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Unpacking the effect of IT capability on the performance of export-focused SMEs: a report from China

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Abstract. *Export-focused small and medium-sized enterprises (SMEs) in China face a number of barriers to success, two primary ones being the liability of foreignness and resource scarcity. In order to transcend these challenges and be able to survive/prosper in the hypercompetitive international market, where players include large resourceful multinational organizations with experience in varied national contexts, these firms need to develop different organizational capabilities. In this paper, we specifically examine the role of a key organizational capability – information technology (IT) capability – and its different dimensions, in determining performance of export-focused SMEs in China. Our study reveals that IT capability has a positive impact on such firms' performance. This finding indicates the need for their owners/managers to invest in IT capability. Further, the study also highlights specific sub-dimensions of IT capability that export-focused Chinese SMEs should (or should not) develop, so as to derive maximum performance-related gains for the minimum amount spent on IT.*

Keywords: IT capability, export-focused SMEs, international performance, Chinese culture

INTRODUCTION

Small and medium-sized enterprises (SMEs) have grown exponentially in China over the last several years because of the country's rapid economic growth, its entry into the World Trade Organization and an abundance of suitable labour (Tang *et al.*, 2007). Reports indicate that SMEs contribute in the range of 30–60% of the gross domestic product of China (e.g. Harvie & Lee, 2003), and represented 99% of all corporations registered in China at the end of 2001

(Chen, 2006). They have been described as the 'backbone of China's economic growth' (Wang & Yao, 2002, p. 199).

An increasing proportion of Chinese SMEs are characterized as *young* and *internationalized*, i.e. they focus on exports and operate on an international scale soon after they are founded (e.g. Chetty & Campbell-Hunt, 2004). Indeed, it is estimated that in China, such SMEs contribute directly to at least 35% of the country's exports (Harvie & Lee, 2003). The prevalence of export-focused SMEs has enabled China to speed-up export-centred development, and to compete more effectively than ever before.

Unfortunately, despite the featured successes of many of these export-focused SMEs, they face several challenges in growing their exports and realizing high firm performance. Often, a barrier to the success of these SMEs in China is that they are constantly faced with 'resource poverty', especially with respect to financial resources; this lack of financial resources partly arises because of governmental regulatory policies, which allow SMEs limited 'access to formal financial markets' (Wang & Yao, 2002). Further, it has been reported that SMEs in China lack adequate information regarding markets, competitors, scope, etc., making it difficult for them to assess market trends and make accurate forecasts, and thus compete effectively in the international market (Wang & Yao, 2002). This might explain why, despite the advantages SMEs enjoy, many are unable to survive (Wang & Yao, 2002).

It is thus important to examine and understand the specific capabilities that enable strong performance of export-focused SMEs in China. Prior research, though not specifically in the Chinese context, has attempted to explore the role of several drivers and impediments to SME effectiveness (e.g. Oviatt & McDougall, 1999; Madsen *et al.*, 2000), with some scholars pointing to 'technological capability' as an enabler of global competitiveness (Dhungana, 2003, p. 7). Interestingly, the literature seems to indicate conflicting opinions about the role of IT capability on SME performance. In contrast with Dhungana's more positive pronouncements on the role of information technology (IT) capability, Levy *et al.* (2003), for instance, suggest that a majority of SMEs view IT as a *cost*, as opposed to having the potential for enabling them to grow. Moreover, export-focused SMEs embedded in the Chinese context have novel opportunities and face distinct challenges, owing to their unique national and business culture. Based largely on Confucianism, the Chinese management culture is known to emphasize issues such as personal relationships among people, control by a 'paternalistic' figure and harmony within organizations (Bond, 1991; Su *et al.*, 1998; Pun *et al.*, 2000). Further, the Chinese culture is also associated with high-context communication and a pictographic language (e.g. Liang *et al.*, 2004). These elements of the Chinese culture have implications for how IT is harnessed. There are, however, no known studies that have examined the effect of IT capability on the performance of export-focused SMEs originating in China. In this study, we address this void by studying the role of IT capability within a specific class of export-focused SMEs in China, those that demonstrate a significant export orientation right from birth[1] (Cavusgil, 1994; Chetty &

[1]For convenience, we refer to such as 'SMEs that are export-focused since their inception' as 'export-focused SMEs'. We revert back to the complete description, i.e., 'SMEs that are export-focused since their inception' only when we are attempting to contrast it with traditional SMEs that gradually evolve to a stage wherein they become export-focused.

Campbell-Hunt, 2004). While found in every part of the world, they have an especially strong appeal in developing countries such as China, where revenues are largely dependent on export sales (e.g. Wang & Yao, 2002).

We believe that an examination of IT capability in Chinese export-focused SMEs will not only help in the rigorous academic clarification of the question 'Does IT matter?' (Carr, 2003), but will also help owners/managers of a growing number of these firms in China determine whether they should consider making investments in IT capability. This leads to our primary research question:

RQ1: Does higher IT capability of export-focused SMEs in China lead to their higher performance?

The existing literature on IT capability suggests that it is a complex construct with several dimensions (e.g. Bharadwaj *et al.*, 1999). Given the widely shared view among scholars that national context-related policies/practices can affect the degree to which certain aspects of IT are effective in certain countries, we expect these dimensions to have different impacts on performance in different contexts. For developing actionable advice for export-focused SMEs in China, clearly, it is not sufficient merely to know if IT capability makes a difference in such firms (RQ1); there is also a need to closely examine *which of the dimensions*/*mechanisms* significantly contribute to the performance of these organizations. Thus, our second research question is

RQ2: What is the nature of the effect of the different IT capability dimensions/*facets on the performance of export-focused SMEs in China?*

Given that the dimensions of IT capability have been developed in large Western organizations (Bharadwaj *et al.*, 1999), by examining whether a particular dimension is relevant/helpful to Chinese export-focused SMEs, we hope to contribute to the body of knowledge on China as well.

The rest of the paper is structured as follows. First, we provide a brief overview of the core concepts underlying our study (i.e. SMEs that are export-focused from their inception, IT capability and key dimensions of the Chinese culture). We then provide a theoretical discussion of our model and present our research hypotheses. Next, we describe our research methodology. Finally, we conclude with a discussion of the results, limitations, and intended contributions.

