

Knowledge Spillover, Knowledge Management Capabilities, and Innovation among Returnee Entrepreneurial Firms in Emerging Markets: Does Entrepreneurial Ecosystem Matter?

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ABSTRACT

The paper brings an entrepreneurial ecosystem approach to examine the conditions under which returnee entrepreneurs can overcome their liabilities and promote innovation in emerging markets. The existing literature has focused on how returnee entrepreneurial firms can transit knowledge to local firms with the assumption that the former are more innovative than the latter. However, returnee entrepreneurial firms themselves experience difficulties in achieving superior innovation performance as they face liabilities when returning to their home countries. In this paper, we argue that such firms can take advantage of the knowledge spillover in the entrepreneurial ecosystem to promote innovation performance by enhancing their own knowledge management capability. The empirical evidence supports this proposition. Although we proposed that this relationship is likely contingent upon the attributes of entrepreneurial ecosystem, empirical evidence does not support it. Theoretical and practical implications are discussed.

Keywords: Entrepreneurial ecosystem, returnee entrepreneurship, knowledge spillover, knowledge management capability, innovation performance, China

1. Introduction

Entrepreneurs are viewed as the main drivers of economic growth and social progress in recent times (World Economic Forum, 2014). While entrepreneurship and innovation have become the topic of interest for researchers and policy makers (Audretsch & Belitski, 2017), in practice, entrepreneurial success stories of many companies including Skype, eBay and Baidu have also inspired almost an entire generation of new entrepreneurs (Isenberg, 2010). In the globalized business environment, the contribution of returnee entrepreneurship to innovation, employment, and the economic development of emerging markets is widely acknowledged and has also received much attention both from government policy makers and business scholars, especially in emerging countries (Bai, Lind, & Johanson, 2016; Kenney, Breznitz, & Murphree, 2013; Lin, Zheng, Lu, Liu, & Wright, 2019; Lu, Tsang, & Peng, 2008; Qin & Estrin, 2015).

Returnee entrepreneurs are defined as scientists, engineers, professionals, or students who have studied and/or worked in developed countries and then returned to their home countries to start up new business ventures (Filatotchev, Liu, Lu, & Wright, 2011; Lin et al., 2019; Dai & Liu, 2009). Returnees are expected to bring academic and technical knowledge, managerial and entrepreneurial skills, practical experience, international networks, and new business ideas back to establish their own business. Returnee entrepreneurs have played an important role in the economic development of their home (generally emerging) countries, such as South Korea, India, and China (Dai & Liu, 2009), attracting increased attention in entrepreneurship research (Lin et al., 2019). One of the several examples includes the founder and CEO of Baidu (China's top search engine), Li Yanhong, who studied and worked in the United States (Filatotchev et al., 2011).

Considering returnee entrepreneurs' contribution toward innovation and economic development, in emerging countries, governments recognize the importance of innovation-

based economic growth, and some governments' public policies have responded by creating entrepreneurial ecosystems (hereafter EE) (Chen, Cai, Bruton, & Sheng, 2019; World Economic Forum, 2014) to encourage R&D spillover, venture capital, and new start-ups (Filatotchev et al., 2011; Wright, Liu, Buck, & Filatotchev, 2008). In China, for example, the central and regional governments operate "costly programs aimed at luring returnees (known locally as Sea Turtles) in the hope that they will bring entrepreneurial growth" (Kenney et al., 2013, p. 393). The governments in China have also established around 1,600 science parks and incubators dedicated to start-ups established by returnee entrepreneurs (Chen et al., 2019). Most of these parks are aimed at providing opportunity and support to the new entrepreneurs in terms of funding and finance, access to a talent pool of the workforce, accessible markets for customers and suppliers, appropriate institutional environment, infrastructure, and social and cultural support such as innovative culture, networking, training and development programs, and mentoring and business-friendly environments (World Economic Forum, 2014; Spigel, 2017). While all these attributes of EE play an important role to help businesses grow (Chen et al., 2019; Mason & Brown, 2014; Spigel, 2017; Stam, 2015), in a recent survey of more than 1,000 entrepreneurs from around the world, the World Economic Forum (2014, p. 14) found that "accessible markets, human capital/workforce and funding and finance" are three main pillars of EE that determine the success and failure of the new start-ups. The findings of the report highlight the importance of government policy and support needed to promote an innovative business culture by developing appropriate EEs.

Evidence suggests that governments in other emerging countries such as South Africa, Mexico, and India are also developing favorable policies to persuade their migrated scientists, engineers, and other highly skilled professionals to return home (Kenney et al., 2013; Lin et al., 2019). It is believed that returnee entrepreneurs will bring "human and social capital" (Schott, 2018, p. 1084) and "new skills, knowledge of new ways of doing things, new

technology and increased entrepreneurial skills” (Lianos & Pseiridis, 2009, p. 156), which will help promote innovation in their home countries. As such, returnee entrepreneurship can be viewed as a key innovation strategy in emerging economies to achieve innovation-based economic growth and catch up with developed economies (Bai et al., 2016; Li & Kozhikode, 2008; Lu et al., 2008). However, it remains unclear whether such policy initiatives have achieved the intended objective of promoting innovation by encouraging knowledge spillover.

At the macro level, the common view is that returnee entrepreneurs are making a prominent impact on their home countries’ innovation capabilities by transferring advanced technological knowledge and business practices from developed (host) countries. Empirical studies have generally supported the positive knowledge spillover effect of returnee entrepreneurship on innovation performance at the local industry level in returnees’ home countries (Kenney et al., 2013; Saxenian & Hsu, 2001). However, the relationship between such knowledge spillover and innovation performance has proven to be considerably more ambiguous at the firm level (Audretsch & Lehmann, 2005; Breznitz & Liu, 2005; Dai & Liu, 2009; Filatotchev et al., 2011; Li et al., 2012).

In addition, prior studies have mostly focused on the possible knowledge spillover from FDI, R&D, cross border mobility of knowledge workers, and from the returnee firms to non-returnee local firms in emerging countries (Dai & Liu, 2009; Liu, Filatotchev, Buck, & Wright, 2010; Schott, 2018), ignoring that between the returnee firms themselves. Other scholars (e.g., Liu et al., 2010; Filatotchev et al., 2011) argued that returnee-related knowledge spillover is more likely to occur in areas with a high density of returnee entrepreneurs; however, the literature does not clarify under what conditions the firms will be able to improve their innovation performance. Therefore, this study introduces the knowledge management perspective to examine its mediating effect on the association between knowledge spillover and innovation performance.

Further, prior studies have argued that firms' innovation performance also depends on appropriate EE, which includes attributes such as access to human and financial capital, presence of networks and mentors, proximity to university and other support services, accessible market, appropriate institutional environment, infrastructure, and government policy (Chen et al., 2019; Spigel, 2017; World Economic Forum, 2014). As these attributes create a supportive environment for innovative ventures, EE is seen as interdependence between these factors (i.e., social, cultural, and material attributes of EE) and entrepreneurial and other actors (Chen et al., 2019; Mason & Brown, 2014; Stam, 2015). While the relationship between these social, cultural, and material attributes reproduces the ecosystem (Spigel, 2017), little empirical evidence exists to support the theoretically established link between EE attributes (Chen et al., 2019) and its impact on returnees' capabilities and performance, especially in the emerging economy context. Compared to other approaches (e.g., clusters and others), the focal point in EE is the individual entrepreneur rather than the firm (Stam & Spigel, 2016); therefore, using EE as a moderating variable appears particularly relevant here as the main focus of this study is returnee entrepreneurs. Accordingly, the following three research questions are proposed:

R.Q. 1: Does knowledge spillover among returnee entrepreneur firms improve their innovation performance?

R.Q. 2: Does knowledge management capability mediate the knowledge spillover–innovation performance relationship?

R.Q. 3: Do the attributes of EEs moderate the association between knowledge management capability and firms' innovation performance?

