

RESEARCH PAPER

High technology start-up innovation and the role of *guanxi*: an explorative study in China from an institutional perspective

Yipeng Liu^{a*}, Michael Woywode^a and Yijun Xing^b

^a*Institute for SME Research, University of Mannheim, Germany;* ^b*Beijing Jiao Tong University, China*

This study explores the influences of institutions on high technology start-up innovation in China by taking into account both formal and informal institutions. Our research settings are two high technology parks in Wuxi and Shanghai, respectively. Drawing upon the theoretical lenses of North's institutional framework and the guanxi literature, we propose an integrative framework to help understand the factors influencing high technology start-up innovation in China. By contrasting different formal institutional settings in Wuxi and Shanghai (in particular, local government interventions), our study shows the positive effect played by local government on innovation and the overarching influence of guanxi. Based on a qualitative research method, nine in-depth semi-structured interviews with the CEOs of high technology start-ups were conducted between August 2009 and September 2010. Additional interviews with government officials and managers of government-owned venture capital funds were performed. We offer evidence to support the dual influence of formal and informal institutions (guanxi). International guanxi triggers government intervention, which in turn facilitates the acquisition of local guanxi. As a multidimensional construct, guanxi has a positive influence on high technology start-up innovation. We contribute to the understanding of the effect of institutions on high technology start-up innovation by disentangling formal and informal institutions. Furthermore, government intervention may have a positive impact on high technology start-up innovation in China, which might shed some light on development in other emerging economies.

Introduction

China, as one of the world's largest emerging economies, is experiencing profound institutional transformation and provides an exciting and promising field in which to carry out management science research (Wright *et al.*, 2005). The transformation of institutions has had enormous impact on entrepreneurship in China (Bruton *et al.*, 2008; Yang and Li, 2008). In the Mao era, private entrepreneurship was a political taboo (Peng, 2004). Recently, China has earned a reputation as one of the world's most entrepreneur-friendly countries (Kshetri, 2007). Market mechanisms and institutions prevalent in the Western world are becoming increasingly established in emerging economies. However, scholars argue that crossvergence

*Corresponding author. Email: liu@ifm.uni-mannheim.de

(rather than convergence) is likely to occur because of cultural influences and economic ideologies (Ralston, 2007; Ralston *et al.*, 2008).

Formal laws and regulations, and informal norms and values are collectively known as an ‘institutional framework’ (North, 1990). Institutions, including formal and informal ones, affect organizations embedded in the respective institutional environment. Scholars acknowledge that the regions of China are culturally, politically, and historically diverse (Ralston *et al.*, 1996). Their economies are embedded in different regional regulatory frameworks. Recent research identifies the regional variations in the level of technological entrepreneurship in China and argues that regional entrepreneurship policy has a considerable impact on technological entrepreneurship activity (e.g. Zhang *et al.*, 2008).

Guanxi, as a cultural construct (Dunning and Kim, 2007), is a unique interpersonal relationship which is deeply rooted in Chinese culture. In this study, we view *guanxi* as a realization of informal institutions in China. Interpersonal relationships and business relationships are inseparable in Chinese culture. *Guanxi* promotes personal trust (Farh *et al.*, 1998) and enhances firm performance (Peng and Luo, 2000). A study of venture capital in China reveals that the social capital of entrepreneurs has an enhancing effect on the investment decisions of venture capitalists (Batjargal and Liu, 2004). Entrepreneurs spend time and energy in forming *guanxi* and building ties with officials (Yang, 2007). However, the construct of *guanxi* is paid scant attention in the innovation literature (Perks *et al.*, 2009) and there is a need for scholarly inquiry. Accordingly, we pose our central research questions as follows:

- (1) How do formal institutions affect innovation in high technology Chinese start-ups?
- (2) How do informal institutions (*guanxi*) affect innovation in high technology Chinese start-ups?
- (3) How do formal and informal institutions interact with each other with regard to their roles in innovation in high technology Chinese start-ups?

A comparative research design, which considers both formal and informal institutions, is required. We have chosen one high technology park in Wuxi, an old city in Jiangsu province and not far from Shanghai, and a high technology park in Shanghai itself as the research settings to explore.

Our contributions are threefold. Firstly, we take an institutional perspective to study innovation in high technology start-ups in China. Secondly, by recognizing *guanxi* as a realization of informal institutions we argue that *guanxi* is a multidimensional construct consisting of international *guanxi* and local *guanxi*, and reveal the underlying mechanisms of *guanxi* acquisition. Thirdly, we offer evidence of government influence in high technology innovation by contrasting two research settings. The article first examines literature streams and develops an integrative framework to investigate high technology start-up innovation activities. Then, the sample, data collection, and research methods are described, followed by explorative propositions based on in-depth cross-case analysis. Finally, we conclude with a discussion of managerial, policy and theoretical implications, and future research directions.