DEVELOPMENT OF THE RESEARCH MODEL

A review of the characteristics of SMEs that are export focused from inception

In this section, we draw on theories of internationalization to isolate the distinctive features between SMEs that are export focused from inception, and other traditional export-focused SMEs. The Uppsala model of internationalization (the most frequently used model in the literature) argues that firms internationalize in stages (Johanson & Vahlne, 1977). As they learn

more about a specific market, they become more committed to it by investing resources. Thus, in this traditional view, firms make their export debut slowly, and only when they have a strong domestic market base (Johanson & Vahlne, 1977).

In contrast to the predictions of the Uppsala model, in recent times, some firms have been found to enter international markets soon after their inception. Such firms may not even have a domestic market base, and are described as 'a business organization that, from inception, seeks to derive significant competitive advantage from the use of resources and the sale of outputs in multiple countries' (Oviatt & McDougall, 1994, p. 49). Existing literature has examined the differences between such firms and traditional export SMEs (e.g. Madsen *et al.*, 2000; Chetty & Campbell-Hunt, 2004). Unlike traditional export SMEs that rely on slow knowledge acquisition, these export-focused SMEs are dependent on international revenues from birth, relying on rapid internationalization (Oviatt & McDougall, 1999). Further, the burgeoning capacity of communication technologies usually plays a key role in such firms, because they rely on these technologies to acquire knowledge, develop strategies and maintain relationships. Finally, such firms are constantly entering new and dynamic environments, thus, they need to adapt and innovate more quickly than traditional export-focused SMEs (Autio *et al.*, 2000). Therefore, competitive strategies involving innovative use of technology are intimately involved in the internationalization of these types of export-focused SMEs, while traditional SMEs are rather sceptical about integrating IT strategy within their business strategy.

IT capability

Our review of the literature suggests that, in the past, IT capability has been conceptualized primarily in terms of managerial capabilities (e.g. Sambamurthy & Zmud, 1992) or technological capabilities (e.g. Sabherwal & Kirs, 1994). Recently, however, there have been attempts to adopt a more inclusive view of IT capability which takes into account both the technological and managerial aspects (e.g. Bhatt & Grover, 2005).

Specifically, two studies (Bharadwaj *et al.*, 1999; Bharadwaj, 2000) contribute fundamentally to the rich conceptualization of IT capability within the information systems (IS) discipline. The resource-based view (RBV)-informed definition of Bharadwaj *et al.* holds that *IT capability is a firm's ability to acquire, deploy, and leverage its IT related resources in combination with other resources and capabilities in order to achieve business objectives*. Bharadwaj *et al.* (1999, pp. 379–381) suggest that this complex construct is composed of six underlying dimensions. They are IT–business partnerships, external IT linkages, business IT strategic thinking, IT business process integration, IT management and IT infrastructure. In this study, we adopt Bharadwaj *et al.* (1999) conceptualization of IT capability.

Before we examine the nature of the effect of IT capability and its dimensions on the performance of export-focused SMEs in China, we provide a discussion on certain dimensions of the Chinese culture, which we believe will have an effect on the way IT is harnessed (or affects performance) in such firms in China.

Key aspects of the Chinese culture relevant to IT

Culture has been defined as the 'collective programming of the mind' that differentiates one group of individuals from another (Hofstede, 2001, p. 9). The differences in culture not only affect people's general behaviour, but they also affect the 'functioning of organizations and the people in them' (Hofstede, 2001, p. 373). Given Hofstede's (2001, p. 373) assertion that 'global solutions to organizational and management problems do not exist', we believe that many of the cross-cultural differences would also affect organizations' investment in IT, and the extent to which they are able to harness its benefits. Recognizing this, in recent times, the effect of culture on IT adoption/implementation has attracted considerable attention from IS researchers (Davison, 2002; Martinsons, 2004).

The existing literature points to several dimensions of culture that differentiate one collective from another. Hofstede's (2001) cultural dimensions of power distance, uncertainty avoidance, individualism/collectivism and masculinity/femininity has received widespread acceptance, and is frequently used in the management literature. Further, another dimension of culture, long-term/short-term orientation (cf. Chinese Culture Connections, 1987) is also gaining in prominence among culture researchers. While China differs significantly from Western cultures on many of these dimensions (e.g. it has high power distance and high collectivism as compared to the Anglo cluster nations; cf. Hofstede, 2001), we believe that there are certain other unique aspects of the Chinese culture (both national and business) that would more profoundly affect the nature of IT capability developed by managers, and the effect of such capability on the performance. We would like to note that many of these dimensions are compatible with some of the dimensions of Hofstede (2001). We now discuss them in further details below:

Confucianism

China has been significantly influenced by the teachings of Confucius, a humble intellectual who preached in China around 500 BC. Confucianism is viewed as 'not a religion but a set of pragmatic rules for daily life' (Hofstede, 2001, p. 354). One of the key principles of Confucius was that 'the stability of the society is based on unequal relationships' (Hofstede, 2001, p. 354). As a result of this emphasis on inequality, it is believed that the junior would always obey and respect (unquestioned) the orders and principles of the senior (Zhu *et al.*, 2005). Principles of Confucianism have also permeated the Chinese business culture, which has been characterized as adhering to paternalism (Hill, 2006). In other words, Chinese organizations rely on centralized decision-making made mostly by the boss; these paternal figures reserve the right to solely 'determine organizational objectives' (Martinsons & Westwood, 1997, p. 222). Chinese organizations also rely on an 'entrepreneurial mode of strategy making', where the paternal figure makes strategic decisions based on 'personal knowledge and intuition', rather than 'objective criteria or formal and quantitative methods' (Martinsons & Westwood, 1997, p. 222). Further, Confucian pragmatism also emphasizes two other aspects, which we believe have implications for the role of IT capability in Chinese organizations. The teachings of

Confucius emphasize 'virtuous behaviour' towards others, and maintenance of a sense of stability and order (in personal life as well as in organizations). Further, Confucianism also emphasizes the importance of the acquisition and maintenance of skills, education and hard work (Hofstede, 2001, p. 354).

