The Role of Service Standardization Capability in Service Innovation: Evidence from Knowledge-Intensive Service Firms

Emergent Research Forum (ERF)

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Abstract

This paper investigates the key factors influencing service innovation in the context of knowledge-intensive businesses. By taking the perspective of the knowledge-based view and applying dynamic capability theory, we develop a theoretical model to investigate the role of knowledge conversion (from tacit knowledge to explicit knowledge), service standardization capability, and value co-creation in service innovation. The related hypotheses are tested by using survey data from knowledge-intensive service firms that have already been involved in service innovation. We applied partial least squares analyses, and the results suggest that knowledge conversion is positively associated with service standardization capability, and that service standardization capability positively moderates the effect of value co-creation on service innovation. This study makes theoretical contributions to the service innovation field by revealing the process of how converted knowledge helps service standardization and how standardized service interacts with value co-creation. Related practical implications and methodological contributions are also discussed.

Keywords

Service innovation, dynamic capability, knowledge-based view, service standardization, value co-creation, partial least squares.

Introduction

As services increasingly dominate production and employment in the global economy (Yeh and Ramirez 2017), organizations seek to improve business performance and build competitive advantage via service innovation, such as by reformulating existing services, developing new ones, and improving the service delivery process (Noorani 2014). To date, researchers have explained that consistent, formalized, or routinized knowledge exchange processes enable services to be easily understood and accepted by recipients, which facilitates interaction among value chain partners in service innovation (Miles 2001). Therefore, standardizing and formalizing knowledge to deliver consistent service could be a key component in the process of transforming knowledge into innovation. Additionally, prior literature has considered knowledge as one type of intellectual resource and applied the Resource-Based View (RBV) or Knowledge-Based View (KBV) for the discussion of value creation in services (e.g., Moller et al. 2008). However, these two views may not be sufficient to understand the process of managing intellectual resources in the fast-changing environment given their focus on intra-organizational resources (Priem and Butler 2001). This limitation may be especially significant when customers also contribute their knowledge to the process of value creation in service innovation (Kaakkola and Alexander, 2014). We, therefore, apply the dynamic capability framework (DCF) alongside the KBV to answer the question: “How does service standardization capability interact with knowledge conversion and value co-creation in service innovation?”
Using this basis, we propose a research framework showing the process of service innovation in the context of knowledge-intensive business service (KIBS) firms. We argue that knowledge conversion (from tacit knowledge to explicit knowledge) is an antecedent to service standardization capability and that service standardization capability is not contradictory to customer engagement, but enhances the influence of value co-created with customers in service innovation. This study makes multiple theoretical and practical contributions to the service innovation field. First, we elaborate on the process of service innovation and investigate the interactions among three key factors: knowledge conversion, service standardization capability, and value co-creation. Second, we conceptualize service standardization capability as a type of dynamic capability that can enable the reconfiguration of resources from customers, integrate them into daily routines, and then standardize innovative services for accelerated acceptance by customers. Third, we highlight the importance of converting tacit knowledge to explicit knowledge for service innovation. Fourth, we demonstrate that service standardization capability is not exclusively associated with customer engagement but enhances value co-creation.

Theoretical Background

Service Innovation

Existing literature conceptualizes innovation and investigates types of innovations from different perspectives. Among the growing body of scholarly research on service innovation with an information-centric focus, three schools of thought exist – an assimilation perspective, a demarcation perspective, and a synthesis perspective (Gallouj and Savona 2008). Common themes across these streams exist around the terms “process,” “capability,” “customer,” “knowledge,” and “value,” which means these words are important components of service innovation and key factors that influence the service innovation process and innovation outcome (Witell et al. 2016).

Knowledge-Based View (KBV) of the Firm

In today’s knowledge-based economy, knowledge is a key to cultivating competitive advantage. Nonaka (1994) proposes two types of knowledge – explicit and tacit. The knowledge-based view of the firm (KBV) emerged from the resource-based view (RBV) and has been used for discussion of value creation via knowledge. Knowledge-based resources are critical for organizations since they are embedded within all aspects in the firms, such as culture, strategies, administrative procedure, as well as employees’ daily routines (Grant 1996a). The KBV is an appropriate theory for this study because it identifies the crucial role of knowledge in creating competitive advantage and improving innovation performance.

Dynamic Capabilities

The RBV has also given rise to the Dynamic Capabilities Framework (DCF). In the DCF, dynamic capabilities are “the firm’s ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments” (Teece et al. 1997, p.516). Building from this definition, service standardization capability could be considered a type of dynamic capability and refer to firms’ ability to integrate external or internal knowledge in service innovation and making the new innovative service consistent, formalized, and standardized (Miles 2001). As supported by prior research, customers’ ideas, which are one type of external knowledge, could be integrated into the firm’s internal knowledge (e.g., daily routines) to create values through innovation.

