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Citation: Liu, X., Wright, M. & Filatotchev, I. (2015). Learning, firm age and performance: An investigation of returnee entrepreneurs in Chinese high-tech industries. International Small Business Journal, 33(5), pp. 467-487. doi: 10.1177/0266242613508147

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Link to published version: https://doi.org/10.1177/0266242613508147

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Learning, Firm Age and Performance: An Investigation of Returnee Entrepreneurs in Chinese High-tech Industries

Abstract

Using unique survey data, this study investigates the impact of the learning and network capabilities of returnee entrepreneurs on firm performance. Our findings indicate that returnee entrepreneurs' experiential and vicarious learning as well as global networks boost firm performance. However, firm age significantly weakens the impact of experiential learning and reduces the effect of global networks on firm performance. Our results extend the existing literature by explicitly examining the inter-relationship between two forms of learning, global networks and firm age.

Keywords: China; firm performance; global networks; experiential learning; returnee entrepreneurs; vicarious learning.

Introduction

International human mobility has become an increasing trend. In particular, the reverse flows of highly skilled migrants from OECD countries to emerging economies, such as China and India, have recently increased significantly and become an important phenomenon. For example, according to the Ministry of Education in China, 1.62 million Chinese went abroad to study from 1978 to 2009, and by the end of 2009, 497,000 of them had returned to China. Among those returnees 5,000 have set up more than 2,000 new high-tech firms in Zhongguancun Science Park (ZSP), commonly known as China's Silicon Valley (ZSP Development Report, 2009). Returnee entrepreneurs are defined here as scientists and engineers, or students who studied or worked in OECD countries at least for two years, and returned to their native countries to become entrepreneurs by setting up new ventures.

The rise of returnee entrepreneurs poses important research questions with regard to their impact on organizations. Yet our understanding remains very limited as few studies have systematically examined this phenomenon (Choudhury, 2010**;** Drori et al., 2009; Filatotchev et al., 2011; Saxenian, 2002; Wright et al., 2008). Prior research has tended to focus on shared common features of returnee entrepreneurs, such as simultaneous embeddedness in two distinctive knowledge contexts (i.e. in the country where they studied/worked and in their home country), and the possession of advanced technology and know-how. However, analysis of the heterogeneity of returnee entrepreneurs is lacking. Returnee entrepreneurs are heterogeneous in terms of their skills, experience and abilities, as well as in the amount of time that has passed since they returned to their home countries. Lack of attention to these aspects represents an important omission since variations in experiential learning capability and vicarious learning capability through knowledge transfer across international boundaries as well as global networks may result in different levels of firm performance and contribution of returnee entrepreneurs to emerging economies. Further,

the performance benefits from overseas experience and networks of returnee entrepreneurs may decay over time as home country experience and local networks becomes more dominant and home country conditions change. As a result, existing conclusions about the effects of returnee entrepreneurs may have led to insights for research and policy that are too general and insufficiently nuanced. Hence, there is a need to better understand the importance of entrepreneurial learning capabilities and their global networks in the performance of firms owned by returnee entrepreneurs. This paper aims to fill this research gap by investigating how variations in returnee entrepreneurs' experiential learning and vicarious learning as well as global networks affect their firm performance. In doing so, we are able to assess whether different types of learning and global networks are crucial for venture success and how firm age moderates the impact of the learning capability and network-related advantages of entrepreneurs on firm performance.

China represents an exciting laboratory for the examination of these issues. Since the late 1970s, the Chinese government has sent a large number of students and scholars abroad in the hope that they will be able to enhance China's scientific and technological development when they return. In addition, the Chinese government has sought to attract Chinese overseas talent as an effective way of catching up with the West, and has implemented various preferential policies to encourage returnees (Wang, 2007). Among these returnees, some have set up companies in science parks where government support is available. Hence, science parks in China provide an excellent setting to study the returnee entrepreneur phenomenon (Tan, 2006; Wright, et al., 2008).

This study takes a first step toward examining the impact of the learning capability and network capability of returnee entrepreneurs on their firm performance and whether such an impact is weakened over time when entrepreneurial firms become more established. It contributes to existing literature in several ways. First, our findings contribute by unpicking

the processes by which overseas experience influences firm performance. Prior literature on repeat entrepreneurs indicates that individuals with past business experience are more able to identify business opportunities and exploit them than those without experience, yet has generated mixed evidence on the performance effects (Fiet, Norton, and Clouse, 2012; Thorngren and Wincent, 2013; Ucbasaran, Westhead and Wright, 2008, 2009; Westhead, Ucbasaran and Wright, 2005). We contribute to resolving this puzzle by building on this prior research to consider the mobility of entrepreneurs across national borders. Second, we provide new insights into how the specific features of returnee entrepreneurs affect the success of high-tech small and medium-enterprises (SMEs), and advance our understanding of the importance of the learning capability and network capability of returnee entrepreneurs. Third, we not only differentiate the characteristics of returnee entrepreneurs in terms of their direct experience abroad, and their ability to obtain knowledge through vicarious learning by observing businesses abroad as well as the impact of their global networks, but also examine whether such learning benefits and network-related advantages have a short life. We thus contribute to filling a general research gap in the existing entrepreneurship literature where the potential impact of the temporal dimension of firm age, on the relationship between the learning capability and network capability of entrepreneurs and firm performance, has been underexplored. A notable exception is research by Autio et al. (2000), but it does not address the returnee context. As such, our study contributes to our understanding of the moderating effect of firm age on entrepreneurial behaviour, their networks and performance (Welter, 2011; Wiklund et al., 2011; Zahra and Wright, 2011). The findings from the study help to provide new insights into the interrelationship between learning benefits, network-related advantage and firm age within ventures set up by returnee entrepreneurs.