Guanxi and personalism

Another unique dimension of the Chinese culture that stems from its high power distance, long-term orientation, collectivism and Confucianism is the importance of 'horizontal coordination' or guanxi networks (Hofstede, 2001, p. 362). Guanxi refers to 'personal networks' (Tung & Worm, 2001) and places high emphasis on 'social networks, trust, commitment, favor, mutuality, reciprocity', among others (Shin *et al.*, 2007). Guanxi brings 'personalism' into the Chinese business culture (Xin & Pearce, 1996; Wong & Tam, 2000), and consequently, Chinese organizational members tend to initiate and maintain communication through written memos and face-to-face interaction (Martinsons & Westwood, 1997), rather than through the mediation of IT (Zhu *et al.*, 2005).

High-context communication

A dimension of culture that has gained prominence is high/low context communication (Hall, 1976, p. 91). In high-context communication cultures, the communication or message is one where 'most of the information is either in the physical context or internalized in the person'. In such cultures, there are no 'formal communication systems and explicit, consistent or enforceable rules' (Martinsons & Westwood, 1997, p. 220). China (and thus Chinese organizations) adhere to high-context communication, and follow the ideal of being 'suggestive rather than articulate' (Martinsons & Westwood, 1997, p. 220). In high-context communication cultures, it is therefore difficult to codify the communication explicitly within information systems, and transmit that information effectively through technologies (e.g. Hall, 1976; Martinsons & Westwood, 1997). Thus, many Chinese business managers find little value in the use of IS for communication. Further, managers fear that using IT-based communication would lead to status equalization, which is also not preferred in China (Martinsons & Westwood, 1997).

Pictographic language

The specific nature of the Chinese language also affects the impact of IT in Chinese organizations (Liang *et al.*, 2004). The Chinese language uses pictographic symbols instead of alphabetical symbols. Each symbol, or character, represents an object or concept. It is, therefore, extremely difficult to translate IS developed by Western organizations in alphabetic languages such as English or German (and with their embedded Western philosophical concepts) to Chinese, accurately. In addition, the homonyms in the Chinese language (i.e. words that 'sound the same, yet have different meanings') also pose a problem (Davison, 2002, p. 110). enterprise resource planning (ERP) systems often generate ID numbers (e.g.

employee ID, hospital patient ID) for logging in to an application system. Due to homonyms in the Chinese language, some ID numbers may be perceived as unacceptable. According to Davison (2002, p. 110), in southern Chinese dialects, four is a homonym for death, while eight is a homonym for wealth or riches. If an ERP system were to generate an employee or patient ID of 4247, the employee or patient would be very reluctant to use it (Davison, 2002), leading to additional clerical work, thereby reducing the efficiency of the IS, and indirectly affecting the performance.

We believe that many of the unique aspects of the Chinese culture discussed above will affect the role played by IT capability and its dimensions on the performance of export-focused SMEs in China. In the absence of any known literature examining the above issue, we develop our hypotheses by drawing on the existing literature (based on large organizations primarily in the US), and integrating it with our knowledge of export-focused SMEs and the dimensions of the Chinese culture. Specifically, our hypotheses development was guided by the following approach:

The expected effect of the dimension of IT capability on performance of export-focused SMEs in China	=	The effect proposed in the existing literature and expected in export-focused SMEs	+	The elements of the Chinese culture

We summarize the development of these hypotheses in Table 1, where we show the expectations based on 'Western' and the SME literature, and how by considering key elements of the Chinese culture, we make different predictions about Chinese export-focused SMEs.

IT capability and firm performance

Proponents of the RBV perspective suggest that IT is a form of organizational capability that can be developed into a valuable, rare and not easily imitable asset, which then forms the basis of competitive advantage and superior performance (Bharadwaj, 2000). Likewise, Bhatt & Grover (2005) concluded that IT capability has a significant effect on large manufacturing firms' performance. However, many of the studies confirming the significant positive effect of IT capability on firm performance were conducted in large US-based firms. The existing literature suggests that SMEs differ from large firms in various ways. For example, large firms have 'greater scope of operation and are involved in diverse markets', have a better ability to 'spread costly new systems over larger units of production', and have 'internal technical development and maintenance capabilities' (Johnston & Wright, 2004, p. 229), which are privileges not typically enjoyed by SMEs. Thus, it would be incorrect to assume (without formal empirical examination) that Chinese export-focused SMEs would also benefit from this capability.

The fragmented literature on general SMEs does suggest that such firms are also likely to benefit from using IT. For example, Levy *et al.* (2003) argue that IT enables SMEs to better

Table 1. Summary of hypothesis development

Dimension of IT capability	The effect on firm performance proposed in the existing literature and expected in export-focused SMEs	The elements of the Chinese culture playing a role in this context	The expected effect of firm performance in export-focused SMEs in China
Overall IT capability	Has a positive effect in large Western organizations. Expected to have a similar effect in export-focused SMEs	The Confucianist value of acquisition and maintenance of new skills	Positive effect on performance
IT business partnerships	Has a positive effect in large, Western organizations; expected to have a similar effect in export-focused SMEs	Guanxi and Confucianism	Positive effect on performance
External IT linkages	Has positive effect in large, Western organizations; expected to benefit export-focused SMEs	Guanxi and high-context communication	No effect on performance
IT business strategic thinking	Has positive effect in large, Western organizations; expected to benefit export-focused SMEs	Paternalism derived from Confucianism	No effect on performance
IT business process integration	Has a positive effect in large, Western organizations; not expected to benefit SMEs	Paternalism derived from Confucianism, guanxi, and high-context communication	No effect on performance
IT Management	Has a positive effect in large, Western organizations; expected to have a similar effect in export-focused SMEs	Confucianism – value of acquisition and maintenance of new skills; promoting order and efficiency	Positive effect on performance
Integrative IT infrastructure	Has a positive effect in large, Western organizations; not expected to benefit SMEs	Confucianism, guanxi, high-context communication, and pictographic language	No effect on performance

manage their customer bases, keep information about customers in a more organized manner and also share knowledge within the organization more efficiently. Likewise, Arenius *et al.* (2006) suggest that export-focused SMEs can realize superior international performance by developing greater IT capability. They contend that such firms suffer from the '*liability of foreignness*' (arising from the costs associated with travel, transportation, etc., to foreign markets and lack of familiarity with the foreign nation's business environment) and from *resource scarcity*, which can be mitigated by IT.

