



Foresight by online communities – The case of renewable energies

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ABSTRACT

Web 2.0 offers manifold ways in order to integrate community members via online communities (OCs) for innovation processes. OCs prove to be a valuable and dynamic source of information. External information sources are also important for foresight in order to be able to identify and monitor all relevant changes. However, traditional foresight methods are rather static in comparison with dynamic OCs. Thus, this study gives first insights into the use of OCs for foresight. First, based on literature, it is conceptually shown that OCs can contribute to foresight. Second, the question of how to assess the potential of OCs for foresight is considered. Renewable energies OCs are identified using a netnographic approach. One selected OC is analyzed in-depth by applying a prior developed criteria catalog which is based on Popper's (2008) foresight diamond. Each of its four dimensions – creativity, expertise, interaction, and evidence – is operationalized with measurement items taken from literature. In particular, the evidence dimension is supported by a text mining approach. Lastly, a focus group interview proves the usefulness of OCs for foresight. The findings show that OCs can contribute to each dimension of the foresight diamond and serve as an additional source of information for foresight.

1. Introduction

In today's complex and competitive business environment, companies are faced with several challenges. Amongst others, one of the main challenges is the company's ability to respond quickly to competitive trends as well as technological, political, economic, and social changes – and, in particular, being faster than competitors. Shorter product life cycles, technology diffusion between previously independent branches, business model innovations, dynamic customer expectations, and merges of existing technologies into new solutions are the daily business of technology-based companies (Förster and von der Gracht, 2014; Heger and Rohrbeck, 2012; Rohrbeck and Gemünden, 2011). In order to adapt to these ever-changing conditions, seize new opportunities, and avoid threats, companies need to be able to detect these changes early and, in particular, react to these quickly. Consequently, they need to include these changes into their process of corporate foresight and strategic planning (Koller, 2009).

Thus, for maintaining a strong competitive position not only innovative capability but also technology and corporate foresight are needed and crucial. The term foresight comprises all efforts to measure and evaluate future developments that are regarded as significant for the organization and its economic prosperity. Furthermore, foresight is directed at the derivation of reaction patterns or proactive behavior, respectively, based on the collected information (Ansoff, 1975).

Foresight is a complex task, especially for small- and medium-sized enterprises which are mostly overwhelmed with their daily business.

Several studies have already shown that companies facing these changes have issues in mastering foresight on their own (Burgelman et al., 2004; Martin, 1995).

In order to react to the aforementioned changes in the business environment, one beneficial and pragmatic possibility is to open up the foresight process. Open and user innovation showed the potential of expanding value creation to external knowledge and information sources (Chesbrough and Appleyard, 2007; von Hippel, 1986, 2010) such as communities, lead users, and suppliers, amongst others (West and Bogers, 2014). Since these external sources possess implicit knowledge and sticky information (von Hippel, 1994), we assume that this knowledge can be useful for foresight processes as well (Ehls et al., 2016). Combining the concepts of corporate foresight with the research on open and user innovation leads to a recently developed process described by Daheim and Uerz (2008) and Ehls et al. (2016), called open foresight. According to Ehls et al. (2016, p. 12), open foresight is “the systematic use of distributed information sources in order to anticipate the future corporate business environment and support an organization's strategic decision making.”

Considering, in particular, customers' dynamic demands (Förster and von der Gracht, 2014), online communities (OCs) (Chesbrough, 2004; Janzik and Raasch, 2011; Zeng, 2014) are a valuable information source for future developments and upcoming changes. By monitoring, for example, the discussions amongst product-related OCs, companies are very close to the end user of their products and can identify how they use, improve, and modify their products. Using this knowledge and

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information through interaction between firms and OCs, trends and market conditions can be derived (Ansoff, 1975). With those gained insights, a basis for a decreased risk of product failure or missed business opportunities or changes in business models is achieved (Bogers and West, 2012; Janzik and Herstatt, 2008). In doing so, companies are able to react quickly to upcoming changes, develop reaction patterns, and become faster than their competitors (Ansoff, 1975; Koller, 2009).

Transferring OCs as one means of open innovation to foresight shows, especially, the flaws of traditional foresight methods (Popper, 2008). Based on new IT-enabled systems, OCs can support companies to identify trends and changes in real-time and also update those trends once the discussions in OCs change. Thus, OCs are more dynamic than most traditional foresight methods which are rather static and are only updated within certain timeframes (Janzik and Raasch, 2011). In comparison, changes and future developments discussed by OCs can be updated more or less immediately. Ultimately, by employing IT-enabled systems such as OCs, less internal resources are needed when compared, for example, with expert foresight consortia but trends can still be explored to a similar quality (Jeppesen and Lakhani, 2010; von Hippel and von Krogh, 2015; Zeng, 2014). Using OCs for foresight and moving towards open foresight approaches, results in a knowledge and information advantage in comparison to companies not using such “open methods”.