Theoretical background

Departing from the new institutional economics, North (1990) defined institutions as the 'rules of the game' in a society, the humanly devised constraints that shape human interactions. In North's institutional framework there are both formal institutions and informal ones. Formal institutions refer to written or formally-accepted rules and regulations which have been implemented to build economic and legal settings. Given the importance of property rights protection and enforcement, formal institutions secure the success of capitalism in the West (Soto, 2000). Informal institutions are traditions, customs, societal norms, values, unwritten codes of conduct, ideologies, and templates (Baumol, 1990; North, 1990). Sugden (1986) argues that informal institutions are culturally bounded and widely accepted.

A burgeoning literature on transition economies considers the institutional framework in its analysis (Ahlstrom and Bruton, 2006; Ahlstrom *et al.*, 2008; Bruton *et al.*, 2010). However, institutional environments in emerging economies differ greatly from those of established economies (Khanna *et al.*, 2005; Bruton *et al.*, 2008; Meyer *et al.*, 2009). Emerging economies do not possess the market mechanisms that exist in developed economies (Wright *et al.*, 2005; Carney *et al.*, 2009). For instance, scholars argue that emerging economies have immature venture capital markets (White *et al.*, 2005), different control and incentive mechanisms on the part of venture capital firms (Tan *et al.*, 2008), and a weak intellectual property rights environment (Zhao, 2006). Puffer and his colleagues (Puffer *et al.*, 2010) argue that informal institutions, such as *guanxi* and trust, play important roles in filling formal institutional voids, such as protecting property rights and enforcement. They believe that, because of deep social and cultural roots, the institutional environment of China will not eventually look like that of the Western world today.

Formal institutions and the role of government

Although China is a fast-growing emerging economy, intellectual property rights (IPR) protection is still far from adequate (Zhao, 2006). Conventional wisdom suggests that firms keep knowledge-intensive activities, such as research and development (R&D), away from countries where IPR protection is weak. However, it has been observed that global multinational companies (MNCs) establish R&D centers in China by means of alliances with universities and research institutions (Li, 2010) or with local firms (Von Zedtwitz, 2004). Zhao (2006) proposes a framework to understand multinational R&D in countries where IPR protection is weak. She argues that, while weak IPR environments can lead to low returns on innovation spending and underutilization of innovative talent, China and other emerging economies possess a fast-growing pool of human capital, which is potentially valuable for R&D.

Given the relatively weak IPR environment in China, firms have developed a variety of strategies to cope with the *de facto* situation. A recent study reported various strategies adopted by foreign firms in China, such as using both external and internal *guanxi* to protect intellectual property (Keupp *et al.*, 2009). A recent study from Liu (2011) investigates the influences of institutional voids on innovation in high technology ventures and argues that institutional voids might offer firms the opportunity to hone their skills in the face of global competition. However, the influence of formal institutions on Chinese high technology start-up is still at an embryonic stage. For example, the immaturity of the emerging venture capital

industry in China may hinder adequate access to capital providers for young high technology firms (White *et al.*, 2005; Ahlstrom and Bruton, 2006; Tan *et al.*, 2008; Short *et al.*, 2009).

Government legislates to regulate the economy, frame the competitive environment, and establish the regulatory environment in which business is conducted (Henisz, 2000). At the same time, governments seek to maximize social welfare, which is contingent on efficiency and social considerations. Scholars have debated how governments matter to business practices and whether management research needs to be re-framed to contribute to public policy (Ring *et al.*, 2005; Kochan *et al.*, 2009). By putting institutional structures in place, governments and states can encourage and foster industry creation as well as entrepreneurship (Spencer *et al.*, 2005). Child and his colleagues (Child *et al.*, 2007) examined institutional entrepreneurship in the development of China's environmental protection systems over 30 years and outlined the various roles of institutional entrepreneurs, presuming in this context that dominant roles were played by the government. A recent study suggests that international entrepreneurship in Dubai was the outcome of the government's active involvement as the agent of change (Nasra and Dacin, 2010). However, the relationship between state and entrepreneur continues to be unclear, although the Chinese government is attempting to embrace the private sector (Luo and Junkunc, 2008).

Local government adopts different strategies to develop local economies. There is a special constellation of institutional arrangements in China, namely the regionally-decentralized authoritarian system. It has been argued that appointing political authorities centrally and delegating the rights for regional economic development in a decentralized fashion has propelled China's rapid economic development (Xu, 2011). Moreover, local government roles differ in how they promote entrepreneurship. Empirical results show that different economic growth rates in various regions contribute directly to differences in entrepreneurship (Yang and Xu, 2006). However, the consequences of regional governmental policies on high technology start-up innovation await further inquiry.