While the above literature focuses on general export-focused SMEs, which are expected to benefit from possessing IT capability, we believe that a similar performance enhancement would also be witnessed by such firms in China. China is now the 'third-largest IT market', growing at 'double-digit annual rates' (Martinsons, 2004, p. 66). Much of this growth has been fuelled by the positive experiences of organizations which have relied on IT for enhancing the

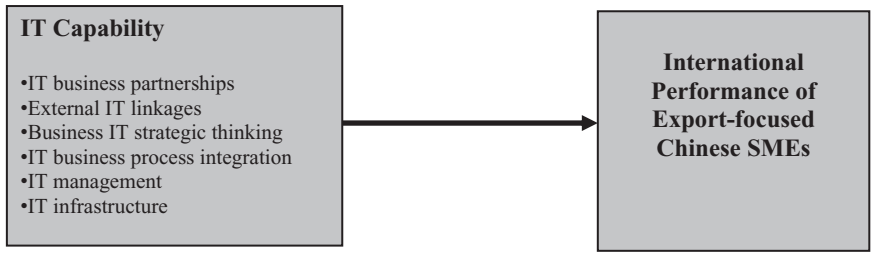

Figure 1. Research model.

efficiency and effectiveness of their business processes (Martinsons & Westwood, 1997). According to Quan *et al.* (2005, p. 70), while 'IT is not a silver bullet for all companies seeking performance improvements or competitive advantage' it does 'permeate Chinese organizations' and the government has been encouraging adoption of IT. We thus argue (see Figure 1):

H1: IT capability will have a significant positive effect on the performance of export-focused SMEs in China.

Next, we unpack IT capability and develop hypotheses for each of its components. We note that the mainstream literature implicitly suggests that *each of the components has a positive effect on performance*. However, in considering some of the unique features of Chinese export-focused SMEs, we find that many of the dimensions may not actually contribute positively.

IT business partnerships and firm performance

Information technology business partnerships refer to the firms' ability 'to foster rich partnerships between the technology providers and technology users' (Bharadwaj *et al.*, 1999). It is to some extent the relationship-building capability that facilitates the dialogue between business and IS professionals and involves developing the users' understanding of IT's potential.

Information technology business partnerships point to the orientation of sharing risk and responsibility of IT applications between IT and business unit management. Unless line management and IT groups can coordinate their responsibilities and accountabilities, the firm is unlikely to acquire, deploy and leverage its IT resources effectively (e.g. Sambamurthy & Zmud, 1992). IT business partnerships depend on the trust between IT groups and business units (e.g. Sarker & Sahay, 2003). Because development of trust takes time, IT-enabled business partnerships can constitute a valuable resource and the basis of competitive advantage for the firm, even for export-focused SMEs (Barney & Hansen, 1994).

In the guanxi-oriented Chinese business culture, trust is particularly significant, and provides the social linkage among relevant parties (Martinsons & Martinsons, 1996; Lin, 2002), and is often instrumental to accomplishing complex work. The existence of such relationships between the IT group and different business units enables bilateral flow of social transactions,

which in turn promotes greater mutual appreciation for each unit's work, expertise, roles and constraints in the organization. This results in effective collaboration (Sarker & Sahay, 2003) through which IT is harnessed, and the firm's efficiency and effectiveness in the international arena is enhanced. Further, maintaining a stable, orderly and harmonious relationship between the IT and the other business units is in line with Confucianist beliefs, which emphasize the importance of order and stability in each network. It is argued that such stability will bring efficiency, and therefore effectiveness to the organization as a whole. We thus conclude:

H2: IT business partnerships will have a positive effect on the performance of export-focused SMEs in China.

External IT linkages and firm performance

External IT linkages refer to the 'technology based linkages between the firm and its key business partners' (Bharadwaj *et al.*, 1999). Bharadwaj *et al.* observe that firms spend significant resources on educating their customers about the importance of IT-based inter-organizational linkages such that better relationships with their customers can be maintained.

Interestingly, while external IT linkages have been shown to have significant positive effects on large firms (Bharadwaj *et al.*, 1999), and have been argued to have similar its effects in SMEs in general (Arenius *et al.*, 2006), their effects on SMEs in China can be quite different. In China, for example, the societal culture indicates that relationship development and maintenance rely less on the use of an impersonal medium such as IT, but more on guanxi connections (Martinsons & Westwood, 1997; Wang & Yao, 2002, p. 209) state that 'the most important channels for creating and maintaining relationships with customers and suppliers for [SME] firms in China were business visits, personal and business contacts, exhibitions . . .', not IT. Similarly, Martinsons (2002, p. 575) reports (based on a study of B2B intermediaries in China), that despite having 'assorted applications, most of the value added by Li & Fung [a B2B intermediary] continues to stem from its decades-old relationships'.

Another dimension of the Chinese culture, high-context communication, also has implications for the influence of IT-based external linkages. Cultures that adhere to high-context communication, believe that 'the number of words should be limited, so that the suggested ideas are limitless' (Martinsons & Westwood, 1997, quoting Fung, 1984, p. 12). Because of a reliance on high-context communication, Chinese organizations believe that IT is unable to appropriately replicate the 'customized and personal services' that personal relationships can achieve (Martinsons, 2002, p. 575). It is thus quite likely that even if IT-based external linkages are developed, the Chinese export-focused SMEs would refrain from using them, resulting in the IT having minimal effect on their performance. We thus argue:

H3: External IT linkages will not have a positive effect on the performance of export-focused SMEs in China.

It may be noted that we are aware that many scholars do not see it appropriate to articulate a 'null hypothesis'. However, in this case, we felt that it may be meaningful to state such hypotheses, since an argument based only on past IT-capability research and without careful

consideration of the Chinese context would actually point to a positive effect. Thus, following scholars who do state null hypotheses when justifiable (e.g. Bhatt & Grover, 2005), we have chosen to include such hypotheses in this study.

IT business strategic thinking and firm performance

In the IS literature, the importance of integrating IT and business strategy has been emphasized on the grounds that IT affects firm strategies, and that strategies have IT implications (Feeny & Willcocks, 1998). Overall, IT business strategic thinking is concerned with management's ability to 'envision how IT contributes to business value' and 'to integrate IT planning with the firm's business strategies' (Bharadwaj *et al.*, 1999).

