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How external partnering enhances innovation: evidence from Chinese technology-based SMEs

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If China is to make the leap from being a manufacturer of goods, often for others, to being a world-class innovator, then Chinese small and medium sized enterprises (SMEs) have an important role to play in achieving this future goal. Much recent debate has focused on innovation activities of multinational corporations in China, with little attention paid to the role of indigenous SMEs and how they attempt to become more innovation oriented. This paper presents findings from 10 case studies of SME firms based in the Zhejiang Province of China to try and establish to what extent external partnerships have helped them become more innovative and competitive. The most common forms of partnering used by these firms is collaboration with universities, with customers and key suppliers, which has implications for how learning and absorptive capacity affects the firm's innovation strategy.

Keywords: Chinese SMEs; external partnering; innovation

Background

A recent report by the Organisation for Economic Cooperation and Development (OECD) and China's Ministry of Science and Technology (OECD 2007) concludes that 'China needs a better return on its fast-rising investments in research and development (R&D) and higher education if it is to meet its goal of becoming an 'innovation-oriented' economy by 2020'. Yoshida (2007) also poses an important question – can China make the leap from being a manufacturer of goods, often for others, to being a country of world-class inventors and innovators as well? In 2006 the Chinese government set out its science and technology objectives for the next 15 years, which included the development and eventual increase in indigenous innovation capacity¹ to reduce China's reliance on foreign technology to 30% or below from the current reliance of approximately 60% (Jacobson 2007). China also aims to develop several world-class research institutions and universities as part of this plan, which are important external partners for industrial firms wanting to explore more innovative lines of research and development with such partners.

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Porter et al. (2009) foresee that China will surpass the USA in technology-based competitive capabilities within a decade or two. The image of China as just a low-cost producer of manufactured goods is no longer accurate. Porter et al. (2009) add that there is now data to suggest that China has an expanding R&D base. For instance, in the emerging nanotechnology domain, China is either number 1 or 2 in publishing in the international literature (the USA is still well ahead in accruing citations to its publications, an important indicator). The next step will be for China to link its burgeoning R&D to commercial enterprise and increase levels of attention on the management of technology (Witzeman et al. 2006).

The objective of this paper is to report a range of industry experiences from 10 case studies that we recently undertook in the Zhejiang Province of China. For all the case studies company presidents/ managing directors, senior managers and some R&D staff were interviewed in all firms visited. In addition management staffs from Zhejiang University's technology transfer office were interviewed as this university plays a prominent role as a research collaboration partner for some of the case study firms. The companies studied had mainly operated in the areas of telecommunications, information technology and specialist technological services. There is already evidence of some indigenous technological innovation capability enhancement in some parts of the Chinese telecommunications industry, where firms have achieved this enhancement via the integration of external knowledge with internal generated knowledge, as confirmed by Wei, Malik and Shou (2005). Most of the firms analysed here are based in Hangzhou, which is the capital of East China's Zhejiang Province. This city is already well on the way to becoming known as an IT software city. The rapid development of the IT software industry has helped the city of Hangzhou to shift its industry pillar from traditional manufacturing, for example, silk and textiles to high technology. We present a number of key lessons from our research findings that should be of interest not only to Chinese SMEs, but also larger multi-divisional companies seeking strategic alliances with SMEs in China and for management researchers interested in the changing role of innovation strategy inside Chinese SMEs.

Here it also needs to be acknowledged that many Chinese SMEs have formerly acted or are currently acting as outsourcing partners themselves, mainly for multinational corporations (MNCs) from Europe or the USA, which represents a form of external partnering for the SME. There is some evidence to show that these outsourcing relationships have promoted technological competencies in Chinese SMEs as well as providing competitive intelligence for the MNC who have invested in this relationship and acquired knowledge from the overseas SMEs (Harryson 2008).

