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A reasoned action perspective of user innovation: Model and empirical test

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ABSTRACT

Much research in the field of user innovation has followed two theoretical perspectives — the *cost–benefit framework* and the *community perspective of user innovation*. By adopting the theory of reasoned action (TRA) into the context of user innovation, this study establishes an integrative theoretical framework to accommodate both the cost–benefit perspective and the community perspective of user innovation. This TRA-extended framework embraces both the direct and the interactive influences of the cost–benefit factors (the perceived effort in innovation and the perceived benefit from innovation), the individual characteristics (personal innovativeness and experience) and the social interactions (the perceived social influence) in shaping user innovation at the individual level. The empirical results support the proposed theoretical model. The results also reveal that the moderating effect of experience (or perceived effort) on the intentional component of user innovation is different from the effect on the behavioral component of user innovation.

1. Introduction

User innovators refer to those individual users or individual user firms who develop new products and services for themselves, without assistance from or involvement of the producers (von Hippel, 1988). Indeed, users (both firm users and individual users) are frequently the first to develop and use prototype versions of what later become commercially significant new industrial and commercial products (Baldwin, Hienerth, & von Hippel, 2006; Enos, 1962; Urban & von Hippel, 1988; von Hippel, 1976, 1978, 1986, 1988). Growing evidence from industrial products (e.g., Morrison, Roberts, & Midgley, 2004; Morrison, Roberts, & von Hippel, 2000; Riggs & von Hippel, 1994; Urban & von Hippel, 1988; von Hippel, 1976; von Hippel, 1988), consumer products (Baldwin et al., 2006; Franke & Shah, 2003; Franke, von Hippel, & Schreier, 2006; Füller, Jawecki, & Mühlbacher, 2007; Hienerth, 2006; Hyysalo, 2009; Jeppesen & Frederiksen, 2006; Lüthje, 2004; Lüthje, Herstatt, & von Hippel, 2005) and new service development (Alam, 2006) research indicates that users may be a highly promising source of innovation.

Much research in the field of user innovation has followed two theoretical perspectives. The *cost–benefit framework* is the most adopted perspective in previous studies and proposes that user innovation is jointly determined by the benefit an individual user expects to obtain from a required innovation and the costs associated with the innovation (von Hippel, 1988, 2005). The other perspective – the *community perspective of user innovation* – has attracted much research interest in recent years, including studies on the user innovator community (e.g., Franke & Shah, 2003; Füller, Jawecki, & Mühlbacher, 2007; Hienerth, 2006; von Hippel, 2005) and the open source community (Bagozzi & Dholakia, 2006; Lerner & Tirole, 2002; von Hippel & von Krogh, 2003; West & Lakhani, 2008). In this research stream,[1] the social interactions among users and user innovators have a critical influence on user innovation activities. Given the importance of the two abovementioned theoretical perspectives, it is interesting to explore whether we are able to establish an integrative theoretical framework that accommodates both the cost–benefit perspective and the community perspective. As such, Bogers, Afuah, and Bastian (2010) observed, in a comprehensive review of the user innovation literature, that a major challenge for user innovation scholars is to develop a more coherent theoretical framework that is embedded in management theories to comprehensively explain user innovation.

It is worth noting that, as stated in Hyysalo (2009), the existing studies have focused mainly on verifying the characteristics of the lead users[2] and exploring whether and which specific user characteristics discriminate user innovators from non-innovating users (i.e., *for end users, why do some of them innovate whereas others do not?*) (e.g., Franke & Shah, 2003; Franke & von Hippel, 2003; Lüthje, 2004; Morrison et al., 2000).

[1] The focus of this stream of research is mainly on the interactions among users and user innovators, the assistance of community members, the free revealing and sharing of information (e.g., Franke & Shah, 2003; Füller et al., 2007; Hienerth, 2006; von Hippel, 2005), and the motivations of the user innovators in their communities of practice (e.g., Jeppesen & Frederiksen, 2006).

[2] An important type of user innovator, the lead user has attracted much attention in the literature on innovation since von Hippel first proposed the concept of 'lead user' (von Hippel, 1978, 1986). Lead users have two characteristics: (a) they expect significant innovation-related benefits from a solution and are thereby motivated to innovate; and (b) they are not presently being satisfied by commercial offerings and thus experience the need for a given innovation earlier than the majority of the target market (Urban & von Hippel, 1988, p. 569; von Hippel, 1986).

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A complementary, yet less examined research topic is *why do user innovators develop some innovations further than others?* In other words, for user innovators, what are the factors that determine their degree of involvement in user innovation? In answering this research question, this paper will focus on the driving factors of user innovators instead of the differences between innovating and non-innovating users. Furthermore, the previous studies on user innovation have examined the individual influences of the cost–benefit factors and the personal characteristics of user innovators. However, with few exceptions, the interactive effects among the cost–benefit factors, social influence and personal innovativeness in the context of user innovation have not been explored using a coherent theoretical framework. Therefore, by establishing an integrative model of user innovation behavior from a reasoned action perspective, this study attempted to fill in the gap in the literature. Specifically, by adopting the theory of reasoned action (TRA) to the context of user innovation and focusing on individual user innovators, this study will provide an integrative framework to combine the cost–benefit perspective and the community perspective of user innovation. Moreover, through modeling and empirically examining the integrative framework, both the direct and the interactive influences of the cost–benefit factors (the perceived effort in innovation and the perceived benefit from innovation), the individual characteristics (personal innovativeness and experience) and social interactions (the perceived social influence) in shaping user innovation will be explored. The user innovation construct is deconstructed into two parts, i.e., the intentional component and the behavioral component. By doing so, this study aims to better depict user innovation phenomena and examines whether there are differences between the influence of the user innovation determinants on the intentional component and the influence of those determinants on the behavioral component of user innovation.