Research shows that a firm's competitive advantage is often dependent on the extent to which IT plans reflect business plans (Kearns & Lederer, 2003). It has specifically been argued that while physical assets and tangible resources can be replicated by competitors, especially those with deep pockets, long-term advantage in the market often depends on the gradually developed expertise of the people who are able to blend IT and business concerns in the organizational strategic planning process (Earl, 1996); this is believed to be true even in the case of SMEs born with an export-focus (e.g. Redding, 1990).

However, certain nuances of the Chinese culture seem to suggest an alternate perspective. As discussed earlier, the Chinese culture adheres to Confucianism and paternalism, where the bosses make the key strategic decisions based on intuition, experience and knowledge (Martinsons & Westwood, 1997). There is very little formal business planning, and the bosses seldom view IT as having a defining role in the firm; instead IT is ascribed an operational/automational role (e.g. Quan *et al.*, 2005). In summary, IT planning is rarely integrated into the strategic thinking and planning (Martinsons & Westwood, 1997), and will thus have a minimal effect on the firm's performance.

H4: Business IT strategic thinking will not have an effect on the performance of export-focused SMEs in China.

IT business process integration and firm performance

This dimension refers to the firm's ability to streamline existing business processes through the use of IT (Bharadwaj *et al.*, 1999). While acknowledging the fact that IT-enabled process integration often enables firms to improve cross-functional processes, thereby becoming more flexible and agile, we note that such efficiency and cross-unit integration is critical in *large* firms, which tend to be compartmentalized into silos, and consist of a large number of complicated interdepartmental processes (Grover *et al.*, 1995). The relevance of such IT-enabled process integration and business process restructuring is relatively lower (if at all) for small firms, which are inherently quite flexible and adaptive (Biggeri *et al.*, 1999).

Further, in Chinese firms, values associated with Confucianism and paternalism are manifested through the presence of bosses who often maintain tight control over information in order to retain power (Martinsons & Westwood, 1997; Davison, 2002). Studies suggest that

these bosses tend to relegate IT to the role of automating non-critical activities rather than of integrating business processes, which would make sensitive cross-functional information available across the organization (Quan *et al.*, 2005). Finally, because of guanxi and high-context communication, informal networks in the Chinese social context are said to be more effective in enabling cross-functional coupling and coordination (Fu *et al.*, 2001), rather than technological enablers such as shared databases and e-communication mechanisms that are seen as effective in large US organizations (Grover *et al.*, 1995). Hence, we believe that IT business process integration will not provide significant benefits to export-focused SMEs in China.

H5: IT business process integration will not have an effect on the performance of export-focused SMEs in China.

IT management and firm performance

This dimension refers to the firm's ability to effectively implement IT project management practices, systems development practices and IT evaluation and control systems, among others. Effective IT management requires skills, such as managerial skills and problem solving skills, in addition to core technical skills (Feeny & Willcocks, 1998; Bharadwaj, 2000).

Managerial skills includes effective management of IS functions, coordination and interaction with the user community and project management and leadership skills (Bassellier *et al.*, 2001). The managerial ability to coordinate the multifaceted activities associated with the successful IT implementation is a key distinguishing feature of successful firms. Problem solving skills refer to the ability to analyse and resolve problem situations, and are valuable to smaller firms, such as export-focused SMEs, in enabling superior marketing and cost reductions (Duncombe & Heeks, 2003).

Further, the principles of Confucianism emphasize the importance of superior skills, education, knowledge and hard work for enhancing order, efficiency and effectiveness. As a result, increasingly, the Chinese society is witnessing a growth in the IT skills of its workforce. As IT (including PCs and the internet) penetrates deeper into Chinese enterprises (Quan *et al.*, 2005), and the SME workforce is becoming involved with more knowledge-intensive work, professionals who can competently manage IT resources are becoming critical to ensuring that there are no redundancies in technical resources, and there is consistency in the IT policies throughout the enterprise (Bharadwaj *et al.*, 1999). This, we believe, would enhance firm performance (Srikantaiah & Dong, 1998).

H6: IT management will have a positive effect on the performance of export-focused SMEs in China.

Integrative IT infrastructure and firm performance

Integrative IT infrastructure has been described as an important organizational capability that can be an effective source of value (Bharadwaj, 2000). A firm's IT infrastructure is comprised of its computer and communication technologies and its shareable technical platforms and

databases. In today's environment, highly integrated IT infrastructure can provide firms with the ability to: (a) share information across different functional units; (b) innovate; (c) exploit business opportunities; and (d) be agile in responding to changes in the environment or business strategy (Cantwell, 2001), and therefore serve as a source of competitive advantage (Barney, 1991).

However, it needs to be noted that most of the studies verifying the benefits of an integrated infrastructure were conducted on large firms. Recent studies on SMEs have suggested that small firms do not realize significant benefits by deploying integrated IT infrastructure (e.g. Shin *et al.*, 2007). In addition, several dimensions of the Chinese culture suggest that integrated infrastructure is not likely to result in better performance of Chinese SMEs. Consistent with Confucianism, many Chinese managers tend to keep important information in-group, viewing information as an instrument of power (Martinsons & Westwood, 1997). Further, a focus on guanxi and high-context communication prompts Chinese managers to share sensitive information depending on personal relationships when appropriate (Chow *et al.*, 2000; Davison, 2002; Xue *et al.*, 2005). Thus, fortified islands of operational and financial data rather than open integrative systems are likely to benefit Chinese organizations, including export-focused SMEs (Krone *et al.*, 1992). Finally, the pictographic Chinese language and its related characteristics (e.g. the use of homonyms) make the use of integrated information within a Western framework difficult and unproductive. We thus argue:

H7: Integrative IT infrastructure will not have an effect on the performance of export-focused SMEs in China.

We summarize the hypotheses in Figure 2 and in Table 1.