This study makes several contributions. First, it extends the research on both knowledge management and returnee entrepreneurship literature by highlighting the importance of knowledge spillover and knowledge management capability within the returnee entrepreneur

parks. Our findings reveal that knowledge (both explicit and tacit) spillover has a significant impact on returnee firms' innovation performance and that returnee firms must enhance their knowledge management capability (i.e., knowledge internalization, application, and protection) to achieve the full benefits of knowledge spillover effect on innovation performance. While prior studies provide mixed and inconsistent findings on returnee firms' performance, our findings provide valuable insights into explicit and tacit knowledge spillover among returnee firms. In addition, by highlighting the importance of knowledge protection and internalization, our findings support the prior theoretical argument that the source of competitive advantage mainly depends on the application of knowledge rather than knowledge itself (Alavi & Leidner, 2001). Second, this study offers new insights into the mediating role of knowledge management capability in the relationship between returnee firms' knowledge spillover and their innovation performance as well as the interaction effects of social, cultural, and material attributes of EE on the returnees' knowledge management capability-innovation performance link. Third, addressing the call for empirical research on EE (Chen et al., 2019), this study contributes to the limited EE literature by providing empirical evidence from the world's largest emerging economy—China. Finally, the findings of this study have some practical and policy implications for the emerging economy governments who are the operators of returnee innovation parks. Previous research indicates that returnee entrepreneurial firms may not be able to perform well in their home country due to losing their local connection while staying overseas (Li et al., 2012). This research suggests that fostering knowledge transfer among returnee entrepreneurial firms in the returnee entrepreneur park could reduce the liabilities they face in their home country. This will not only enable returnee entrepreneurs to survive, grow, and succeed but also help underpin economic growth and social progress in the local areas in which these returnee parks operate.

2. Theory and hypotheses development

We build our arguments and develop our hypotheses by drawing on the EE, returnee entrepreneurs, knowledge-based view of firm, and knowledge spillover theory.

2.1. Entrepreneur ecosystems, returnee entrepreneurs, and knowledge spillover

EE is defined as a combination of social, political, economic, and cultural elements within a region that “support the development and growth of innovative start-ups and encourage nascent entrepreneurs and other actors to take the risks of starting, funding, and otherwise assisting high-risk ventures” (Spigel, 2017, p. 50). The main focus of EE is the interactive activities related to resource allocation, developing networks, and creating opportunities among entrepreneurial and other actors to establish a broader ecosystem (Chen et al., 2019). The EE approach highlights the importance of entrepreneurship, which is seen as the source of innovation, growth, employment, and economic development (Stam, 2015; Isenberg, 2010; Mason & Brown, 2014; World Economic Forum, 2013).

EE is not an automatic process. Mason and Brown (2014) suggested that EE has generally emerged in places that have an established knowledge base employing many scientists and engineers. For example, places closer to the universities, research laboratories, and R&D labs are seen as fertile ground (Mason & Brown, 2014) because they are known for advancement of knowledge, scientific discoveries, and technological advancements that can attract and produce talents who could be future entrepreneurs.

Several principals, pillars, components, and attributes of EE have been discussed in the literature, which differentiates EE from traditional economic business models. For example, Isenberg (2011) listed six general domains of the ecosystem as policy and leadership, finance, conducive culture, quality human capital, markets for products, and supports available. The World Economic Forum report (2013, p. 6) presented eight pillars of EE as accessible markets, human capital/workforce, funding and finance, support systems, regulatory framework and infrastructure, education and training, major universities as catalysts, and cultural support,

where three pillars (i.e., access to markets, human capital, and finance) are found to be the most important for the growth and success of the early-stage companies. In order to create a successful EE, Isenberg (2010) suggested that governments focus on nine key principles: (1) stop emulating Silicon Valley, (2) shape the ecosystem around local conditions, (3) engage the private sector, (4) favor the high potentials, (5) get a big win, (6) tackle cultural change, (7) stress the roots, (8) do not overengineer clusters, helping them grow organically, and (9) reform legal, bureaucratic, and regulatory frameworks (Isenberg, 2010, pp. 3–9).

Although some overlapping attributes or characteristics provide benefits and resources to entrepreneurs, in their review article, Chen et al. (2019) identified 12 common elements that are seen as important to sustain and support regional EEs. These elements include “government policy (e.g., policy support, tax incentives), culture, human capital, financial capital, entrepreneurship organizations, education, infrastructure, economic clusters, networks, support services, early customers, and leadership” (Chen et al., 2019, p. 6). Spigel (2017) suggested that the three main attributes of EE are social, cultural, and material. Social attributes include the resources, such as talent pool of workers, investment capital, presence of networks, and mentors, which can help entrepreneurs acquire technological knowledge, human, and financial capital and gain access to customers and suppliers (Spigel, 2017). Cultural attributes include underlying beliefs about entrepreneurship, which largely influence potential entrepreneurs. Entrepreneurial success stories such as Skype’s adoption by millions and \$2.6 billion sale to eBay and Baidu’s success in China have inspired an entire generation of new entrepreneurs (Isenberg, 2010). Material attributes include having a good physical location with proper facilities such as transport (road, airport, railways, and container shipping), access to the market, proximity to a university or educational institutions and to support services (e.g., accountants, lawyers, and human resource advisors), and entrepreneur friendly policies. All of these attributes create a supportive environment for innovation-based ventures. As a result, EE

is viewed as the interdependence between entrepreneurial and other actors and factors (or attributes) that enable productive entrepreneurship (Stam, 2015; Chen et al., 2019). Spigel (2017) suggested that relationships between these attributes (e.g., social, cultural and material) reproduce the ecosystem; however, little or no empirical evidence exists to support the theoretically established relationship among the attributes (Chen et al., 2019).

The EE approach shares some similarities with other established concepts such as clusters, industrial districts, and innovation systems; for example, the focus is primarily on the external (though within the region) business environment, which can contribute to the firm's growth and success (Stam, 2015; Stam & Spigel, 2016). However, EE differs from clusters and other approaches in terms of the fact that the individual entrepreneur, rather than the firms, is the focal point (Stam & Spigel, 2016). The application of the EE approach appears particularly relevant as the main focus of this study is returnee entrepreneurs.

Returnee entrepreneurs are defined as “scientists, engineers, professionals or students who were trained or studied/worked in OECD countries, and returned to their native countries to become returnee entrepreneurs by setting up new ventures” (Dai & Liu, 2009, p. 373). During their study or work for a period of time (at least two years) in foreign countries, these returnees have gained knowledge, technical skills, and valuable work experience and have established international networks, which differentiate them from local entrepreneurs (Dai & Liu, 2009). In recent times, migrants from the developed (Western) countries are more likely to return to their home countries with the knowledge and skills acquired in foreign countries because of the opportunities and incentives provided by some governments of emerging countries such as China and India (Li et al., 2012; Estrin et al., 2019). For example, a recent study suggests that nearly a million overseas Chinese students came back to China in the 2012–2014 period, which is more than the total number of returning students in the past 30 years (Lin et al., 2019).

Among them, some were returnee entrepreneurs. Returnees have also been viewed more favorably in India in recent times, which was not the case in the past (Kenney et al., 2013).

The contributions made by the returnees are also well documented in the literature in terms of the formation of powerful export-based ICT industries and their clusters in countries such as China and India as well as in the economic development of their home (generally emerging) countries (Dai & Liu, 2009; Filatotchev et al., 2011; Kenney et al. 2013). Academic and technical knowledge, practical experience, entrepreneurial skills, and social networks are found to be useful for returnees when establishing new entrepreneurial ventures in their home countries. These returnees, who are seen as a distinct category of entrepreneurs as they are familiar with both their home and host countries' culture and context, have attracted increased attention from scholars in entrepreneurship research (Lin et al., 2019; Filatotchev et al., 2011; Kenney et al. 2013; Dai & Liu, 2009). However, prior studies have presented inconsistent findings in terms of their performance in the home country context (see Li et al., 2012; Lin et al., 2019). For example, in their study on SMEs in China's Zhongguancun Science Park, Dai and Liu (2009) found that returnee entrepreneurs performed better than those owned by local entrepreneurs due to their technological and commercial knowledge as well as their international entrepreneurial orientation.

