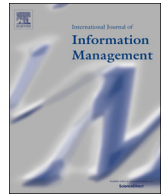




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## Antecedents and outcomes of collaborative innovation capabilities on the platform collaboration environment

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## ABSTRACT

The application of emerging collaborative digital technologies enhanced firms' collaborative innovation and firm performance. This paper examines the drivers of collaborative innovation capability, and its effects on the digital collaboration capability. Based on the technology-push and need-pull perspective as well as operational capability hierarchy view, we proposed the model of antecedents and outcomes of higher-level operational capability, such as collaborative innovation capability. We tested the research hypotheses using a field survey of 184 Chinese corporations. The research model was validated using hierarchical regression analysis with the data collected from the survey data. The results provide strong support for the proposed research model. In particular, we found that as hypothesized, the fit of platform technology and collaborative business need is the critical driver of collaborative innovation capability. Furthermore, the higher-level operational capability (i.e., collaborative innovation capability) impacts on the lower-level operational capability (i.e., digital collaboration capability). Especially, the impact of the fit on digital collaboration capability is completely mediated by collaborative innovation capability. By integrating the technology-push and need-pull perspective as well as operational capability hierarchy literature, this paper provides significant implications for antecedents and outcomes of collaborative innovation capabilities under the platform collaboration environment.

## 1. Introduction

In recent decades, new collaborative digital technologies (such as digital devices, digital platforms, social media, and cloud technology) and their widespread applications encouraged organizations to innovate their products, services, and processes (Ali, Warren, & Mathiassen, 2017; Karakaya & Demirkan, 2015; Ngai, Tao, & Moon, 2015; Sedera et al., 2016; Wu, Wu, & Si, 2016). Firms start looking at digital technologies (e.g., social media platform) as effective mechanisms to interact more with their customers (Alalwan, Rana, Dwivedi, & Algharabat, 2017; Misirlis & Vlachopoulou, 2018). Especially, IT-based networks and real-time data flows enable external innovation collaboration<sup>1</sup> (Alegre et al., 2014; Thomke, 2006). For instance, Tianhong,

an asset management company in China, through cooperating with Alipay.com (similar to Paypal.com in the United States), generates the digital innovation product, Yuebao (Internet financial product). This digital collaborative innovation has accelerated the innovation of Internet finance<sup>2</sup> in China. Therefore, understanding how to utilize digital technologies (de Reuver, Sørensen, & Basole, 2017) to achieve collaborative innovation capabilities and enhance performance has become a concern for practitioners.

Prior information systems research mainly focused on internal firm innovation (Constantinides, Henfridsson, & Parker, 2018; Parker, Van Alstyne, & Choudary, 2016), where companies internally manage all of the process involved in the innovation life cycle (Chesbrough, 2003). For example, Kleis et al. (2012) found that, combined with IT, internal

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research and development (R&D) has a strong and positive relationship with innovation production. Similarly, Tarafdar and Gordon (2007) used the resource-based view of firms to explore how information system competencies affect process innovation in an organization. Recently, with the development of new digital technologies (such as digital platforms, Industry 4.0), the traditional internal innovation paradigm has been challenged (Han et al., 2012; Sedera et al., 2016; Gerke, Dickson, Desbordes, & Gates, 2017; Constantinides et al., 2018; Parker et al., 2016). Therefore, in order to respond to the fast-changing environment and rapidly evolving consumers' needs, firms need to develop the collaborative innovation capability with the help of digital technologies (de Reuver et al., 2017; Han et al., 2012; Lee et al., 2012). Baldwin and von Hippel (2011) further argued that both innovation by individual users and open collaborative innovation increasingly compete with and may displace producer innovation in many parts of the economy. Also, Han et al. (2012) investigated the economic and strategic value of open innovation alliances, by which participating firms cocreate economic value through the joint development and co-marketing of IT innovations.

Some studies have examined the role of IT in firm innovation and begun to study collaborative innovation in the platform environment (Han et al., 2012; Sedera et al., 2016; Yoo et al., 2012; Yoo, 2013). There are still some limitations in past studies. First, although prior scholars studied the effects of IT on the products, services or processes innovation, relatively little research attention has been paid to other non-IT drivers of collaborative innovation (Ali, Kan, & Sarstedt, 2016). Second, previous literature has explored the relationship between innovation and performance (Slater, Mohr, & Sengupta, 2014), but the value generation process of collaborative innovation is still unclear (Wang et al., 2016). For example, some firms have a high collaborative innovation capability and still have difficulties in achieving firm performance.