Standardizing the process of innovation and innovative services is critical since prior research has shown that not all service innovations that integrated customers’ needs are profitable. Some customized services raise the operational cost without improving any business performance, and some maintain a current business situation without providing competitive advantage (Dan Reid and Sandler 1992). Therefore, it is important for firms not simply to customize services based on customers’ requirements, but to make certain adjustments to standardize services to bring value to the firm when interacting with customers. It means that firms could rationally adopt customers’ ideas, integrate them into the service process, and standardize innovative services to increase the likelihood of new service acceptance by general customers.
Hypotheses Development

Based on our theoretical proposition that knowledge management, standardized service, and co-created value are essential in service innovation, we develop a research model (shown in Figure 1) consisting of five related hypotheses.

Knowledge management literature classifies knowledge into two types: tacit and explicit. Knowledge conversion refers to the firms’ ability to convert tacit knowledge into explicit knowledge (Nonaka and von Krogh, 2009). Studies show that tacit knowledge can be made explicit via repeated daily routines, formally transferred via documentation, and tacitly reapplied in context. The new standardized tacit knowledge would then be available for sharing with others. At each turn of the cycle, tacit knowledge is made to be explicit gradually and the collective knowledge of the organization increases (Zack 1996; Hamel and Prahalad, 1989). Service standardization capability integrates internal and external knowledge to make the new innovative service consistent, formalized, and standardized (Miles 2001). Converting knowledge from tacit to explicit makes the knowledge routinized and standardized, which can be repeated and delivered consistently. Knowledge conversion helps organizations standardize knowledge, enhancing service standardization capability. Thus, we propose that

**H1. Knowledge conversion (from tacit knowledge to explicit knowledge) positively influences firms’ service standardization capability.**

Service standardization capability indicates the extent to which the service that firms provide to customers or partner firms is consistent, formalized, or routinized. The degree to which a firm can easily interact with value chain partners is, we argue, partially determined by whether its knowledge exchange with those partners follows a consistent pattern. Standardization enables and facilitates interactions and knowledge sharing between firms and other parties in the business value chain, enabling customers to accept new services easily in a relatively short period (Miles 2001). Thus, the standardization of services facilitates interaction among value chain partners and is one aspect of the interactivity of a firm. We propose that

**H2. Firms’ service standardization capability positively influences their service innovation.**

In service innovation, value co-creation refers to the process by which firms allow business partners, including customers, to participate in developing and delivering innovative services (Howells 2003). From the service-logic perspective (Vargo and Lusch 2004), organizations and customers can collaborate with each other to create innovative ways to provide for customers’ needs and wants, which satisfies customers’ expectations and also brings organizational benefits. Arguments emphasizing customer engagement have been supported by a business strategy and marketing practice. For example, Google interacts with its search users to rank search results, making the search engine more useful and powerful for customers. And by interacting with its subscribers, Netflix allows customers to determine what content Netflix provides (Anderson 2006). Therefore, we argue that customer engagement leads to more service innovation in firms and propose:

**H3. Value co-creation positively influences firms’ service innovation.**

In the rapidly changing business environment, such as in the knowledge-intensive service industry, firms keep making adjustments in their strategies, routines, and products to satisfy customers’ demands (Agarwal...
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and Selen 2009). Instead of purely customizing new services, firms standardize their innovative services, which enables them to reach as many customers as possible, simultaneously satisfy a rather limited number of customer needs (Farrell and Saloner 1985). Standardization makes innovative services easily understood and accepted by customers, which facilitates service innovation. Firms could rationally adopt customers' ideas, integrate them into service processes, and standardize innovative services to increase the likelihood that new services will be accepted by general customers. Therefore, we propose that

**H4. Service standardization capability moderates the positive influence of value co-creation on service innovation.**

In various industries, organizations raise revenue by satisfying their customers' needs via new products or services. Innovation, especially service innovation, is seen as critical to growth and viewed as the key to creating value (TSIA 2015). Deshpande et al. (1993) indicated that innovativeness is positively associated with various aspects of organizational performance, such as profitability, organizational size, market share, and its business growth rate. For instance, Cisco has engaged with its service providers to create new revenue streams and business models, which are estimated to be worth $1.7 trillion and are expected to increase revenue by 20% over the next decade (Cisco 2014). Therefore, we propose that

