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*Returnee Entrepreneurs and Knowledge Spillovers in
Emerging Economies: Evidence from China*

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Jiangyong LU

*Institute School of Economics and Management,
Tsinghua University, China*

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Abstract

Using novel survey data, we examine the relationship between returnee entrepreneurs, multinational enterprise (MNE) working experience, global networks and firms' innovation performance in high-tech SMEs in China. We adopt an integrated framework which combines knowledge based view and social capital theory to investigate whether human mobility and global networks facilitate international knowledge spillovers. We find that returnee firms are more innovative than their local counterparts. We also find that returnee firms have an indirect impact on non-returnee firms' innovation performance and act as a new channel for technological knowledge spillovers. Global networks are found to complement the advantage possessed by returnee entrepreneurs. We find that the presence of a technology gap positively moderates the effect of returnee spillovers on non-returnee firms' innovation performance but the impact of MNE working experience on local innovation is constrained by the technology gap. Our results extend the existing literatures on knowledge spillovers and strategic entrepreneurship and have important managerial and policy implications.

Keywords: Returnee entrepreneurs; MNE working experience; Global networks; technology gap; High tech industries; Emerging economies

Introduction

Intensive research has been conducted on the effect of knowledge spillovers on host countries. Foreign direct investment (FDI) and trade have been regarded as the main vehicle for knowledge spillovers (Blalock and Simon, 2009; Blomstrom and Kokko, 1998; Buckley et al., 2002; Grossman and Helpman, 1991; Keller and Yeaple, 2003; Liu and Wang 2003; Liu, Wang and Wei, 2009; Marin and Bell, 2006). However, in a globalized economy, knowledge spillovers also take place through human mobility since highly skilled labor has become more mobile and is now more easily able to cross national borders than ever before.

A new phenomenon of returnee entrepreneurs has appeared recently as US-educated or other OECD countries-educated scientists and engineers or students return to their home countries to set up new ventures in order to take advantage of promising local opportunities (Saxenian, 2002a). This phenomenon has raised an important research question as to whether knowledge spillovers occur through entrepreneurs' mobility across national borders.

However, very few studies have been carried out on the impact of cross-border human mobility on knowledge spillovers (Song et al., 2003). There is relatively little evidence on the extent to which cross-border human mobility affects the international diffusion of knowledge. In particular, the impact of reverse flows of highly skilled labor from OECD countries to emerging economies, such as China, India and Russia, which provides a potentially important channel for international knowledge spillovers, has been largely overlooked. In addition, most prior studies on knowledge spillovers were based on secondary data analysis and used FDI presence or exports/imports as proxies of spillovers from foreign firms/trading partners to local firms at industry level in developing countries. Hence, knowledge spillovers were treated as a 'black box' (Blomstrom and Kokko, 1998; Buckley et al., 2002; Grossman and

Helpman, 1991; Keller and Yeaple, 2003; Liu and Wang 2003; Liu, Wang and Wei, 2009). This study goes beyond the existing literature by measuring knowledge spillovers from human mobility at firm level through interaction between different types of entrepreneurs. This setting enables us to capture not only the evidence of spillovers but also the actual process of knowledge spillovers.

This study aims to examine the relationship between returnee entrepreneurs and their firms' innovative performance as well as their role in knowledge spillovers in high-tech firms. Strategic entrepreneurship, grounded in the resource-based view (RBV) of the firm, recognizes the importance of accessing the resources and capabilities required to support opportunity seeking behavior aimed at achieving competitive advantage (Ireland, Hitt and Sirmon, 2003). However, given the emergent nature of the concept of strategic entrepreneurship (Kuratko and Audretsch, 2009), the sources of these resources and capabilities remain under-explored in the context of knowledge spillovers. Our focus on returnee entrepreneurs emphasizes the role of the resources and capabilities embodied in their knowledge and social capital in gaining competitive advantage through innovation. Accordingly, we adopt an integrated framework which combines the knowledge-based view (KBV) with social capital theory. Specifically, we investigate whether returnee entrepreneurs act as a channel for knowledge diffusion in high-tech industries. In addition, we also consider how entrepreneurs' previous working experience in multinational enterprises (MNEs) affects their firms' innovation. Both returnee entrepreneurs and non-returnee entrepreneurs may have previously worked for an MNE, but not all returnee entrepreneurs will have previously been employed in an MNE. Local entrepreneurs may have worked for an MNE within the home country. In this sense, we consider two modes of knowledge spillovers through human mobility in a large emerging economy, China, where returnees have gained significance under

the government policy which encourages overseas Chinese students and scientists to return to China. We also investigate how global networks established by entrepreneurs affect innovation through international knowledge spillovers.

The findings from our study help broaden understanding of the role of human mobility in emerging economies and provide new insights into the new phenomenon of returnee entrepreneurs. The evidence from the study helps extend the existing literature on knowledge spillovers by considering the role of human mobility and networks in knowledge spillovers which has been neglected in the existing literature. With respect to strategic entrepreneurship research, our findings provide new insights into the source of the resources and capabilities required for innovative opportunity seeking behavior, with particular emphasis upon the knowledge embodied in individual returnees.

This paper is organized as follows. The next section discusses theories and hypotheses. Section three introduces our empirical model and data used in the study. While the subsequent section presents and analyses empirical results, the last section concludes with the suggestions for future studies.

Theory and Hypotheses

We adopt a comprehensive framework which embraces the KBV and social capital theory to examine knowledge spillovers. While the KBV focuses on the importance of knowledge creation and acquisition in innovation, social capital theory highlights the role of relational capital in acquiring knowledge externally through firm networks. Thus, these two approaches complement each other by emphasizing that critical resources/knowledge for innovation may be beyond firm boundaries and so firms may benefit from external knowledge spillovers through human mobility and their networks (Dyer and Singh, 1998). This combined

framework allows us to examine how human mobility and global networks established by entrepreneurs affect international knowledge spillovers. Those potential channels for international knowledge spillovers have not been commonly noted in the existing literature. In this section, we discuss our integrated framework first, then establish hypotheses based on the framework.