In contrast, other scholars (e.g., Li et al., 2012) argued that, while returnees have the advantage of being educated overseas and international experience, they also face issues related to the lack of local knowledge and connection. For example, during their stay overseas, they might have lost their connections with the local community and access to resources, and they also may not be aware of social, cultural, and institutional changes in their home country, which can have an impact on their business performance. Furthermore, returnees may experience cultural shock when they return to their home country and suffer in terms of making adjustments to the local markets and networks. Without local knowledge of the market and

proper links with clients, suppliers, and customers, the survival and success of the returnees' venture may be at risk (Estrin et al., 2019; Li et al., 2012). Indeed, some evidence suggests that returnee entrepreneurs may not be able to perform better than local firms due to their absence from the home country, lack of local knowledge, and networks (Li et al., 2012).

Apart from the cultural shock, loss of local connection, and lack of local knowledge, returnee entrepreneurs also face difficulties with different institutional environments in their home (especially emerging) countries. For instance, formal institutional characteristics such as legal and political systems, intellectual property rights, access to finance, governance issues, and others are seen as important factors in terms of doing business, especially for new start-ups. This is because returnees may have to raise capital, get access to new markets, comply with local and national regulations, and also take risks associated with their new ventures. While entrepreneurial activities can benefit from strong institutional arrangements, Estrin et al. (2019, p. 34) suggest that “emerging economies are often described as having underdeveloped formal institutions in terms of institutional voids.” All of these (i.e., lack of local knowledge, connection and weak institutional environment) can have a significant impact on entrepreneurship, which raises an important question, namely “how can returnee entrepreneurs improve their innovation performance in order to survive and grow in such market environments?” In order to explore this question and build our hypotheses, we draw on the knowledge-based view of the firm and theory of knowledge spillover, mainly focusing on human mobility (i.e., returnee entrepreneurs) and interaction between actors and factors (i.e., EE), which can largely influence the innovation activities of the returnee entrepreneurs in the context of emerging countries (Chen et al., 2019; Dai & Liu, 2009; Liu et al., 2010; Isenberg, 2010).

2.2. Knowledge spillover and innovation performance in returnee entrepreneurial firms

The knowledge-based view (KBV) of the firm (Grant, 1996), which has mainly emerged from and has been built upon a resource-based view of it (Barney, 1991), considers knowledge as the most important intangible strategic resource that can be used to develop a firm's capability and strategy and determine its position in the competitive market environment (Liu et al., 2010). Among various classifications of knowledge (Alavi & Leidner, 2001), explicit and tacit (Nonaka & Takeuchi, 1995; Polanyi, 1966) characteristics of knowledge are widely discussed in the literature. The main distinction is that explicit knowledge can be codified, documented, and communicated easily, while tacit knowledge is less tangible and difficult to articulate and transfer (Polanyi, 1962). Smedlund (2008) highlights the importance of explicit and tacit knowledge as

codified explicit knowledge assets, such as customer databases, can be turned into value by efficiently implementing them in production. Tacit knowledge assets, such as the professional knowledge embedded in employees, can be turned into value by transferring them and sharing them with others to create learning benefits and increase the efficiency of a firm. (p. 64)

The KBV literature emphasizes the creation and acquisition of knowledge as well as the processing, storing, and application of knowledge (Grant, 1996). This is because, if firms can convert their firm-specific knowledge into appropriate business ideas, it can be a source of innovation, which firms can use to develop innovative products or services and improve their performance (Liu et al., 2010; Filatotchev et al., 2011). However, the application and utilization of knowledge to create value and achieve superior performance depends on four attributes that should be valuable, rare, and difficult to imitate and substitute (Barney, 1991). This may be more relevant for tacit rather than explicit knowledge.

The creation and acquisition of knowledge needed for innovation can come from a number of internal and external sources. For established large firms, the knowledge source of

innovation often comes from their investment in R&D or the augmentation of human capital to endogenously create new knowledge and generate innovative output (Jaffe, 1986). However, very few firms can possess all the required resources needed for successful innovation (Mansfield, 1988). In particular, returnee entrepreneurs and their firms, which are typically much smaller in size and weaker in their knowledge base, cannot afford a large investment in internal R&D for generating innovation output. Instead, they may find it cost effective and less time consuming to look for external sources rather than developing them internally. Therefore, it is imperative for such firms to have access to knowledge assets outside their organizations, to allow innovation to take place.

Prior studies suggest that firms can access external knowledge in two broad ways. First, firms can engage in intentional exchange of knowledge with other firms through knowledge transfer or sharing. Second, they access knowledge through unintended information exchange; such a mechanism of accessing knowledge is called spillover. Agarwal and Audretsch (2010, p. 272) referred to knowledge spillover as the “external benefits from knowledge creation that is enjoyed by parties other than the party investing in the creation.” While external knowledge is seen as one of the most common and important sources of innovation, knowledge spillover is not an automatic process (Filatotchev et al., 2011; Liu et al., 2010).

Various channels of knowledge spillover, such as trade, FDI, R&D, and inter-firm labor or human mobility, are discussed in the literature (Liu et al., 2010). Returnee entrepreneurs are seen as a new type of human (or cross border) mobility, and their contribution to knowledge transfer and innovation is well documented in the literature (Filatotchev et al., 2011; Liu et al., 2010). Returnees are seen as the international dimension of entrepreneurship in the context of emerging economies (Estrin et al., 2019) and as individuals who are familiar with both home and host country market environments (Lin et al., 2019; Wright et al., 2008). Smaller firms, such as returnee entrepreneurial start-ups, can benefit from knowledge spillover as they get

access to the innovative knowledge without even paying for the value it holds. For small entrepreneurial start-ups, their source of innovation seems to be more likely through the spillover of knowledge from other knowledge-generating organizations, including other entrepreneurial firms in the same region (Audretsch & Lehmann, 2005).

The mechanisms of knowledge spillover can be usefully examined by differentiating between explicit and tacit knowledge spillover. First, explicit knowledge can be disseminated in the form of intermediate and final products, machinery, equipment, hard data, and well-defined procedures. When a firm does not possess the knowledge necessary for producing innovative products or services, capturing the spillover effect of such explicit knowledge through the leasing of new equipment, reverse engineering a competitor's new products, or simply observing the rising use of new technology at a supplier's site can provide the firm with quick access to necessary skills and knowledge to improve their own innovation performance. Firms that are geographically concentrated benefit most from the spillover of such explicit knowledge, especially in upstream product development-related areas (Acs, Anselin, & Varga, 2002). The geographic proximity afforded by China's returnee industrial parks, for example, promotes the direct exchange of input, components, and final products with customers, suppliers, partners, and competitors.

While explicit knowledge can be exchanged at both the individual and firm levels, tacit knowledge, which is seen as difficult to articulate and transfer, can be exchanged only at the individual level through personal interactions (Storper & Venables, 2004). The KBV literature suggests that tacit knowledge can be acquired through experience, learning by doing, informal interactions, and human mobility, which make geographic proximity an even more crucial condition for such knowledge spillover. For firms in China's returnee entrepreneur parks, it is not only their innovation ideas and activities that benefit from the geographic proximity, but they can also benefit from cognitive and social proximity (Boschma, 2005) given their similar

background and experiences in working and studying overseas before starting their ventures. Such cognitive and social proximity are increasingly seen as complementary, if not necessary, for firms' innovation performance (Kloosterman, 2008); thus, a combination of various forms of proximity afforded by China's returnee entrepreneur parks will facilitate the communication, exchange, and diffusion of important tacit knowledge, which, in turn, will enhance these firms' innovation performance. Based on the above discussion, we propose the following hypothesis:

H1: Knowledge spillover between returnee entrepreneurial firms, i.e., in terms of both explicit knowledge (H1a) and tacit knowledge (H1b), has a positive impact on these firms' innovation performance.

2.3. The mediating role of knowledge management capability

Once returnee firms absorb the external knowledge, they must also manage it successfully to improve their innovation performance. Knowledge management is an approach involving more active leveraging of knowledge and expertise to create value and enhance performance for organizations (Gold, Malhotra, & Segars, 2001). Effective knowledge management facilitates the knowledge exchange required in the innovation process and enhances firms' innovation performance through the development of new insights and capabilities (Chen & Huang, 2009). Grant (1996) argued that organizational capability is important in terms of integrating an individual's specialized knowledge to convert inputs into value-creating products and services. Knowledge management capability is viewed as a process that involves creating, transferring, integrating, and applying knowledge (Alavi & Leidner, 2001).

