualitative differences compared to the non-potentials, except for the fact that non-potentials elaborate more on their frustrations. To support these findings, we compared the satisfaction scores of the potential lead users (M=4,01), with the non-potentials (M=3,82) and found that lead users are significantly more satisfied with the current movie theater experience compared to the non-potentials (T= -2,169, df=55819, p<0.05). A second open question was integrated to stimulate idea generation and link the evaluation of their ideas to the potential lead user score. The question: ‘People arrive later in the movie theaters and often skip the preshow partially or completely. How would you deal with this problem?’ was asked to the respondents. The quality of the different ideas were evaluated and the potentials came up with a higher variety of ideas and more innovative ideas compared to the non-potentials.

The results of the open questions are contradictory to previous research stating that lead users are dissatisfied with the current market offerings and therefore generate more innovative ideas (Luthje & Herstatt, 2004). Their ideas are more innovative, but this is not related to their level of satisfaction.

Conclusions

The results of this study imply a working model to identify lead users via a standardized scale combined with an open question. The final model suggested to identify lead users looks as following:

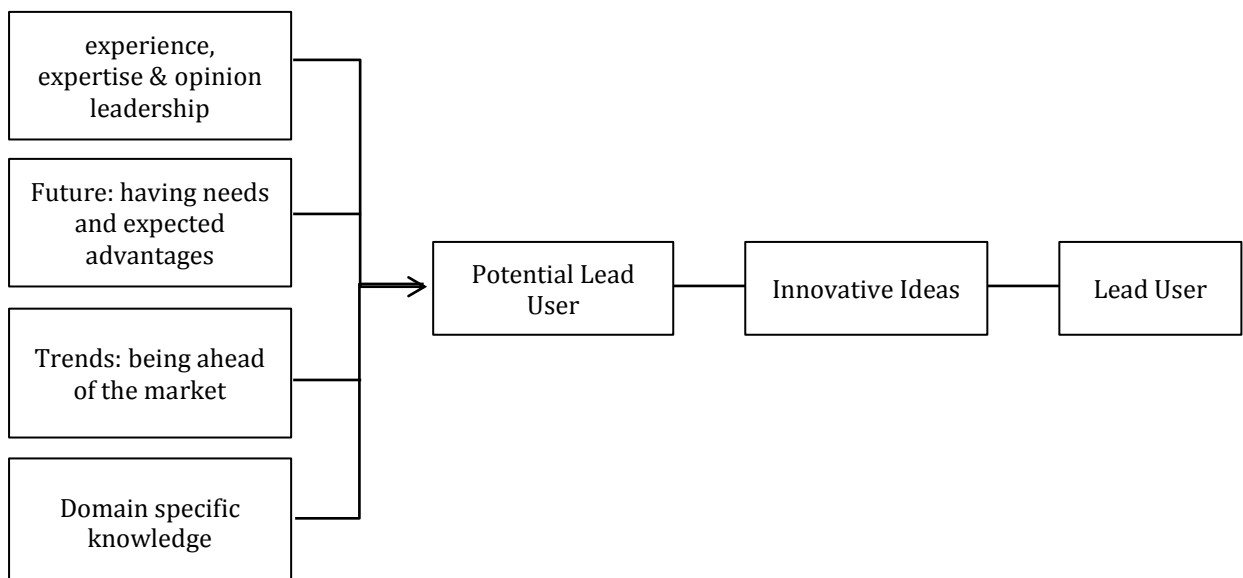


Figure 3: Final conceptual model

This study has various implications for the movie theatre industry. They can use the identified lead users for co-creation of a new concept and testing the concept in the movie theatre environment. Additionally, other industries can implement this method to identify lead users as part of their innovation strategy. The identification process has almost no additional costs when applying it in a living lab environment. It fits perfectly in the contextualization and selection phase, meaning it can become part of the living lab environment and as such avoid additional costs.

It is argued that traditional survey methods are only applicable for companies that have a known customer base. Companies that do not own one, lack the capability to efficiently identify lead users. Especially when resource and time constraints apply (e.g. fast moving consumer good environment). Nowadays the internet provides us with new ways of integrating the traditional survey methods in a more efficient way (Spann et al., 2009), meaning this model can be applied in an online environment as well. Hence, this model can also be applied by companies that have no knowledge of their current customer database.

The results contradict previous research in regard to the dissatisfaction of lead users with the product or service (Hoffman et al., 2010). Movie theater lead users are significantly more satisfied with the current offer in movie theaters compared to regular users. Therefore we believe lead users are not necessarily dissatisfied with the current product and services in the market place but are just inclined to improve whatever is out there. This can be a sign of the non-domain specificity of lead users. Especially because we noticed certain lead users deducted from this research, also prevailed as lead users in previous research, both handling different topics. Future research can determine whether lead users are domain specific or not. This might have implications to standardize a potential identification method.

Not all potential lead users are actual lead users. It might be that they cannot translate their needs into an innovation. The open question helped in identifying those lead users that understand the market better or that are able to formulate their needs or ideas better. Therefore the open question of idea generation is an important contribution to the scale and a necessary item to integrate when identifying lead users. Although the analysis of the open questions indicates the ideas of the lead users being more innovative, no objective evaluation was available. Future research should focus on evaluating the ideas for example via a Delphi method, leading to a more objective scoring of the results.