The paper is organized as follows. The next section discusses the theoretical background and hypotheses. We then describe the sample and variables used in the study,

while the empirical results are presented in the subsequent section. Finally, we discuss the findings and their implications, followed by conclusions.

Theory and hypotheses

We adopt a learning perspective and network theory to examine the relationship between the learning capability and network capability of returnee entrepreneurs and firm performance. The learning perspective focuses on the importance of experiential learning and vicarious learning in creating sustainable competitive advantages (Martin and Salomon, 2003; Shane and Khurana, 2003), whereas network theory emphasizes the importance of social relations which underline the links between social capital and access to resources, including both interpersonal relationships and the resources embedded in the relationships. Network-related resources are intangible and are difficult to replicate, thus providing new ventures with a significant advantage (Burt 1997; Peng & Luo 2000; Lin 2001). Business networks are particularly important to small firms, as described in prior studies (Davidson & Honig 2003; Peng & Zhou 2005).

A key aspect of learning theory is knowledge acquisition, which includes gaining understanding from experience or observation, and environmental scanning (Uhlenbruck et al., 2003). Specifically, two forms of learning affect firm performance (Huber, 1991; Salomon and Martin, 2008). The first is experiential learning. This form of learning accrues as entrepreneurs learn from their past experience of conducting business activities (Argote, 1999; Hilmersson, 2012). What entrepreneurs have learned from past experience may help them become more capable business owners (Rae and Carswell, 2001). This implies that learning from past experience serves as the basis for expertise and knowledge in the entrepreneurial context (Shook et al., 2003). The second form of learning is vicarious learning which occurs through learning by observing, or through knowledge spillovers, whereby entrepreneurs learn from other firms' business experience, best practice and

advanced technology, and obtain external knowledge within their industry and across national borders (Martin and Salomon, 2003; Tsang, 2002; Agarwal et al., 2007).

The learning perspective and network theory have important implications for entrepreneurial firms because it focuses on experience and network capability to obtain external knowledge and resources. The characteristics of returnee entrepreneurs associated with their experiential and vicarious learning will be reflected in firm performance as these two forms of learning help entrepreneurs identify and pursue business opportunities (Bakhru, 2004; Wright, et al., 1997). Past business experience and the ability to obtain advanced technology and commercial knowledge are recognized as essential tools for the successful development of technology-based firms in emerging economies (Saxenian, 2006). Social capital in the form of networks is the relational and structural resource attained by individuals/firms through a network of social relationships (Adler & Kwon 2002; Cooper & Yin 2005; Hadjikhani, Lee, & Ghauri 2008). Social capital that returnees develop in the form of global networks may enable returnee-owned firms to access external knowledge and new ideas created elsewhere, thus contributing to firm performance (Coviello & Munro, 1997; Zahra et al., 2000). Hence, we posit that the performance of returnee entrepreneurial firms will be affected by their founder's past business experience and ability to acquire knowledge externally through vicarious learning as well as global networks. Our focus on learning theory and social capital emphasizes the role of past experience and international knowledge acquisition embodied in entrepreneurs as well as returnees' global networks in gaining competitive advantage. This integrated approach enables us to examine the extent to which different forms of learning and global networks are crucial to firm performance.

In addition, we also consider the moderating impact of firm age on the relationship between the two forms of learning, global networks of returnees and firm performance and how firm age interacts with entrepreneurs' experiential learning and vicarious learning and

jointly affects firm performance. Firm age has been considered a factor which relates to firm performance in prior studies and is most frequently included as a statistical control variable (Rauch, et al., 2009; Zahra et al., 2000). However, a few recent studies have emphasized the role of age in innovation and export performance and have highlighted that firm age should be treated as more than just a control variable (Anderson and Eshima, 2013; Shinkle and Kriauciunas, 2010). Autio et al. (2000) argue, for example, that the venture's age is an important contingency factor that affects the inter-relationship between learning and the extent of the venture's internationalization. Extending this line of work, we examine the moderating effect of firm age on learning and networks and posit that the impact of experiential and vicarious learning as well as global networks on firm performance may decay with firm age. In particular, the impact of the initial vicarious learning and global networks may decline with firm age or these factors may have a short life. Building on the learning perspective and network theory, we derive a number of testable hypotheses in the following sections.

Experiential learning and firm performance

Experiential learning through prior engagement in business activities may affect firm performance in a number of ways (Madhok, 1997; Reuber and Fischer, 1997). First, past experience helps entrepreneurs more accurately identify business opportunities and provides individuals with information which is important to recognize and act on, such as information on finance, sales, technology, logistics, marketing, and organization (Dimov, 2010; Romanelli and Schoonhoven, 2001; Shepherd et al., 2000; Ucbasaran et al., 2008). Experiences may shape the cognitive structures through which entrepreneurs see the world, and these cognitive structures (or mental models) enable entrepreneurs to filter business opportunities as well as to interpret and construct meanings out of them, to cope with fast

changing external environments and to make appropriate strategic responses (Huff, 1990; Miller, 1993; Ucbasaran et al., 2009). In other words, individuals with past business experience are more able to identify business opportunities and exploit them than those without experience. Past experience helps entrepreneurs to evaluate the risks associated with the opportunities, and enhances their confidence to pursue the identified opportunities (Shane, 2001).