External partnerships and innovation in Chinese SMEs

It is generally accepted that companies must possess the capabilities to manage internal and external innovation processes in a complementary way to ensure that external technological knowledge acquisition supports internal activities and does not undermine them in any way (Howells, James, and Malik 2003; Kelly, Schaan, and Joncas 2002). External partnerships can also lead to strong ties, which are usually more effective in transferring technological know-how because firms are more familiar with each other and should show higher levels of trust (McCutcheon and Stuart 2000; Tan 2005). Empirical research evidence from Schoenmakers and Duysters (2006) also confirms that strong external ties would be more effective in transferring technological know-how from the external knowledge provider to the recipient company acquiring the knowledge. Also the chances of opportunistic behaviour between partners are considered to be lower and therefore it is expected that information will flow more effectively between partners. Davenport, Davies, and Grimes (1998) suggest that an increased level of external projects collaboration helps with

the development of ‘competence trust’, that is, a trust in the ability of research capability *per se* to produce useful results, enabling firms to develop their own confidence and competence in technical matters. Connected to the notion of trust are a number of different organisational traits that could either help or hinder the building of trust (Schoenmakers and Duysters 2006). For example, characteristics of Chinese cultural values such as collectivism, relationship building, morality and organisational citizenship behaviour have hindered the diffusion of western management ideas such as employee involvement and total quality management (Fan 1998; Pun, Chin, and Lau 2000). Therefore, as suggested by Liang and James (2009), it is necessary to gain deep understanding of how a unique Chinese culture affects people’s views and the implication of cultural difference for the organisational adoption of any new knowledge from the outside.

Much of the internal innovative activities in a firm are linked to R&D. Witzeman et al. (2006) state that the use of external research and development resources has increased significantly over the past decade, adding to Chesbrough’s (2003) documentation of this trend in his book *Open Innovation*. However, applying the open innovation concept seems to be a more recent phenomenon among Chinese firms, based on our study observations in Zhejiang Province. This province is located in Eastern China and is considered to be one of the most developed areas in the country. Zhejiang is a typical market-oriented province and has very little central government intervention. Around 95% of all firms are private enterprises in this province and the vast majority of the firms are SMEs.

A big concern for Chinese firms is that many firms lack capable managers (Li and Yue 2005), which is one of the major constraints on firm growth in China, as confirmed in a recent study by Tan (2005) that looked at firm growth and experiences of a Chinese IT entrepreneur. This is mainly referring to a lack of ‘capable R&D managers’ in technology-based firms. There is a good supply of technician level staff in Chinese SMEs, but there appears to be a shortage of good quality R&D managers, who are not only capable of managing their project teams, but also managing the interface between senior management and the R&D/technology function in the company. Related to this internal capability issue is the idea that absorptive capacity is crucial to the effective acquisition of external know-how and to obtaining benefit from complementarities between internal and external resources, as confirmed by Hervás-Oliver and Albors-Garrigós (2009) in their study of 48 SMEs located in one of Europe’s leading ceramic tile clusters in Spain. This study shows that the greater the firm’s internal resources, the more intense the exploitation of relational resources and, as a result of a synergic effect of both components, the greater the interaction effect on the firm’s performance. This demonstrates that access to certain external resources requires a minimum level of internal resources (i.e. absorptive capacity).

Many foreign MNCs see in China a manufacturing base where products can be assembled and manufactured at low costs and then shipped to customers worldwide, but it has been rare so far for either domestic or foreign companies to consider China as a host for indigenous product development or even technology research. According to Von Zedtwitz (2004), this notion is beginning to change whereby many indigenous Chinese firms are now making investments in NPD projects as well as conducting some in-house technological research and development. Therefore it is interesting to study how SMEs in China view this situation, which we explored in terms of how significant some international partnerships are for Chinese SMEs with respect to enhancing their own innovation activities. Here are the main research questions that we were interested in exploring when interviewing the SMEs in Zhejiang Province:

- (1) Do SMEs actually recognise a need to acquire technological knowledge via external partnerships to improve their own competitiveness?