Knowledge based view and knowledge spillovers

Knowledge is considered as a specific strategic resource and the principal basis for creating competitive advantage according to KBV (Grant and Fuller, 1995; Grant, 1996a, 1996b, 1997). The knowledge needed for innovation may be obtained from a variety of internal and external sources. From the knowledge-based perspectives, firms may develop internal innovative capabilities associated with R&D activities (Peteraf, 1993). Few firms, however, possess all the elements required for successful and continuous technological development even though they are the source of much of the knowledge needed in innovation. Some studies (Mansfield, 1988) have found that the original sources of invention came from outside the firm. Firms often find that it is less costly and faster to source external knowledge rather than develop it internally.

External knowledge spillovers exist due to the non-rival nature of knowledge. Knowledge spillovers imply that knowledge created by one party produces externality which can facilitate innovation by other parties (Jaffe et al., 2000). This is consistent with the insight of Arrow (1962) into knowledge spillovers from the traditional factors of production which are non-rivalrous; if one firm uses an idea, it does not prevent others from using it. On the other hand, knowledge is not universally accessible (Arrow, 1962) and is also partially excludable which gives private firms an incentive to invest in R&D in order to obtain higher profits based on market demand (Romer, 1994).

The process of knowledge creation involves a combination of tacit and codified knowledge (Nonaka and Takeuchi, 1995). Explicit or codified knowledge may be published in books, papers or documents, which can be reproduced at low cost. The transfer of this kind of knowledge does not prevent its use by the original holder. On the other hand, much knowledge in organizations is tacit (Nonaka and Takeuchi, 1995) and socially complex. The tacit and complex nature of valuable knowledge makes knowledge acquisitions very difficult (Kogut and Zander, 1992) as it embodies in organizational members, tools, tasks and networks (Argote and Ingram, 2000). This kind of knowledge can be transferred more effectively through human mobility (Kaj et al. 2003; Song et al., 2003) and hands-on experience (Almeida and Kogut, 1999; Teece, 1982; Zucker et al., 1998). Hence, human mobility enables firms to overcome barriers in knowledge transfer and facilitate knowledge diffusion.

Social capital theory and knowledge spillovers

As discussed above, firms need to obtain new knowledge and business information externally within the firm's networks and through human relations. Social capital theory places a greater emphasis on human relations and on the elicitation of tacit knowledge in the context of the global economy. Social capital in the form of networks is viewed as the relational and structural resources attained by entrepreneurs/firms through a network of social relationships (Adler and Kwon, 2002; Cooper and Yin, 2005). We argue that social capital-related factors may enable firms to access external knowledge and new ideas created anywhere else, thus stimulating their firms' innovation performance (Coviello and Munro, 1997; Zahra et al., 2000).

Extending the existing literature on knowledge spillovers, our study examines the role of

human mobility and networks in innovation, and seeks evidence as to whether returnees are a new force of international knowledge diffusion. We combine KBV and social capital theory to explain how firms acquire much needed knowledge for innovation through different external spillover channels. This integrated theoretical framework helps explain how external knowledge spillovers and internal efforts jointly determine the innovation performance of high-tech firms. Specifically we focus on returnee entrepreneurs and MNE working experience as well as global networks as channels for external knowledge spillovers. As indicated above, some but not all returnee entrepreneurs will have previously been employed in an MNE while some local entrepreneurs may have worked for an MNE within the home country. The reason for considering these channels is that they involve direct human interaction and communications rather than through tangible means of spillovers, such as trade and FDI. Based on our framework, we derive a number of testable hypotheses below.

Returnee entrepreneurs as a new channel for knowledge spillovers

Intensive research has been conducted on knowledge spillovers via different channels such as FDI and trade (Blalock and Simon, 2009; Blomstrom and Kokko, 1998; Buckley et al., 2002; Grossman and Helpman, 1991; Keller and Yeaple, 2003; Liu and Wang 2003; Liu et al., 2009; Marin and Bell, 2006). However, few studies have considered entrepreneurs as a channel for knowledge spillovers with the exception of Acs et al. (2006) who propose the knowledge spillover theory of entrepreneurship. They adopt the view that a firm is created endogenously through innovative activities by economic agents. Their approach considers new knowledge and ideas as a source of entrepreneurial opportunities. Hence, a knowledge gap across different countries may create entrepreneurial opportunities. When returnee entrepreneurs start new businesses in their home countries, they may serve as a conduit through which

knowledge spillovers occur via new firm formation (Acs and Audretsch, 1989; Audretsch and Lehmann, 2005; Shane, 2001a; 2001b).

Returnee entrepreneurs, as a new phenomenon of human mobility, may help facilitate the flow of capital, knowledge and new ideas. Such 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 there is potential for learning which can be instrumental both for generating innovative ideas as well as for finding solutions to existing problems. Human mobility is crucial to transferring tacit knowledge or knowledge-building capabilities (Ettlie, 1980; Chesbrough, 1999, Leonard-Barton, 1995) as tacit knowledge, rather than explicit knowledge, becomes a necessary condition enabling firms to improve their flexibility, performance and innovative capabilities (Angel 1991; Feldman, 2000; Saxenian 1994).

In a globalized economy, international human mobility has increased significantly and the emergence of trans-national scientists and engineers has played an important role in knowledge diffusion across national borders (Saxenian, 2006). Hence, human mobility can be considered an important mode of knowledge spillovers across national borders.

As documented by Saxenian (2002a), returnee entrepreneurs have contributed to scientific and technological development in Taiwan, South Korea and India. We argue that these returnee entrepreneurs act as an important channel for transferring tacit knowledge (Fornahl et al., 2005). For example, some returnee entrepreneurs brought not only the latest technology and patents with them when they returned to their home country, but also their tacit knowledge, experience and business networks. In this sense, returnee entrepreneurs are able to contribute to the knowledge creation and innovation of their own firms. Hence we propose:

H1a: The firm's innovative performance is positively associated with the presence of a returnee entrepreneur.

Meanwhile, returnee entrepreneurs may also be an important source of dynamic externalities. Malmberg and Maskell (2002) found that the rivalry between firms encourages variation, observability and comparability. As a consequence, different types of knowledge are exchanged, and the possibilities for innovation are enhanced. Innovation diffusion is not only through the commercialization of a new product, but also the imitation and introduction of the product into different contexts. Learning through observation (i.e. imitative behavior/imitation) may also allow for the diffusion of tacit knowledge. Spillovers from the presence of returnee firms may affect non-returnee firms in two ways. One is that non-returnee firms can learn new knowledge and new ideas from returnees through direct contact and networks which may lead to an increase in the innovation performance of their firms. The other is that returnee entrepreneurs who possess new technology and ideas may not only enhance the innovation performance of their own firms, but also are able to accelerate the technological development of their industry, thus increasing the overall technical standard of the industry. In turn, non-returnee firms are able to benefit from the increased standard of the industry indirectly. Therefore, we propose:

H1b: The non-returnee firm's innovation performance is positively associated with knowledge spillovers from returnee entrepreneurs.