The management of existing or new knowledge is classified in many ways, with a focus on different aspects of the process (Alavi & Leidner, 2001). In a useful synthesis, Gold et al. (2001) integrated various classifications into a taxonomy comprising four dimensions of knowledge management capabilities: knowledge acquisition, knowledge conversion, knowledge application, and knowledge protection. The existing knowledge management

literature has identified two primary means by which firms acquire knowledge: by seeking and acquiring entirely new knowledge and by creating new knowledge out of existing knowledge through collaboration between individuals and between business partners (Nonaka & Takeuchi, 1995); both are important foundations for firm innovation (Leonard, 1995).

While a firm may build access to the knowledge and skills that reside in individual employees or business partners through knowledge acquisition, it must also possess the capacity to ensure effective utilization of this knowledge and skill in the development of organizational expertise for innovation (Chen & Huang, 2009). Such ability to convert knowledge into a useful form is called knowledge conversion capability (Gold et al., 2001). Knowledge conversion involves processes relating to structuring knowledge to make it easier to access and distribute within a firm (Nonaka & Takeuchi, 1995); it also involves combining or integrating the specialized knowledge of many individuals or in different parts of the organization, to reduce redundancy and improve efficiency (Grant, 1996). These two steps of knowledge acquisition and conversion are often closely linked to each other in a sequential pattern and, when combined, they result in knowledge internalization (Tsai & Lee, 2006). Tsai and Lee (2006) referred to knowledge internalization as the ability to apply knowledge in real situations. It is seen as the process of converting externally gained explicit knowledge into tacit knowledge by individuals, which can help improve the organization's competitiveness and, ultimately, its innovation performance.

In order to realize the full benefits of the spillover effect on the innovation process and performance, returnee firms must enhance their capability to turn external knowledge into useful internal knowledge within the firm. Previous studies have shown that knowledge gained from inter-firm collaboration in the form of technology sharing, personnel movement, and long-term buyer-supplier relationships can only contribute positively to a firm's innovation performance when it is internalized to become firm-specific expertise and skills (Kloosterman,

2008; Liu et al., 2004). If external knowledge cannot be internalized, its value to firm innovation will be lost; thus, it can be argued that knowledge internalization is an important capability that can help improve returnee firms' innovation performance.

While the ability to internalize external knowledge into useful internal knowledge helps augment the knowledge base of the returnee firms, such augmented knowledge base will be of little value if firms do not have a strong ability to apply the knowledge in concrete innovation projects. For innovation to take place, firms must also be able to apply their organizational knowledge effectively. Referring to knowledge-based theory, Alavi and Leidner (2001) argued that the source of competitive advantage largely depends on the application of knowledge rather than knowledge itself. Knowledge application points to the processes that include effective storage and retrieval mechanisms enabling the firm to quickly access knowledge when needed. The value of individual and organizational knowledge resides mainly in its application because of the stickiness and tacitness of knowledge (Grant, 1996). Only by way of deep application can firms successfully translate the value of their knowledge and expertise into innovative products (Chen & Huang, 2009). Effective application of knowledge gained from spillover can accelerate new product development time, increase the functionality of the new product, and aid in the widespread adoption of the new product (Gold et al., 2001), which ultimately can have an impact on innovation performance.

Protecting knowledge is equally important to achieve and preserve competitive advantage (Gold et al., 2001), and innovation is not likely to take place and be sustainable if a firm does not have the capability to protect the innovation output from being imitated or duplicated. Innovation relies on knowledge assets that are rare and inimitable, and without proper protection capability, knowledge loses these important qualities for competitive advantages (Barney, 1991). A firm's knowledge protection capability ensures that firms have the incentive and confidence to engage in innovation. To guard against the opportunistic learning of

competitors and business partners, firms must develop processes to carefully manage the transactions and relationships with other organizations. In this regard, patents, trademarks, and copyrights only provide limited protection of firms' intellectual properties due to the incompleteness of property rights laws and the transaction costs involved in using legal mechanisms to protect knowledge (Besanko et al., 2013). Knowledge protection capabilities are especially important for returnee firms that operate in countries or regions with insufficient legal protection of knowledge assets.

The spillover of knowledge, whether tacit or explicit, is an unintentional act of knowledge transmission. Such unintended knowledge exchange can take place in every possible interaction between firms, including competitors. Once a firm's knowledge is made available to other firms as a result of knowledge spillover, it will have little or no control over how other firms may use that knowledge. It is reasonable to expect that without a strong knowledge protection capability, firms will be very careful or reluctant to engage in knowledge-sharing activities that could result in unwanted knowledge externalities, such as reverse engineering by competitors. In fear of such risks associated with knowledge spillover, firms may reduce their interaction with others. Strong knowledge protection capabilities can strengthen returnee firms' ability to guard against the negative externalities of knowledge spillover and hence strengthen the positive impact of knowledge spillover on innovation performance. Based on the above discussion, it can be argued that firms can transform the knowledge obtained from spillover into knowledge management capability; further, by making effective use of internalization, application, and protection of knowledge, returnee firms can improve their innovation performance. Accordingly, this study proposes the second hypothesis as follows:

H2: Knowledge management capability, which includes knowledge internalization capability, knowledge application capability, and knowledge protection capability, mediates the relationship between knowledge spillover and firms' innovation performance.

2.4. The moderating role of the attributes of an entrepreneur ecosystem

We further argue that the relationship between knowledge management capability and firms' innovation performance will be contingent on the entrepreneur ecosystem conditions. Previous studies on entrepreneur ecosystems suggested that an individual firm's action is not enough to develop high innovative performance, and other contextual factors may affect it (Acs et al., 2002; Mason & Brown, 2014). Similarly, research on organizational capabilities indicates that the effectiveness of organizational capabilities is contingent upon the institutional environment, namely the formal legal environment and the informal cultural support and business-friendly environment (Peng, Wang, & Jiang, 2008; Peng & York, 2001). In the case of this study, the conditions of returnee parks and the entrepreneur ecosystem play a prominent role. Although the concept of EE started in China almost 30 years ago with the establishment of Zhongguancun Science Park by the Beijing local government, the country now has almost 1,600¹ science parks and incubators providing financial, accounting, and legal support and services to entrepreneurs; the number of parks is estimated to reach 10,000 in the coming years (Chen et al., 2019). While a number of attributes or pillars of EE are explained in the literature (e.g., social, cultural, and material), in this paper, we adopt Audretsch and Belitski's (2017) conceptualization of the conditions of returnee parks, which includes six domains of the entrepreneurial ecosystem (culture, formal institutions, infrastructure and amenities, IT, Melting Pot, and demand).

When the EE is well established, it provides a facilitating environment that allows firms to better exert their knowledge management capabilities. First, a good EE could support the knowledge management process by creating routines and policies to provide guidelines regarding how to better internalize, apply, and protect external knowledge (Bendickson et al.,

¹We acknowledge that some of these science parks may not have all the support systems required for the ecosystem.

2020). In doing so, it would help to reduce the firms' need to invoke additional costs to set up these governance institutions all by themselves; furthermore, it could provide a safe environment for the firms to engage in knowledge management activities. When a local firm is involved in knowledge internalization, knowledge application, and knowledge protection activities, it is vital that these activities are viewed as legitimate in the local context (DiMaggio & Powell, 1983). Without a good EE, these knowledge management activities will suffer from unlawful behaviors such as patent infringement, which would incur more legal and economic costs to fully use its knowledge management capabilities. As such, a good EE provides safeguards against possible legal and social issues and enables the knowledge management capabilities to perform at low cost and risk (Bendickson, Irwin, Cowden, & McDowell, 2020). Finally, a good EE provides the necessary infrastructure (e.g., the internet) to support the firms' knowledge management capabilities. It is widely documented that information systems can enhance knowledge management processes (Schmidt & Cohen, 2013). In this way, a good EE not only comes with a network advantage, which allows information and critical resources (e.g., knowledge) to flow among the member entrepreneurs, but it also provides opportunity and support systems to innovate faster (Chen et al., 2019), which can ultimately help entrepreneurs improve their innovation performance. Based on the above arguments, we propose the following hypothesis:

H3: The attributes of an entrepreneur ecosystem have a positive moderating effect on the association between knowledge management capabilities and firms' innovation performance, such that when the attributes of the entrepreneur ecosystem are more favorable, the effect of knowledge management capability on firms' innovation performance will be stronger.