- (2) What types of external partnership agreements (local or international) have SMEs implemented most recently and what were the firm's main motivations behind these partnerships?
- (3) If firms are increasingly acquiring external knowledge to become more competitive, have they developed internal capabilities to learn how to best absorb and use this knowledge to enhance innovation?
- (4) What role do universities, public research laboratories, local government, supplier firms and other external actors play to promote more flexible innovation networks in their local region?

These questions are increasingly important given that according to some estimates, China now has over 20 million SMEs, accounting for about 98% of the total enterprises in the country. It needs to be noted that in China the definition of SMEs is different for different industries, but it is generally acknowledged as a firm with less than 500 employees, but can also include some state-owned firms with around 1000 employees.

How the research study was undertaken

After conducting a review of some key literatures presenting conceptual frameworks dealing with: R&D/technology collaborations; innovation strategies of SMEs; and knowledge management aspects relating to decision-making criteria used by firms (e.g. where and how new knowledge is acquired from and who decides what knowledge to acquire via internal generation or external partnering?), we prioritised key issues arising from this review on the basis of relevance to the Chinese context and the impacts of external partnerships on SME innovation strategies. Most issues are common to any context, but a few were considered less relevant to the Chinese context after some scoping interviews with some industrial managers, like for example, external partnering to outsource R&D to contract research organisations (CROs) as CROs are rarely approached by SMEs in China. Another example is the licensing-in of technology via partnerships with technology providers, where this does not appear to be a widespread business phenomenon among Chinese SMEs, so this issue is considered less relevant here.

This research study was primarily interested in developing an understanding of meaning (from company manager's experiences) and meeting people in their natural work settings. As Cresswell (1994) points out, the process of qualitative research is inductive and the idea is to purposefully select informants (or documents) that will answer research questions. No attempt was made to randomly select informants. The generalisability of case studies can also be increased by the strategic selection of cases and this helps to obtain information about the significance of various circumstances for case process and outcome (Flyvbjerg 2006). The main thrust of the research findings was to provide some ideas and information that can help SME company management teams learn some lessons from external partnering and its impact on innovation strategy. This should also of course be of relevance to academic study in the field of technology analysis and strategic management. Also when there is an emphasis on real-world experience this is relevant to practitioners across a broad spectrum of industries.

Ten companies had agreed to participate in the research study after originally contacting over 15 firms as these 10 firms all showed a willingness to provide contacts in their respective organisations and they showed an eagerness to learn from other firms/industries. The study was undertaken after semi-structured interviews were designed for meetings with managing directors and R&D managers typically lasting 2–3 hours. The vast majority of interviewees answered most of the questions posed, providing some rich insights into the inner workings of Chinese SMEs and their management practices, especially relating to innovation and competitiveness. The interview

Table 1. Companies surveyed.

Company name	Main line of business	Approx. number of employees	Year founded
Hangzhou Mingkang Monitoring	Technical services	200	1996
Zhejiang Bafang Telecom Co. Ltd.	Telecommunications equipment manufacturer	480	1997
Caitong Securities Brokerage Co. Ltd.	Information systems for securities brokerage businesses	200	1998
Zheda Lande Scitech Ltd.	Telecommunication applications service provider	400	1997
Zhejiang Etime Telecom. Co. Ltd.	IT products for the telecommunication sector	100	1989
Huali Group	Telecommunications equipment manufacturer and IT services	400	2000
Zheda Quickware Co. Ltd.	IT equipment manufacturer	650	1993
Allytech Electronic Co. Ltd.	IT equipment, management software design	120	2001
Ningbo Mingzhou Construction Design Inst.	Technological services and consulting services	130	1994
Hangzhou Alcart Telecom. System Company	Telecommunication equipment and IT services	110	1994

process was exploratory and thus not designed to enable any statistical treatment of results, nor to test or confirm any specific hypothesis. Over 20 individuals were interviewed from the 10 firms surveyed and we also interviewed two technology transfer office staff from Zhejiang University, which is considered to be among the top five research universities in China. In addition we interviewed an official from the Zhejiang Provincial Government offices who was able to comment on the provincial government's role in helping to promote innovation among SMEs. Table 1 shows the list of case study firms with some brief details concerning size and activities of the firms. All firms are based in China's Zhejiang Province.