MNE experience and innovation

Founders/entrepreneurs who previously worked for MNEs may also act as a channel for

knowledge transfer (Zhou & Xin, 2003). As noted above, both returnee entrepreneurs and non-returnee entrepreneurs may have previously worked for an MNE, but not all returnee entrepreneurs will have previously been employed in an MNE. Local entrepreneurs may have worked for an MNE within the home country. Knowledge spillovers can arise when former MNE employees move to domestic firms or set up their own enterprises as they embody the firm-specific knowledge assets of MNEs and may be able to transfer technological know-how, marketing and management skills to local firms (Inkpen and Tsang, 2005), thus positively affecting local firms' innovation. From the KBV perspective, the past experience of decision-makers represents an important organizational resource that may underpin the firm's innovation (Reid, 1981; Axinn, 1988). Moreover, the former employees of MNEs who become founders of local firms may also maintain collaborative links with MNEs that facilitate knowledge spillovers and hence innovation (Tan, 2006). Therefore, we propose:

H2: Entrepreneurs' working experience in MNEs positively affects local firms' innovation.

Global networks and innovation

Social capital theory provides the theoretical foundations to understand the impact of the special character 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 their firms' innovation (Alvarez and Barney, 2001; Hitt and Ireland, 2000). Managers or founders with such social capital are well-positioned to identify and develop innovative opportunities (Burt, 1997). Being embedded in social networks also gives entrepreneurs the opportunity to acquire information and ideas needed for innovation (McDougall et al., 1994).

The importance of networks for learning and knowledge transfer has been explicitly recognized (Kostova and Roth, 2002). Parise, Cross and Davenport (2006) have found that people who are central to the previous innovation network can bring crucial technical expertise, organizational memory and a set of social relationships into the recipient firms. The social structure of professional networks is also an effective means of establishing trust. Hence, they facilitate communication and knowledge transfer. Moreover, international linkages are important for obtaining leading-edge knowledge for firms in emerging economies to catch up with advanced technology developed anywhere else (Simmie, 2003). Havnes and Senneseth (2001) find that entrepreneurs who are heavily involved in global networking are able to access information and knowledge. We argue that entrepreneurs' global networks may facilitate international knowledge spillovers and have an important impact on firms' innovation performance.

Returnee entrepreneurs who have developed social capital in the form of international networks may act as a bridge between the context of their home country and international markets. Zweig et al. (2005) perceive returnee entrepreneurs as 'trans-national capital' that results from trans-national networks. This type of social capital may help returnee entrepreneurs access valuable resources, thus enhancing their firms' innovation performance directly. Hence:

H3: Entrepreneurs' global networks positively affect firm innovation.

Human mobility, global networks and innovation

The discussion above considers human mobility such as returnee entrepreneurs and MNEs' working experience as independent factors affecting firms' innovation. However, these channels may interact with global networks established by entrepreneurs. Global networks

may complement these channels in terms of their effect on innovation. The overall effectiveness of human mobility as knowledge spillover mechanisms may depend on global networks established by entrepreneurs. Hence, we expect that global networks enhance the spillover effect through entrepreneur mobility.

Returnee entrepreneurs may have maintained ties with colleagues/business partners in the West and may be able to access information and ideas from the Western scientific community through ‘knowledge networks’ (Barré et al., 2003; Kuznetsov, 2006). The same argument can be applied to entrepreneurs with MNE working experience. Even though they have left MNEs, they may still maintain their networks established when working for MNEs (Tan, 2006). For both returnee entrepreneurs and entrepreneurs with MNE working experience, the networks they have previously built through personal relations and/or business contacts provide a basis for trust and mutual understanding that would be difficult and costly to create for entrepreneurs in emerging economies who may previously have had limited contact outside the home country. These continuous networks enable them to gain new ideas and information needed for innovation. Hence:

H4a: There is a complementary effect between returnee entrepreneurs and global networks in terms of their impact on innovation performance.

H4b: There is a complementary effect between MNE working experience and global networks in terms of their impact on innovation performance

Knowledge spillovers, technology gaps and innovation

The existing literature contends that knowledge spillovers may be affected by a technology gap between knowledge recipients and knowledge creators (Verspagen, 1993). This is especially the case where a technology gap exists between those who are able to

innovate to produce new technology, and those who cannot. The technology gap may enhance knowledge spillovers for a firm whose knowledge is based on other firms through disembodied outputs, such as patents and the process of reverse engineering.

While some studies have found that knowledge spillovers materialize when there is a large technology gap between knowledge generators and recipients (Driffield, 2001; Castellani and Zanfei, 2003), others have shown that domestic firms are able to reap the benefit from FDI spillovers only when the technology gap is moderate (Flores et al., 2001). Some technology gap allows foreign and local firms to help each other stretch their knowledge for the purpose of bridging and connecting diverse knowledge (Nooteboom et al., 2007). Too large a gap may introduce a cognitive distance such that recipient firms do not have the absorptive capacity (Cohen and Levinthal, 1990) to assimilate and implement technological knowledge (Nooteboom et al., 2007).

This argument can be applied to the case of returnees and entrepreneurs with MNE working experience who are more likely to access advanced technological knowledge due to their background and international networks. In contrast, local-grown entrepreneurs with solely domestic experience in emerging economies have few such opportunities. A possible technology gap between returnee firms, MNEs and non-returnee firms may impact on the effectiveness of knowledge spillovers and innovation performance of non-returnees firms. When the technology gap between returnee firms, MNEs and non-returnee firms is relatively small, the potential for knowledge spillovers may be limited as non-returnee firms can benefit little from returnee entrepreneurs and former MNE employees. A relatively large technology gap implies great potential for knowledge spillovers from returnees and MNE former employees. Hence, we argue that a large technology gap represents learning potential for non-returnee firms and an opportunity to catch up with returnee-firms and MNEs. In this

context, interactions with returnee entrepreneurs and previous working experience in an MNE provide mechanisms to bridge the technology gap. Hence:

H5a: The effect of returnee spillovers on innovation performance in non-returnee firms is positively moderated by a technology gap.