**H5. Service innovation positively influences innovation performance.**

**Methodology**

**Data Collection**

To test our proposed hypotheses, we developed a questionnaire based on prior literature (Armbruster et al., 2008; Blind, 2006; den Hertog, 2000; Hipp et al., 2000; Meeus et al., 2001; Miles, 2001; Nonaka, 1994) and conducted a survey in knowledge-intensive business service (KIBS) firms. We drew a sample from the company list of IT Service Management Forum. The questionnaire was mailed to a randomly-chosen sample of 230 KIBS firms. Of which, 41.7% firms completed and returned the questionnaires. Of the returned questionnaires, 5 out of 96 were incomplete, yielding 91 usable responses for the data analysis. Among the participants, 80.2% are male, and 18.8% are female. The majority are mid-level managers and professionals. To fully account for the differences among knowledge-intensive service firms, we also include two control variables that characterize our unit of analysis: firm size and industry type. Additionally, the common method bias test shows that only 6 (out of 14) of the method factor loadings were statistically significant. We applied the Partial Least Squares (PLS) statistical analysis technique to test our proposed research model. We assessed the validity as well as the reliability of the reflective measures in multiple ways. First, the convergent validity was assessed by using Cronbach’s $\alpha$ (> 0.7 in all cases) and the average variance extracted (>0.5 in all cases). Second, the reliability was assessed by using composite reliability scores (>0.7 is recommended, with all greater than or equal to 0.866). Third, the correlations between the constructs did not raise any concern.

**Results**

![Figure 2. The Estimated Model: PLS Results](image)

We analyze our hypotheses following a procedure suggested by Hair et al. (2014). First, the VIF (variance inflation factor) for each construct must be less than 3.3. The VIFs for each construct are Knowledge...
conversion – 1.000, Service standardization capability – 1.092, Value co-creation – 1.000, service innovation – 1.304, and Innovation performance – 1.226. The small VIF values indicate that the correlation among variables is low.

Second, the significance of relationships was assessed based on the path coefficients (see Figure 2). All relationships are significant. The first hypothesis (H1), which proposes that knowledge conversion positively influences service standardization capability, is supported by the results ($\beta = 0.373$, t-value = 4.623, p-value < 0.001). The second hypothesis (H2), which proposes that service standardization capability has a positive influence on service innovation, is also supported ($\beta = 0.461$, t-value = 5.179, p-value < 0.001). The third hypothesis (H3), which proposes that value co-creation has a positive influence on service innovation, is supported ($\beta = 0.245$, t-value = 2.806, p-value < 0.001); The fourth hypothesis (H4), which proposes that service standardization capability positively moderates the effect of value co-creation on service innovation, is also supported ($\beta = 0.181$, t-value = 2.570, p-value < 0.001). Finally, the last hypothesis (H5), which proposes that service innovation has a positive influence on innovation performance, is also supported by the results ($\beta = 0.576$, t-value = 10.295, p-value < 0.001). Discussion of these five results is presented in the next section.

Third, the assessment of R-square values refers to how much the variation in the dependent variable can be explained by variation in the independent variables. The relatively low $R^2$ value ($R^2 = 0.139$) associated with service standardization capability indicates that although knowledge conversion is important, it may only explain a limited amount of variation in a firm’s service standardization capability. However, an additional result is that the firm’s service standardization capability and value co-creation account for 44.2% of the variation in its service innovation. With a relatively high $R^2$ value ($R^2 = 0.442$), our results show that service standardization capability and value co-creation have a reasonable power to explain service innovation, indicating their importance in service innovation. Finally, the $R^2$ value ($R^2 = 0.332$) associated with innovation performance indicates service innovation explains a notable proportion of variation in innovation performance.

Fourth, we examine the assessment of effect size of relationships, $f^2$. A higher value of effect size indicates the greater strength of a relationship. Both the relationship between service standardization capability and service innovation ($f^2 = 0.348$), as well as the relationship between service innovation and innovation performance ($f^2 = 0.497$) are strong since $f^2$ is higher than 0.3. Others are smaller with $f^2$ values lower than 0.15 (Cohen 1988).

**Discussion**

This study makes contributions from both theoretical and practical perspectives. First, we elaborate on the process of service innovation and investigate the interactions among three key factors that influence service innovation: knowledge conversion, service standardization capability, and value co-creation. We also consider service standardization capability as one dynamic capability that can reconfigure resources from customers, integrate them into daily routines, and then standardize innovative services to facilitate acceptance by customers. This perspective improves the understanding of standardization capability in service innovation by addressing dynamic and relational aspects. Second, the study has shown the importance of converting tacit knowledge to explicit knowledge in service innovation. To enhance the service standardization capability, firms can encourage employees to convert tacit knowledge (e.g., valuable experience in daily work) to explicit knowledge by standardizing routines and documenting best practices within the firms. Third, the study has shown that service standardization capability is not exclusive to customer engagement but also enhances the value co-created with customers in service innovation. Customer engagement is important in service innovation. Integrating customers’ ideas into existing service delivery processes may improve existing service models or create new ones. Firms should rationally interact with customers and make the interaction process consistent and standardized, which will facilitate service innovation acceptance by customers. Finally, service innovation can enhance business performance by increasing revenue and increasing customers’ satisfaction.

**References** (A full list of references is available upon request.)