Main findings from the case studies

Our interviews with company presidents / managing directors and R&D Managers about external partnering and its effects on company innovation strategy revealed that the most important and often-cited issues dealt with the need to promote an outward looking culture that recognises the benefits of external partnerships and the optimum use of the company's internal knowledge base to effectively acquire knowledge from external partnerships to help promote innovation.

The most common forms of external relationships described by the firms interviewed here included collaboration with universities/public research institutes, closer working with customers, key suppliers and management consultants and a few firms (Caitong Securities and Zhejiang Etime Telecom) mentioned how important a role government can play in helping to promote innovation within the SME sectors and the economy as a whole. Although only some of the firms interviewed had any formalised R&D activities, there appears to be greater emphasis to improve research and development related work in all aspects of a firm's activities by connecting it to the needs of the customer and ensuring that R&D can respond to manufacturing and marketing function interface challenges. As

speed-to-market is becoming more critical for many innovative firms, R&D work can be executed independently inside the boundary of a firm or in parallel with another external partner.

Consulting firms and the provincial government have helped some of these firms with promotion of local level networking. These types of networking events are used to help with preparation of some feedback on technical monitoring issues to government and are seen as being useful for organising particular types of training and organising visits to companies in the same industry. One interviewee believed it would be beneficial for some of his staff to also visit companies from other sectors to broaden their contacts and improve learning from a variety of industrial sector experiences. Another interviewee mentioned that formal agreements with external partners like IBM, for example, help the Chinese company staff to receive some training as part of the collaboration agreement and this can be at IBM premises, therefore broadening the expertise of the staff receiving the training.

Acquisition of external knowledge to enhance innovation performance for a few of the interviewed firms is mainly executed through the purchasing of IT software. Therefore there is some close interaction with key suppliers. This close interaction with external IT software providers is not only helpful for the SMEs acquiring the IT software, but this also enables the SME to increase its liaisons of knowledge flows with the external supplier as this is seen to provide them with a better understanding of the technical attributes of the IT software that should ensure a smooth integration of the technology in the SME acquiring the software. This also helps to reduce uncertainty, which is often a challenge with many NPD projects that rely on integrating external components and software into the host NPD project environment. Here firms will also pursue some form of external knowledge scanning and this is undertaken via staff attending training courses or attending foreign conferences. One drawback mentioned with optimisation of external knowledge acquisition is that since some businesses are government controlled, it is not easy to introduce new or novel IT systems into the sector, which may have worked well in other sectors.

One of the main weaknesses inside a number of these firms is that there appears to be no formal strategic planning that could help to drive a technology strategy. One firm attempted to design a technology strategy a few years ago, but this was not actually taken through to implementation. A human resource management strategy exists in this firm, which helps with manpower resource planning and has helped to ensure the company can hold onto a few key staff with high level capabilities. Some firms, particularly in the telecommunications sector, reported that they collaborate with external partners on a regular basis as they find it a challenging task to develop technologies internally in this fast moving sector. The collaborations are usually with other firms and with some universities. Their main motivations for collaboration with external partners include access to technology and shared resources, with for example large scale engineering projects.

One important external partnership is with universities and one of the firm's we interviewed 'Zheda' (operating in telecommunications sector) has formed a strategic partnership with Zhejiang University. Here this relationship helped to co-found the 'Zhejiang University Lande Technical Research Center'. This laboratory specialises in technological research and new product development. There are post-doctoral, doctoral level and masters level researchers working in this centre. One of the advantages of this relationship is that some of the best high-calibre post-graduate students from Zhejiang University can be recruited every year to add to the existing pool of scientific staff already working there, which is an advantage that many of Zheda's competitors do not have. Intellectual property rights (IPRs) arising from the centre's research activities are shared between the university (e.g. theoretical papers) and Zheda (e.g. company has the right to exploit

any business applications). From the firm's perspective this relationship with Zhejiang University has been very good for enhancing innovation capability in the company as it has enabled this company to explore some new product development opportunities.

