OPENNESS FOR SERVICE INNOVATION THROUGH KNOWLEDGE CREATION

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ABSTRACT

The present study adopts a technology–organization–environment framework to discuss the effects of company openness on service innovation. The role of knowledge creation is proposed as a mediating factor in the relationship between openness and service innovation. We suggested that openness has a positive effect on knowledge creation which, in turn, has a positive effect on service innovation. Knowledge creation plays a mediating role in the relationship between company openness and service innovation.

Keywords: Openness; service innovation; TOE framework; knowledge creation

INTRODUCTION

As today’s business environment becomes increasingly dynamic and uncertain, companies look to maintain a dominant position over their competitors. Companies try hard to achieve state-of-the-art competitive advantages and to enhance their values (Lusch et al., 2010). To ensure the seamless provision of these values to customers and business partners, firms must continuously produce new products or services in a timely manner (Lovelace et al., 2001). Service innovation involves the provision of new or modified service(s) that aim to exchange and co-create value with customers (Vargo and Lusch, 2004). Service innovation is a critical way in which firms can create value (Michel et al., 2008; Möller et al., 2008; Ostrom et al., 2010) and sustain a competitive advantage (Chen et al., 2009). Firms that engage in service innovation are more successful in responding to the competition in a way that allows them to grow and increase their profitability (Berry et al., 2006). Moreover, service innovation practices tend to be facilitated by technology (Chen and Tsou, 2007), internal organizational competencies (Berry et al., 2006; van

1 Service innovation captures both the development of new service offerings and the processes or methods employed to develop and market new services to customers (Eisingerich et al., 2009).
Riel et al., 2004), and external information gathering in the market environment (van Riel et al., 2004). Thus, technological, organizational, and environmental factors are key inputs affecting service innovation practices.

Organizations can be viewed as open systems (Pfeffer, 1972). The idea of an “open system” or “openness” has been broadly used to analyze business conduct and benefits as a means of expanding value creation for organizations (Chesbrough and Appleyard, 2007). Openness is integral to the success of innovation processes (McMillan et al., 1995). Firms may develop openness to create new products and services from internal collaboration and external cooperation with downstream or upstream partners. Although the role of openness has manifested in several different areas (e.g., technology, strategy, process, culture, experience, relationships, communication), it is unclear whether and how openness initiatives in the context of technology, organization, and the environment (TOE) are able to improve service innovation and value creation.

The power of openness in terms of value creation rests largely with the inherent characteristic of knowledge (Chesbrough and Appleyard, 2007). Knowledge is held by individuals or groups in an organization and is difficult to replicate or transfer within the organization (Grant, 1996). Although firms can leverage knowledge management to access the knowledge of individuals and groups (Ruggles, 1998), they may still need to use more effective practices to manage tacit/explicit knowledge, information, and resources to ensure openness for service innovation (Storey and Kahn, 2010). According to the theory of knowledge creation (Nonaka, 1994), information and natural resources are transformed into knowledge-based assets through a four-phase process model of knowledge conversion and self-transcendence. These four phases are socialization, externalization, combination, and internalization. Organizational knowledge creation theory has been widely discussed in academia and adopted in practice, but more research remains to be done (Nonaka and von Krogh, 2009). For example, knowledge creation must be discussed not only for a single firm but among cluster firms (Arikan, 2009). How to cooperate with business partners and customers to create knowledge is also a topic for further investigation. Moreover, knowledge creation requires research from the process perspective, such as research on how to generate ideas for new product development in the pre-project phase (Schulze and Hoegl, 2008). Thus, another research question, from the point of view of contingency theory (i.e., fit-as-mediation view) (Venkatraman, 1989), is whether the effect of openness on service innovation is mediated by knowledge creation or whether openness results directly in better service innovation.

Thus, this study seeks to improve researchers’ understanding of the determinants of service innovation. We develop a model based on the TOE framework to investigate the effects of technology, organizational characteristics, and the external environment on the adoption and implementation of innovation (Tornatzky and Fleisher, 1990). Previous research has focused on the link between TOE and the diffusion of technological innovation (e.g., Zhu and Kraemer, 2005; Zhu et al., 2004; Zhu et al., 2006), but this understanding needs to be extended to other innovation domains (Chau and Tam, 1997), such as the service innovation domain studied here. Accordingly, the purpose of this study is to examine the mediating effect of knowledge creation on the relationship between openness of TOE and service innovation.
RESEARCH BACKGROUND AND PROPOSITIONS

Openness from the perspective of the TOE framework

Openness refers to analytic dimensions of internal and external properties and contributed fully strategic meanings in innovative research (Chen and Liu, 2005). Previous studies have discussed three main types of openness: standardization of platform technologies (Buganza and Verganti, 2006; Chau and Tam, 1997), the open culture or open-mindedness of an organization (Bond et al., 2004; Burke and Wilcox, 1969; Ciavarella et al., 2004; Ritter and Gemünden, 2003), and open boundaries to the external environment (Fontana et al., 2006; Kandemir and Hult, 2005; Laursen and Salter, 2006; Ramasamy et al., 2006). The present study uses a TOE framework to explore openness in the following contexts: (a) the technological context, referring to the compatibility and standardization of open systems that help reduce operating barriers and reliance on paper-based operations and that improve working efficiency (Chau and Tam, 1997); (b) the organizational context, referring to both innovation and globalization that enable a company to take advantage of new opportunities and initiate new services (de Brentani and Kleinschmidt, 2004); and (c) the environmental context, referring to a set of processes that include searching, screening, and signaling for partner collaboration in research and development projects (Fontana et al., 2006).