Evidence is mixed, however, regarding the impact of past experience on firm performance. Some existing studies have found that entrepreneurs' prior business experience had a significant and positive relationship with firm performance (Dyke et al., 1992; Gimeno, et al., 1997), thus supporting the experiential learning argument. It is argued that much of the necessary information about exploiting opportunities and coping with the liabilities of newness can only be learned by doing (Cope, 2005; Shane and Khurana, 2003). For example, how to run a business may only be learned by creating organizations and developing organizational routines (Bruderl et al., 1992; Shepherd et al., 2000). Following the same logic, how to collect the right information and make effective decisions about the identified opportunities can only be understood by undertaking those activities (Dimov, 2010; Duchesneau and Gartner, 1990; Ronstadt, 1988). On the other hand, some studies have indicated that past experience does not necessarily lead to future entrepreneurial success (Kahneman and Tversky, 2000). Entrepreneurs who largely rely on past experience may find it harder to recognize industry or technological changes and thus modify the heuristics that worked in the past (March, 1991). In addition, past experience may make entrepreneurs overconfident, and they may overestimate the likelihood of events, and draw conclusions based on small samples of experience (Denrell, 2003; Shepherd et al., 2003).

Second, experience can assist in the accumulation of new knowledge and social capital, enabling individuals to adapt to new situations (Davidson and Honig, 2003) and

become more productive (Parker, 2004). Previous experience provides valuable episodic knowledge such as managerial experience, enhanced reputation, access to financial institutions and broader social and business networks (Kenny and Fahy, 2011; Shane and Khurana, 2003; Stam and Elfring, 2008) which can be leveraged to create new ventures.

In the context of returnee entrepreneurs, prior episodic knowledge from developed commercial markets enables returnee entrepreneurs to transfer the relationships and processes of technological entrepreneurship to a new institutional context and build partnerships with distant customers (Saxenian, 2006). Returnee entrepreneurs who bring expertise relating to commercialization, and also knowledge about products, technology and new business ideas may boost firm performance in a context where there has previously been an entrepreneurial deficit. In this sense, the past experience of returnee entrepreneurs represents an important organizational resource which underpins firm performance (Escriba-Esteve et al., 2009; Reid, 1981). Based on the discussion above and the existing evidence, we expect that the prior business experience of returnee entrepreneurs will have a positive impact on firm performance. This leads to the following hypothesis:

Hypothesis 1: Past business experience gained by returnee entrepreneurs through experiential learning is positively associated with firm performance.

Vicarious learning and firm performance

It is widely recognized that external knowledge is an increasingly important source of firm performance. Acquiring external knowledge through vicarious learning is a critical and necessary condition for organizations to sustain competitive advantage (Matusik and Heeley, 2002; Tzabbar, 2009). Thus, entrepreneurs need to be engaged in vicarious learning. Academics and practitioners have become increasingly interested in understanding

mechanisms and channels for international transfer of vicarious knowledge since a knowledge gap across different countries may create entrepreneurial opportunities (Audretsch and Lehmann, 2005). This is particularly valuable for SMEs because entrepreneurs can learn from the business success and failure of other firms in order to overcome their lack of resources and experience (Bandura, 1977). Vicarious learning can lead to intense business-related exchanges of information and knowledge spillovers (Salomon and Martin, 2008) and enables entrepreneurs to acquire knowledge and ideas externally, thus enhancing their ability to identify and exploit business opportunities (Brown and Duguid, 2000; Dimov, 2010; Ghoshal and Moran, 1996).

More specifically, returnee entrepreneurs who are embedded in two distinctive knowledge contexts (i.e. in the country where they studied/worked and in their home country) may help to facilitate the flow of advanced technology and new ideas across national borders. Entrepreneurial mobility has at least two important implications. One is that knowledge possessed by individuals can be transferred and applied to a new context. The other is that vicarious learning can take place which can be instrumental both in generating innovative ideas as well as in finding solutions to existing problems (Acs and Audretsch, 1989; Shane, 2001). Vicarious learning occurs when returnees extract new knowledge though observing how firms operate abroad and the business actions they take. For example, some returnee entrepreneurs may bring not only the latest technology and patents with them when they return to their home country, but also draw upon new ideas they observe from firms in the country in which they studied/worked. Specifically, returnees entrepreneurs were exposed to a different environment when staying abroad, and such an environment acted as a source of new knowledge which enabled them to engage in vicarious learning. They were able to obtain a variety of knowledge, such as new technological ideas marketing knowledge, financial knowledge and new business models. Such vicarious learning may help returnee

entrepreneurs identify new market opportunities and enables them to imitate competitive advantage-seeking actions observed abroad and adopt best practice to compete in both domestic and international markets (Audretsch and Keilbach, 2004), thus enhancing firm performance. Hence, we hypothesize:

Hypothesis 2: New knowledge obtained by returnee entrepreneurs through vicarious learning is positively associated with firm performance.

Global networks and firm performance

Social capital theory provides the theoretical foundations for understanding the impact of the special characteristics of entrepreneurs on firm performance. The theory stresses that social capital in the form of business networks is a powerful tool for entrepreneurs enabling them to gain access to external knowledge and improve firm performance (Alvarez & Barney, 2001; Havnes and Senneseth, 2001; Hitt & Ireland, 2000). Managers or founders with such social capital are well-positioned to identify and develop business opportunities (Burt, 1997). Being embedded in social networks also gives entrepreneurs the opportunity to acquire information and ideas and helps entrepreneurs to establish credibility and access critical resources, including knowledge and technology (McDougall, et al., 1994). For SMEs, social capital directly affects the combine-and-exchange process, provides relatively easy access to network resources (Nahapiet & Ghoshal, 1998) and enables firms to realise their new resource configurations, creating unique competitive advantages (Shane & Stuart, 2002). Recent studies have found that returnee-owned firms have benefited from returnees' overseas networks when they seek growth in overseas markets and these firms are more export-orientated than non-returnee firms (Filatotchev et al., 2009). We argue that returnee entrepreneurs' global networks may have an important impact on firm performance by

reducing information asymmetries and providing the focal firm with important knowledge and resources. Such social capital-related factors may enable entrepreneurs to access valuable information and create global value chains to target international niche markets (Coviello & Munro, 1997; Zahra et al., 2000). Their global networks may play an important role in the acquisition, transfer, adaptation and the creation of knowledge. In this sense, global networks may help to boost firm performance directly (Hitt, et al., 2006; Zhou et al., 2007). Hence, we propose:

Hypothesis 3: Global networks are positively associated with firm performance.