RESEARCH METHOD

Sample and data collection

To test our proposed model, a survey methodology was used. Our objective in this study was not only to test the hypothesized relationships in the context of Chinese export-focused SMEs, but also to develop an empirically validated model that may be generalized to all other Chinese export-focused SMEs. A survey methodology was thus seen as appropriate for meeting these objectives (Dale, 2006). The survey was administered to SMEs in China that were export-focused from their inception. To overcome potential problems arising from postal systems and the lack of reliable archival data (Li & Atuahene-Gima, 2001), instead of the 'mail survey' approach, we used the alternate 'key informant technique' that is recommended for such contexts (e.g. Lambe *et al.*, 2002). Consistent with this approach, members of top managements were first contacted to make sure that they were willing to participate in the study. Data was collected using an on-site interview, whereby a trained interviewer completed the questionnaire based on the responses of a designated key informant in the organization (Li & Atuahene-Gima, 2001; Bhatt & Grover, 2005).

Our data collection effort focused on organizations located in and around Chengdu and Zhengzhou in Western and Central China respectively. We would like to note that owing to the

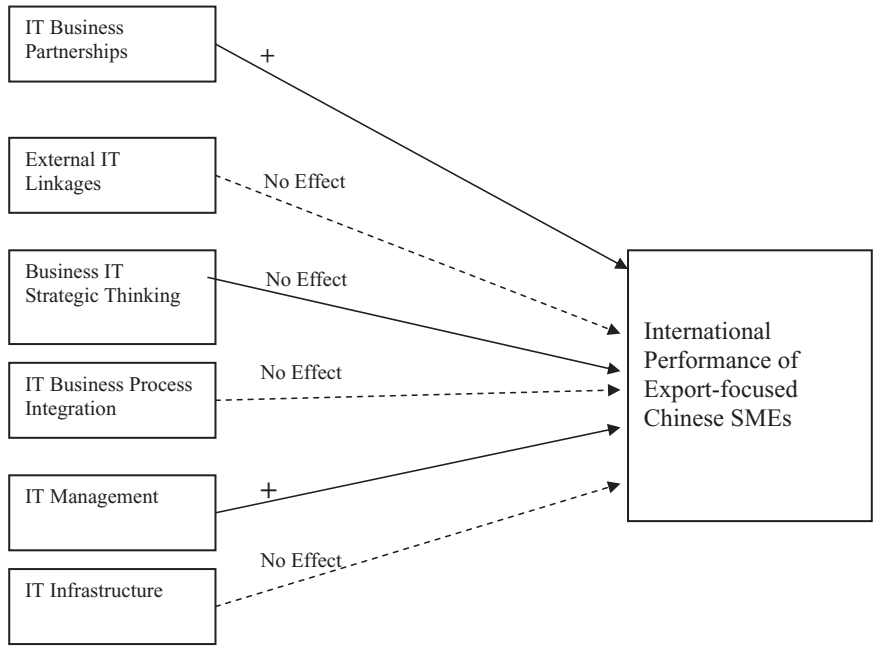

Figure 2. The hypothesized impact of IT capability components on international performance.

vastness of (and the diversity in) the country, identifying a representative sample is virtually impossible. Prior studies on Chinese firms have concentrated their data collection efforts in one/two regions (e.g. Christmann & Taylor, 2001), as in this study. While we acknowledge that focusing on specific regions can potentially limit the generalizability of a study, we believe that the culture of these two regions we have chosen is reasonably similar to many other parts of the country, and the results from this study can be generalized, albeit cautiously, to rapidly developing as well as developed regions in China. Chengdu, the fourth major city in China, is the focal point of the Great Western Development Strategy, an initiative undertaken by the Chinese government to economically develop the western and central regions of China, and has thus witnessed significant industrialization and economic growth over the last few years. Similarly, Zhengzhou (a hub of the Eurasian Continental Bridge) is undergoing significant economic development, and is currently an important gateway to frontier trade. Cultural researchers (e.g. Ralston *et al.*, 1995) argue that transformation of a region from underdevelopment to development brings forth changes in people's values and cultures, such that they increasingly converge towards the culture and value systems of the more industrialized regions. Thus, it may be argued that people/collectives in Chengdu and Zhengzhou would be increasingly *similar* in values (and culture) to rapidly developing as well as developed regions of China. Further, given that prior research on China has focused primarily on more economically advanced cities such as Shanghai, focusing on these two upcoming regions of China may be valuable in itself.

Table 2. Sample demographic characteristics

Characteristic	China sample
Number of employees	
Mean	256
Standard deviation (SD)	240.6
Ages of the firms	
Mean	6.68
SD	5.80
IT investment (in US dollars)	
Mean	1.2×10^6
SD	6.2×10^6
Sales revenue (in US dollars)	
Mean	6.0×10^6
SD	1.2×10^7

Top management of 180 of the 240 firms contacted agreed to participate in the study. Our data collection efforts finally yielded 136 completed questionnaires, all from manufacturing firms. Missing data and list-wise deletion further reduced the current analytic sample to 99, for an effective response rate of 55%. Table 2 presents descriptive statistics of the responding firms.

Measures

All measures used in the survey were adapted from established studies (see Appendices I and II). The specific dimensions of IT capability were drawn from the instrument developed by Bharadwaj *et al.* (1999). The measures of each of the dimensions in this scale were considered 'reliable and valid', and were found to have good psychometric properties (cf. Wade & Hulland, 2004).

Firm performance, especially of large and multinational organizations, is often measured using objective financial indicators. However, objective financial measures are difficult to obtain in the case of Chinese SMEs, since such firms prefer to keep a high-level of secrecy regarding the specifics of their business operations and are 'sensitive' to the public disclosure of financial data (Siu *et al.*, 2004). Thus, studies involving Chinese SMEs typically use self-assessed measures of performance (Siu *et al.*, 2004). Given that our study is focused on Chinese export-focused SMEs, we used self-assessed measures of international performance. Specifically, we drew on a scale developed by Zou *et al.*, (1998) to measure international performance of firms in Asia, which has also been utilized extensively in prior authoritative work in international business (e.g. Morgan *et al.*, 2000; Dow, 2006). The scale incorporates prior conceptualizations of export performance (e.g. financial and strategic), and also takes into consideration the firm's performance relative to its competitors.

All the instruments were professionally translated to Chinese, with back-translation and refinements undertaken by two independent bilinguals, as suggested by Douglas & Craig (1983).