[Insert Figure 1 here]

3. Sample and method

3.1. Sample and procedures

To test our hypotheses, this study chose returnee entrepreneur firms in the Yangtze River Delta as our empirical setting. The Yangtze River Delta, including the Shanghai, Zhejiang, and Jiangsu provinces, is the most economically developed area in China, and it has established several returnee entrepreneur parks to attract talent and improve innovation capabilities. According to Gu (2012), returnee entrepreneur firms are defined as firms that have been established for less than five years by returnee entrepreneurs. To gain access to target firms, the authors used their personal contacts at local universities to facilitate this process through their business networks (Yu & Cooper, 1983). Snowballing strategies were also applied, where people who participated in this research were asked to refer contacts to solicit more potential respondents (Atkinson & Flint, 2001). These strategies are particularly useful in China, where local personal networks are very helpful for data collection (Easterby-Smith & Malina, 1999). Based on a thorough literature review, this study used well-established measures in the literature to design the questionnaire, which was pretested with a small sample of returnee entrepreneurs to ensure that the questions were clearly and easily understood. Only returnee entrepreneurs were selected as respondents because they had a comprehensive understanding of their organizations' knowledge flow and innovation performance. Table 1 summarizes the major characteristics of the sample, including key organizational information such as firm size, age, industry, and locations.

[Insert Table 1 here]

Two types of questionnaires—paper-based and online—were used, depending on the participants' preference. To reduce potential common method bias, we adopted a multiphase

design to collect data. We sent questionnaires to 300 returnee entrepreneurs and asked them to fill in the background information and knowledge spillover in phase one. Two weeks later, 167 returnee entrepreneurs who responded in phase one were asked to report knowledge management capabilities. Two more weeks later, 129 entrepreneurs who responded in the first two rounds were invited to report firm innovation performance. Of the 300 questionnaires sent, 129 usable surveys were obtained, representing a 43% response rate. This research also adopted several other procedures recommended by Podsakoff et al. (2003) to reduce potential common method bias. First, the survey introduction made it clear to respondents that their anonymity and confidentiality were guaranteed; second, the use of positive and negative wording in survey questions was balanced; lastly, Harman's single factor test was utilized to check the potential common method bias (Podsakoff et al., 2012). All the variables were loaded into an exploratory factor analysis to test whether one single factor accounted for a majority of the covariance between the measures. The unrotated factor solution suggested that one factor explained 17.5% variance, indicating that common method variance was not substantial.

To check the non-response bias, we used the wave analysis method suggested by Armstrong and Overton (1977). The assumption underlying this procedure is that respondents who reply later to a survey are more likely to resemble non-respondents; as such, significant difference between those early and late waves of respondents could predict the non-response bias. We compared the responses of early and late waves of returned surveys. T-tests were performed, and the results show no significant difference between those two sets of responses ($p > 0.05$). The results suggest that non-response bias is not a significant problem in the current data.

3.2. Variable measurement

3.2.1. Independent variables

Knowledge spillover. Based on Polanyi (1966), Jaffe (1986), and Fallah and Ibrahim (2004), knowledge spillover is measured by two dimensions—explicit knowledge spillover with three items and tacit knowledge spillover with four items. One example item for explicit knowledge spillover is “my company can acquire new technology from other companies in the returnee entrepreneur parks.” One example item for tacit knowledge spillover is “my company can acquire operation management expertise from other companies in the returnee entrepreneur parks.” We calculated the alpha coefficients for the samples in this research. The alpha coefficient for knowledge spillover was 0.93, and the alpha coefficients for explicit knowledge spillover and tacit knowledge spillover were 0.90 and 0.91, respectively.

Knowledge management capabilities. These ($\alpha = 0.94$) were measured by three dimensions: knowledge internalization, knowledge application, and knowledge protection. Drawing on Leonard-Barton (1995) and Nonaka and Takeuchi (1995), knowledge internalization was measured by four items; one example item is “my company always shares knowledge and information, and summarize the best experiences or practices.” Knowledge application was measured by three items adapted from Zander and Kogut (1995) and Szulanski (1996); an example item is “my company can quickly apply new knowledge to solve problems.” This study adapted a three-item scale developed by Kogut and Zander (1992) to measure knowledge protection, of which an example item is “my company always emphasizes the importance of knowledge protection for employees.” All the responses were obtained on a five-point scale, ranging from 1 = *strongly disagree* to 5 = *strongly agree*.

3.2.2. *Dependent variable*

Innovation performance. This paper adapted a five-item scale developed by Ritter et al. (2003) to measure innovation performance. The items are: “compared with other companies in the same industry, my company puts forward new technology or products more quickly,” “compared with other companies in the same industry, my company has the advantage of

developing new market,” “my company actively takes new measures to improve employee performance,” “my company constantly improve its business model,” “my company tries different management processes to achieve business goals.” The scale’s alpha reliability was 0.89.

3.2.3. Moderating variable

Attributes of entrepreneurial ecosystem. Few empirical studies measure the perceived attributes of EE. We found and adapted a six-dimension measure of attributes of EE developed by Audretsch and Belitski (2017), which includes culture and norms, formal institutions, infrastructure and amenities, IT, Melting Pot, and demand. One example item for culture and norms is “most people can be trusted”; one example item for formal institutions is “administrative services help efficiently”; one example item for infrastructure and amenities is “satisfied with transport”; one example item for IT is “satisfied with internet access”; one example item for Melting Pot is “Foreigners here are well integrated”; and one example item for demand is “It is easy to find a good job.” All the responses were obtained on a five-point scale, ranging from 1 = *strongly disagree* to 5 = *strongly agree*. The scale’s alpha reliability was 0.93.

3.2.4. Control variables

Four organizational characteristics served as control variables: industry, firm size, firm age, and firm location. Industry characteristics were controlled by grouping firms into six categories: (1) pharmaceuticals and bioengineering, (2) advance materials, (3) new energy, (4) finance, (5) information technology, and (6) others. Firm size was controlled by grouping firms into four categories: (1) 1–50, (2) 51–100, (3) 101–500, and (4) >500. Firm age was controlled by grouping firms into four categories: (1) <1, (2) 1–4, (3) 5–8, and (4) >8. Firm location was

controlled by grouping firms into three categories: (1) Shanghai, (2) Zhejiang Province, and (3) Jiangsu Province.

3.2.5. Confirmatory factor analysis

Before testing our hypotheses, we conducted confirmatory factor analyses (CFAs), and the reliability of each construct and its dimensions was assessed through construct reliability. As Table 2 displays, the construct reliability of each research variable ranges from 0.90 to 0.95—above 0.9. Convergent validity was also attained as the resulting average variance (AVE) extracted for each scale ranges from 0.534 to 0.725—above 0.5. Construct validity was estimated on CFA. The resulting measurement model provided an adequate fit to the data (RMSEA=0.10, NFI=0.72, CFI=0.81, IFI=0.82, TLI=0.80), and model fit was also supported through $\chi^2/df=2.45$, which was under the relevant benchmark of 2.5. These results enabled us to conclude that the scales were measuring distinctive constructs and to move on to test the proposed hypotheses.

4. Results

Table 2 provides the means, standard deviations, and correlation coefficients of the main studied variables.

[Insert Table 2 here]

4.1. Test of direct effect of knowledge spillover on innovation performance

We used regression analysis to test H1, H1a, and H1b. Table 3 shows the result for H1. The results support H1 as knowledge spillover is positively related to innovation performance ($t = 0.34, p < 0.01$). Furthermore, we tested the effect of both explicit knowledge spillover and

tacit knowledge spillover separately. Table 4 shows that both explicit and tacit knowledge spillover have a significant and positive effect on innovation performance, supporting H1a and H1b ($t = 0.26, p < 0.01$ and $t = 0.30, p < 0.01$, respectively).

[Insert Table 3 here]

[Insert Table 4 here]

4.2. Tests of mediation

We tested the mediation effect and the moderated mediation effect based on formal significance tests of the indirect effect through the application of bootstrapped confidence intervals (CIs) by using SPSS macro provided by Hayes (2018). The result in Table 5 provides support for H2 as knowledge management capabilities have an indirect effect on innovation performance (0.19). Bootstrap results confirmed the significance of the indirect effect, with a bootstrapped CI around the indirect effect not containing zero (0.06, 0.31); therefore, Hypothesis 2 is supported.