The moderating effect of firm age

Although much of the literature seems to suggest that both experiential learning and vicarious learning will benefit all firms, it is likely that the learning effect will differ between young and old firms. We posit that younger firms may benefit more from their founders' past experience and knowledge acquired through vicarious learning. The reason is that at the early stage of venture development, learning benefits derived from experiential and vicarious learning of entrepreneurs may substitute for lack of firm-specific experience of running new business activities and significantly influence the design and implementation of firm strategy (Bruneel et al., 2010). In other words, the learning advantages of newness compensate and even outweigh some of the disadvantages of scant resources and lack of industry experience. However, as the firm grows, experiential learning may have a diminishing effect on firm performance, given that entrepreneurs may gain more confidence and accumulate more direct knowledge through their current activities. This implies that younger firms are better positioned to capture more benefits from founders' experiential learning than older ones, thus enhancing performance.

Returnee entrepreneurs can learn from their experiences and potentially improve their overall performance (Zahra et al., 2000). Consistent with the learning perspective, experiential learning enables returnee entrepreneurs to identify or adopt successful competitive recipes, and enables them to operate successfully. Returnee entrepreneurs with past business experience, can leverage their capabilities and successfully transfer international knowledge to their new firms. These returnee entrepreneurs can quickly develop new capabilities and use them in their operational and strategic activities. However, when firms become well established, the impact of experiential learning and vicarious learning may diminish as they may develop new capabilities.

Following the same logic, new firms with limited resources may be better than established firms at using vicarious learning to compensate the lack of resources. Learning from other firms and assimilating advanced technology into a venture's activities may be instrumental in enhancing firm performance (Gilbert et al., 2008). They can utilize external knowledge gained through vicarious learning to leverage and configure their resources into capabilities that lead to business success (Autio et al., 2000). However, the benefits from vicarious learning may diminish when firm age increases as initial international knowledge transfer from overseas experience may have a short life and only be effective for a limited period of time. Hence, learning benefits from external sources may be weakened when returnee entrepreneurial firms become more established.

Finally, the arguments above also apply to the contingent value of global networks when considering the passage of time for two main reasons. First, returnee entrepreneurs may depend on their global networks at the early stage of venture development due to the lack of local networks or underdeveloped local institutional environment. In other words, their global networks may compensate for the lack of local connections, given the fact that returnees exit local networks when they were away from their home country (Li, et al., 2012). Second,

returnees may have difficulty maintaining or strengthening their overseas networks once they have returned to China even though it is possible to maintain global networks through different communication channels, such as internet and telephone as well as short visits. Some studies show that face to face communication is still a best way to maintain contacts and develop business networks (Cox, 2004). This implies that the value of global networks on firm performance may be reduced when firm age increases and when returnee entrepreneurs do not have continuous presence in foreign countries. Our discussion leads to the following hypotheses:

Hypothesis 4a: Firm age weakens the association between experiential learning and firm performance.

Hypothesis 4b: Firm age weakens the association between vicarious learning and firm performance.

Hypothesis 4c: Firm age weakens the association between global networks and firm performance.

Sample

The outlined hypotheses were tested based on the data collected through a questionnaire survey in 2006. The sample firms were selected from the largest science park in China, Zhongguancun Science Park (ZSP), which has attracted a large number of returnee entrepreneurs. All firms in our sample are from high-tech industries, following the definition of the Ministry of Finance and the National Bureau of Statistics of China, comprising electronics and information technology, bio-engineering and new medical technology, new materials and applied techniques, advanced manufacturing technology, aviation and space technology, modern agricultural technology, new energy and high power conservation

technology, environmental protection technology, marine engineering technology and nuclear-applied technology. Since returnee-owned firms are a relatively recent phenomenon in China since the late of the 1990s, we limited the sample to SMEs. According to the State Planning Commission, the Ministry of Finance and the National Bureau of Statistics of China, a small to medium size firm is defined as a company that has fewer than 300 employees or with the total sales below 5 million RMB (ZSP Development Report, 2006). By applying these criteria for SMEs, a population of 1,003 returnee-owned firms was identified from a list obtained from the management committee of ZSP. A willingness to participate in our survey was indicated by 857 firms which were owned by returnees only, representing 85.4% of the population. The key informant at firm level was the returnee founder/owner/entrepreneur.

The questionnaire was translated from English into Mandarin Chinese. Then it was back-translated by three Chinese Professors in Beijing to ensure its validity. A pilot study was carried out in ZSP where two workshops were organized involving groups of 6 and 8 returnee entrepreneurs, not involved in the final sample, who completed an initial version of the questionnaire and were asked to identify any unclear questions. We modified the questionnaire according to feedback received from the workshops. The questionnaire is available from the authors on request. We distributed 857 questionnaires by mail to returnee-owned firms. We employed two full-time research assistants in Beijing who followed this up with phone calls and visits to 84 sample firms in order to increase the response rate. A total of 353 usable questionnaires were returned providing a 35% response rate. The possibility of non-response bias was checked by comparing the characteristics of the respondents with those of the original population sample. The calculated t-statistics for employee growth and ownership are all statistically insignificant, indicating that there are no significant differences between the respondent and non-respondent firms.

