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Institution-based barriers to innovation in SMEs in China

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Abstract Despite significant development, small and medium-sized enterprises (SMEs) in China continue to experience institution-based barriers, especially in the area of innovation. What exactly are these barriers? How do these barriers influence innovation? How about the status quo of the institutional environment for SMEs' innovation and development? We seek to uncover these underexplored areas by developing a model characterized by a cost-risk-opportunity (CRO) innovation triangle. We then enrich this model by interviewing 82 top managers and owners at 41 SMEs. We identify the five key institution-based barriers to innovation in China: (1) competition fairness, (2) access to financing, (3) laws and regulations, (4) tax burden, and (5) support systems. These findings enhance the institution-based view of entrepreneurship by shedding light on how institution-based barriers affect innovation in SMEs.

Keywords Small and medium-sized enterprise (SME) · Innovation · Institution · Policy · China

There is hardly any debate on a key proposition in the institution-based view of entrepreneurship: institutions matter (North, 1990). Specifically, "managers and firms

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rationally pursue their interests and make strategic choices within the formal and informal constraints in a given institutional framework" (Peng, Sun, Pinkham, & Chen, 2009: 67; Yamakawa, Peng, & Deeds, 2008). What is more interesting in the next generation of research on entrepreneurship and innovation is *how* institutions matter (Lee, Peng, & Barney, 2007; Lee, Yamakawa, Peng, & Barney, 2011; Peng, Yamakawa, & Lee, 2010; Yang, Liu, Gao, & Li, 2012). In the context of this paper, we ask: How do managers and owners at small and medium-sized enterprises (SMEs) perceive the formal institutional constraints in their institutional framework that affect their strategic choices such as innovation?

A large body of evidence has shown that SMEs have contributed substantially to commercial exploitation of new product and rapid diffusion of new technology, although small firms have to cope with additional constraints of size and limited resources in comparison with large firms (Acs & Audretsch, 1988; Rothwell & Dodgson, 1993; Taymaz & Ucdogruk, 2009). Factors that influence innovation in SMEs have been intensively studied in developed economies, while research on SMEs in emerging economies, especially the barriers to innovation, has been largely neglected (Hadjimanolis, 1999; Keizer, Dijstra, & Halman, 2002; Radas & Bozic, 2009). Many studies focus on the internal factors that determine the success or failure of innovation (Hoffman, Parejo, Bessant, & Perren, 1998). As a result, how external, institution-based factors impact SME innovation has remained relatively underexplored, especially in emerging economies such as China (Lu, Tsang, & Peng, 2008; Yang et al., 2012).

Historically, the attitudes of government to small firms have varied considerably, both between countries and over time within countries. Many arguments have been put forward for the public support of small firms due to the important role played by new technology-based SMEs in both the United Sated and Europe (Rothwell, 1989). However, because of the differences in business environment, governance structure, and culture, the considerable experience accumulated in innovation policies and their implementation in developed economies may not be applicable in less developed countries. In the case of China, the legacy of central planning and diverse levels of regional development make innovation by SMEs even more challenging. Therefore, it is crucial to tailor the regulations to specific actors' peculiarities by applying the right incentives to promote innovation (Hu & Mathews, 2008).

In response, this article endeavors to start filling the gap by investigating how managers and owners at SMEs perceive institution-based barriers to innovation in China. We focus on SMEs in selected high-technology sectors. These SMEs have undertaken product innovations, service innovations, and/or process innovations. We argue that uncovering the institution-based barriers to innovation, as perceived by managers and owners at SMEs, may provide a solid base upon which further discussion on institutional changes that center on improving SMEs' innovation capabilities and potential can be launched.

Research background

The role of SMEs in the global economy has long been recognized. The advantages associated with SMEs are those of entrepreneurial dynamism, internal flexibility, and

responsiveness to changing circumstances. In 2002, China promulgated the SME Promotion Law, which emphasizes SMEs' scientific and technological innovations and upgrading. In 2004, China amended the constitution to grant non-state-owned firms a legal status (Chen, 2006; Zhu & Sanderson, 2009). Since most SMEs are non-state-owned, such a legislative move shows China's broad acknowledgement of the importance of the private sector, which in turn is conducive to the further development of SMEs.