As described, we know from the open and user innovation research that expert knowledge and innovative solutions can be found in OCs. However, the extent to which this knowledge and information can be beneficial for foresight and if OCs also discuss future developments rather than only innovative ideas remains unclear. Based upon the literature, this paper firstly shows the benefits of conducting foresight with OCs in general. After the general appropriateness of OCs for foresight is shown, this paper aims to answer the research question of how to assess the potential of OCs for foresight. Since a mass of OCs exist in the Internet, several steps are necessary in order to identify the ‘right’ OC. First, a criteria catalog for assessing the potential of OCs and their future developments for foresight is developed by using prior literature. Secondly, with a netnographic approach (Kozinets, 2002, 2006), this criteria catalog is empirically tested with one selected OC. Additionally, text mining is executed using a topic modeling approach in order to show which topics are discussed by OCs, how they change over time, and how this is useful for companies’ foresight approach. Based on those findings from the OC, a focus group interview (Armstrong, 2006; Krueger and Casey, 2015) takes place in order to assess the insights from the netnography and prove the assumption about the usefulness of OCs for foresight from a practical management perspective.

The remainder of the paper is structured as follows: After the understanding of open foresight is clarified, the idea of using OCs for foresight is described in Section 2. In Section 3, the criteria catalog is developed. The mixed-methodological approach is described in Section 4. The developed criteria catalog is then used to evaluate one exemplary OC from the renewable energy industry in Section 5. Subsequently, the results of the topic modeling approach are presented. The findings section closes with the report on the focus group interview. In Section 6, the findings are discussed. Based on this, implications for research and managerial implications are derived and some limitations leading to future research are described in Section 7.

2. Conducting foresight with online communities

The fast moving business environment makes it necessary for companies to be able to detect changes early and able to react to these (Rohrbeck, 2010). The aim of foresight is to secure the ability for action while reducing uncertainties. This is done by a systematic search and use of information. The focus lies in the identification of possible future developments (trends) and influencing factors (Carlson, 2004). In sum, the generated knowledge is used for reducing the complexity and

uncertainty and raising awareness of future scenarios. Foresight, however, aims not at predicting the future; instead, foresight supports individuals to think about different future directions and developments (Cachia et al., 2007; Vecchiato, 2012).

In traditional foresight processes, experts play an important role and are the basis for the use of many methods. Their expert knowledge generates harmonized descriptions about possible future directions (Schatzmann et al., 2013). Instead of simply relying on experts discussing future developments, new approaches also include external sources, e.g., suppliers, research institutes, users, OCs. By integrating such external sources, the potential of different points of view can be integrated into the foresight process, resulting in collective intelligence (Ehls et al., 2016; Gattringer and Strehl, 2014; Miemis et al., 2012).

The technological development of the Internet in the direction of a participative approach, the so called Web 2.0 (O’Reilly, 2007), changed usage behavior dramatically. This evolution is characterized by user-centered and interactive websites and forums which foster user activities such as co-creation and communication, as well as content sharing and creation (Janzik and Herstatt, 2008). With these developments, OCs emerged. In OCs, individuals are unified by shared interests or common goals and discuss these using an Internet platform on the Web 2.0 (Janzik and Raasch, 2011; Zeng, 2014). Their knowledge makes them especially valuable for foresight processes. A systematic integration of OCs, therefore, might reduce uncertainty about future changes.

Cachia et al. (2007) made a first attempt in the direction of open foresight in the field of online tools by examining the potential of online social networks for foresight. Taking Ferebee and Davis (2009) into consideration, the study by Cachia et al. (2007) neglects to consider the community architecture. Ferebee and Davis (2009) describe the Web 2.0 as consisting of a system architecture – representing the technical features – and the community architecture – representing the community members’ content, values, and shared ideas. A social network is the mere system architecture while the community layer is missing. In contrast, OCs unite both architectures and enrich the technical features of a social network by discussing their needs and goals.

Another attempt in this direction is the study by Woo et al. (2015) which focuses on the community architecture and the content of web forums on medical issues, especially Alzheimer disease patients, using data mining. They determine the main needs of the affected patients and, additionally, recognize that these needs have changed over time. The researchers also claim that the ‘survival’ of different topics in the forums can be used to classify their future significance. Furthermore, they found that peoples’ attitudes change over time. Thus, they recommend companies monitor specific communities of different areas for a certain period of time and, in particular, check if the focuses of topics change in the progress of discussions. Based on this, it might be possible to recognize certain trends which can, thereupon, also be applied to company practice. Summarized, communities could generate valuable information regarding future customer needs and complete the ‘picture of the future’.

OCs are characterized by a number of features that make them attractive for foresight. One is the generally young mean age of the members which makes OCs in general open towards future-oriented themes (Da Costa et al., 2006) and attractive for creative tasks. Furthermore, their expert knowledge (Chesbrough, 2004; Janzik and Raasch, 2011; Zeng, 2014) is a crucial factor for foresight (Popper, 2008). In addition, it should be noted that the members are able to communicate free of charge and without delay. This encourages intense interaction with others and provides additional data generation. Since most of the discussions and articles in these OCs are free of charge, this is an advantage for companies. Moreover, most of the posts are publicly available which makes the data easily accessible. Further beneficial is the size of the community: The number of members can grow to several million members. Correspondingly large is the amount of communication and data volume (Da Costa et al., 2006). However, besides the quantity of data, the quality of the discussed future developments plays

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