Another motivation for collaboration with universities, mentioned by a different firm, provides the firm with an opportunity to entrust the university research group to develop some tools, which the company does not then have to develop by itself. For example, collaboration with Zhejiang University's computer sciences department on a 'systems of information integration' project was initiated through both the company and the university jointly applying for research grant funding for this project. This firm's president believes that this type of collaboration helps to achieve a number of incremental innovations, which best suits his company's technology strategy, rather than concentrating on more radical type innovations.

External partnerships with specialist small firm suppliers can also lead to the acquisition of those suppliers. For example, the president of one of our case study firms confirmed that his main motivation for acquiring two small IT software companies was to rapidly acquire some specialist technical software products, which helped his company to enter two niche market areas. These market areas are office automation and e-government applications. His company already had a strong marketing presence and the advantage of acquiring the two software firms was that the IT software could be sold via stronger marketing channels and with complementary technology hardware products. A related issue here is that the Chinese SME itself can be acting as a supplier to its international customers and this has implications for external partnering. For example, one of our case study firms reported that in mobile telecommunications certain suppliers of technologies or components have fared much better with being in the 'Nokia innovation community' than (to a varying degree) those of Ericsson, Motorola or Philips, although the technologies they have delivered or acquired have been equal or superior in technology and design terms.

One example of an international partnership mentioned by one of our case study firms was a 'joint venture' between a Chinese telecommunications firm and a Swedish technology firm. This cooperation agreement was not very successful because of a number of problems and has not been a success in terms of acquiring new technological knowledge for the Chinese partner. Part of the difficulty is that the technology is physically located in Sweden and has not been adequately transferred to China, where it needs to be adapted locally to conform to the technological and regulatory requirements in China. This has highlighted some cultural differences between the joint venture partners. It must also be noted that there are other examples of successful international partnerships between Chinese based firms and their international partners. From the international partner's perspective it may be easier to build a joint venture partnership if your company has already invested in an R&D facility in China. This is confirmed by Von Zedwitz et al. (2007), who state that if anyone can have a great innovative idea and the role of MNCs is to find these ideas efficiently, then it might be a smart bet to locate R&D centres in China to create crystallisation points for these scientists and other technically trained people.

Insights from Zhejiang University and Zhejiang Provincial Government

The case studies also involved interviews with Zhejiang University's technology transfer office and the Zhejiang Provincial Government to understand how these organisations viewed the promotion of external partnerships for SMEs in order to improve innovation capability and their role in these types of arrangements.

The Zhejiang University's technology transfer office believes that it is very important for the university to collaborate with companies and industry more widely because a great part of the research funding of this university is from corporations. There are a number of different forms of collaboration with SMEs in Zhejiang University:

- (1) The university (or some departments) are the company founders themselves. The university can bring its fruits (technological achievements) directly into the market place through this means.
- (2) The university occasionally sets up a joint venture operation with some firms. Here the university usually provides technological research resources and the companies provide the financial capital.
- (3) The university sets up technology development centres for some companies, which will then conduct R&D to meet specific needs of the company that sponsors the centre.
- (4) The university promotes bilateral R&D project collaborations with companies.

According to the Zhejiang Provincial Government, SMEs in China are receiving intensified state support to improve innovation efforts. In fact, a few years ago a special fund was set up by the Ministry of Technology, which was devoted to financing technological innovations in SMEs all over China. This fund aids R&D projects inside the firms through direct grants and some projects received low-interest loans to help firms improve their innovative performance. The government continues to support SMEs in China in helping them to improve innovative and competitive performance levels via specific policy support instruments that are aimed at helping firms with intellectual property protection and improving market prospects for many firms.

Main lessons learned

This paper now highlights a number of important lessons learned from our case studies that should be applicable to other technology-based firms in China as well as being of general interest to technology managers, management strategists and scholars outside of China.