To fill the gap in the extant literature, this paper firstly adds non-IT drivers of collaborative innovation capability from the technology-push and need-pull perspective of innovation literature (Di Stefano, Gambardella, & Verona, 2012; Schon, 1967; Voss, 1984). Both platform technologies and collaborative business need can explain the generation of collaborative innovation capability. Platform technology is the critical infrastructure necessary to guarantee the activities of collaborative innovation, and the collaborative business need reflects the innovation motivation of the focal firm with channel partners, according to the market environment and customers' needs. Based on the technology-push and need-pull perspective, both platform technology and collaborative business need is associated with the level of collaborative innovation capability. Therefore, we study the interaction effect of technology and need to explore the generation process of collaborative innovation capability.

Furthermore, based on the perspective of operational capability hierarchies<sup>3</sup> (Mishra, Devaraj, & Vaidyanathan, 2013), collaborative innovation capability is a kind of higher-level operational capability which can be applied at the functional or operational level. It can affect the lower-level operational capabilities, which can be applied at individual task- or process- levels, such as digital collaboration capabilities with distributors. Therefore, our two research questions are: (1) How is collaborative innovation capability generated by the fit of platform technologies and collaborative business need? (2) How does collaborative innovation capability affect the lower-level operational capabilities, such as digital collaboration capabilities?

This study contributes to the evolving literature on collaborative innovation capability in three respects. First, based on the technology-push and need-pull perspective, this paper introduces a new non-IT driver of collaborative innovation capabilities, namely collaborative business need. We further find that the fit of platform technology and collaborative business need is a significant predictor of collaborative innovation capability (Chuang & Lin, 2013). Second, prior studies mainly explored the relationship between dynamic and operational capabilities, neglecting the hierarchical structure in the dynamic or functional capabilities (Mishra et al., 2013; Peng, Quan, Zhang, & Dubinsky, 2016). Based on the operational capability hierarchies view, this paper finds that, in the platform collaboration environment, as a higher-level operational capability, collaborative innovation capability also affects the lower-level operational capability such as digital collaboration capability with distributors. Third, we find that collaborative innovation capability fully mediates the effect of the fit of platform technology and collaborative business need on digital collaboration capability. Thus, firms should create and nurture collaborative innovation capability, which serves as a precondition to the creation of lower-level operational capabilities. This finding contributes to platform innovation literature by exploring the key role of collaborative innovation capability in effecting information technology capability on the platform collaboration environment (Constantinides et al., 2018; de Reuver et al., 2017; Yoo, 2013).

## 2. Theoretical background

### 2.1. Technology-push and need-pull perspective

For many years, researchers investigated the critical driving forces of innovation, usually from two alternative perspectives (Voss, 1984; Kim & Lee, 2009; Di Stefano et al., 2012; Dutta & Hora, 2017). The first perspective is technology-push, which focused on the key role of science and technology in developing innovations. The other perspective is demand-pull, which identified the market features (such as the needs of customers) that affects the performance of innovation.

Based on the traditional view, science and technology determined the pace and direction of innovation. The market needs played a relatively minor role in affecting the innovation (Phillips, 1966). When studying the innovation within firms, Meyers and Marquis (1969) found that more than 70% of the innovation would be classified as need-pull. Zmud (1984) argued that the need-pull innovations have higher probabilities for commercial success than technology-push innovations do.

Many scholars suggest that innovation is generated when a need and the science technologies to resolve it simultaneously emerge, that is, both technology-push and need-pull drives the innovation (Nemet, 2009; Kivimaa and Kern, 2016). Firms need to match the two sources of innovation (technology-push and need-pull) and thus establish proper innovation capabilities (Kim et al., 2009). The integration of technology-push and need-pull contributes to more innovation. Therefore, the generation of collaborative innovation capabilities should be induced by the proper integration or matching of technology-push and need-pull. In order to explore the interaction effect of both technology and need, this study examines the fit mechanism of platform technology and collaborative business need and its effect on the collaborative innovation capabilities.

### 2.2. Operational capability hierarchies view

Based on the resource-based view, literature has explored the notion of hierarchy of capabilities (Mishra et al., 2013). There are two levels of capabilities in the literature: first-order reconfiguration capabilities (including improvisational capabilities and dynamic capabilities) and zero-order ordinary capabilities (functional/operational capabilities) (Pavlou, El, & Omar, 2010; Mishra et al., 2013). First-order capabilities enable firms to create destruction of existing operational capabilities

<sup>3</sup> Operational capability hierarchies explored the two levels of operational capabilities, including the higher-level operational capabilities and lower-level operational capabilities (Mishra et al., 2013). The higher-level operational capabilities can apply at the functional level, whereas lower-level operational capabilities can apply at individual task-levels. The high-level functional capabilities temporally precede lower-level IT-enabled functional capabilities.

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