[Insert Table 5 here]

4.3. Tests of moderation

Table 6 presents the result for H3, which posits that attributes of an entrepreneurial ecosystem moderate the relationship between knowledge management capabilities and innovation performance. The results in Table 6 suggest that the interaction item between knowledge management capabilities and attributes of entrepreneurial ecosystem is insignificant ($t = -0.09, p > 0.05$); thus, Hypothesis 3 was rejected.

[Insert Table 6 here]

5. Discussion and conclusion

The first aim of this study was to examine the association between knowledge spillover and firms' innovation performance (H1). Using the survey data collected from 129 firms operating in China, this study finds that knowledge spillover is positively associated with innovation performance. Further analyses indicate that both explicit and tacit knowledge spillover have a significant and positive effect on firms' innovation performance. Innovation is the key for returnee entrepreneurial firms to achieve competitive advantages in a highly competitive home market. For innovation to take place, however, our study suggests that returnee firms must make some important decisions when they start their businesses back home. For instance, this study shows that such firms would benefit from locating close to each other to create the flow and the sharing of necessary skills and knowledge for innovation. As our findings indicate, returnee entrepreneur parks established by Chinese governments are an example of where such firms can take advantage of the knowledge spillover effect for innovation. This is consistent with previous research, which found that returnee firms located within such parks tend to perform better than those outside of them (Liu et al., 2010).

While several studies have examined the returnee firms' performance in their home country context, the findings are mixed (Li et al., 2012; Lin et al., 2019). For example, Dai and Liu (2009) found that returnees perform better than the local entrepreneurs, which may be partly due to the returnee entrepreneurs' academic and technological knowledge and their international experience. The current literature has made the implicit assumption that valuable knowledge gained abroad can enhance the innovation performance of returnee firms, and the

focus has been on how the presence of returnee firms contributes to the innovation capabilities among local firms (Lin et al., 2016; Qin & Estrin, 2015). It is also argued that returnee entrepreneurial start-ups possess a spirit of entrepreneurship as well as useful knowledge that they have learned from their studies and/or work in advanced countries; however, other researchers (e.g., Li et al., 2012) argued that returnees may not be able to perform well in their home country. This is mainly because returnees might have lost their local connection while staying overseas, and they also may not be well aware of any institutional, social, and cultural changes in their home country. This can not only lead to culture shock for returnees when they return to their home country, but it also poses a challenge in terms of the survival and success of their business ventures without the knowledge of local markets and lack of connection with their customers and suppliers (Li et al., 2012; Estrin et al., 2019). In light of the mixed and inconsistent findings on returnees' performance, our results ascertain the positive effect of knowledge (both explicit and tacit) spillover on innovation performance among returnee firms in China's returnee entrepreneur parks. The findings provide some insights on explicit and tacit knowledge spillover among the returnee firms and its influence on firms' innovation performance within the context of an emerging economy, namely China. Our findings also extend the prior literature on both knowledge management and entrepreneurship by highlighting the importance of knowledge spillover within geographic proximity, such as in returnee entrepreneur parks, where entrepreneurs can also benefit from cognitive and social proximity (Boschma, 2005).

The second purpose of this study was to examine the mediating role of knowledge management capability on the relationship between knowledge spillover and innovation performance (H2). Our findings indicate that the knowledge management perspective plays an important role in terms of managing firms' externally absorbed knowledge to improve their innovation performance. The findings suggest that returnee firms must enhance their

knowledge management capability (i.e., knowledge internalization, application, and protection) to achieve the full benefits of knowledge spillover effect on innovation performance. While a growing number of studies have been focusing on knowledge management in small firms, including entrepreneurial start-ups, the literature is still fragmented, and some specific areas remain poorly investigated (Esposito & Evangelista, 2016; Pillania, 2008). This is particularly true in the context of rising returnee entrepreneurial start-ups in emerging markets. Returnee firms may have gained important technological and managerial knowledge in the Western countries, but some firms may be able to turn their knowledge into innovation output, while others may fail. Although a positive knowledge spillover effect provides an external environment that is conducive to the innovation performance of returnee firms, as this study found in China's returnee entrepreneur parks, possessing internal knowledge management capability is another key pillar for successful innovation, as shown by our results.

Returnee firms must develop their knowledge management capability to internalize at least some aspects of knowledge spillover from other firms into their own firm-specific expertise and skills. They will also need to develop a knowledge application capability to translate this expertise and skill into concrete innovative products or services. Furthermore, returnee firms in emerging markets should pay particular attention to the importance of knowledge protection capability. In emerging markets, such as China, firms cannot rely solely on legal protection for their innovative products and ideas. Externally, returnee firms should manage their relationships and transactions with business partners carefully to guard against the opportunistic exploitation of proprietary knowledge. Internally, these firms should develop rigorous processes and procedures to manage important technological and financial data. In particular, it is suggested that, while investing in technological infrastructure is important to protect proprietary knowledge, returnee firms should not over-rely on technology (e.g., digital

storage and transmission) to try to transform all important tacit knowledge into explicit knowledge. As Gold et al. (2001) pointed out, such overuse may result in the loss of the value of knowledge when it is transformed from rich tacit form into codified form, and it may also make it easier to imitate, make illegal use of, or steal such knowledge. Our findings also confirm a prior theoretical argument (Alavi & Leidner, 2001) by which the source of competitive advantage mainly depends on the application of knowledge rather than knowledge itself.

The third purpose of this study was to examine the moderating effect of EE on the association between knowledge management capability and firms' innovation performance (H3). We did not find support for the interaction effect of knowledge management capability and firms' innovation performance in our empirical study. The reason may be that the effect of knowledge management capability is so powerful that it alone might determine firms' innovation performance, irrespective of attributes of EE. This is evident as the correlation between knowledge management capability and innovation performance is very high ($r = 0.63$). Another possible reason is that, although we argue that attributes of EE might amplify the effect firms' knowledge management capability, the opposite can occur—that is, attributes of EE might also weaken firms' knowledge management capability. Recent research suggests that, when institutions of an entrepreneurial ecosystem are lacking or weak, knowledge spillover and knowledge management capabilities play a more important role by using knowledge spillover and internal knowledge management capabilities to substitute such gaps (Bendickson et al., 2020). In a similar vein, when the institutions of an entrepreneurial ecosystem are strong, firms can rely on the favorable institutional conditions to facilitate innovation, downplaying the role of knowledge management capability in firms' innovation performance. Therefore, because of the two contradicting forces, the influence of knowledge management capability on firms' innovation performance will not vary with attributes of EE.

This study is subject to a number of limitations. First, the paper focuses on the effect of knowledge spillover on innovation performance among returnee entrepreneurial firms in China's returnee entrepreneur parks. However, this study did not explore how knowledge actually spills over; thus, future research should delve deeper into the mechanisms that facilitate such knowledge spillover and focus on how different mechanisms might play different roles in making the spillover effect more or less effective. Particularly, this study shows that the difference between the effect of explicit knowledge spillover and tacit knowledge spillover is very small (0.26 and 0.30, respectively). Therefore, future research could investigate and compare specific mechanisms through which the two types of knowledge spillover occur as tacit knowledge is deemed as more difficult to learn or transfer. Second, our study used the knowledge management perspective as a mediating variable and EE as a moderating variable to examine their effect on knowledge spillover and firms' innovation performance; however, our findings are based on the cross-sectional data and 129 survey responses. Therefore, the findings should be used with caution in other countries and contexts, and future studies could employ a mix of both qualitative and quantitative methods to extend and validate the findings of this study. Third, this paper used cross-sectional data. Future research should consider collecting objective data such as the number of patents and that of new products developed. Relatedly, future research could also collect data on the size or density of the returnee networks in different locations to test the agglomeration effect of returnee entrepreneur parks.

Despite these limitations, this study contributes to the limited EE literature by addressing the call for empirical research (Chen et al., 2019) and providing empirical evidence in the context of the world's largest emerging economy (China). The findings of this study have some policy implications for emerging economy governments and practical implications for the operators of returnee innovation parks. Previous studies highlighted the liabilities faced by

returnee entrepreneurial firms when returning to their home country due to losing their local connection while staying overseas (Li et al., 2012). This study suggests that fostering knowledge transfer among returnee entrepreneurial firms in the returnee entrepreneur park might mitigate this adverse condition and promote returnee entrepreneurial firms' survival and success.

