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Drivers and export performance impacts of IT capability in 'born-global' firms: a cross-national study

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Abstract. *Past research focusing on large firms has argued that information technology (IT) capability enhances firm performance. However, these studies have seldom explored why firms develop IT capability, and have also left a void the understanding of the role of IT capability in Small- and medium-sized enterprises (SMEs). This study attempts to fill that void by examining the effect of relevant environmental and firm-level factors on IT capability, and the effect of IT capability on the export performance of Chinese and US born-global firms, a special breed of export-focused SMEs. Results indicate that environmental factors such as information intensity, and firm-level factors such as international entrepreneurial orientation, prompt born-global firms to develop IT capability. Further, our results also strongly emphasise the positive role that IT capability plays on the performance of born-global firms. Finally, a comparative analysis of the Chinese and US born-global firms revealed a lack of a cross-cultural difference in the factors leading these firms to develop IT capability, therefore supporting the 'convergence' perspective in cross-cultural research.*

Keywords: IT capability, born-global firms, resource-based view, international market performance, export-focused SMEs, national culture and IT

INTRODUCTION

Small- and medium-sized enterprises (SMEs) make significant contributions to the global economy. SMEs not only play important roles in developed countries, such as the USA, but

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Table 1. Possible differences between large firms and SMEs

Category	Large firms	SMEs (including born-global firms)
Scope of operations	Greater, in diverse markets	Less
Resources	Relatively abundant	Resource-poor
Flexibility	Not high	Flexible and efficient, but bound in complicated organizational structures (e.g. Pratten, 1991)
Research and development (R&D)	Higher resources available and spent for R&D and maintenance	Little or no resources available for R&D and maintenance (Johnston & Wright, 2004)
Relationship with supply chain	Greater control; and therefore can demand services and quality from vendors, etc.	Little control over vendors, and believes in 'responsible behavior' from them (Perrini *et al*., 2007)
Strategy/management style	Disperse production globally and likely to adopt single sourcing (Tam *et al*., 2007)	Prefer multiple sourcing and use combination of in and outsourcing
Knowledge management	Employees and artefacts sources of knowledge	Social interaction-based
Management	Formal	Informal approaches, less likely to commit to written policies (e.g. Gray & Mabey, 2005)

also make a significant contribution to developing countries, such as China. For example, in China they contribute to 99% of the country's enterprises, 40% of gross domestic product, 60% of exports and 75% of job opportunities (LEAD International, 2003). While about 600 000 new SMEs establish business each year, more than 500 000 existing SMEs face closure (Small Business Administration Office of Advocacy). How to survive the challenges of changing environment and competition is a critical question for SMEs. For many scholars, developing and utilising appropriate information technology (IT) capability is part of the answer.

According to Rivard *et al*. (2006, p. 30), the 'contribution of Information Technology (IT) to the achievement of business objectives is an important management issue', both for academics and for practitioners in today's digitised world. On similar lines, Feeny *et al*. (2003, p. 115) note that the 'role of IT capabilities as sources of sustained competitive advantage is now well-known'. It is thus not surprising that 'numerous studies' have sought to examine the role of IT capability on a firm's competitive advantage and performance (Rivard *et al*., 2006, p. 30). While prior research has undoubtedly informed our understanding of the IT capability construct and its impact on firm performance (e.g. Bharadwaj, 2000; Bhatt & Grover, 2005), a review of the literature suggests that studies seldom explore *why firms develop IT capability*. Also, empirical examinations on IT capability have typically been conducted primarily on *large North American* firms. Yet, past research shows that knowledge based on large firms can not automatically be considered valid for small- or even medium-sized businesses (e.g. Hunter, 2004).