Overall, SMEs have experienced significant growth in terms of number and size. At present, China has more than 42 million SMEs. Shown in Figure 1, SMEs contribute more than 60% of the nation's GDP, 50% of tax revenues, 70% of import and export trade, and 80% of urban employment (Zhu & Sanderson, 2009). With respect to innovation, SMEs have contributed 66% of patents nationwide, 74% of technological innovations, and 82% of new products (Liu, 2009).

However, according to Chinese statistics, 68% of SMEs would close down in their first five years, only 19% can survive 6–10 years, and only 13% of SMEs' lifespan can exceed 10 years (CTIBJ, 2008). This problem is not unique to China. For example, the lack of availability of institutional support including finance and public support in the UK has long been accepted as a serious constraint on SME growth—particularly in high-technology sectors (Murray & Lott, 1995). SMEs in OECD countries have identified some important barriers to investments in innovation, such as a lack of available finance, infrastructure, skilled knowledge workers, and regulations (e.g., tax rules) (Oslo Manual, 2005).

Thus, how to construct an institutional framework to improve the environment and eliminate the obstacles for innovation in SMEs becomes very important. Unfortunately, there are widespread anecdotal, media reports that SMEs in China continue to experience institution-based barriers. What exactly are these barriers? How do these barriers influence innovation? How do managers and owners at SMEs perceive these barriers? How about the status quo of the institutional environment for SMEs' innovation and development? Our research seeks to systematically uncover these underexplored areas.

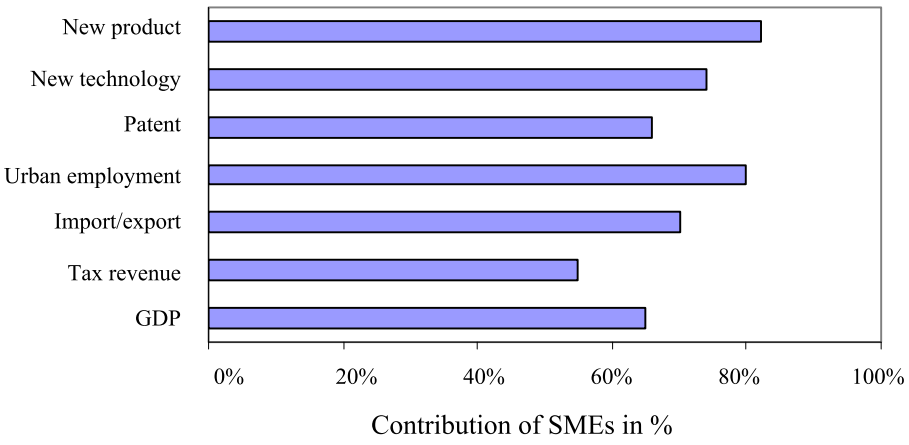

Figure 1 The overall contributions of SMEs in China

A cost-risk-opportunity (CRO) innovation triangle

To identify the nature and effect of obstacles, we develop a model of the space of innovation to investigate the external innovation barriers encountered by SMEs embedded in the Chinese context (Figure 2). The three sides of this triangle are opportunity of innovation, cost of innovation, and risk of innovation. Opportunity of innovation covers issues associated with competition fairness, industrial monopoly, and possibility to obtain public support. Cost of innovation refers to the tax burden, access to financing, and entry barriers. Risk of innovation refers to the ability to cope with complex regulations, availability of external service, degree of market power, and channel and information for new technologies and markets.

Of course, these three sides sometimes overlap. For instance, SMEs can experience difficulty in acquiring external resources (e.g., capital) necessary for rapid growth, which would refer to both the cost and risk of innovation. In terms of the space of innovation, when the upper base line (i.e., opportunity of innovation) rises and two waist lines (i.e., cost and risk of innovation) decline, the space of innovation expands, which means the environment for SMEs' innovation improves and their possibility of innovation is enhanced. We will call this triangle a cost-risk-opportunity (CRO) innovation triangle, which may help to analyze the perceived institution-based barriers to innovation. Next, we turn to our empirical efforts.