One major lesson learned here is that most of the Chinese SMEs interviewed are moving away from single external partnership routes to multiple partnerships routes, which they believe opens up more attractive opportunities and can have a positive effect on their innovation performance, but one concern with multiple partnership routes is that the SMEs might lack the coordinated approach that is often required to maximise benefits from different types of external partnerships (Kogut and Zander 1992), again because of lack of in-house capability to effectively absorb knowledge from these partnerships (Welch and Nayak 1992), which can lead them to become more divergent rather than fully coordinated.

Some SMEs cooperation with government in China seems to be driven by the motivation to access certain markets on a national scale, like for example, securities brokerage businesses and telecommunication equipment and IT services. This can often be done through participating in government-invited tenders, which might help to develop new business markets for the types of firms studied here. However, there also needs to be more awareness in industry of the types of R&D grant support that government can provide SMEs in order to promote external partnerships. For example, some grants have reached significant levels that enable SMEs to enter R&D collaboration with external partners like universities and government research centres. In addition, procurement policies of government agencies are designed to

favour firms that are designated as innovative. This is especially helpful for firms in the telecommunications, electronics, automotive and customised software industries (Yusuf and Nabeshima 2007).

One important form of external partnering is cooperation with customers, which is often driven by the motivations to help customers with the introduction of advanced technological systems, which then enables the firm to gain some customer feedback regarding the new concept (Pisano 1994). Here the customers of the firms studied include government agencies, IT equipment retailers, telecommunication companies and a range of other technology-based firms. This type of partnership helps to improve innovation whereby customer feedback has been used to make improvements in the design and development of a new range of products and services. However, it needs to be noted that this type of customer cooperation only appears to be cemented with some key account customers and not with all customers, so such partnerships could perhaps be extended to a wider customer base.

The acquisition of external knowledge for SMEs via different types of partnerships is acknowledged to be an important strategic goal and this means that internal capabilities must be developed to learn how to best absorb the externally acquired knowledge (Howells, James, and Malik 2003; Powell 1998). Therefore decision-making plays a crucial role with acquisition of external knowledge. Here the type and nature of the R&D project and partner relating to the use of external partnerships to acquire technological knowledge affected the decision-making process. Thus, the familiarity of the partner and type of project; the project size and number of external partners sought to provide the external knowledge; and how new the type of technological knowledge being sought all affected the nature of the decision process.

Some SMEs reported that with most external collaborations an early stage evaluation is undertaken to consider various contractual matters concerning financial implications, as well as who will hold onto the knowledge arising from this collaboration. This includes considerations about ownership of intellectual property arising from the collaboration and if this can be addressed in the collaboration contract at the beginning it is likely to be advantageous for both partners as they are less likely to get locked into disputes about IPR ownership later during the collaboration (Bainbridge 1998). These firms might also have to consider making some company laws that ensure the company can protect any confidential knowledge arising out of the external partnership as some firms spoke about the danger of this type of knowledge leaking out of the company if key employees were to leave. Therefore the company laws could help to ensure that this type of important R&D knowledge does not easily leak out to competitors. Another important point related to the issue of collaboration (especially via outsourcing alliances) is the problem of 'hidden agendas' and 'incomplete contracts'. Bergfeld and Doepfer (2009) stress that partnering firms in outsourcing alliances should approach the problems of hidden agendas and incomplete contracts that result in innovation barriers from a new perspective, by perceiving the alliance as a 'venture of social cooperation for mutual advantage and long term value creation'. There is a necessity to have some clearly structured guidelines in the form of institutional settings for such alliances.