Dependent variable

Newer high-tech firms, in particular, may be loss-making or have little revenue since they are in the early stages of developing a market presence. Financial performance measures may therefore not provide a reliable indicator of firm performance. Satisfaction is a fundamental measure of performance for the individual entrepreneur and may bear on decisions about whether to continue or close a business (Cooper and Artz, 1995). Satisfaction-with-performance measures have been shown to possess strong internal consistency and reliability (Chandler and Hanks, 1993). Therefore, we used performance perception together with exploratory factor analysis to measure the extent to which returnee entrepreneurs were satisfied with firm performance in terms of market share, sales growth and the pre-tax profitability of their sales in both Chinese and international markets (Cooper and Artz, 1995). The items were measured on a 7-Likert point scale. The results show that these four items - 1) sales growth in local markets; 2) sales growth in international markets; 3) pre-tax profitability in local markets; 4) pre-tax profitability in international markets - loaded on a single factor with a reliability coefficient of Cronbach's Alpha being 0.827.

Independent variables

Experiential learning was measured by the past business experiences of returnee entrepreneurs. A dummy variable was created for those returnees who spent their time in business when they stayed abroad, including start-up experience (Lee and Tsang, 2002; Stuart and Abetti, 1990). *Vicarious learning* was measured on the basis of four questions that focus on the importance of various types of knowledge returnee entrepreneurs obtained from observing businesses abroad (Inkpen and Wang, 2006; Saxenian, 2002): (1) new technological ideas; (2) new business ideas; (3) new marketing knowledge, and (4) new

financial knowledge. Factor analysis also confirmed that these seven point likert-type questions loaded on to one factor, with eigen value exceeding 1.0, and the Cronbach's Alpha being 0.928. A *global networks* variable was constructed using three questions in our questionnaire. These seven point Likert-type questions focused on three types of networks: (1) networks established in foreign markets; (2) contacts maintained with people in foreign markets; (3) membership of different associations abroad. Factor analysis confirmed that these three questions all loaded on one factor with eigen value exceeding 1.0. The Cronbach's Alpha is 0.846. Finally, firm age is measured as years since founding (Shinkle and Kriauciunas, 2010).

Control variables

The sample firms mainly fall into four sub-sectors in high-tech industries, including electronics and information technology, bio-engineering and new medical technology, new materials and applied techniques, new energy and high-power conservation technology, and others. Therefore, we included industry dummy variables in the estimation equation to capture the impact of industrial sectors on firm performance. Firm size (the logarithm of total sales) and the length of time that returnees spent abroad were also controlled for (King et al., 2003). In addition, we further controlled for the impact of formal education on firm performance by creating a dummy variable which equals one if returnees gained a doctoral degree in overseas institutes. We also control for the impact of technological capability on firm performance which was measured by number of patents owned by the sample firms.

To minimize the effect of common method variance, we took the following steps. First, multiple item constructs were used in our survey. Response biases are more likely to occur at the item level than at the construct level. In addition, our main hypothesis tests

involve interaction effects. It is observed that complex relationships between the dependent and independent variables are not part of the respondents' theory-in-use (Chang et al., 2010). This may help reduce the risks of common method variance. Finally, common method bias was tested by performing the single factor test proposed by Podsakoff and Organ (1986). We conducted a factor analysis with all the variables used in our study and obtained a four-factor solution. The largest factor explained only 22.83% of the variance.

Empirical results

Table 1 reports the descriptive statistics for the variables used in the analysis and the matrix of correlation coefficients. Our data show that the average number of years that returnee entrepreneurs stayed abroad was seven. The majority of returnees had business experience while pursuing higher education abroad. Over 45% of returnee entrepreneurs held a doctoral degree from overseas institutes. The average age of the firms is almost five years. We also checked multicollinearity using variance inflation factors (VIFs) which are well below 10, showing that multicollinearity is not a concern in our regressions.

Insert Tables 1 & 2 Here

Table 2 summarizes the results where the perceptual measure for performance was the dependent variable. The results based on our baseline model (Model 1) show that length returnee entrepreneurs stayed abroad is positive and has marginally significant at the 10% significance level. These results imply that the longer they stayed abroad, the more experience they have accumulated and thus contributed to firm performance. However, the other variables, such as formal education, firm size, patents and industry dummies are not significant, indicating that the performance of the sample firms is not size- and industry-

driven and is not affected by the academic qualification of returnee entrepreneurs and patented-related advantage. Returnee entrepreneurs in younger firms tend to be more optimistic and confident about firm performance. The variables of direct learning, vicarious learning and global networks significantly affect returnee entrepreneurs' satisfaction with their firm performance. Hence, Hypotheses 1, 2 and 3 which propose a positive association between direct learning, various learning, global networks and firm performance are supported. The interaction terms between the variables of direct learning, vicarious learning, global networks and firm age are included in Models 2-5. The results show that the interaction term between experiential learning and firm age is negative and significant, indicating that firm age weakens the impact of experiential learning on firm performance, thus supporting Hypothesis 4a. Similarly, the interaction term between global networks and firm age is also negative and statistically significant which is line with Hypothesis 4c. However, the interaction term between the variables of vicarious learning and firm age is insignificant. Hence, the evidence obtained does not support Hypothesis 4b that states a negative moderating effect of firm age on vicarious learning.

Insert Figures 1a & 1b here

Finally, we graphically show the interaction effect between experiential learning, global networks and firm age. Figure 1a depicts that, as one goes from mean minus one standard deviation to mean plus one standard deviation of experiential learning, firm performance increases with experiential learning for newer firms with a low value of firm age, but decreased for firms with a high value of firm age. Similarly, Figure 1b also indicates that the impact of global networks is contingent on firm age. Differences in firm performance are increased when one goes from newer firms to well-established firms. This implies that the

impact of global networks is weakened for established firms. These plots are consistent with Hypotheses 4a and 4c.