Some limitations indicate that the identification model needs to be refined. The identified lead users are primarily male and score high on their needs towards interactive cinema. Previous research showed that lead users are often male (Von Hippel, 1986) but the self-assessment aspect of the scale can influence this. Gender research showed that males are more confident when self-assessing (Pallier, 2006) and therefore males will score higher on the current questionnaire to uncover lead users. A correction factor or adjusted scale is recommended to find the right lead users without having gender as a confounding factor. Future research should also focus on a true cut-off point to identify potential lead users. For now we assumed a minimum score of 14 suffices to identify someone as a potential lead user. A more standardized method is needed.

The iCinema project is a work in progress, meaning results are only preliminary and we are currently optimizing and evaluating the identification method even further. In the near future we will be able to provide more results and conclusions about the effectiveness of this identification method.

References

- Belz, F.-M., & Baumbach, W. (2010). Netnography as a Method of Lead User Identification. *Creativity and Innovation Management*, 19(3), 304–313. doi:10.1111/j.1467-8691.2010.00571.x
- Bilgram, V., Brem, A., & Voigt, K.-I. (2008). User-Centric Innovations in New Product Development — Systematic Identification of Lead Users Harnessing Interactive and Collaborative Online-Tools. *International Journal of Innovation Management*, 12(03), 419–458. doi:10.1142/S1363919608002096
- Eriksson, M., Niitamo, V., Oyj, N., & Kulkki, S. (2005). State-of-the-art in utilizing Living Labs approach to user-centric ICT innovation - a European approach. *1*(13), 1–13.
- Frissen, V., & van Lieshout, M. (2004). To user-centred innovation processes: the role of living labs. In *TNO-ICT*. Delft.
- Herstatt, C., & Hippel, E. (1992). FROM EXPERIENCE: Developing New Product Concepts Via the Lead User Method: A Case Study in a “Low-Tech” Field. *Journal of Product Innovation Management*, 9(3), 213–221. doi:10.1111/1540-5885.930213

- Hoffman, D., Kopalle, P., & Novak, T. (2010). The “Right” Consumers for Better Concepts: Identifying and Using Consumers High in Emergent Nature to Further Develop New Product Concepts. *Journal of Marketing Research*, 47, 854–865.
- Lilien, G. L., Morrison, P. D., Searls, K., Sonnack, M., & Von Hippel, E. (2002). Performance Assessment of the Lead User Idea-Generation Process for New Product Development. *Management Science*, 48(8), 1042–1059.
- Lin, J., & Seepersad, C. C. (2007). Empathic Lead Users: The Effects of Extraordinary User Experiences on Customer Needs Analysis and Product Redesign. In *Proceedings of IDETC/CIE 2007 ASME 2006 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference* (pp. 1–8). Las Vegas.
- Luthje, C., & Herstatt, C. (2004). The Lead User method: an outline of empirical findings and issues for future research. *R and D Management*, 34(5), 553–568. doi:10.1111/j.1467-9310.2004.00362.x
- Oosterloo, N., Kratzer, J., & Achterkamp, M. C. (2010). Applying lead user theory to young adults. *Young Consumers: Insight and Ideas for Responsible Marketers*, 11(1), 5–23.
- Pallier, G. (2006). Gender Differences in the Self-Assessment of Accuracy on Cognitive Tasks, 48(March 2003).
- Phillips, J., & Noble, S. M. (2007). Simply Captivating: Understanding Consumers’ Attitudes Toward the Cinema as an Advertising Medium. *Journal of Advertising*, 36(1), 81–94. doi:10.2753/JOA0091-3367360106
- Pierson, J. O., & Lievens, B. (2005). Configuring Living Labs for a “Thick” Understanding of Innovation. *Ethnographic Praxis in Industry Conference Proceedings*, 1, 114–127.
- Schuurman, D., Mahr, D., & De Marez, L. (2012). User characteristics for customer involvement in innovation processes : deconstructing the Lead User- concept.
- Schuurman, D., & Marez, L. De. (2012). Structuring User Involvement in Panel-Based Living Labs, (September), 31–38.
- Spann, M., Ernst, H., Skiera, B., & Soll, J. H. (2009). Identification of Lead Users for Consumer Products via Virtual Stock Markets. *Journal of Product Innovation Management*, 26, 322–335.
- Ståhlbröst, A. (2008). - *The Living Lab Way of User Involvement*. Lulea University of Technology.
- Von Hippel, E. (1976). Lead user analysis for the development of new industrial products. *Management Science*, 35, 569–582.

Von Hippel, E. (1986). Lead Users: A source of Novel Product Concepts.
Management Science, 32(7), 791–805.

Von Hippel, E. (1988). *The source of innovation*. New York: Oxford University Press.

Wijnen, K., Janssens, W., De Pelsmacker, P., & Van Kenhove, P. (2002).
Marktonderzoek met SPSS (p. 465). Antwerpen: Garant.