Informal institutions and *guanxi*

Informal institutions cover a wide range of unwritten codes of conduct, customs, habits, and rituals. Although informal by name and in nature, informal institutions matter to a large extent in facilitating the operation of a socially constructed society. They play a central, underlying role in situations that might easily be taken for granted. Dacin and colleagues (Dacin *et al.*, 2010) used grounded theory in an empirical study into dining at Cambridge University, and illustrated the self-reinforcing power of rituals in maintaining institutions. Moreover, culture as an informal institution can be perceived as a toolkit which might be used by individuals and organizations for different purposes in various circumstances. A recent study investigated the cultural resources in the repertoire of Alessi, the Italian manufacturer of the household products, in developing and formulating strategies (Rindova *et al.*, 2011). Xing and Sims (2012) found that Chinese managers in the banking sector apply principles drawn from classical philosophy, such as Daoist Wu Wei, in practicing leadership. Such unwritten wisdom is manifest in informal institutions across both business practices and society as a whole.

Guanxi can be regarded as a realization of informal institutions in the Chinese context. The literature on *guanxi* relies heavily on social network and social capital theories. Social networks have been extensively analyzed by scholars looking at the strength of weak ties (Granovetter, 1973), the position in the social network (Powell *et al.*, 1996), the creation of human capital (Coleman, 1988), the social capital model of high-growth ventures (Florin *et al.*, 2003), the multidimensional view of social capital on strategic alliances (Koka and Prescott, 2002), and the impact of social capital on entrepreneurial performance (Batjargal, 2007). A recent study focusing on the Cambridge high technology cluster found a significant effect of the social capital of serial entrepreneurs on the process of creating new ventures (Myint *et al.*, 2005).

In the Chinese context, *guanxi* is a special interpersonal relationship (Chen and Chen, 2004). Scholars distinguish *guanxi* from mere social networks by taking a cognition approach. Arguably, *guanxi* is closer to a trusting relationship based on affection (Chua *et al.*, 2009), which mirrors the metaphor of the heart, whereas Western social networks rely more on a cognitive-based trusting relationship, which is used as a metaphor of the head (Chua *et al.*, 2009). Given the importance of familial collectivism in Chinese society, *guanxi* mirrors the familial collectivism in social and, in particular, business relationships. *Guanxi* can be regarded as 'an extension of family norms to business settings' (Chua *et al.*, 2009, p.502).

Although scholars acknowledge the prevalence of *guanxi*, its importance might be weakened by institutional development. Tan and colleagues suggest that the role of *guanxi* gradually changes during institutional transitions and becomes less important when trust in market systems, based on well-established institutions, is firmly established (Tan *et al.*, 2009). In contrast, it is argued that *guanxi* can work in conjunction with markets and regulations and is not eroded by the development of market mechanisms (Anderson and Lee, 2008). Given the deeply-rooted traits of *guanxi* in Chinese culture (Luo, 1997), and given the early stage of market transition in China (Yang and Li, 2008), we argue that *guanxi* will remain essential in the Chinese business environment for the foreseeable future.

***Guanxi*, firm performance, and innovation**

Recent research acknowledges that *guanxi* affects the performance of an organization. A recent study conceptualized *guanxi* as a core corporate competence, and confirmed *guanxi*'s direct effects on a firm's marketing performance (Gu *et al.*, 2008). *Guanxi* with government officials enables firms to understand the rules of the game better, and so achieve a position of advantage (Child and Tse, 2001). The dynamics of *guanxi* affect knowledge management and decision making in Chinese high technology firms (Fu *et al.*, 2006). An analysis of Chinese high technology companies suggests that conventional wisdom towards brokers might not function as expected because of the cultural contingency of social capital (Xiao and Tsui, 2007). A more recent study of 100 paired competitors operating in various industries in Shanghai indicates that a high level of *guanxi* reduces conflict, which in turn results in partnership effectiveness (Wong and Tjosvold, 2010).

Perks and colleagues (2009) argue that *guanxi* positively influences the integration of R&D and marketing departments, as well as the development of new products. From an institutional perspective, one empirical study reveals the contingent effects of institutional support for product innovation strategy and the performance

of technology ventures in China (Li and Atuahene-Gima, 2001). In the context of Chinese firms, there is still scant research on *guanxi*'s effect on innovation (Perks *et al.*, 2009). Our study responds to calls for such research by investigating the influence of *guanxi* on firms' innovation, taking a macro-level institutional perspective.