Openness of technology and knowledge creation

Adopting open systems technology (OST) enhances compatibility over internal (or external) applications and promotes communication and computation of data across units and processes. OST involves providing an environment of sufficient interoperability to enable two distributed processes to share selective data with each other and to enhance coordination among their process operations (Nutt, 1990). Meanwhile, OST enhances interconnectivity by bridging the gaps between “islands of private information” so as to promote the sharing of information and applications across companies (McClain, 1991). Both interconnectivity and interoperability highlight the importance of OST.

OST enables companies to profit from network externalities (Lecocq and Demil, 2006). Firms that adopt OST may profit from and reduce barriers to working with partners. For example, firms can be more flexible in selecting the proper hardware and software to support access to transparent data rather than waste time transitioning to other closed systems. Furthermore, OST results in technology that is more interoperable and information that is more portable (Chau and Tam, 2000). For example, wiki technology (e.g., Wikipedia) stimulates collaboration through knowledge sharing (Prasarnphanich and Wagner, 2009). Hence, firms characterized by open technology are not restricted to using any particular propriety or technical knowledge but are compatible with other technological systems; thus, they can reduce the costs associated with switching data to other systems (Chau and Tam, 2000; Chau and Tam, 1997; Garud and Kumaraswamy, 1993; Lecocq and Demil, 2006). Thus, the feasibility and success of knowledge creation are shaped by the use of OST.

Proposition 1: Openness of technology has a positive effect on knowledge creation.

Openness of corporate culture and knowledge creation
Corporate culture is a set of broad, tacitly understood rules and guidelines for employee behavior and decision making (Camerer and Vepsalainen, 1988). For organizations with employees from different nations or cultures, it is helpful to have one unified but open culture in which managers can respect diverse thoughts and views and suggest timely and innovative action. Furthermore, employees involved in cross-national projects will get used to working with employees from other companies and nations and will embrace the merits of intellectual exchange (de Brentani and Kleinschmidt, 2004). With this in mind, this study defines openness of corporate culture as the conceptualized features and interpretations of an organization with respect to open perspectives in globalization cultures. Companies that expand their efforts and scope across national borders also require an open culture (de Brentani and Kleinschmidt, 2004). Employing diverse individuals from different cultural backgrounds is a good way to stimulate intellectual conflict (resulting from different perspectives), which can bring forth new ideas (Leonard and Sensiper, 1998). With this openness of corporate culture, a firm can use the interchange of information among members (or functions or country units) to develop and create more knowledge.

**Proposition 2:** Openness of corporate culture has a positive effect on knowledge creation.

**Openness to the external environment and knowledge creation**

Being open to the external environment involves not just collecting information from the outside but also sharing internal knowledge with outsiders (Fontana et al., 2006). Openness to the external environment, which refers to a firm’s willingness to interact and involve itself with the outside environment, has three chief process components: searching, screening, and signaling. Searching involves seeking out useful information or knowledge from a wide variety of fields. This process involves a search for solutions to existing problems, new product or service ideas, and suitable channels for knowledge acquisition (Laursen and Salter, 2004). Screening involves a firm’s behavior and insights into partner selection and resource identification (Fontana et al., 2006). Selecting the right partner and interacting with the right new or underutilized resources are important in maximizing opportunities for operating performance and success (Bayona Sáez et al., 2002). Partner selection criteria are especially important in terms of market expansion and knowledge acquisition (Luo, 2002). Partner selection not only plays a key role in a firm’s process formation but also helps it compound its “competence and resources, operating rules and process, and competitive viability” (Geringer, 1991). Signaling involves disseminating knowledge of particular competencies from those who possess more information to those who possess less (Spence, 2002). By remaining open to the environment, firms can unlock their potential by absorbing a wide range of external technologies and knowledge.

**Proposition 3:** Openness to the external environment has a positive effect on knowledge creation.

**Knowledge creation and service innovation**

Customer service is “the service provided in support of a company’s core products” (Zeithaml et al., 2005). Services differ from goods in terms of intangibility, heterogeneity, inseparability, and perishability; in keeping with this distinction, the innovation literature distinguishes service innovation from goods innovation (Paswan et al., 2009). **Innovation** is a radical or incremental act that involves the introduction of a new element or a new combination of old elements.
(Schumpeter, 1934). Hence, service innovation refers to a novel or considerable change in service that leads to a (re)new(ed) service function for the firm as well as new offerings for the market (Van Ark et al., 2003). Service innovation has also been regarded as involving new developments in service processes responsible for the delivery of core products and services (Oke, 2007). Thus, service innovation can be viewed as the development of both new service offerings and processes or methods to develop and market new services to customers (Eisingerich et al., 2009).