Methodology

Because of our focus on innovation, we decided to survey SMEs in a relatively narrow set of new technology-based sectors. Although research on SMEs in general

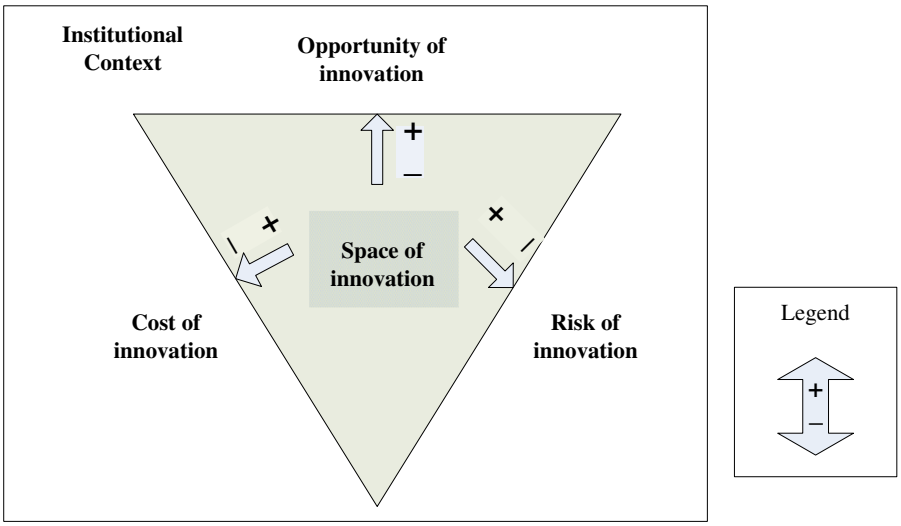

Figure 2 The space of innovation

is plentiful, not all SMEs in all sectors innovate (Oakey, 1991; Storey, 1992). Therefore, focusing on these sectors known for their innovations helped us highlight the innovation aspects of SMEs. Further, existing research suggests that innovation does not necessarily translate directly into improved firm performance and, ultimately, greater profitability (Su, Tsang, & Peng, 2009; Teece, 1986).

In this study, we adopted conversational interview techniques via face-to-face semi-structured interviews (Lee, 1999). As an interview checklist, a questionnaire designed for CEOs, firm owners, or managing directors was developed (see Appendix). Prior to conducting interviews, a draft survey was pilot tested on two SMEs. Taking the feedback into consideration, some modifications were made before the final version of the questionnaire was rolled out. Overall, 82 top managers and owners at 41 SMEs from Beijing, Shanghai, Shenzhen (located in the Pearl River Delta), and Suzhou (located in the Yangzi River Delta) were interviewed in 2009. Table 1 provides the distribution of SMEs interviewed by industry and location.

Results

The top five institution-based barriers to innovation-based SMEs perceived by the managers emerge from our interviews. The rankings of the barriers are based on the frequency of the responses from our samples (Figure 3).

The top five barriers focus on (1) competition fairness, (2) access to financing, (3) laws and regulations, (4) tax burden, and (5) public support systems. Table 2 shows that nearly all of the factors hampering innovation activities of SMEs are relevant for regulatory environment, which provides policymakers with some guidance to crafting effective innovation policy by examining specific policies that constitute the core of national innovation strategies.

Unfair competition

A total of 67% of interviewees considered their innovation activities were to a large extent constrained by the unfair competition environment and discriminated

Table 1 Distribution of the sample by industry and location.