H5b: The effect of MNE working experience on innovation performance in non-returnee firms is positively moderated by a technology gap.

The sample and method

The sample

To test our hypotheses, a sample of firms was selected from the largest science park in China, Zhongguancun Science Park (ZSP), one which has attracted a large number of returnee and local entrepreneurs (Tan, 2006). All firms in our sample are from high-tech industries, following the definition of the Ministry of Finance and China National Bureau, 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 recent phenomenon in China, we limited the sample to SMEs, according to the official Chinese definition, where an SME has fewer than 300 employees, and a total value of sales below 5 million RMB.

By applying the criterion of high-tech SMEs founded for around 3-5 years, populations of 1,003 returnee-owned and 1,138 local firms were identified from a list obtained from the management committee of ZSP. A willingness to participate in our survey was indicated by

857 returnee-owned firms and 976 local entrepreneurial firms, representing 85.4% and 85.6% of the population respectively.

The questionnaire was translated from English into Mandarin Chinese, then it was back-translated by two 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 to 8 returning and local entrepreneurs who completed the questionnaire and were asked to identify any unclear questions. We modified the questionnaire according to feedback received from the workshops, and copies were mailed to 857 returnee-owned and 976 local firms. Given the nature of the questions we were addressing, we adopted a key informant approach (Kumar et al., 1993). The key informant at firm level is the founder/owner/entrepreneur. We employed two full-time research assistants from the Great Wall Enterprise Institute in Beijing who were responsible for following up the respondents with phone calls and visits to 156 sample firms.

A total of 353 usable questionnaires were returned from returning entrepreneurs (a 41.2% response rate), and 358 questionnaires from local firms (36.7%). 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 the number of employees and R&D expenditures of the firms were all statistically insignificant, indicating that there were no significant differences between the respondent and non-respondent firms. The variables used in the estimation were defined as follows:

Dependent variable

We used the number of patents owned by firms as a measure of *innovation performance (IP)*. Patents are mainly the outcome of formal research processes. This measure is convenient because patent data are easily accessible. Also, it is argued that innovation

facilitated by international knowledge spillovers can be more directly assessed in firms' efforts to generate patents (Jaffe, Trajtenberg and Henderson, 1993; Salmon and Shaver, 2005). Hence, patents classified across various technological categories allowed us to characterize firms' positions in the technological space.

Independent variables

We constructed a dummy variable for *returnee-owned firms (RE)* which equals 1 (zero otherwise), where a returnee is defined as a Chinese native with at least two years of commercial and/or educational experience in an OECD country¹. A *global networks (GN)* variable was constructed using three questions in our questionnaire. These seven point Likert-type questions focused on the degree of importance of 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 cumulative variance explained was 84.64%. A dummy variable was created for entrepreneurs' working experience in an *MNE*, taking the value 1 if the entrepreneur previously worked for an MNE, and zero otherwise. Non-returnee entrepreneurs may also have this experience, so this variable is substantially different from the returnee entrepreneur variable. *Spillovers from returnees to local-grown entrepreneurs (RES)* were measured as a dummy variable, taking 1 if local-grown entrepreneurs stated that they have had interaction with returnee entrepreneurs, and zero otherwise. The *technology gap (Gap)* variable was constructed based on the question of how long it would take for non-returnee entrepreneurs to catch up with returnee

¹ The reason we chose two-year overseas experience as the threshold for returnee entrepreneurs is to screen out those who had not spent enough time abroad and may not be able to learn enough from overseas experience. One specific reason for choosing the two-year threshold is that a typical full-time MBA program lasts for two years.

firms and MNEs. If the answer was over three years, then there is a substantial technology gap between them.

Control variables

We controlled for firm *age* in years since founding, and firm *size* measured by number of employees (see Bonaccorsi, 1992 for a discussion). As the sample firms mainly fall into four sub-sectors that are broadly qualified as high-tech *industries*, including electronics and information technology with 49.5% of the sample firms, bio-engineering and new medical technology (17.5%), new materials (17.2%) and environmental protection technology (8.9%), we controlled for industry-specific effects by introducing dummy variables for firms from these sub-sectors.

A firm's own R&D activity may enable the focal firm to develop innovative capabilities that generate a high number of innovative outputs, such as patents (Barney, 1991; Peteraf, 1993; Wernerfelt, 1984). R&D not only contributes directly to enterprises' knowledge stock and increases innovation intensity (Damijan et al., 2006), but also improves firms' absorptive capabilities of adapting and applying the external technology stock (Cohen and Levinthal, 1990). In this sense, R&D activities play a dual role, developing innovations on the one hand, and enhancing the learning capacity of an organization on the other. Therefore, we control for investment in R&D as an important driver of innovation. *R&D intensity (RD)* was measured as R&D expenditure per employee.

To test our hypotheses, we adopted the count model to estimate the data as the dependent variable (patents) is a non-negative number. We estimated the Poisson regression model first and then tested over-dispersion. The result based on the approach suggested by Wooldridge (1990) shows the evidence of over-dispersion as the coefficient of the predicted dependent variable is statistically significant at the 0.01% significance level. Therefore, we estimated a

negative binomial model (Green, 1997).

To minimize the effect of common method variance, we have taken 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 hypotheses tested 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, Witteloostuijn and Eden, 2009). 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-factors solution. The largest factor explained only 26.63% of the variance.

Empirical Results

Table 1 reports the descriptive statistics for the variables used in the analysis and the matrix of correlation coefficients. The correlations between the variables show the predicted signs and most of the coefficients are statistically significant, providing preliminary evidence for the proposed hypotheses.