An integrative conceptual framework

Informal institutions may complement or substitute for formal institutions (North, 1990; Helmke and Levitsky, 2004). Informal institutions are complementary if they create and strengthen incentives to comply with formal rules, thus providing solutions to the problems of social interaction and coordination, and enhancing the efficiency of formal institutions (Baumol, 1990). Conversely, information institutions are substitutive if they create individual incentives which are incompatible with formal institutions. Formal and, particularly, informal institutions have been found to play important roles in the corruption of entrepreneurs (Tonoyan *et al.*, 2010). We argue that formal and informal institutions influence each other reciprocally, and that they jointly influence high technology innovation. In line with this argument, we propose an integrative conceptual framework which captures the influences of both formal and informal institutions.

As indicated in Figure 1, we use the IPR environment, the development of venture capital (VC) markets, and government intervention to proxy formal institutions. Given the development phase of different regions, the IPR environment differs across regions. Moreover, regional competitions lead to a variation of policies with regard to government intervention. As a realization of informal institutions, we conceptualize *guanxi* as a multidimensional construct consisting of local *guanxi* and international *guanxi*. Local *guanxi* takes the form of intensive business contacts with local players, including end users, suppliers, regulators, and local governmental officials. International *guanxi* manifests itself in the international connections of high technology entrepreneurs acquired during international exposure, such as

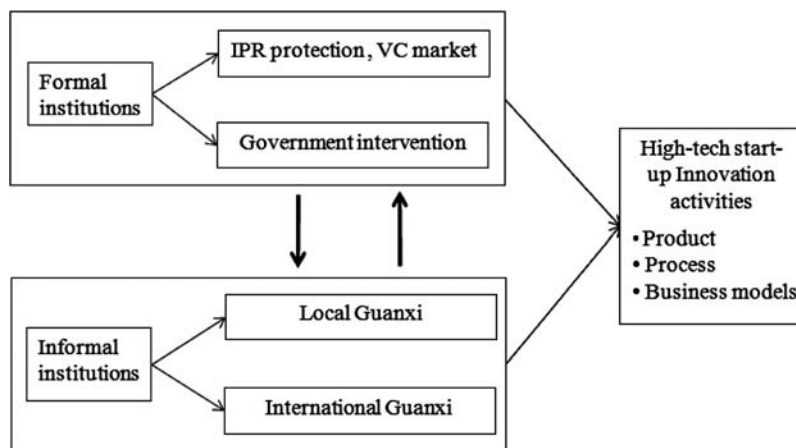


Figure 1. A conceptual model of high technology start-up innovation based on an institutional framework

education or work experience in foreign countries as well as cooperation with partners abroad. This framework is used as a guideline to conduct the study and develop interview questions.

Research design

Given the limited amount of existing scholarship in this field and the purpose of exploring new phenomena in a new setting, an explorative research method has been adopted for this study (Eisenhardt, 1989). The nature of the research questions suggests that comparative case studies are the most appropriate research method (Eisenhardt and Graebner, 2007). For the purpose of obtaining variations in both formal and informal institutions, we chose two high technology parks for our research setting: one in Shanghai and one in Wuxi. Semi-structured in-depth interviews with CEOs from high technology start-ups, governmental officials, and park administrators were conducted. The interviews, ranging from one to two hours, were tape recorded and transcribed. We used the qualitative research software ATLAS.ti to analyze the data.

Case selection is a key factor when developing theories based on case study research. The concept of population is crucial, because the population defines the set of entities from which the research sample is to be drawn. To provide greater focus and comparability between the two research settings, the following criteria for case selection are fulfilled: (1) high technology start-ups in the information and communication technology (ICT) sector; (2) firms registered as local private Chinese firms; and (3) firms actively involved in innovation activities. Table 1 lists the samples included in this study.

We adopt the purposive case selection approach. This approach enables us to choose the most appropriate cases for the comparative study. With a view to comparing high technology start-ups in Wuxi and Shanghai, we use the most similar cases selection techniques in sampling our cases. We chose two representative institutional settings, namely the Zizhu high technology park in Shanghai and the Wuxi national industrial design park. Although there are similarities between the two high technology parks, they display many contrasting characteristics; for instance, in ownership, public capital availability, application requirements, and the entrepreneurs they target. The roles of high technology parks will be explained in detail in the Findings section.

Data collection and analysis

Data collection occurred mainly through the contacts and networks of the first author and through the administration offices of local high technology parks. We conducted semi-structured field interviews between August 2009 and September 2010. The interviews were carried out in Mandarin Chinese, English and German. All the interviews carried out in foreign languages were translated into English before being analyzed.