Analysis technique

PLS-Graph (Chin & Frye, 2003) version 3.00 was used for analysing the data. The PLS analysis technique has been viewed as superior for small to medium sample sizes, and when the model has second-order factors, as in this study (e.g. Chin *et al.*, 2003).

Instrument validation

To assess the validity of the instrument, a confirmatory factor analysis was conducted. Adequate *convergent validity* was confirmed based on the following: (a) all items loaded significantly on their respective constructs, and none of the items had a loading below 0.50 (Hulland, 1999); (b) the composite reliabilities of each of the items were above 0.70 (Hulland, 1999); and finally, (c) the average variance extracted (AVE) of all the constructs were over the threshold value of 0.50. In assessing the *discriminant validity*, we ensured that the square root of the AVE of a construct exceeded all correlations between that factor and any other construct within the study (Gefen & Straub, 2005) (see Tables 3 and 4).

Hypothesis testing

Next, we examined the significance and strength of our hypothesized relationships. To test our first hypothesis (i.e. the effect of the overall multidimensional construct of IT capability on performance), we used a model that incorporated second-order factors. Specifically, we created a hierarchical component model using repeated manifest variables (Chin *et al.*, 2003). All of the path coefficients from IT capability to its six dimensions were high, with coefficients for four of the six paths being over 0.70 (Chin *et al.*, 2003), the others being adequate (0.643 and 0.679). This suggested that our second-order factor was indeed indicated by the underlying first-order factors. Further, results indicated that the overall multidimensional IT capability has a significant positive effect on the international performance of born-globals in China ($b = 0.632$, $p < 0.001$), supporting H1.

For testing hypotheses 2–7, we set up a path model with direct linkages from each of the dimensions of IT capability to performance. H2 posited that IT business partnerships will have a significant effect on the performance (or 'international performance', which we use interchangeably with 'performance' here). This hypothesis was supported ($b = 0.188$, $p < 0.05$). H3, which suggests that external IT linkages will not have a significant effect on the performance was also supported ($b = 0.116$, $p > 0.10$). H4, where we had argued that business IT strategic thinking will not have an effect on performance, was not supported ($b = 0.182$, $p < 0.10$). The data seems to indicate that IT strategic thinking does have an effect (albeit marginal) on performance. H5, which argued that IT-enabled business process integration will not affect the performance, was supported ($b = –0.011$, $p > 0.10$). Results also indicated that IT management has a significant effect on performance ($b = 0.515$, $p < 0.01$), thereby supporting H6. Finally, results indicated that IT infrastructure has a significant negative effect on performance, contrary to expectations that it would not have an effect ($b = –0.204$, $p < 0.10$). Thus, H7 was not supported. We summarize the results in Table 5.

Table 3. Mean, standard deviation (SD) and loadings of the items

Scale item	Item mean	Item SD	Item loading	Mean loading*
IBP1	4.343	1.400	0.7330	0.7180
IBP2	4.989	1.182	0.8055	0.8016
IBP3	5.020	1.088	0.8765	0.8762
IBP4	4.515	1.265	0.7572	0.7483
IBP5	4.485	1.343	0.6986	0.6946
EIT1	5.364	1.138	0.8173	0.8073
EIT2	5.444	1.052	0.8824	0.8797
EIT3	5.384	1.226	0.8562	0.8623
BIT1	5.394	1.211	0.8676	0.8616
BIT2	5.465	1.109	0.8013	0.7921
BIT3	5.657	1.271	0.8776	0.8723
BPI1	5.293	1.162	0.8550	0.8570
BPI2	4.778	1.274	0.7067	0.6533
BPI3	4.717	1.415	0.8073	0.7562
ITM1	4.061	1.570	0.8559	0.8555
ITM2	4.232	1.490	0.8802	0.8764
ITM3	4.354	1.534	0.7883	0.7691
ITM4	4.121	1.500	0.8208	0.8166
ITM5	5.667	1.187	0.5944	0.5838
ITM6	4.081	1.549	0.8628	0.8559
INF1	3.748	1.587	0.9311	0.9219
INF2	4.010	1.600	0.9296	0.9349
INF3	3.707	1.668	0.8573	0.8318
PERF1	4.364	1.249	0.8590	0.9594
PERF2	4.374	1.234	0.8814	0.8891
PERF3	4.505	1.366	0.8461	0.8436
PERF4	4.879	1.394	0.9090	0.9074
PERF5	4.677	1.369	0.8982	0.8956
PERF6	4.657	1.401	0.8993	0.8998

*Mean item loadings were calculated using the bootstrap algorithm with 200 subsamples; all mean loadings are significant at $p < 0.01$.

IBP, information technology business partnerships; EIT, external information technology linkages; BIT, business information technology strategic thinking; BPI, information technology business process integration; ITM, information technology management; INF, information technology infrastructure; PERF, performance.

DISCUSSION

In general, the results indicated support for the expected effect of IT capability and its dimensions on the performance of Chinese SMEs with export-focus from their birth. Overall, as hypothesized, IT capability was found to have a significant positive effect on the performance. Further, IT business partnerships and IT management had significant positive effects on performance, while external IT linkages and IT-enabled business process integration did not make any significant differences on performance.

Table 4. Composite reliabilities, correlation between constructs, and square root of AVEs

Construct	Composite reliability	1	2	3	4	5	6	7
IT business partnerships	0.883	0.777						
External IT linkages	0.888	0.485	0.853					
Business IT strategic thinking	0.886	0.637	0.461	0.849				
IT Business process integration	0.834	0.565	0.310	0.760	0.792			
IT management	0.917	0.587	0.471	0.514	0.426	0.806		
IT infrastructure	0.933	0.529	0.410	0.472	0.337	0.708	0.907	
Performance	0.955	0.545	0.444	0.521	0.420	0.592	0.377	0.883

Table 5. Results of hypotheses testing

Hypothesis number	Independent variables	Dependent variable	Path coefficients/ *p* value	Hypothesis support
H1	Overall IT capability	International Performance of export-focused SMEs in China	0.632 ($p < 0.001$)*	Yes
H2	IT business partnerships		0.198 ($p < 0.05$)†	Yes
H3	External IT linkages		0.122 ($p > 0.10$)	Yes
H4	Business IT strategic thinking		0.209 ($p < 0.10$)	Yes; marginal
H5	IT business process integration		–0.017 ($p > 0.10$)	Yes
H6	IT management		0.455 ($p < 0.01$)	Yes
H7	IT infrastructure		–0.193 ($p < 0.10$)	No; marginally significant, and in a negative direction

*Variance explained by IT capability is 0.400.