Table 1: Correlation Matrix and Descriptive Statistics

	Mean	Std. Deviation	Patents	GN	R&D	RES	GAP	MNEs	Age	Size
Patents	1.709	2.382	1.000							
GN	0.041	0.478	0.031	1.000						
R&D	137.485	68.188	0.004	0.053	1.000					
RES	0.608	0.491	0.157	0.160*	0.103	1.000				
GAP	0.165	0.373	0.198	0.154	0.001	0.243	1.000			
MNEs	0.344	0.475	0.133	0.229	0.014	0.283	0.224	1.000		
Age	4.613	0.641	0.091	0.086	0.078	-0.024	0.044	0.039	1.000	
Size	2.515	3.953	0.091	0.246**	0.142	0.021	-0.021	0.198	0.144	1.000

All correlation coefficients more than 0.13 or less than -0.13 are significant at 5% level or higher

First, we estimated the overall sample to test whether returnee entrepreneurs have had a direct impact on their firms' innovation performance. Second, we test whether possible knowledge spillovers from returnees to non-returnee firms affect innovation in non-returnee firms by including a returnee spillover variable for the subsample of non-returnee firms. The results for the whole sample summarized in Table 2 show that most of our hypotheses received support for the overall sample. Only control variables were included in Model 1 in Table 2 which shows that firm age and size are positively associated with innovation performance. This implies that large and well established firms tend to be more innovative than small ones. Hence, firm size positively affects innovative performance. Industry dummy variables are not significant, showing that the innovation performance of the sample firms is not industry-driven. Innovation performance is only weakly positively associated with in-house R&D (10% level), indicating that invest more in R&D exhibit higher innovation than those that are weak in R&D investment.

The results in Model 2 in Table 2 indicate that returnee firms are more innovative than non-returnee firms and have better innovation performance as the coefficient of the returnee dummy variable is positive and statistically significant at the 0.1% significance level. The result implies that those returnee firms have exhibited a higher level of innovation than non-returnee firms which support hypothesis H1a. We have also found that the innovation performance of both types of firms is strongly related to global networks as the coefficient of this variable is statistically significant at the 1% significance level. This result suggests that firms with global networks are able to produce a high number of patents, thus supporting H3. However, the variable of MNE working experience is insignificant. Thus, the evidence is inconsistent with H2 in respect of the whole sample.

Table 2: Direct Knowledge Transfer for the whole sample
Dependent Variable: Patents

Variables	Model1	Model 2	Model 3 Coefficients (Std. errors)
Control Variables			
Age	0.043* (0.021)	0.022 (0.021)	0.022 (0.023)
Size	0.769*** (0.056)	0.696*** (0.058)	0.687*** (0.058)
R&D	0.001† (7.74E-05)	0.001† (7.95E-05)	0.001† (7.98E-05)
Independent Variables			
RE		0.454*** (0.111)	0.398** (0.151)
MNEs		0.063 (0.115)	0.259 (0.191)
GN		0.316** (0.125)	0.005† 0.190
RE*GN			0.504* (0.225)
MNEs*GN			0.301 (0.239)
Industry dummies	No	No	No
Adjusted R ²	0.13	0.20	0.22
Observations	711	711	711

Notes: ***, **, * and † represent the 0.01%, 1%, 5% and 10% significance levels.

In order to examine how global networks may facilitate firms to transfer tacit knowledge and to engage in innovation activities, we created an interaction term by multiplying the variables of returnee dummy and MNE working experience with that of global networks. Model 3 in Table 2 included these interaction terms between returnees, MNE working experience and global networks. The result shows that the variable of the interaction between returnee and global networks has a positive association with innovation performance and is statistically significant at the 1% level. The result may reflect the advantage of returnees with established global networks. Those returnee firms with well-established global networks tend to be more innovative than the firms without global networks. Hence, the finding supports H4a. However, the interaction between MNE working

experience and global networks is not significant. Thus, the evidence does not support H4b.

Table 3 summarizes the results for the subsample of non-returnee firms by including the variable of returnee spillovers. The result in Model 5 in Table 3 shows that the presence of returnee spillovers positively affects the innovation performance of non-returnee firms (significant at the 1% level). The coefficient of the variable for MNE working experience is now strongly positively and statistically significant (at 0.1% level), showing that MNE working experience is an important means of gaining external knowledge and new ideas by non-returnee firms. Model 6 in Table 3 included the variables of the interactions between returnee spillovers, MNE working experience and technology gap. The result shows that the technology gap positively moderates the effect of returnee spillovers on non-returnee firms' innovation performance (significant at 5% level), providing support for H5a. This implies that the larger the technology gap, the larger the magnitude of returnee spillovers to non-returnee firms. However, the coefficient of the interaction between MNE working experience and the technology gap is weakly negatively significant (10% level), which is not consistent with H5b. This result suggests that non-returnee firms can benefit from MNE working experience only when the technology gap is moderate. Taken together, the results show non-returnee firms extract more benefits from knowledge spillovers via returns when there is a large technology gap, whereas MNE working experience is able to benefits those non-returnee firms when the technology gap is modest.

Table 3: Knowledge Spillovers from Returnee firms to Non-returnee Firms
Dependent variable: Patents of non-returnee firms

Variables	Model 4	Model 5 Coefficients (Std. errors)	Model 6 Coefficients (Std. errors)
Control Variables			
Age	0.034*** (0.014)	0.019 (0.039)	0.009 (0.042)
Size	0.799*** (0.034)	0.682*** (0.107)	0.676*** (0.113)
R&D	4.58E-05 (0.001)	4.32E-05 (0.001)	2.39E-05 (0.001)
Independent Variables			
RES		0.478** (0.202)	0.021 (0.386)
MNEs		1.729*** (0.211)	2.082*** (0.307)
GN		0.096 (0.248)	0.017 (0.263)
RES*GAP			0.717* (0.424)
MNEs*GAP			-0.582† (0.343)
Industry dummies	No	No	No
Adjusted R ²	0.11	0.17	0.21
Observations	369	369	369

Notes: ***, **, * and † represent the 0.01%, 1%, 5% and 10% significance levels.

Discussion

This paper has examined the spillover effects of human mobility and global networks on local innovation. Specifically, we considered the role of human mobility as represented by returnee entrepreneurs and of global networks in providing the resources and capabilities to stimulate opportunity seeking behavior in the form of innovation by local firms. Using novel survey data, our results show that returnee firms are more innovative and perform better than their local counterparts in terms of innovation. Hence, we have obtained evidence of direct knowledge transfer through returnees. The results also show a positive association between our returnee spillover variable and innovation performance in non-returnee firms. This

finding suggests that returnee firms have an indirect impact on non-returnee firms' innovation performance and act as a new channel for technological knowledge spillovers. Global networks are important for innovation through their direct and interaction effects. In particular, we have found that global networks complement the advantage possessed by returnee entrepreneurs. Returnees with well established global networks are able to obtain external knowledge, hence contributing to higher innovation performance. Our results support the hypotheses built on social capital theory which emphasize the importance of networks in obtaining external source of knowledge and ideas needed for innovation. However, we have found that MNE working experience is insignificant, showing that entrepreneurs with MNE working experience may encounter organizational constraints when applying their previous working experience to local firms.