It is difficult to obtain informants in China. Cold calls on behalf of a research institution are unlikely to secure interview partners for any kind of research study in China, although such an approach is commonly practiced and successful in a Western setting. This rather illustrates the importance of *guanxi* in China, even for scientific research. We tackled the problem by using contacts and asking informants

Table 1. Samples in case studies

Case	Founders' background	Firm age (years) ^a	Firm specification in ICT sector ^b	Firm location	Financing source
1	Ph.D. from Germany	1.5	Wireless sensor network application	Wuxi	Government
2	M.Sc. from China	1.5	Software developer for smart phones	Shanghai	Bootstrap
3	M.Sc. from Germany	2.5	Browser game service provider	Shanghai	Bootstrap
4	Ph.D. from Germany	2	Software developer for financial services	Wuxi	Government
5	Ph.D. from Sweden	3	Solution provider for image recognition	Shanghai	Bootstrap
6	M.Sc. from China	2	Solution provider for industrial automation	Shanghai	Bootstrap
7	Ph.D. from Japan	1	Application for robot automation	Wuxi	Government
8	Ph.D. from Germany	2	Microchip design for wireless applications	Wuxi	Government
9	MBA from China	1	Mobile Internet application provider	Wuxi	Government

^aFirm age at time of interview.

^bAccording to the technology and business model.

to recommend potential interviewees. While this might be thought to introduce bias into our sample, we nevertheless argue for its representativeness, given the different research settings and our purposive interview guidelines. Our interview questions include three sections: (1) formal institution influence (for instance, how does the IPR environment affect innovation activities? How do you perceive government intervention in innovation?); (2) informal institution influence (how does *guanxi* affect innovation?); and (3) interaction between formal and informal institutions (how do you perceive institutional changes that developed between 2000 and 2010?).

We used a qualitative data analysis approach after transcribing the data. ATLAS.ti smoothes the process of data analysis. We reviewed our interview protocols carefully until we identified the propositions that represented and summarized the data. The replication logic assists in taking multiple cases to build an understanding of a relatively new domain and in enabling direct application of the information (Yin, 2009).

Findings

Following the conceptual model that we have developed, we illustrate the empirical findings from the perspectives of formal and informal institutions. Our empirical evidence strongly supports the explanatory power of the conceptual model. As the data analysis unfolds, we posit several propositions accordingly. Our research design enables us to observe variations in formal institutions. The two high technology parks differed in terms of ownership, services offered, functional roles, and availability of capital. Table 2 provides a comparative overview of the two parks.

The fundamental differences between these two high technology parks can be attributed to differences in regional policy, which is reflected in the profile of their entrepreneurs. Wuxi park targets overseas technology entrepreneurs, whereas Shanghai park has no specific focus. Owned by the Wuxi government, Wuxi park is host to what are called ‘530 firms’. This refers to a regional policy in Wuxi called the ‘530 Plan’, introduced in April 2006. The 530 Plan targets overseas Chinese technology entrepreneurs who can bring advanced technology to support their technology ventures. The initial idea was to emulate the success story of Suntech Power, and aimed to attract 30 leading overseas technology entrepreneurs to Wuxi over five years. Suntech Power was founded in 2001 by Zhengrong Shi, an overseas Chinese technology entrepreneur, with strong Wuxi government financial support and a

Table 2. A comparison of the characteristics of two high technology parks

Wuxi national industrial design park	Shanghai Zizhu high technology park
Government-owned	Mainly privately-owned as a business entity
530 Plan was installed in April 2006	Established in May 2006
Seed capital as award, public capital investments	No seed capital, no public capital investments
Application: intellectual property required	No application: no intellectual property required
Information broker, potential buyers, introduction of customers	Information broker, no introduction of customers

hands-on approach. In December 2005, Suntech Power went public on the New York Stock Exchange, and Shi became the richest businessman in China by market value (Kwok, 2009).

Since it was officially established in March 2006, Shanghai park has been run by a consortium of local government, universities, and third-party developers as a business entity. The Shanghai park is operated as a technology incubator without particular orientation to either domestic or overseas entrepreneurs, and is located at Shanghai Jiao Tong University, one of the best Chinese universities, with a focus on engineering and technology. Both high technology parks offer training and workshops to help start-ups overcome challenges encountered in the early stage of high technology ventures. Both parks play the role of information broker, gathering as well as conveying industry and policy information to high technology entrepreneurs. One recent study argues that, in a high technology cluster, the ties of new ventures with service intermediaries enable them to tap into these networks and contribute to the ventures' product innovation (Zhang and Li, 2010).