†The variance explained by the separate dimensions of IT capability on performance is 0.460.

One of the surprising results was related to the role of the integrative IT infrastructure. Drawing on recent literature on the effect of integrated infrastructure in SMEs and considering relevant aspects of the Chinese business practices, it was hypothesized that such platforms would not have any significant effect on a firm's performance. Interestingly, the results indicated that this construct has a negative effect, albeit marginally (at $p < 0.10$), suggesting that investments in integrated IT infrastructure tend to lower the international performance of export-focused SMEs in China. While initially this result seemed unexpected, a closer examination of the literature on SMEs seems to provide some support to this negative effect. For example, Dhungana (2003, p. 19) argues that 'SMEs can ill-afford the high costs involved in adopting . . . integrated solutions known as enterprise resource planning (ERP) . . . and run the risk of being driven out of business'. ERP implementation is especially challenging to SMEs in China because of high implementation costs, technological complexity, lack of IT infrastructure and lack of well-trained employees (He, 2004). Finally, building an integrated IT infrastructure requires an open system of communication and work, where all authorized users have access to the majority of the features of a system (e.g. Davison, 2002). Such an access works well in countries with an open culture. However, in China, information is often treated as an individual, rather than an

organizational resource (Martinsons, 1991), and thus, information systems that were designed based on values that are inconsistent with the culture are destined to fail. Further, as Autio *et al.* (2000) suggest, SMEs that are export-focused from inception, continually operate in new and dynamic environments, and have business processes that need to frequently change or reconfigure. ERP solutions often do not have the flexibility to 'easily adapt to changing business practices' and end up being more expensive for such firms (Liang *et al.*, 2004).

While the study offers a number of interesting findings for export-focused Chinese SMEs, we believe that like most others, it does have potential limitations.

Limitations

One of the limitations arises from the specific research methodology employed. We used a cross-sectional survey technique to collect the data, where the same respondent provided assessment of the predictor and the criterion variables. While this is not an uncommon practice, recently, some researchers have raised common method variance (CMV) concerns regarding such studies (Podsakoff *et al.*, 2003). While our study could have potentially been affected by CMV, we believe that it is not a concern here, because of the three following reasons: (a) the use of established instruments (as in this study) reduces the threats associated with CMV (Podsakoff *et al.*, 2003); (b) we conducted the widely known Harmon's single-factor test to check for CMV (e.g. Bhatt & Grover, 2005), which indicated that CMV was not a major problem; and (c) our confirmatory factor analysis, viewed as a 'sophisticated test' of CMV (Podsakoff *et al.*, 2003, p. 889), also revealed that the items had higher loadings on their respective factors (as opposed to other factors).

However, another limitation in the study could have resulted from the fact that the survey was administered to export-focused SMEs located in two particular regions of China (i.e. Chengdu and Zhengzhou). While it may be argued that because of recent developments, these regions share similar cultural characteristics as other rapidly developing or economically advanced parts of the country, we believe that future research needs to examine other more developed and less developed areas in China in an effort to increase the study's generalizability.

CONCLUSION

This study sought to examine the effect of IT capability on the performance of export-focused SMEs in China, especially those that focus on international markets from their inception. While such SMEs have been growing rapidly over the last few years in China, they constantly face challenges arising from their 'foreignness' and 'resource scarcity'. One of the factors recognized to have the potential for enhancing their effectiveness and performance is IT capability, though the role of IT capability remains unclear in SMEs in general, and uninvestigated in the Chinese context. Our study, we believe, is among the first studies empirically establishing the need for 'born' export-focused SMEs in China to invest in IT capability, since this capability tends to positively affect both their financial and strategic performance. We believe this to be an important practical contribution of the study.

Further, by 'unpacking' the various dimensions of IT capability and examining their differential effects on performance, the study highlights the specific dimensions (i.e. aspects) of IT capability that such firms should invest in, thereby allowing them to get the most return from their investments. Future directions include investigating the factors that prompt these firms to develop their IT capabilities.

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Biographies

Man Zhang is an Assistant Professor of International Business at Bowling Green State University, Bowling Green, Ohio. Her research has been published in the *Multinational Business Review*, *Information Systems Journal*, *Journal of International Business and Economics*, *Journal of Academy of Business and Economics* and *ICIS Proceedings*.

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Appendix I

Items measuring IT capability

IT capability (six factors) (Bharadwaj *et al.*, 1999)
IT business partnerships (5 items)
- We have multi-disciplinary teams to blend business and technology expertise
- We have good relationship between line management and IT service providers
- We have good line management sponsorship of IT initiatives
- There is a climate that encouraging risk taking and experimentation with IT
- There is a climate that nurture IT project championship

External IT linkages (3 items)
- We have technology based links with customers
- We have technology based links with suppliers
- We use IT based entrepreneurial collaborations with external partners

Business IT strategic thinking (3 items)
- There is clarity of vision regarding how IT contributes to business value
- There is integration of business strategic planning and IT planning
- Management has the ability to understand value of IT investments

IT business process integration (3 items)
- There is consistency of IT application portfolios, which is a set of different types of IT applications, with business processes.
- We restructure business work processes to leverage opportunities.
- We restructure IT work processes to leverage opportunities.

IT management
- Effectiveness of IT planning
- IT project management practice
- Planning for security control, standards compliance, and disaster recovery
- Systems development practices
- There is consistency of IT policies throughout the enterprise
- IT evaluation and control systems

IT infrastructure (3 items)
- Appropriateness of the data architectures
- Appropriateness of network architectures
- Adequacy of architecture flexibility

Appendix II

Items measuring performance of export-focused SMEs

International performance of the firm (adapted from Zou *et al.* 1998)
Has been very profitable
Has generated a high volume of sales
Has achieved rapid growth
Has improved our global competitiveness
Has strengthened our strategic position
Has significantly increased our global market share