Importantly, we have found that the presence of a technology gap interacts differently with two channels for knowledge spillovers, namely returnee spillovers and MNE working experience. The result suggests that the presence of a technology gap positively moderates the effect of returnee spillovers on non-returnee firms' innovation performance. This finding implies that local firms that lag behind returnee firms are able to learn more from returnees, thus enhancing innovation in those firms. This positive moderating effect suggests that local-grown entrepreneurs are able to absorb new knowledge and ideas from returnee entrepreneurs even though the technology gap is relatively large. On the other hand, the impact of MNE working experience on local innovation is constrained by the technology gap. Non-returnee firms can benefit from MNE working experience only when the technology gap is modest. It shows that MNE working experience may have a limited impact on local innovation, possibly depending on the compatible infrastructure of local firms, whereas the direct contact with returnee entrepreneurs enable home-grown entrepreneurs learn more and

gain more external technological knowledge and commercial knowledge.

Taken together, these results suggest that returnee entrepreneurs are an important channel for international knowledge spillovers. Returnees not only contribute to their own firms' innovative performance, but also make an indirect contribution to those non-returnee firms. MNE working experience has a positive impact on firms' innovation performance only when the technology gap is modest. Networks are an important factor affecting local firms' innovation through direct effect and indirect impact when interacting with returnees and MNE working experience.

Our study makes a number of contributions to existing research. First, this study is among the few which compare the innovation performance of two groups of firms with different characteristics. Besides returnee entrepreneurs as a new channel for international knowledge and technology spillovers, this study also estimates the impact of MNE working experience on the innovation performance of local firms in high-tech industries. Second, our research extends the literature on international knowledge spillovers by adding a new channel for knowledge spillovers. We not only consider cross-border human mobility, such as returnee entrepreneurs and MNE working experience, but also incorporate social capital theory into the existing literature. This helps broaden the mechanisms which facilitate international knowledge spillovers. Importantly, we have found that the spillover effect from returnee entrepreneurs is positively moderated by a technology gap, whereas the spillover effect from MNE working experience is constrained by the technology gap. This finding deserves more attention and suggests that the spillover effect from returnee entrepreneurs and previous MNE working experience varies with a technology gap. A possible explanation is that local non-returnee firms are able to extract more spillovers when they lag behind returnee firms, but they gain from MNE working experience only when their firms are compatible

with MNEs. Third, the findings from the study will provide new insights into the role of human mobility in technological development in emerging economies and will help to advance the theoretical development of the new channel for knowledge spillovers and broaden our understanding of the factors affecting international knowledge flows.

The findings from our research have implications for policy makers and practitioners. For policy makers, attracting returnees from OECD countries may be an effective way of catching up with technological leaders in developed countries. Hence, providing incentives to induce returnees back to their home country will be able to benefit local firms and may provide a complementary approach to providing incentives for foreign firms to invest in emerging economies. For local-grown entrepreneurs, building partnership or networks with returnee firms and MNEs may represent a viable strategy to access external knowledge and ideas which are unavailable internally.

We acknowledge some limitations of the study which suggest further research possibilities. With respect to innovation performance, we should also consider organizational innovation which cannot be measured by patents and R&D only. As noted in the existing studies, patent counts have several shortcomings as a measure of innovation (Pavitt, 1985; Griliches, 1989; 1992). Also, the method of measuring knowledge spillovers is limited in several aspects as illustrated in details by Cincera (2005). Moreover, a further study is needed to examine the process and dynamic nature of indirect knowledge spillovers from returnee firms to non-returnee firms based on longitudinal datasets.

The study was 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. We also obtained a high response rate for this kind of survey and, quite unusually for studies in an emerging market context (Hoskisson et al., 2000), were able

to establish the representativeness of the sample. However, further research in China might extend to returnee entrepreneurs in science parks elsewhere such as Shanghai and close to Hong Kong where the nature of the technological context and returnee entrepreneurs' links abroad might be different. Additional research could also be extended to other emerging economies such as India, Central and Eastern Europe, and Latin America where returnee entrepreneurs have a notable presence.

Conclusions

Using novel survey data, this study is one of the first to examine the relationship between returnee entrepreneurs, MNE working experience, global networks and firms' innovative performance and their role in knowledge spillovers in high-tech SMEs in a large emerging market. Our findings show that international knowledge transfer more often occurs in returnee firms and is strongly associated with innovation performance of their firms. The results show that international knowledge flows with human mobility through global networks. In the context of China as an emerging economy, the results show returnee entrepreneurs not only absorbed international knowledge, but also indirectly transferred their knowledge to non-returnee firms. MNE experience is positively associated with the innovative capacity of non-returnee firms subject to the condition of technology gap between MNEs and local firms. By highlighting the role of human mobility and returnees in particular in facilitating both direct technology transfer and indirect technology spillovers to other local firms, our study has introduced new dimensions to both spillover and strategic entrepreneurship research.

References

- Acs ZJ, Audretsch, DB. 1989. Patents as a measure of innovative activity. *Kyklos* **42**(2): 171-180.
- Acs ZJ, Audretsch DB, Braunerhjelm P, Carlsson B. 2006. The knowledge spillover theory of entrepreneurship. Discussion Paper No. **77**, *Centre for Economic Policy Research*, London.
- Adler P, Kwon S. 2002. Social capital: Prospects for a new concept. *Academy of Management Review* **27**(1): 17-40.
- Aldrich H, Zimmer C. 1986. Entrepreneurship through social networks. In *The Art and Science of Entrepreneurship*, Sexton D, Smilor R (eds.). Ballinger, Cambridge, MA: 3–24.
- Almeida R, Fernandes A. 2006. Openness and technological innovations in developing countries: Evidence from firm-level surveys. World Bank Working Paper, No. 3985.
- Almeida P, Kogut B. 1999. The Localization of knowledge and the mobility of engineers in regional networks. *Management Science* **45**(7): 905-917
- Alvarez S, Barney J. 2001. How entrepreneurial firms can benefit from alliances with large partners? *Academy of Management Executive* **15**(1): 139-148.
- Angel DP. 1991. High-technology agglomeration and the labor market: the case of Silicon Valley. *Environment and Planning A* **23**(10): 1501 – 1516
- Argote L, Ingram P. 2000. Knowledge transfer a basis for competitive advantage in firms. *Organizational Behavior and Human Decision Processes* **82**(1), 150-169.
- Arrow KJ. 1962. The economic implications of learning by doing. *The Review of Economic Studies* **29**(3), 155-173.