Competitive success is increasingly linked to an organisation's ability to harness its intellectual capital (the intangible assets of knowledge, skill and intellectual property) to meet the needs of the customer and to grow the business. Therefore many organisations have expanded their intellectual capital assets to not only remain competitive, but to also become more effective learning organisations. Here 'intellectual capital assets' refers to knowledge that can be converted into profits. This is the sum of a firm's ideas, skills, inventions, designs, processes, creativity and publications (Teece 2000). The firms that we studied confirmed that they cannot afford to maintain the full range of competencies and skills required to effectively sustain their innovation

Figure 1. External partnering knowledge inflows to SMEs and some hindering factors.

efforts. Hence these firms are creating strategic external partnerships with other firms and research establishments that possess the capabilities needed. Successful contract negotiations with such partners are often enabled by the presence of strong portfolios of intellectual capital assets. For example, one of our case study firms has a strategic partnership with Intel, who provides component technologies to the Chinese firm, but from the Chinese firm's perspective it is also important to learn about latest advanced management techniques from Intel as part of this collaboration. The Chinese SME believes that as it possesses good intellectual capital assets it is in a better position to leverage more out of the partnership with Intel than just acquiring component technologies, since Intel may see longer term advantages with this type of partnership arrangement with Chinese SMEs.

Our case studies appear to confirm that as the innovation process has become more distributed, firms increasingly have to deal with whole sets of firms, universities and research organisations simultaneously in a complex of overlapping and sometimes competing relationships. As such, there has been a shift in the nature of inter-organisational relations, moving from one-off, bilateral, short-term links to coordinating a more complex set of multilateral links over the long term. For example, a number of the firms studied here previously just had bilateral collaborative partnerships with some key technology suppliers, but have now moved to multilateral partnerships with suppliers, customers and universities. For SMEs there is the challenge of managing these types of multilateral partnerships over longer time periods because they do not possess the depth and breadth of management skills often found in larger sized firms who may find it easier to allocate managerial resources to multilateral partnerships over longer periods of time. Figure 1 summarises the major insights obtained from the case studies with respect to capturing typical knowledge flows into the SME that accompany external partnerships, which can contribute to promoting innovation more widely. There are also a number of factors that can hinder these 'knowledge inflows', which are highlighted in the diagram.

Conclusions

This paper has presented findings from case studies of SME firms based in the Zhejiang Province of China to try and establish to what extent external partnerships have helped them become more innovative and competitive. The case studies provided some informative insights, but we accept that this research study is limited to firms in the Zhejiang Province, and more extensive field study of SMEs covering the rest of China would obviously provide a large data set to verify the findings. However given the associated difficulties in conducting large scale studies in China using survey methods and the selection of respondents (company Presidents, senior managers and owner/ managers), our sample size is sufficient in terms of getting access to management staff in small and medium sized companies for the purposes of this exploratory analysis in Zhejiang Province. Nevertheless, there is the potential for future large-scale case studies to be conducted in a number of other industrially advanced provinces of the country, which should lead to more definitive conclusions.

Some previous studies suggest that collaborative arrangements, including external networking and alliances, will have immense implications for Chinese firms since they are embedded in a unique institutional environment quite different from market-driven economies (Boisot and Child 1996). Our research demonstrates a shift for SMEs studied in Zhejiang Province, where most of these firms are now characterising some elements of market-driven economies in opening up to the idea of engaging in more external partnering arrangements that could help them to improve their innovative and competitive performance. Governmental agencies and policies can also help to shape an environment that will be conducive to innovation. Our research demonstrates some evidence of this through the provincial government efforts to support R&D efforts in industry and encourage more technology transfer activity between universities and local firms, which also helps to enhance innovation for Chinese SMEs.

Note

1. 'Innovation capacity' is a term often found in many different literature sources ranging from management journals to international policy level reports and the term is sometimes loosely interchanged with the terms 'competence' and 'capabilities'. Our perception of the term 'innovation capacity' within the context of this paper is that this term refers to a continuous improvement of the overall capability of firms to generate innovation for developing new products to meet market needs. Hence the firm's 'capabilities' (meaning internal resources and routines) are mobilised to help convert the knowledge acquired from external sources into end products and services. In order to be competitive these products and services must provide the firm with some competitive advantage. Therefore the capabilities are given strategic intent in the form of competences, which ensure capabilities are used in a way that helps the firm to differentiate its offerings from competitors so that a core competence should be difficult for competitors to imitate. For example, see Coombs (1996) for further information on this aspect.

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