The park mainly offers us industry information, which helps to save a lot of time. But, we need to find customers ourselves. We develop our applications based on customer requests. (Case 6, Shanghai park)

The most benefit I feel is that I am not alone; before moving to the park, I stayed in a rented office. Now I feel the young entrepreneurs carry the same passion and want to make things happen! (Case 3, Shanghai park)

To cope with the relatively weak IPR environment, foreign firms in China practice different strategies (Keupp *et al.*, 2009). Both high technology parks function as intermediaries, which enables the high technology ventures to circumvent the generally weak IPR environment. Moreover, patent applications are encouraged by governments, implying the government's commitment to improving IPR protection.

In the parks, they encourage us to apply for patents, and they will cover the application fees. With patents, we can apply for other research funds on a district, city, or even national level. (Case 5, Shanghai park)

Bruderl *et al.* (1992), looking at the survival of new ventures, emphasize the importance of capital in helping them to weather the crucial start-up period and to cope with random shocks from the surrounding environment. Research shows that the venture capital market in China displays special traits and a special development trajectory (Ahlstrom and Bruton, 2006). It is argued that although the system for financing new high technology ventures in China has evolved, the specific actors, means of coordination and control, regulations, and other elements of the Chinese financing system differ greatly from their counterparts in developed countries (White *et al.*, 2005). A recent study empirically illustrates that domestic Chinese venture capital firms are less active in monitoring and less motivated to provide value-added services than foreign venture capital firms in China (Tan *et al.*, 2008). Wuxi park offers financial support to entrepreneurs upfront, which allows the technology entrepreneurs to concentrate on innovation. One firm in our sample received the same terms and conditions as Suntech Power from the Wuxi government.

There is no need to worry. Later when we grow the company, the government can just get back their upfront investments and some interest. We are the company owner, not the government. (Case 4, Wuxi park)

Another difference between the two parks is the government's active role in the go-to-market phase. In addition to the supply of capital from government paving the way for high technology start-ups to take innovative activities, governments are actively involved in this phase of high technology start-ups. The Chinese market is driven by short-term benefits. Customers care more about present utility than about long-term rewards. In the absence of early adopters for product innovation, firms are reluctant to innovate. We find that regional government plays an important role in encouraging firms to be more innovative. Governments have the tolerance to support innovative products with some shortcomings.

Our first innovative product was only possible due to a partnership with the local fire department. Governmental officials introduced us to them. The wireless sensor technology used in smoke detection was triggered by a discussion with people from the fire department. This helped us to innovate according to demand. (Case 1, Wuxi park)

Accordingly, based on data analysis and case studies, we posit the following:

Proposition 1a: High technology ventures in government-owned high technology parks may show a higher propensity to undertaking innovation activities than those in privately-owned parks.

Proposition 1b: Government pre-selection intervention may positively correlate with high technology venture innovation.

The interaction of *guanxi* with government intervention

We consider *guanxi* to be a multidimensional construct, namely international *guanxi* and local *guanxi*. International *guanxi* denotes the personal connections of entrepreneurs to international entities, such as firms, research institutions, and organizations, assembled through working or educational experience. Another dimension is local *guanxi*, which we define as interpersonal connections with governmental officials, users and contract providers.

International guanxi

International *guanxi* is associated with the social capital and network perspective in transnational entrepreneurship research, an emerging field of study (Drori *et al.*, 2009). Transnational entrepreneurship research emphasizes the role of individual entrepreneurs who engage in international activities, leverage opportunities arising from their networks, and mobilize resources, whereas the international entrepreneurship literature concentrates on firm-level variables (Zahra, 2004).

Recent empirical studies reveal the advantages leveraged by returnee entrepreneurs. One discovered that high technology small and middle-sized enterprises (SMEs) founded by returnees are more innovative than their local counterparts in China (Liu *et al.*, 2010). There seem to be clear differences between globalized and domestic entrepreneurs in China, as indicated by a recent empirical study of

12 high-profile female entrepreneurs. This study demonstrated a significant internationalization effect, enabling the subjects to start a business at a younger age, utilize their external contacts and outside knowledge, and innovate by mobilizing global resources (Alon *et al.*, 2011). A study of 711 SMEs from the Zhongguancun science park in China shows that export orientation and export performance are positively associated with the returnee entrepreneurs (Filatotchev *et al.*, 2009).

International *guanxi* plays an important role in innovation in Chinese high technology start-ups. This importance is partially attributed to the status of innovation in China, where it is less highly regarded than in developed economies (Liu and White, 2001). High technology start-ups in emerging economies are inclined to utilize overseas connections either to jointly develop products or to localize existing products. When the founders of firms are overseas returnees, the target group of the 530 Plan, they have connections to firms from developed economies. Their intermediary roles – importing product or transferring technology – give a competitive advantage over local Chinese firms which do not possess international *guanxi*. Such activities invite imitative innovation.