Location Industry	Shanghai	Beijing	Shenzhen	Suzhou
Pharmaceuticals industry	6	1	2	2
Software industry	2	2	2	2
Integrated circuit technology industry	3	1	3	3
Solar energy industry	1	0	1	0
New materials industry	3	1	1	2
Cultural and creative industry	1	1	1	0
Total $N = 41$ SMEs interviewed	16	6	10	9

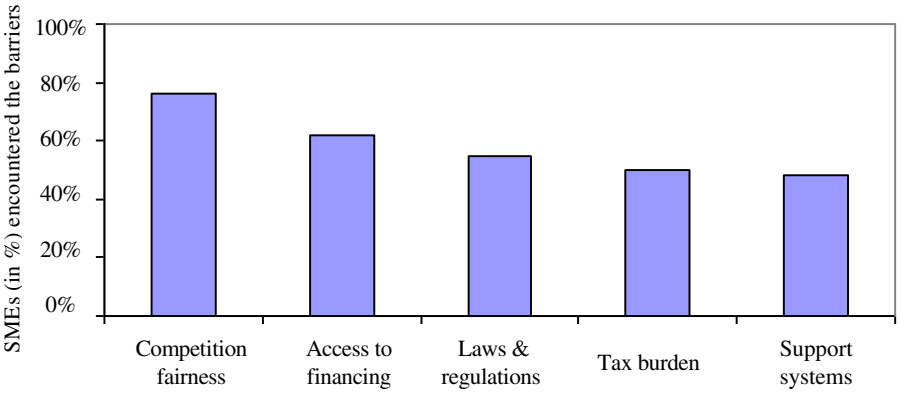

Figure 3 Percentage of interviewees who encountered institution-based barriers to innovation

against with respect to business opportunities. Large firms—both domestic and foreign—tend to corner or monopolize the market due to preferential treatment by the government and broader access to resources. For instance, government procurement concentrates on producers of well-known brands, especially foreign multinationals.

In 1993, for the first time, China enacted the Unfair Competition Law in light of the fast pace of private sector development, which created the need for rules to govern competition. The law is enforced by the State Administration for Industry and Commerce and its branches at the regional level. However, China's competition policy regime has two major drawbacks: regional protectionism and poor enforcement (Lin, 2005). Despite the new law, our interviewees complained that the current business environment continues to favor large firms, especially those on the Fortune 500 list. This unfair arena discourages SMEs to innovate. For example, the general manager of one small firm that specialized in mobile Internet technology told us:

> When we were right in the course of further development, a large SOE entered. This superpower operator has very close ties with ministries in the government, and can even influence policies and regulations. It absolutely monopolizes the market and important commercial channels. As a small private firm, we are always at risk of such exclusion.

Limited access to financial support

Lack of access to financing has been identified in many countries as one of the most significant obstacles to the survival and growth of SMEs (Acs, Carlsson, & Karlsson, 1999; OECD, 2008). Due to the relatively high risk profile that SMEs possess, commercial banks and investors are reluctant to provide financial support. This situation is exacerbated by uncertainty and information asymmetries, lack of

Table 2 Institution-based barriers hampering SMEs' innovation activities.

	Cost of innovation	Risk of innovation	Opportunity of innovation
Competition fairness			
No priority for government procurement	+		−
Difficulty of starting a business	+		−
Poor enforcement of the Unfair Competition Law	+	+	−
Regional protectionism	+		−
Access to financing			
Difficult to get bank credit	+		−
High doorsill for capital market	+		−
Lack of venture capital, especially angle capital		+	−
Hard to access to public sources of funding	+		
Laws and regulations			
Extra entry barriers	+		−
Unclear to assess intangible collateral	+	+	−
Weakness of property rights			−
Lack of regulations and/or concrete regulations at operational level	+	+	−
Ambiguity of property rights and creditors' rights in the event of bankruptcy	+	+	−
Inconsistent policies		+	
Lack of regulations to protect non-technological innovation	+	+	−
Tax burden			
Current value-added tax (VAT) system	+		−
Pro-innovation tax system	−	−	+
R&D tax credit policy	−	−	+
Public supporting systems			
Lack of infrastructure	+		−
Lack of linkage with public research institute	+	+	−
Deficiencies in the availability of external services	+	+	−
Lack of information on markets	+	+	−
Lack of information on technology	+	+	−
Short of training and education	+		−
Lack of intermediary to provide services for SMEs	+	+	−

"+" means positive correlation; "−" means negative correlation.

loan guarantee and collateral, and some ambiguities of property rights and creditors' rights in the event of bankruptcy (Arora, 2009).[1]

[1] A series of recent papers using evidence from countries around the world (but not China) have found that clarifying entrepreneurs' and creditors' rights through more entrepreneur-friendly bankruptcy laws can stimulate more development of SMEs (Lee et al., 2007, 2011; Peng et al., 2010).