- Audretsch D, Lehmann E. 2005. Does the knowledge spillover theory of entrepreneurship hold for regions? *Research Policy* **34**(8), 1191-1202.
- Axinn C. 1988. Export performance Do managerial perceptions make a difference? *International Marketing Review* **5**(2): 61–71.
- Barney JB. 1991. Firm resources and sustained competitive Advantages. *Journal of Management* **17**(1): 99-120.
- Birley S. 1985. The role of networks in the entrepreneurial process. *Journal of Business Venturing* **1**(1): 107–117.
- Blalock G, Simon D. 2009. Do all firms benefit equally from downstream FDI? The moderating effect of local suppliers' capabilities on productivity gains. *Journal of International Business Studies* **40**(7): 1095-1112.
- Blomstrom M, Kokko A. 1998. Multinational corporations and spillovers. *Journal of Economic Surveys* **12**(3): 247-277.
- Bonacorsi A. 1992. On the relationship between firm size and export intensity. *Journal of International Business Studies* **23**(4): 605–625.
- Buckley P, Clegg J, Wang C. 2002. The impact of inward FDI on the performance of Chinese manufacturing firms. *Journal of International Business Studies* **33**(4): 637-655.
- Buckley P, Casson M. 2002. *The Future of The Multinational Enterprise*, 25th anniversary. Palgrave Macmillan: New York, [originally published in 1976].
- Burt R. 1997. The contingent value of social capital. *Administrative Science Quarterly* **42**(2): 339-365.
- Castellani D, Zanfei A. 2003. Technology gaps, absorptive capacity and the impact of inward investments on the productivity of European firms. *Economics of Innovation and New Technology* **12**(6): 555-576.

- Chang S, Witteloostuijn, AV, Eden L. 2009. Common method variance in international business research. Letter from the Editors, *Journal of International Business Studies*, Forthcoming.
- Cohen, WM, Levinthal A. 1990. Absorptive capability: the new perspective learning and innovation. *Administrative Science Quarterly* **35**(1): 128-152.
- Coviello N, Munro H. 1997. Network relationships and the internationalization process of small software firms. *International Business Review* **6**(4): 361-386.
- Driffield N. 2001. The impact on domestic productivity of inward investment in the UK. *The Manchester School* **69**(2): 103-119.
- Dunning J, Kim C, Lin J. 2001. Incorporating trade into the investment development path: A case study of Korea and Taiwan. *Oxford development studies* **29**(2): 145–154.
- Dyer H. and Singh H. 1998. The relational view: cooperative strategies and sources of interorganisational competitive advantage. *Academy of Management Review* **23**(4): 660-679.
- Ettlie J. 1980. Manpower flows and the innovation process. *Management Science* **26**(11): 1086-1095.
- Feldman M. 2000. Location and innovation: the new economic geography of innovation, spillovers, and agglomeration. *The Oxford Handbook of Economic Geography*. Clark G, Feldman M, Gertler M. Oxford, Oxford University Press: 373-394.
- Fornahl D, Zellner C, Audretsch DB (eds). 2005. *The Role of Labour Mobility and Informal Networks for Knowledge Transfer*. Dordrecht: Springer
- Grant R, Baden-Fuller C. 1995. A knowledge-based theory of inter-firm collaboration. *Academy of Management Journal Best Papers*, Proceedings, 17-21.
- Grant R. 1996a. Prospering in dynamically-competitive environments: Organizational

- capability as knowledge integration. *Organization Science* **7**(4): 375-388.
- Grant R. 1996b. Toward a knowledge-based theory of the firm. *Strategic Management Journal* **17** (Special issue):109-122.
- Grant R. 1997. The knowledge-based view of the firm: Implications for management practice. *Long Rang Planning* **30**(3): 450-454
- Green W. 1997. *Econometric Analysis*, third edition, Prentice Hall, New Jersey.
- Grossman G, Helpman E. 1991. *Innovation and Growth in the Global Economy*. MIT Press, Cambridge, MA.
- Havnes PA, Senneseth K. 2001. A panel study of firm growth among SMEs in networks. *Small Business Economics* **16**(4): 293–302.
- Hitt M, Ireland D. 2000. The intersection of entrepreneurship and strategic management in *Handbook of Entrepreneurship*, Sexton D, Landstrom H (eds), Blackwell, Oxford: 45-63.
- Inkpen AC, Tsang EWK. 2005. Social capital, networks, and knowledge transfer. *Academy of Management Review* **30**(1): 146- 165.
- Ireland, RD, Hitt MA, Sirman DG. 2003. A model of strategic entrepreneurship: The construct and its dimensions. *Journal of Management* **29**(6): 963-989.
- Jaffe AB, Trajtenberg M, Henderson R. 1993. Geographic localization of knowledge spillovers as evidenced by patent citations. *The Quarterly Journal of Economics* **108**(3): 577-98.
- Jaffe, AB, Trajtenberg M, Fogarty MS. 2000. Knowledge spillovers and patent citations: evidence from a survey of Inventors. *American Economic Review* **90**(2): 215-218.
- Kaj UK, Pekka P, Hannu V. 2003. Tacit knowledge acquisition and sharing in a project work context International. *Journal of Project Management* **21**(4): 281-290.
- Keller W, Yeaple S. 2003. Multinational enterprises, international trade, and productivity