Innovation in online business is important. But it costs you money and has high risk. We import the concept of web game or browser game to China as the first one. We innovate in a way that we translate and localize the products from abroad first. We actively look for partners to localize their products. (Case 3, Shanghai park)

Innovation time and development risk are two important factors for high technology start-ups undertaking innovation. By using international *guanxi*, innovation time can be enormously shortened and the development risk can be largely reduced.

Imitative innovation strategies are commonly adopted by emerging economies and can explain much of their economic growth (Minniti and Lévesque, 2010). Grimpe and Sofka (2009) look at the difference in firm search and innovation behavior between firms in developed Western European market economies and firms in the transition economies of Central and Eastern Europe. Search strategies differ considerably between established market and transition economies. Our findings in China align with these empirical findings. We argue that high technology start-ups in China, one of the largest transition economies in the world, are likely to use existing products and technology acquired through international *guanxi*.

The Wuxi government's 530 Plan invites overseas Chinese to return with innovative technologies and products. In fact, this is a prerequisite for entrepreneurs to apply for various benefits and obtain governmental support. One park manager in Wuxi explains:

We highly welcome Chinese nationals who live abroad to return and embark upon a new successful career in our park. We also encourage them to maintain their contacts abroad. They do not need to invest 100% of their time here [China]. Links overseas are important.

Based on observations and existing case studies, we propose that:

Proposition 2a: International *guanxi* positively influences innovation activities in Chinese high technology start-ups.

Local guanxi

China's highly context-based business environment places additional obstacles in the way of high technology start-ups trying to find customers and access appropriate channels. Established players in China already occupy these channels and monopolize access to end users. Technology advantages might position high technology start-ups as technology providers to established players who have access to channels and possess good knowledge and contacts. High technology entrepreneurs develop products in the context of projects with contract providers to fulfill the requirements of end users.

One empirical study of 75 UK and US manufacturers in China discovered a strong and continuing significance of *guanxi* networks in the search for suitable local customers (Millington *et al.*, 2006). In China, market-based search strategies, such as working through trade fairs and the Internet, are frequently either unavailable or perceived as unreliable. To identify the search strategies of indigenous Chinese firms, our study reveals the overarching influence of local *guanxi* in the two research settings.

We assume the role as technology provider; we develop applications for our partners. They have the big contract, within which we just provide part of it. They are the integrator. They talk to customers directly. You know, in China, channel or *guanxi* is the king. (Case 5, Shanghai park)

Our solar application project is developed for a local private firm – they have the established channels. We only provide the wireless communication part. The connection arrives because we are a network 530 firm. (Case 1, Wuxi park)

The cross-case analysis illustrates the importance of local firms which have established local networks, have market knowledge, and have connections with contractors. For newly-founded technology firms, pure technology know-how is not sufficient to sustain profitable growth. Furthermore, a variety of project development opportunities is derived directly from knowing local Chinese partners. Our argument is in line with a recent qualitative study of 12 small Chinese high technology firms in Beijing and Shenzhen suggesting network strategies in which *guanxi* plays an important role (Siu and Bao, 2008). Based on our data analysis, case studies, and observations, we propose:

Proposition 2b: The more local *guanxi* high technology entrepreneurs possess, the more likely it is that high technology start-ups pursue innovation activities.

Overseas technology entrepreneurs may struggle to acquire valuable local *guanxi* if they have been absent from China for a long time. The lack of local *guanxi* may hinder their innovation activities. The technology entrepreneurs from our sample in Shanghai confirmed the difficulty in doing business with local firms. In contrast, Wuxi local government intervenes in the *guanxi* acquisition process of high technology entrepreneurs. Governments can actively assist high technology entrepreneurs to acquire customers. The firms in the 530 Plan are introduced to local partners and established Chinese firms. These may not have advanced technology, but they do have market knowledge and channels. Such government intervention reduces both search and acquisition costs.

They [government] offer different activities helping us to get to know potential customers and cooperation partners, where we can meet Chinese private enterprises. (Case 8, Wuxi park)

Our data analysis reveals the triggering effect of international *guanxi* for government involvement. International *guanxi* on the part of technology entrepreneurs attracts the attention of local government (see Hoffman and Ocasio, 2001). An external event triggers attention within the system. The success story of Suntech Power in Wuxi communicated a positive signal by linking overseas entrepreneurs to advanced technology and know-how. The implicit meaning associated with international *guanxi* attracts the attention of local governments, which in China can mobilize various resources by organizing matching events or establishing essential links to local players. Hence, we argue that the symbolism of international *guanxi* enables the acquisition of local *guanxi*. Zott and Huy (2007) have empirically demonstrated the symbolic management strategies adopted by young entrepreneurial firms to acquire resources. We offer empirical evidence that overseas entrepreneurs in China use symbolic strategies to engage important stakeholders in the Chinese business environment. Hence, we posit the following:

Proposition 2c: Active intervention on the part of government positively correlates with the acquisition of local *guanxi*.