Discussion

Using novel survey data collected from firms in ZSP and adopting the learning perspective and network theory, our study focuses on the relationship between the learning and network capabilities of returnee entrepreneurs, and firm performance. The learning perspective is highly relevant to returnee entrepreneurs who are embedded in different knowledge contexts, i.e. where they studied/worked and their home country. Such embeddedness provides returnee entrepreneurs with opportunities to benefit from their experiential and vicarious learning through knowledge transfer across national borders. The different learning capabilities of returnee entrepreneurs should result in different firm performance. Hence, adopting the learning perspective helps to capture the impact of the special features of returnee entrepreneurs on firm performance. In addition, global networks established by returnee entrepreneurs when they stayed abroad may be associated with unique advantages and hence contribute to firm performance. The findings suggest that vicarious learning through knowledge transfer is positively associated with firm performance. Thus, this result indicates that returnee entrepreneurs who are able to acquire new ideas and new knowledge internationally are rewarded with a positive performance outcome. Our findings imply that acquiring new ideas and advanced technology help to boost entrepreneurs' confidence and employment growth. The findings also show that firms do not operate in isolation and hence vicarious learning serves as an important channel for external knowledge acquisition. This result suggests returnee entrepreneurs are able to benefit from international knowledge transfer through vicarious learning due to their embeddedness in two different

knowledge contexts. Such embeddedness equips returnees with distinctive advantages derived from vicarious learning which are crucial to firm performance.

We have found that experiential learning is positively associated with performance. This supports the view that past experience helps returnee entrepreneurs recognize business opportunities and develop their own businesses in China. This also indicates that returnee entrepreneurs with business experience are more likely to be optimistic and confident about their firm performance (Landier and Thesmar, 2009). Our findings indicate that global networks are an important factor affecting perceptual performance. Returnee entrepreneurs with well-developed global networks contribute significantly to firm performance. Returnee entrepreneurs with well-established global networks are more likely to access valuable information and create global value chains to target international markets. The result suggests that returnee entrepreneurs with well-established global networks are more optimistic and positively contribute to firm performance. Their overseas networks are critical to the business outlook of their firms.

We further investigated how firm age interacts with two forms of learning as well as global networks and found interesting results regarding the moderating role of firm age in entrepreneurs' learning capability and networks. Specifically, firm age has a negative moderating impact on experiential learning, thus implying that firm age weakens the impact of experiential learning on firm performance: younger firms benefit more from direct experiential learning especially, whereas the impact of experiential learning decreases when firms become older. Firm age also weakens the impact of global networks on perceptual performance. The results may suggest that returnee entrepreneurs with vicarious learning capabilities are more likely to be optimistic and confident about their firm performance. They may perceive that international knowledge transfer may have a long-lasting effect on firm performance. The impact of global networks on perceptual performance declines with firm

age. The result implicitly suggests that competitive advantages derived from global networks is more important for new startups. Such an impact is reduced once firms have established or returnee entrepreneurs may have difficulty maintaining their established contacts abroad once they returned to China or they may have established local networks once they operate in their home country. Hence, the presence of a significant negative coefficient in relation to global networks and firm age may be reflection of returnee entrepreneurs having difficulty continuing to benefit from overseas networks after they return to China. The results may also imply that direct learning and global networks may substitute for firm specific knowledge and skills for younger firms which are likely to suffer from resource and knowledge constraints. This finding reveals that the impact of both learning and global networks on firm performance is not universal, but is subject to firm age.

This paper offers several contributions. First, this study adds to developments that extend research on the mobility of entrepreneurs across country borders beyond traditional attention to immigrant entrepreneurs to incorporate examination of those entrepreneurs that return to their home country. While this research has been developing, its principal focus has been to compare returnees with non-returnee local entrepreneurs and has only given limited attention to the heterogeneity of the benefits returnee entrepreneurs may have gained from spending time abroad. Further prior research has generally neglected the relationships between this heterogeneity and firm performance. More specifically, we adopted an integrated approach by combining learning perspective and network theory and examined whether both experiential and vicarious learning as well as global networks contribute to firm performance. Our investigation contributes to the learning perspective and network theory by revealing the links between direct learning, vicarious learning and global networks and firm performance. Hence, the findings provide evidence that emphasizes the need for more fine-grained consideration of the differential effects of experiential learning and vicarious learning

as well as global networks on firm performance in the context of entrepreneur mobility across national borders. Second, we further investigated how firm age, moderates the impact of the experiential learning, vicarious learning and global networks of returnee entrepreneurs on firm performance. Our findings provide new insight into the interrelationship between learning benefits, network-related advantages and firm age as we show that learning benefits and network-related advantages are contingent on firm age. This represents an important extension of previous studies which often treat firm age as a control variable when examining the impact of learning on firm performance (Lee and Tsang, 2002; Marin and Bell, 2006; Stuart and Abetti, 1990). The impact of learning capabilities appears age dependent and in particular we show that the effect of learning from exposure to business activities abroad deteriorates with the number of years since the entrepreneur returned to their home country. Similarly, the value of global networks declines when returnee firms become established. More generally, we make a third contribution in responding to calls for further understanding of the influence of context on entrepreneurial behavior (Zahra and Wright, 2011) both in examining returnee entrepreneurs in an emerging economy context and in investigating the temporal dimension of context.

Implications

Our findings have some important managerial and policy implications. First, the evidence on the role of experiential learning and vicarious learning suggests that entrepreneurs need to be aware of the importance of both forms of learning and be proactive in exploiting the advantages of learning. In particular, cross-border knowledge acquisition represents a viable way to access external knowledge which is unavailable internally. Second, managers and entrepreneurs need to avoid the 'age trap' whereby firms grow, their experiential learning through past experience may become less relevant and the impact of

initial international knowledge transfer as well as previous global networks becomes less valuable. While it may be difficult to maintain overseas experiential learning and networks once they have returned to their home country, finding ways to sustain vicarious learning from overseas experience and maintaining global networks subsequent to returning home may be beneficial. Third, for local entrepreneurs, returnee migrants in general and returnee entrepreneurs in particular may represent a new source of international knowledge. Hence, local firms should build links with returnee entrepreneurial firms to maximize benefits from vicarious learning.