- growth: firm level evidence from the United States. *NBER Working Papers* No. 9504.
- Kogut B, Zander U. 1992. Knowledge of the firm, combinative capabilities, and the replication of technology. *Organization Science* **3**(3): 383-397.
- Kostova T, Roth K. 2002. Adoption of an organizational practice by subsidiaries of multinational corporations: institutional and relational effects. *Academy Management of Journal* **45**(1): 215–233.
- Kumar N, Stern LW, Anderson JC. 1993. Conducting interorganizational research using key informants. *Academy of Management Journal* **36**(6): 1633-1651.
- Kuratko D., Audretsch D. 2009. Strategic entrepreneurship: exploring different perspectives of an emerging concept. *Entrepreneurship Theory & Practice* **33**(1): 1-18.
- Kuznetsov Y. 2006. *Diaspora Networks and the International Migration of Skills: How Countries Can Draw on Their Talent Abroad*, World Bank Institute, Washington DC.
- Lin N, Cook K, Burt, RS. 2001. *Social Capital: Theory and Research*, NY: Aldine de Gruyter.
- Liu X, Wang C. 2003. Does foreign direct investment facilitate technological progress: evidence from Chinese industries? *Research Policy* **32**(6): 945-953.
- Liu X, Buck T. 2007. Innovation performance and channels for international technology Spillovers: Evidence from Chinese high-tech industries. *Research Policy* **36**(3): 355-366.
- Liu X, Wang C, Wei Y. 2009. Do local manufacturing firms benefit from transactional linkages with multinational enterprises in China, *Journal of International Business Studies* **40**(7): 1113-1130.
- Leonard-Barton D. 1995. *Wellsprings of Knowledge: Building and Sustaining the Sources of Innovation*. Harvard Business School Press.
- Malmberg A, Maskell P. 2002. The elusive concept of localization economies: towards a

- knowledge-based theory of spatial clustering. *Environment and Planning A* **34**(3): 429-449.
- Mansfield E. 1988. Industrial R&D in Japan and the United States: a comparative study. *American Economic Review* **78**(2): 223-228.
- Marin A, Bell M. 2006. Technology spillovers from foreign direct investment: the active role of MNC subsidiaries in Argentina in the 1990s. *Journal of Development Studies* **42**(4): 678 – 697.
- McDougall P, Shane S, Oviatt B. 1994. Explaining the formation of international new ventures: the limits of theories from international business research. *Journal of Business Venturing* **9**(6): 469–487.
- Mowery D, Oxley J, Silverman B. 1996. Strategic alliances and interfirm knowledge transfer. *Strategic Management Journal* **17** (Special issue): 77-91.
- Nonaka I, Takeuchi H. 1995. *The Knowledge Creating Company: How Japanese Companies Creates the Dynamics of Innovation*. Oxford University Press, New York.
- Nooteboom B., Van Haverbeke W., Duysters W., Gilsing V., van den Oord A. 2007. Optimal cognitive distance and absorptive capacity. *Research Policy*. 36: 1016-1034.
- Parise S, Cross R, Davenport TH. 2006. Strategies for preventing a knowledge-loss crisis. *MIT Sloan Management Review* **47**(4): 31-38
- Peteraf M. 1993. The cornerstones of competitive advantage: a resource-based view. *Strategic Management Journal* **14**(3): 179-191.
- Reiche S. 2004. Knowledge sharing through expatriate assignments in multinational companies: A social capital perspective. Working Paper No. 3 Victoria: Australian Centre for International Business. Available at <http://www.ecom.unimelb.edu.au>.
- Reid SD. 1981. The decision-maker and export entry and expansion. *Journal of International*

- Business Studies* **12**(3): 101-112.
- Romer P. 1994. The origins of endogenous growth. *Journal of Economic Perspectives* **8**(1): 3-22.
- Salmon R, Shaver J. 2005. Learning by exporting: New insights from examining firm innovation. *Journal of Economics & Management Strategy* **14**(2): 431-460.
- Saxenian A. 1994. *Regional Advantage: Culture and Competition in Silicon Valley and Route 128*, Harvard University Press.
- Saxenian A. 2002a. *Local and Global Networks of Immigrant Professionals in Silicon Valley*. San Francisco, CA: Public Policy Institute of California.
- Saxenian A. 2002b. Transnational communities and the evolution of production networks: the cases of Taiwan, China and India. *Industry and Innovation, Special Issue on Global Production Networks* **7**(3): 183–202.
- Saxenian A. 2006. *The New Argonauts: Regional Advantage in a Global Economy*. Harvard University Press: Cambridge, MA.
- Scherer FM. 1982a. Interindustry technology flows in the US. *Research Policy* **11**, 227-245.
- Shane S. 2001a. Technological opportunity and new firm creation. *Management Science* **47**(2): 205-220.
- Shane S. 2001b. Technological regimes and new firm formation. *Management Science* **47**(9): 1173-1190.
- Simmie J. 2003. Innovation and urban regions as national and international nodes for the transfer and sharing of knowledge. *Regional Studies*, **37**(6-7): 607-620.
- Song J, Almeida P, Wu G. 2003. Learning by hiring: when is mobility more likely to facilitate inter-firm knowledge transfer? *Management Science* **49**(4): 351-365.
- Szulanski G. 1996. Exploring internal stickiness: Impediments to the transfer of best practice

- within the firm. *Strategic Management Journal* **17**(Special issue): 27-43.
- Tan J. 2006. Industry clustering, innovation, and technology transfer: Evidence from Beijing Zhongguancun Science Park. *Journal of Business Venturing* **21**(6): 827-850.
- Teece DJ. 1982. Towards an economic theory of the multiproduct firm. *Journal of Economic Behavior and Organization* **3**(1): 39-63.
- Teece DJ, Pisano G, Shuen A. 1997. Dynamic capabilities and strategic management. *Strategic Management Journal* **18**(7): 509–533.
- Verspagen B. 1993. *Uneven Growth between Interdependent Economies: Evolutionary View on Technology-Gaps. Trade and Growth*, Aldershot, Avebury.
- Wernerfelt B. 1984. A resource-based view of the firm. *Strategic Management Journal*, **5**(2): 171-180.
- Wooldridge J. 1990. Quasi-likelihood methods for count data in *Handbook of Applied Econometrics*, Vol. 2. Pesaran MH, Schmidt P (eds.). Malden, MA: Blackwell, 352-406.
- Zahra S, Ireland RD, Hitt AH. 2000. International expansion by new venture firms: International diversity, mode of market entry, technological learning, and performance. *Academy of Management Journal* **43**(5): 925-950.
- Zhou Y, Xin T. 2003. An innovative region in China: interaction between multinational corporations and local firms in a high-tech cluster in Beijing, *Economic Geography* **79**(2): 129-152.
- Zucker LG, Darby MR, Armstrong J. 1998. Geographically localized knowledge: Spillovers or markets? *Economic Inquiry* **36**(1): 65–86.
- Zweig D, Vanhonacker W, Chung SF, Rosen S. 2005. *Reverse and migration and regional integration: entrepreneurs and scientists in the PRC*, Centre on China's Transnational Relations, Working Paper No. 6, The Hong Kong University of Science and Technology.