Discussion

The comparative research settings reveal the active role of local government in peripheral regions, such as in Wuxi. Regional policy corresponds to the urgent national call for innovation to occur alongside the regional competition developmental model (Xu, 2011). This might contribute to a paradigm shift from 'Made in China' to 'Created in China'. Firms from developed economies should consider the local regional economy when selecting locations. There are possibilities for such firms to form partnerships with Chinese local high technology start-ups and utilize them as a platform to enter the Chinese market. Relatively less developed regions might offer better business opportunities and lower their entry barriers, given the existence of local high technology entrepreneurs and their willingness to collaborate. If overseas Chinese entrepreneurs can bring advanced technology to China, they are given every opportunity and may possibly make a fortune as high technology entrepreneurs.

In building up an entrepreneurial environment, more financial and infrastructural support is required. The entrepreneurial atmosphere cultivated in Silicon Valley is, arguably, difficult to replicate in other parts of the world (Isaak, 2009). Our study looks at local government intervention and its positive consequences for innovation over a short period of time. From the initial financial support and ancillary services in Wuxi City, an entrepreneur-friendly environment has gradually been constructed. However, continuity of regional policy is imperative for sustained regional development. We observed, in the context of this regional policy, a scale effect, as exemplified by policy emulation by other regions. The particularities of Chinese regional competition (Tan *et al.*, 2009) encourage such policy emulation. While we cannot offer general recommendations to policy makers based on our qualitative study, we believe that the underlying mechanisms should function to some extent in other emerging markets.

The literature on *guanxi* argues that *guanxi* involves a high probability of corruption. We find no suggestion of corruption in the local *guanxi* acquisition supported by government. There are two possible explanations for this. Firstly, at the macro-level, both central and local government look for opportunities to upgrade their technology base in order to outperform competing regional economies. Secondly, the current political constellation of China pushes local government to seek out drivers for local economic growth. As local officials' political careers are evaluated in terms of local economic performance, officials are willing to help as long as promoting technology entrepreneurship can result in local economic prosperity.

The multidimensional *guanxi* construct proposed in our framework, namely local and international *guanxi*, aligns with the argument of glocalized networks – networks with both local and global connections (Chen and Tan, 2009; Drori *et al.*, 2009). We extend this line of argument, and provide empirical evidence that *guanxi* positively influences high technology innovation. Socio-cultural factors have a bearing on entrepreneurial performance, which encourages the use of an institutional framework in future research (Thornton *et al.*, 2011). A recent study of the emergence and development of transnational entrepreneurs illustrates these socio-cultural factors by analyzing transnational entrepreneurs of different ethnicity in Catalonia (Urbano *et al.*, 2011). Our study argues that *guanxi* is a cultural construct, and uses an institutional framework to advance its understanding. Sarasvathy and Venkataraman (2011) ask whether entrepreneurship is an instrument of free markets or an alternative to the market *versus* government debate. Our study indicates that Chinese high technology entrepreneurs use markets and governments as instruments when formulating their entrepreneurial strategies, creating institutions with policy makers at the same time. Interesting questions remain. How has Wuxi, a second-tier city, become so strong in technology entrepreneurship in China? How has institutional change in Wuxi evolved over time? How do actors leverage their resources and power in shaping and developing institutions?

Conclusions

We studied the influence of institutions (formal and informal) on high technology start-up innovation in China. By contrasting two high technology parks, in Wuxi and Shanghai, this qualitative study shows the positive effect on innovation of local government intervention and the overarching influence of *guanxi*. Evidence from in-depth, semi-structured interviews with the CEOs of high technology start-ups, government officials and managers of venture capital funds suggests the dual influence of formal institutions and informal institutions on innovation. *Guanxi* is a multidimensional construct with a positive influence on high technology start-up innovation. International *guanxi* triggers government intervention, which in turn facilitates the acquisition of local *guanxi*. The role of local government is significant in this process. Institutional theory seems to offer a fruitful theoretical foundation for this sort of research. There are two basic approaches to the study of institutional entrepreneurship: one is new institutional economics; the other organizational institutionalism theory (Pacheco *et al.*, 2010). This paper has drawn upon the former. We believe that the latter may also help in studying the institutional change process in emerging economies.

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