Finally, policy makers should consider designing an appropriate policy to take advantage of human mobility across national borders. Attracting returnees from developed countries may be an effective way of catching up with technological leaders in developed countries. Thus, the government should continue to provide incentives to encourage overseas Chinese students and scientists to return to China. Meanwhile, policymakers may also need to design incentives to retain the expertise of returnees. However, our analysis shows that global networks and knowledge resources developed abroad have a limited life-span, and, perhaps a separate set of incentives is needed to encourage returnee entrepreneurs to hone their learning capabilities and develop local networks as their ventures mature.

Limitations and future studies

There are some limitations of the study which suggest further research possibilities. First, with respect to performance, we were constrained by the lack of published information, and sensitivity on the part of respondents to report details on levels of profitability. Second, the study was also restricted to a single science park in the Chinese context, notwithstanding that this is the largest science park in China and one that has attracted a large number of returning overseas Chinese. Recent attention has been drawn to the need to understand the

effects of context on entrepreneurial behaviour and performance (Welter, 2011; Zahra and Wright, 2011) and of the emerging economy context in particular (Bruton et al., 2008). Although we focused on returnee entrepreneurs in China, they may also play an important role in other emerging market contexts, such as India and Russia. Future studies should examine whether the findings we have identified on the nature of learning by returnee entrepreneurs holds in institutional contexts. Third, our study was based on a cross-sectional survey and hence was unable to address questions relating to the process of learning itself. Further research using longitudinal data may be able to look deeper into this issue. Fourth, our focus only on returnee entrepreneurs may involve something of a selection effect as only the most able would-be entrepreneurs may seek experience in OECD countries. As such, the generalizability of our findings to other types of entrepreneurs may be limited.

Conclusion

By adopting the learning perspective and network theory, this study investigates the impact of the learning capabilities and network capabilities of returnee entrepreneurs on firm performance using hand-collected survey data from ZSP in Beijing. In the context of an emerging economy, the findings show that experiential and vicarious learning as well as global networks help boost firm performance. We also found that firm age weakens the impact of both experiential learning and global networks on perceptual performance. By examining the interrelationship between returnee entrepreneurs' learning capabilities, network capabilities and firm age, the study highlights that the impact of entrepreneurial learning and network capabilities is contingent on firm age.

Acknowledgments:

Thanks to the editor and three anonymous reviewers for constructive comments. Thanks to the British Academy grant number LRG-39371 for research support.

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Table 1: Correlation Matrix and Descriptive Statistics

	Mean	Std. Dev	1	2	3	4	5	6	7	8
1 Firm age	4.895	0.254	1.000							
2 Experiential learning	0.851	0.354	0.113	1.000						
3 Formal education	0.452	0.495	0.046	0.008	1.000					
4 Global networks	0.024	0.991	0.122	0.019	-0.100	1.000				
5 Patent	3.315	4.470	0.244	0.031	0.165	0.132	1.000			
6 Performance	0.018	0.983	-0.115	0.132	-0.046	0.504	0.152	1.000		
7 Size	8.225	1.518	0.151	0.09`	-0.041	0.117	0.244	0.094	1.000	
8 Vicarious learning	0.013	0.976	0.279	0.064	-0.074	0.393	0.158	0.406	0.022	1.000
9 Years abroad	7.350	4.264	-0.194	0.032	0.083	0.237	0.166	0.293	-0.046	0.193

Notes: All correlation coefficients more than 0.031 or less than –0.031 are significant at 5% level or higher.

Table 2: Returnee Entrepreneurs and Firm Performance

Independent Variables	Model 1 Coefficients (Std. errors)	Model 2 Coefficients (Std. errors)	Model 3 Coefficients (Std. errors)	Model 4 Coefficients (Std. errors)	Model 5 Coefficients (Std. errors)
Experiential learning (H1)	0.363** (0.178)	1.343** (0.434)	0.382* (0.179)	0.345* (0.176)	1.263** (0.451)
Vicarious learning (H2)	0.548*** (0.153)	0.601*** (0.152)	0.819** (0.330)	0.509*** (0.153)	0.449 (0.353)
Global networks (H3)	0.442** (0.081)	0.416*** (0.080)	0.431*** (0.082)	0.772*** (0.186)	0.714*** (0.197)
Firm age	-0.074** (0.023)	0.117 (0.081)	-0.028 (0.055)	-0.047† (0.027)	0.112 (0.084)
Experiential learning X firm age (H4a)		-0.202** (0.083)			-0.190* 0.086
Vicarious learning X firm age (H4b)			-0.055 (0.059)		0.023 (0.064)
Global networks X firm age (H4c)				-0.066* (0.034)	-0.058† (0.035)
Control Variables					
Formal education abroad	0.016 (0.136)	0.006 (0.134)	0.020 (0.136)	0.055 (0.136)	0.040 (0.136)
Patents	0.016 (0.014)	0.008 (0.014)	0.016 (0.014)	0.016 (0.013)	0.008 (0.014)
Size	0.039 (0.021)	0.029 (0.042)	0.040 (0.043)	0.044 (0.042)	0.034 (0.042)
Years abroad	0.042 (0.014)	0.025† (0.014)	0.021 (0.014)	0.021 (0.014)	0.025† (0.014)
Industry dummies	Included	Included	Included	Included	Included
Adjusted R^2	0.343	0.361	0.352	0.364	0.375
Observations	353	353	353	353	353

Notes: ***, **, * and † represent the 0.1%, 1%, 5% and 10% significance levels.