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FIGURE 1

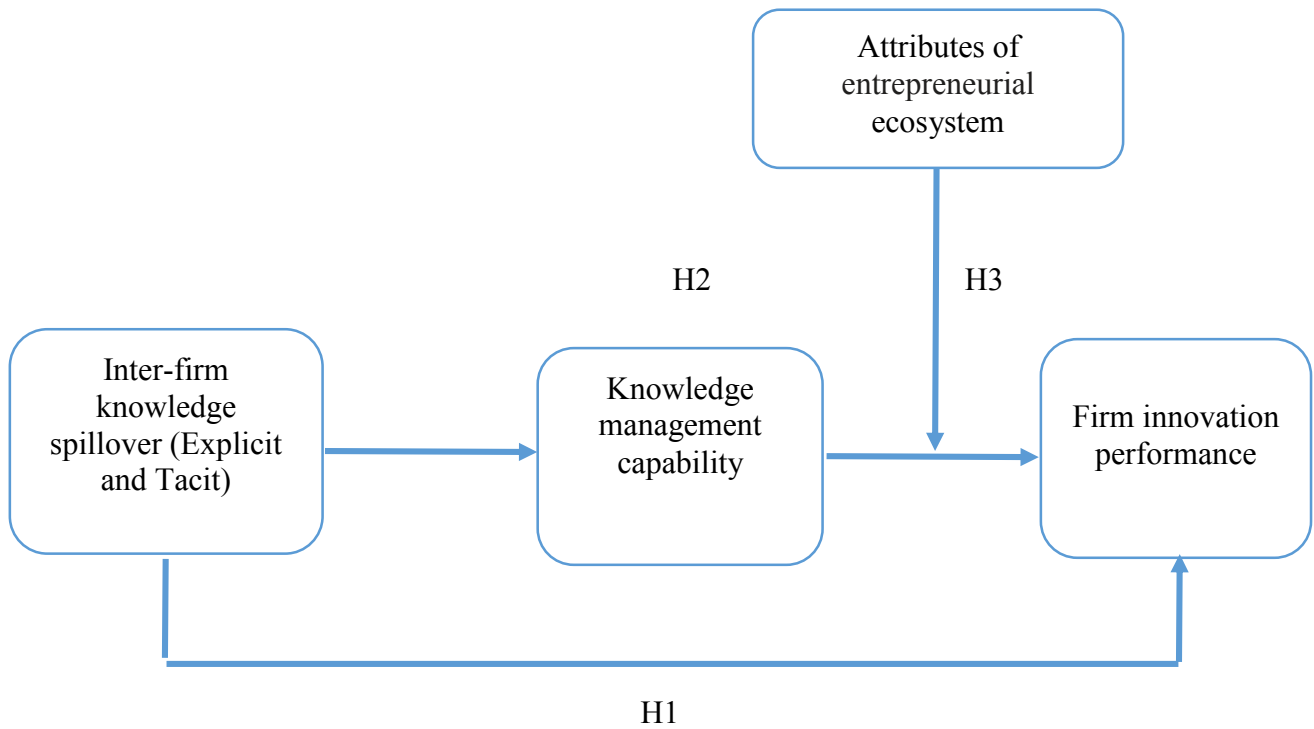


Figure 1. Conceptual model

TABLES

Table 1. Sample Characteristics

Variable	Category	Percent
Industry	Pharmaceuticals and Bioengineering	1.4%
	Advance materials	2.9%
	New energy	5.0%
	Finance	12.9%
	Information technology	62.1%
	Others	15.7%
Firm age	<1	2.9%
	1-4	12.9%
	5-8	10.7%
	>8	73.5%
Firm size	1-50	26.4%
	51-100	10.7%
	101-500	15.7%
	>500	47.2%
Locations	Shanghai	54.3%
	Zhejiang Province	28.6%
	Jiangsu Province	17.1%

Table 2. Construct inter-correlations for the confirmatory factor analysis model

Constructs	Mean	SD	1	2	3	4	AVE	CR
1 KS	3.27	0.90	1				0.7	0.92
2 KMC	3.67	0.88	0.35**	1			0.6	0.95
3 AEE	4.03	0.70	0.47*	0.61**	1		0.5	0.93
4 IP	3.21	0.86	0.37**	0.63**	0.47**	1	0.64	0.90

Note: (1) $N = 129$; * $p < 0.05$, ** $p < 0.01$, two tailed. (2) KS: knowledge spillover, (3) AEE: attributes of entrepreneurial ecosystem, (4) KMC: knowledge management capabilities, and (4) IP: innovation performance.

Table 3. The Effect of Knowledge Spillover on Innovation Performance

Variables	<i>Estimated coefficient</i>	<i>t-statistic</i>	<i>p-value</i>
Constant	2.42	10.35	.00
Indus1	.29	.45	.66
Indus2	.11	.22	.82
Indus3	-.19	-.55	.59
Indus4	.17	.71	.48
Indus5	-.09	-.42	.68
Firm Age1	.91	1.70	.09
Firm Age2	.26	.99	.32
Firm Age3	-.03	-.10	.92
Firm Size1	-.53	-2.34	.02
Firm Size2	-.16	-.59	.55
Firm Size3	-.39	-1.71	.09
Location1	-.35	-.92	.36
Location2	-.07	-.29	.77
knowledge spillover	.34	4.32	.00**

*Note: N=129. (1) Industries were recoded to six dummy variables: Dumindu1: Pharmaceuticals and Bioengineering; Dumindu2: Advance materials; Dumindu3: New energy; Dumindu4: Finance; Dumindu5: Information technology. Other industries was omitted and served as the base case. For each dummy variable, 0 represents No (or Not from this industry) and 1 represents Yes (or Yes the company is from this industry). (2) Firm Age was recoded to 3 dummy variables: Firm Age1: less than 1 year; Firm Age2: 1-4years; Firm Age3:5-8years; Firm age (more than 8 years) was omitted and served as the base case. (3) Firm size was recoded to 3 dummy variables: Firm Size1: 1-50 employees; Firm Size 2: 51-100 employees; Firm Size3:101-500 employees; Firm Size (more than 500 employees) was omitted and served as the base case. (4) Locations was recoded to 2 dummy variables: Location1: Zhejiang Province; Location2: Jiangsu Province. Location (Shanghai) was omitted and served as the base case. * $p < 0.05$; ** $p < 0.01$. Two tailed.*

Table 4. The Effect of Knowledge Spillover on Innovation Performance

Variables	<i>Estimated coefficient</i>	<i>t-statistic</i>	<i>p-value</i>
Constant	2.39	9.98	.00
Indus1	.34	.51	.61
Indus2	.10	.19	.85
Indus3	-.16	-.47	.64
Indus4	.19	.75	.45
Indus5	-.06	-.29	.77
Firm Age1	.89	1.66	.10
Firm Age2	.27	1.01	.31
Firm Age3	-.04	-.16	.87
Firm Size1	-.53	-2.34	.02
Firm Size2	-.19	-.68	.50
Firm Size3	-.39	-1.72	.09
Location1	-.34	-.90	.37
Location2	-.07	-.31	.76
Explicit knowledge spillover	.26	1.05	.00**
Tacit knowledge spillover	.30	2.28	.00**

*Note: N=129. (1) Industries were recoded to six dummy variables: Dumindu1: Pharmaceuticals and Bioengineering; Dumindu2: Advance materials; Dumindu3: New energy; Dumindu4: Finance; Dumindu5: Information technology. Other industries was omitted and served as the base case. For each dummy variable, 0 represents No (or Not from this industry) and 1 represents Yes (or Yes the company is from this industry). (2) Firm Age was recoded to 3 dummy variables: Firm Age1: less than 1 year; Firm Age2: 1-4years; Firm Age3:5-8years; Firm age (more than 8 years) was omitted and served as the base case. (3) Firm size was recoded to 3 dummy variables: Firm Size1: 1-50 employees; Firm Size 2: 51-100 employees; Firm Size3:101-500 employees; Firm Size (more than 500 employees) was omitted and served as the base case. (4) Locations was recoded to 2 dummy variables: Location1: Zhejiang Province; Location2: Jiangsu Province. Location (Shanghai) was omitted and served as the base case. * $p < 0.05$; ** $p < 0.01$. Two tailed.*