A founder and CEO of a software company who returned from the United States after eight years of working in the IT sector said:

> The bank creditors treat us as more risky borrowers and are not prepared to assess our patents and software copyrights as collateral. Of course it is difficult to get credit from the bank. In spite of very innovative ideas, well-educated engineers, and advanced technologies, many entrepreneurs may not be able to pass over the "Valley of Death" by relying solely on their personal savings in the start-up period.

Although Chinese SMEs contribute more than 60% of China's GDP, they only obtain less than 25% of bank credit (Zhu & Sanderson, 2009). In our study, SME managers and owners ranked the financing constraints as the second most severe obstacle. Approximately 60% of our interviewees pointed this out. In another survey carried out by the All-China Federation of Commerce and Industry, 58% of all the respondents listed financial deficiency as the top challenge for private enterprises (ACFCI, 2007). In China, less than 10% of private enterprises can obtain bank loans and less than 1% are able to obtain other external financing from capital markets (EC, 2008). Most SMEs have to rely on self-financing, including owners' capital and corporate revenues. Such self-financing is often short-term profit orientated and is reluctant to invest in R&D and engage in innovation activities, which tend to be long-term in nature.

Lack of and/or unclear regulations

Although in 2002 the National People's Congress Standing Committee passed the SME Promotion Law, SMEs are still disadvantaged for a lack of concrete regulations and/or clear policies at the operational level (Zhu & Sanderson, 2009). Thus far, policies on how to assess intangible collateral are still missing. Although some regional authorities have attempted to use invisible assets such as intellectual property right, copyright, trademark, or patent as credit guarantee, most financial institutions are still conservative and set extra entry barriers for SMEs to access financing.

On the one hand, the complexity in the implementation of laws lies in the multilevel dispersion of policy responsibilities among many organizations and agencies. Due to some regulations for SMEs' innovations that come from different ministries or from different regional governments, these policy efforts are not always coordinated and not without conflict. Our interviewees found these to be very confusing and unhelpful. On the other hand, our interviewees complained that enterprise establishment approval, registration, and bankruptcy proceedings are very complicated, time-consuming, and expensive.

In addition, the government's promotion of innovation so far has concentrated on the technological side—either product or process innovations. Few regulations cover non-technological innovations, such as business model innovations, organizational innovations, and service innovations. Several of our interviewees pointed out that quite often laws and amendments in this area in China lag behind those in developed countries.

Excessive taxation

While the fundamental purpose of tax policies is to raise revenues to support governmental missions, tax policies can be structured in ways that either spur or harm innovation. According to *Forbes*, which evaluates whether a country's policy attracts or repels capital and talents in terms of the "Tax Misery" score, the Tax Misery score for China is ranked the second harshest worldwide in 2008 and 2009 (*Forbes*, 2009). *Forbes* also found that the more firms invest in R&D, the louder they voice concerns about the tax burden.

Given our chosen focus on SMEs that emphasize innovation, not surprisingly a majority of them complained about the tax burden. Specifically, approximately 95% of our interviewees complained that the value-added tax (VAT) system demotivates innovation because VAT is based on production. For SMEs in IT sectors whose physical materials costs are very low while labor costs are quite high, most production costs cannot be deducted from sales income according to the tax regime. These knowledge-intensive SMEs thus face disadvantages compared with capital-intensive and labor-intensive ones, such as manufacturing companies. This institution-based barrier increasingly becomes a key area of complaints among our interviewees. This clearly is one of the bottlenecks that hinder the development of knowledge-intensive industries, especially SMEs in such sectors.