Figure 1a: The plot of the interaction effect between experiential learning and firm age

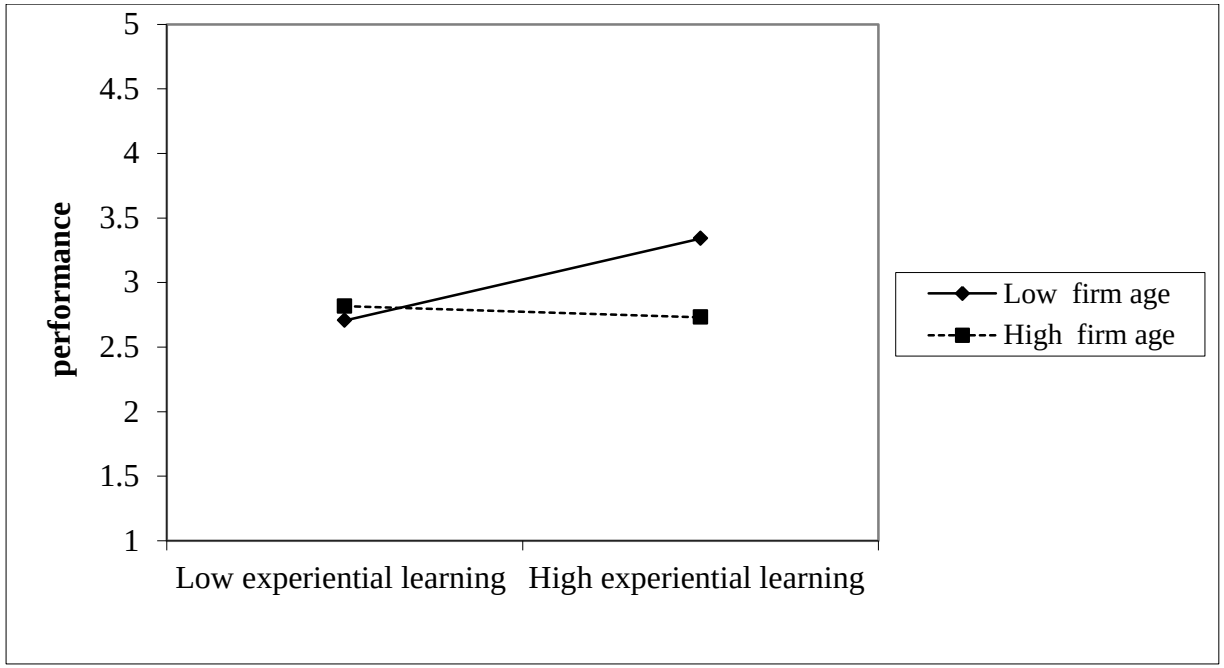
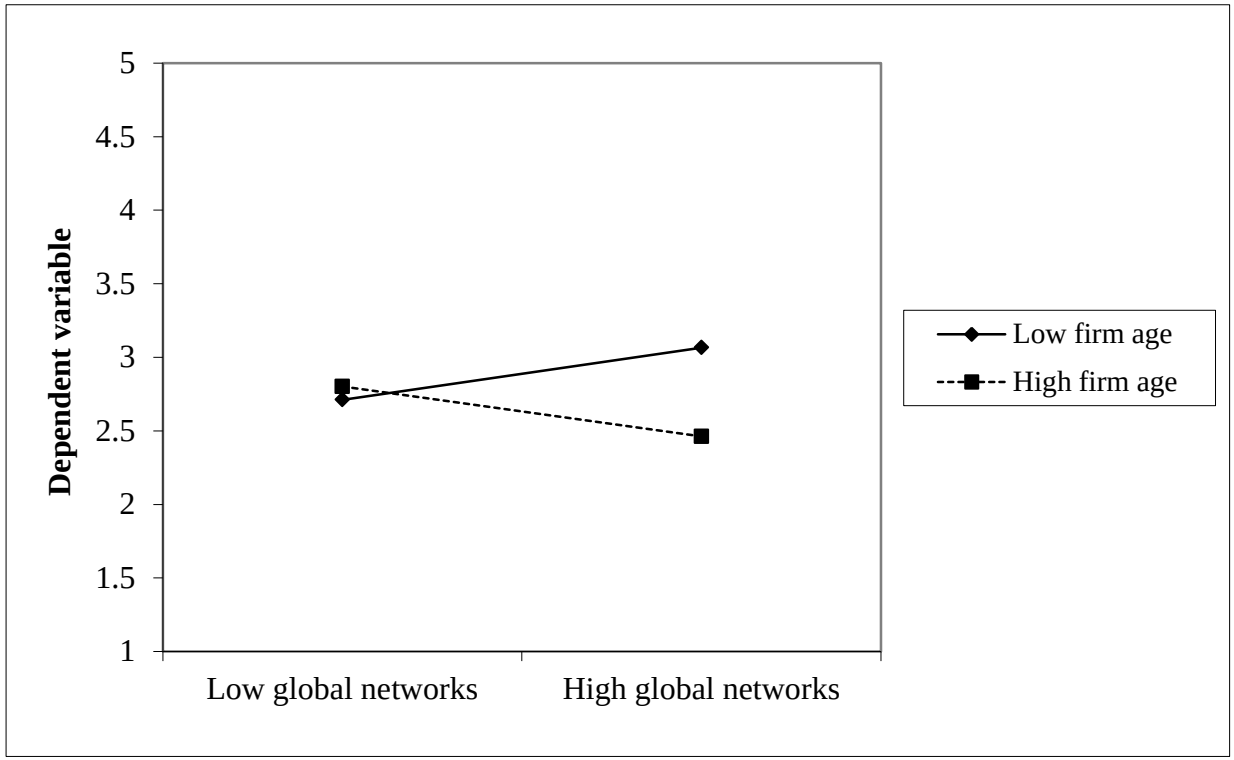
Figure 1b: The plot of the interaction effect between global networks and firm age