An organization’s innovativeness is closely tied to its ability to use its knowledge resources (Subramaniam and Youndt, 2005). As discussed, knowledge creation is a process that involves both tacit and explicit knowledge. Organizational innovations germinate from the seeds of tacit knowledge and that implicit knowledge generates new value when it is made explicit (Choo, 1998). This implies that knowledge creation transforms novel ideas into valuable and tangible or intangible outputs through innovation. For firms, knowledge creation induces exclusive competencies that are beneficial for converting abstract ideas into new products, services, and processes (Popadiuk and Chun, 2006). Therefore, we propose that new ideas are formed through interaction among employees in environments that foster knowledge creation. Innovation involves the transformation and implementation of these new ideas as products, processes, or services, which generates value for the firm. We thus hypothesize that knowledge creation plays a pivotal role in supporting and fostering service innovation.

**Proposition 4:** Knowledge creation has a positive effect on service innovation.

**The mediating effect of knowledge creation**

The preceding hypotheses link the relationships among openness of TOE, knowledge creation, and service innovation. They suggest that openness of TOE affects service innovation through the knowledge creation process. That is, firms can use openness to cultivate a certain level of capacity in knowledge socialization, externalization, combination, and internalization, which in turn will promote the firm’s innovation practice. Thus, we argue that knowledge creation plays a mediating role in the relationship between the independent variables of openness of TOE and the dependent variable of service innovation.

**Proposition 5:** Knowledge creation mediates the relationships between service innovation and (a) openness of technology, (b) openness of corporate culture, and (c) openness to the external environment.

**DISCUSSION AND CONCLUSION**

This study has uncovered the role of knowledge creation in the relationship between openness of business operations and service innovation. Openness of corporate culture promotes cooperation and communication among diverse geographical subunits, thereby weakening obstacles to exchanging innovative understanding and know-how (Kandemir and Hult, 2005; de Brentani and Kleinschmidt, 2004). In addition, today’s business models have changed from being closed to being open to the external environment (Chesbrough, 2003); interacting with the outside world provides more opportunities for firms to gather, integrate, and transform valuable information.
into profitable knowledge. Therefore, firms should continue investing in developing and acquiring OST; training employees to generate creative new ideas and collaborate on international product/service projects; and searching, screening, and signaling. Through openness of TOE, firms can improve their knowledge creation.

Moreover, the present study help explain the effect of knowledge creation on service innovation. The study shows that there are significant relationships between knowledge creation and service innovation. If firms interpret or integrate information into exclusive knowledge through continuous tacit and explicit knowledge communication, service innovation will improve. Accordingly, firms can develop service innovation by converting novel ideas or private know-how into tangible and intangible outputs (Nonaka, 2007; Popadiuk and Chun, 2006). Firms should rely on knowledge management and applications to conceptualize ideas and translate them into service innovation practices. Because employees are fully supported by well-organized facilities to give insights into the organization. Therefore, employees should feel empowered and honored to participate in service innovation, and the greater socialization, externalization, combination, and internalization processes can be positive for the firm.

This study contributes to the theoretical development of a conceptual model for explaining the relationships among openness of TOE, knowledge creation, and service innovation. Despite the increasing importance of openness and service innovation, few studies in the literature have examined these relationships. The study shows that knowledge creation is a critical mediator through which openness of technology, openness of corporate culture, and openness to the external environment positively affect service innovation. Furthermore, a greater level of knowledge creation can stimulate creative and innovative practices that may eventually lead to better service innovation. Managers need to build up proper knowledge platforms that help nurture tacit and explicit knowledge interaction. In addition, they must provide greater incentives to motivate employees to exchange, learn, translate, and absorb knowledge to access innovations (Nonaka et al., 2000; Tsai and Li, 2007). Hence, to exploit the link between openness of TOE and service innovation, managers first need to recognize the importance of—and then cultivate—knowledge creation. Lastly, future empirical research should be conducted to generalize or modify these propositions. The primitive operational definitions of the interested variables are provided in table 1 below.

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<th>Table 1. Operational definitions of constructs</th>
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| Openness of technology | • Compatible with other technical systems  
• Reducing system migration costs and barriers  
• System interconnectivity  
• System interoperability | Chau and Tam (1997, 2000)  
Garud and Kumaraswamy (1993)  
Lecocq and Demil (2006)  
Nutt (1990)  
McClain (1991) |
|---|---|
| Openness of corporate culture | • Global innovation culture | Boutellier et al. (1998)  
Hult et al. (2000)  
Leonard and Sensiper (1998) |
| Searching | • Seek out useful information or knowledge from a wide variety of fields | Laursen and Salter (2004) |
| Screening | • An open behavior of a firm and its insight into partner selection and resource identification | Bayona Sáez et al. (2002)  
Fontana et al. (2006) |
| Signaling | • Reveal knowledge with particular competences from whom possessed more information to those whom were less informed | Spence (2002) |

References:


17, 109–122.


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Lexington Books.