Table 5. The Indirect Effect of Knowledge Spillover on Innovation Performance through Knowledge Management Capabilities

Predictor	B	SE	t	p	Boot LLCI	Boot ULCI
Mediator variable model: knowledge management capabilities						
Constant	2.81	0.25	11.31	0	2.32	3.3
KS	0.32	0.08	3.85	0	0.15	0.48
Indus1	0.65	0.68	0.94	0.35	-0.71	2.01
Indus2	-0.3	0.63	-0.47	0.64	-1.55	0.95
Indus3	0.14	0.37	0.38	0.71	-0.6	0.88
Indus4	0.27	0.27	1.03	0.31	-0.25	0.8
Indus5	0.01	0.23	0.06	0.95	-0.44	0.47
Firm Age1	0.08	0.55	0.14	0.89	-1.01	1.17
Firm Age2	-0.17	0.29	-0.6	0.55	-0.75	0.4
Firm Age3	0.14	0.29	0.47	0.64	-0.43	0.7
Firm Size1	-0.29	0.25	-1.19	0.24	-0.78	0.2
Firm Size2	-0.06	0.32	-0.18	0.85	-0.69	0.58
Firm Size3	-0.38	0.24	-1.59	0.11	-0.85	0.09
Location1	-0.42	0.39	-1.05	0.29	-1.2	0.37
Location2	-0.23	0.24	-0.95	0.35	-0.71	0.25
Dependent variable model: innovation performance						
Constant	0.76	0.3	2.51	0.01	0.16	1.36
KS	0.15	0.07	2.05	0.04	0.01	0.29
KMC	0.59	0.08	7.37	0	0.43	0.75
Indus1	-0.24	0.56	-0.42	0.67	-1.34	0.87
Indus2	0.55	0.51	1.07	0.29	-0.47	1.56
Indus3	-0.24	0.3	-0.78	0.44	-0.84	0.36
Indus4	0.02	0.22	0.07	0.94	-0.41	0.44
Indus5	-0.11	0.19	-0.6	0.55	-0.48	0.26
Firm Age1	0.94	0.44	2.11	0.04	0.05	1.82
Firm Age2	0.6	0.24	2.54	0.01	0.13	1.07
Firm Age3	0	0.23	0.01	0.99	-0.46	0.46
Firm Size1	-0.43	0.2	-2.16	0.03	-0.83	-0.03
Firm Size2	-0.39	0.26	-1.52	0.13	-0.91	0.12
Firm Size3	-0.22	0.2	-1.13	0.26	-0.61	0.17
Location1	-0.15	0.32	-0.46	0.65	-0.78	0.49
Location2	0.1	0.2	0.53	0.6	-0.29	0.49
Indirect effect of X on Y						
KMC	0.19	0.06			0.06	0.31

Note: N=129. (1) Industries were recoded to six dummy variables: Dumindu1: Pharmaceuticals and Bioengineering; Dumindu2: Advance materials; Dumindu3: New energy; Dumindu4: Finance; Dumindu5: Information technology. Other industries was omitted and served as the base case. For each dummy variable, 0 represents No (or Not from this industry) and 1 represents Yes (or Yes the company is from this industry). (2) Firm Age was recoded to 3 dummy variables: Firm Age1: less than 1 year; Firm Age2: 1-4years; Firm Age3:5-8years; Firm age (more than 8 years) was omitted and served as the base case. (3) Firm size was recoded to 3 dummy variables: Firm Size1: 1-50 employees; Firm Size 2: 51-100 employees; Firm Size3:101-500 employees; Firm Size (more than 500 employees) was omitted and served as the base case. (4) Locations was recoded to 2 dummy variables: Location1: Zhejiang Province; Location2: Jiangsu Province. Location (Shanghai) was omitted and served as the base case. (5) KS: knowledge spillover; (3) KMC: knowledge management capabilities; *p<0.05; **p<0.01. Two tailed.

Table 6. The Moderating Effect of Attributes of Entrepreneurial Ecosystem on the Relationship between Knowledge Management Capabilities and Innovation Performance.

Predictor	<i>B</i>	<i>SE</i>	<i>t</i>	<i>p</i>	Boot LLCI	Boot ULCI
Mediator variable model: knowledge management capabilities						
Constant	2.81	0.25	11.31	0	2.32	3.3
KS	0.32	0.08	3.85	0	0.15	0.48
Indus1	0.65	0.68	0.94	0.35	-0.71	2.01
Indus2	-0.3	0.63	-0.47	0.64	-1.55	0.95
Indus3	0.14	0.37	0.38	0.71	-0.6	0.88
Indus4	0.27	0.27	1.03	0.31	-0.25	0.8
Indus5	0.01	0.23	0.06	0.95	-0.44	0.47
Firm Age1	0.08	0.55	0.14	0.89	-1.01	1.17
Firm Age2	-0.17	0.29	-0.6	0.55	-0.75	0.4
Firm Age3	0.14	0.29	0.47	0.64	-0.43	0.7
Firm Size1	-0.29	0.25	-1.19	0.24	-0.78	0.2
Firm Size2	-0.06	0.32	-0.18	0.85	-0.69	0.58
Firm Size3	-0.38	0.24	-1.59	0.11	-0.85	0.09
Location1	-0.42	0.39	-1.05	0.29	-1.2	0.37
Location2	-0.23	0.24	-0.95	0.35	-0.71	0.25
Dependent variable model: innovation performance						
Constant	-0.28	1.02	-0.28	0.78	-2.31	1.75
KS	0.12	0.08	1.59	0.11	-0.03	0.28
KM	0.87	0.33	2.63	0.01	0.21	1.52
AEE	0.37	0.32	1.15	0.25	-0.27	1.01
KM*AEE	-0.09	0.09	-0.97	0.33	-0.28	0.09
Indus1	-0.27	0.56	-0.48	0.63	-1.38	0.84
Indus2	0.5	0.51	0.98	0.33	-0.52	1.53
Indus3	-0.29	0.31	-0.94	0.35	-0.9	0.32
Indus4	0.02	0.22	0.08	0.94	-0.42	0.45
Indus5	-0.09	0.19	-0.49	0.63	-0.46	0.28
Firm Age1	1.14	0.5	2.26	0.03	0.14	2.14
Firm Age2	0.6	0.24	2.54	0.01	0.13	1.07
Firm Age3	0	0.23	0.02	0.99	-0.46	0.46
Firm Size1	-0.43	0.2	-2.12	0.04	-0.83	-0.03
Firm Size2	-0.38	0.26	-1.46	0.15	-0.9	0.14
Firm Size3	-0.2	0.2	-1.03	0.3	-0.59	0.19
Location1	-0.15	0.33	-0.47	0.64	-0.8	0.49
Location2	0.15	0.2	0.74	0.46	-0.25	0.55

Note: N=129. (1) Industries were recoded to six dummy variables: Dumindu1: Pharmaceuticals and Bioengineering; Dumindu2: Advance materials; Dumindu3: New energy; Dumindu4: Finance; Dumindu5: Information technology. Other industries was omitted and served as the base case. For each dummy variable, 0 represents No (or Not from this industry) and 1 represents Yes (or Yes the company is from this industry). (2) Firm Age was recoded to 3 dummy variables: Firm Age1: less than 1 year; Firm Age2: 1-4years; Firm Age3:5-8years; Firm age (more than 8 years) was omitted and served as the base case. (3) Firm size was recoded to 3 dummy variables: Firm Size1: 1-50 employees; Firm Size 2: 51-100 employees; Firm Size3:101-500 employees; Firm Size (more than 500 employees) was omitted and served as the base case. (4) Locations was recoded to 2 dummy variables: Location1: Zhejiang Province; Location2: Jiangsu Province. Location (Shanghai) was omitted and served as the base case. (5) KS: knowledge spillover; (3) KMC: knowledge management capabilities; (6) AEE: Attributes of Entrepreneurial Ecosystem. * $p < 0.05$; ** $p < 0.01$. Two tailed.