The remainder of this article is organized as follows. Section 2 presents the theory, the model and the hypotheses. Section 3 contains the sample, the data and the measures, and Section 4 presents the research results. Then, the discussion and conclusions are presented in the final section.

2. Theory and hypotheses

2.1. A reasoned action perspective of user innovation

The theory of reasoned action (TRA) developed by Martin Fishbein and Icek Ajzen (Ajzen, 1991; Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975) is one of the most fundamental and influential theories of human behavior concerned with the determinants of consciously intended behaviors (Sheppard, Hartwick, & Warshaw, 1988). According to the TRA, a person's behavioral intention to perform a specified behavior and his or her performance of that behavior are jointly determined by the person's attitude toward the behavior and the social influence associated with the behavior in question. Attitude toward behavior is "an individual's positive or negative feelings (evaluative affect) about performing the target behavior" (Fishbein & Ajzen, 1975, p. 216). Social influence (or, subjective norm) is defined as "the person's perception that most people who are important to him think he should or should not perform the behavior in question" (Fishbein & Ajzen, 1975, p. 302).

There are two rationales for adopting the reasoned action perspective in establishing an extended theoretical framework to explain and predict user innovation. First, the literature on social behavior suggests that the TRA has excellent applicability in the context of voluntary behavior (Ajzen, 1991; Sheppard et al., 1988). In these contexts, the theory of reasoned action has "received considerable and, for the most part, justifiable attention within the field of consumer behavior … not only does the model appear to predict consumer intentions and behavior well, but it also provides a relatively simple basis for identifying where and how to target consumers' behavioral change attempts" (Sheppard et al., 1988, p. 325). Generally, user innovations are voluntary in nature, because user innovators are able to decide whether to engage in the modification, improvement or development of a given product based on their own judgments of the innovation.

Second, and most important, a user innovation model from a reasoned action perspective has great potential because it provides a solid and coherent theoretical base to accommodate both the cost–benefit framework and the community perspective of user innovation. In the cost–benefit framework of user innovation, the expected benefit from and the perceived cost of user innovation are the two most critical aspects of the user-innovator's attitude toward user innovation (von Hippel, 1988, 2005). User innovators will weigh their expected benefit from innovation-related activities against the perceived costs. Meanwhile, consistent with the prediction of the TRA framework, several recent studies have highlighted the influence of social interactions within user communities on user innovation (e.g., Franke & Shah, 2003; Füller et al., 2007; Jeppesen & Frederiksen, 2006). Users rarely innovate in isolation but do so in interaction with their friends, relatives, acquaintances, and other innovative users to look for innovation ideas, feedback, complementary knowledge and skills to realize their innovative ideas (Franke & Shah, 2003; Füller et al., 2007; von Hippel, 2005). As such, social influence in user communities will significantly affect the intentional and behavioral aspects of user innovation (Franke & Shah, 2003; Füller et al., 2007; Jeppesen & Frederiksen, 2006).[3]

Therefore, a research model (see Fig. 1) was built and extended from a reasoned-action perspective, with an expectation to accommodate all of the relationships hypothesized in the cost–benefit framework and the community perspective of user innovation. Additionally, the interactive effects of the cost–benefit factors (the perceived effort and the perceived benefit concerning innovation), the individual characteristics (personal innovativeness and experience) and the social interactions within communities (the perceived social influence) were incorporated into this model to comprehensively explain the shaping of the intentional and behavioral components of user innovation. The respective hypotheses in the model are presented in the following sub-sections.

2.2. Social influence and user innovation

Social influence is defined as the degree to which the actions, reactions, and thoughts of an individual are influenced by other people or groups (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975). The theory of reasoned action suggests that groups with interdependent members often develop social norms, and these norms in turn influence the group members' perceptions and behaviors (Ajzen, 1991; Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975; Turner, 1991). In the research field of user innovation, several studies focus on innovation behavior within user communities and the influence of user communities on user innovation (e.g., Franke & Shah, 2003; Füller et al., 2007; Jeppesen & Frederiksen, 2006). In addition to the influence that comes from within the user communities, social influence may also come from the user innovators' other social connections, such as friends, relatives, acquaintances or colleagues, from whom the user innovators may hope to gain social recognition for being creative.

Social influence contributes to user innovation through two types of mechanisms. On the one hand, user innovators often need to receive innovation-related information, advice and assistance in developing their innovations and must work closely with other users in similar communities of practice to take advantage of complementary skills (Franke & Shah, 2003; Porter & Donthu, 2008). By

[3] For example, for information to be shared freely within user communities (one of the critical components of user innovation), innovative users share and offer free innovation-related assistance to others mainly for social reasons (social influence) rather than because of the quality of the information or the assistance itself (Franke & Shah, 2003; Füller et al., 2007; Jeppesen & Frederiksen, 2006). Additionally, user innovators exhibit strong motivation to implement innovation-related activities because of their needs for recognition from fellow members in their user communities (Füller et al., 2007).

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