In order to encourage firms to innovate, China has promulgated an R&D tax credit policy, which permits tax deduction of 150% of the actual income. We found that such R&D tax credit is an effective tool, which spurs approximately two dollars in private R&D spending for every dollar of the credit. But it is just a starting point. More supportive policies from both the supply side and the demand side should be implemented to incentivize SMEs to invest more in innovation activities.

Insufficient support system

The fifth institution-based impediment to SME growth and survival is the insufficient and inefficient support system and public services available. SMEs are very heterogeneous by nature and their needs differ. Although China has implemented a series of support systems for SMEs to undertake R&D and engage in innovation (such as providing start-up capital for technological entrepreneurs and partial subsidies for developing technology), our interviewees complained that it is not easy for SMEs to benefit from these programs. This is due to the shortage of effective intermediaries and transparent services information connecting these support systems and needy SMEs.

Innovation intermediaries are organizations that work to enable innovation, either directly by improving the innovativeness of firms or indirectly by enhancing the innovative capacity of sectors, regions, and/or nations. Because of their limited scope, SMEs often have to specialize in their core competencies and thus have to rely on innovation intermediaries to bridge the gap between the business and research communities, to perform interorganizational networking activities, and to facilitate such collaboration.

Discussion and conclusion

Endeavoring to deepen our understanding of the institution-based view of entrepreneurship, this paper contributes to the literature by developing a CRO innovation triangle framework and by drawing on the rich insights from our interviews of top managers and owners at SMEs that focus on innovations. Our findings suggest that despite the improvement in the environment for SMEs, SMEs continue to confront institution-based barriers that prevent them from unleashing the innovation potential in China. Specifically, we identify the top five institution-based barriers to innovation in China. Based on the field survey, our analysis on the barriers to innovations in SMEs also presents some policy implications on the necessity to reform the rules and regulations to turn them toward a more entrepreneur-friendly direction.

While this paper is limited by the relatively small sample size and the relatively coarse-grained nature of our findings, it has clearly pointed out the necessity for future research that probes deeper into the underlying institution-based barriers that pull down the innovation potential in SMEs. Further quantitative work to further dimensionalize the five areas that we have identified will be needed. In addition, assessing the impact of these institution-based measures on SME performance will form a sounder basis for policy prescriptions. Obviously, whether our findings can be generalized to other developing and emerging economies also remains to be seen.

From the age of being hostile to entrepreneurs, the institutional environment in China has come a long way to become interested in facilitating innovation in SMEs. How to strengthen market-supporting, entrepreneur-friendly institutions in an effort to unleash the innovation potential in SMEs is at the heart of the institution-based view of entrepreneurship (Lee et al., 2007, 2011; Peng et al., 2009, 2010; Yamakawa et al., 2008). In general, innovations are inherently unpredictable and risky. Given the liability of smallness and newness, innovations in SMEs are even more unpredictable and more risky. As a result, such SMEs require more nurturing and support, thus calling for more research on their needs, wants, and perceived institution-based barriers. In conclusion, we argue that only when more is known about how institutions matter will we be able to recommend better and more innovation-friendly policies that can facilitate SMEs' development.

Appendix

Interview checklist

1. Please introduce the background and history of your firm.
2. How has your firm achieved its growth so far? Are you satisfied with such growth?
3. Do you have any collaboration with universities and research institutes? Are you satisfied with such collaboration?
4. Has your firm experienced the most difficult stage of survival and development, the so-called "valley of death"? If yes, how did you overcome it?
5. Within the current institutional environment, what are the principal barriers for the growth of your firm?

6. How will/do the principal barriers influence the cost, risk, and opportunity of innovation?
7. Did you have work experiences overseas before? If you did, what are the similarities and differences between the innovation environment in China and that in other countries?
8. What kinds of strategic advice for SME development and innovation will you give when these institution-based barriers are removed?
9. Why did you choose this city/region to set up your firm/to work? Are you satisfied with this decision?
10. What are the primary institution-based barriers to the development and innovation of your industry?

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