Indeed, SMEs differ from large firms in various ways (see Table 1 for a summary). Apart from suffering from resource constraints and having other structural differences, SMEs also differ from large firms in the type of strategy they use for achieving competitive advantage. Specifi-

cally, SMEs tend to rely on using informal social networks (termed as 'guanxi' in China, 'Kankei' in Japan, 'immak' in Korea, or 'blat' in Russia) to serve as the initial basis from which formal networks of business linkages are developed and through which exporting relationships are formed (Styles & Ambler, 1994; Ellis, 2000; Ellis & Pecotich, 2001; Sapienza *et al*., 2005). Unlike large firms, SMEs also often have to reconfigure themselves at short notice, including building new processes and business models, complementary assets and methods in an effort to take advantage of new opportunities that may come up unexpectedly (Jantunen *et al*., 2005).

Given (a) that SMEs currently constitute a significant proportion of the economies of countries, especially those of developing nations such as China; (b) that many SMEs around the world fail within the first few years of their inception (e.g. Watson & Everett, 1996); and (c) that SMEs differ from large firms in multiple ways, we believe that it is particularly important to specifically study IT capability of SMEs in today's global context.

Recently, a special breed of *young and export-focused SMEs* has drawn the attention of academics as well as consultants. These organisations, sometimes referred to as *born-global firms*, enter the global marketplace soon after their inception, in many cases, by-passing the domestic market (e.g. Knight & Cavusgil, 1996). One of the striking features of born-global organisations is that, despite their 'resource poverty', they need to develop a unique set of capabilities that would allow them to leapfrog the stages of internationalisation and compete effectively with firms having access to much larger resource pools (Kundu & Katz, 2003). *IT capability*, one of the key organisational capabilities associated with today's organisations (Barney & Clark, 2007), has a potentially important role to play in the success of born-global firms, which need to rapidly gain access to distant markets; to acquire, integrate and assimilate information about markets and competitors; to maintain a tight network of relationships within the firm and with external partners; and to develop a high level of agility/efficiency in order to deal with the dynamic global environment (e.g. Feeny & Willcocks, 1998; Knight & Cavusgil, 2004). Indeed, Arenius *et al*. (2006) suggest that born-global firms can realise 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 transportation, etc., to foreign markets and lack of familiarity with the foreign nation's business environment) and from *resource scarcity*. IT can help mitigate the effects of both of these inhibitors. Others suggest that 'technological capability' in SMEs is an enabler of global competitiveness (Dhungana, 2003, p. 7). Moreover, in uncertain environments, firms must rapidly innovate, adapt and reconfigure themselves to match the changing environment. IT capabilities can help firms to respond to uncertain environments with access to information, enhanced information flows and enhanced collaboration (El Sawy & Pavlou, 2008). Yet, research offers little guidance on the circumstances that prompt born-global firms to develop IT capability, and what the impacts of such capability are, in born-global firms. Thus, we seek to offer a contribution in this important arena by addressing a set of related research questions:

RQ1: What key factors lead born-global firms to develop their IT capability?

A secondary research objective of this study is to confirm, in the context of born-global firms, what is accepted in the literature for larger firms – the fact that IT capability of export-focused born-globals has an impact on their international performance. Formally:

RQ2: Is higher level of IT capability associated with stronger international performance of born-global firms?

We examine the abovementioned research questions through an empirical study of born-global firms in China and the USA. We selected born-global firms from the two countries as part of our sample due to a number of reasons. First, born-global firms exist throughout the developing and the developed world, contributing significantly to their national exports. Second, their prospects are believed to be particularly promising in developing countries, such as China, where a large proportion of revenues for SMEs come from exports. Third, the USA and China are seen as being distinct in terms of a number of factors such as economic development and especially culture (e.g. Martinsons & Westwood, 1997). We believe that a comparison between these two diverse nations, where export-focused SMEs play an important role in their respective economies (OECD, 1997), can potentially reveal interesting insights regarding IT capability, and shed light on the third research question:

RQ3: What (if any) are the differences in the antecedents and consequences of IT capabilities arising from the differences in national contexts of the born-global firms?

THEORETICAL FOUNDATION OF THE STUDY

Born-global firms

Born-globals are SMEs that engage in international operations soon after their inception (e.g. Knight & Cavusgil, 1996; 2004; Rialp *et al*., 2005). Different terms have been used to define born-globals, such as international new ventures, global start-ups, instant exporters, instant internationals, amongst others (e.g. Rialp *et al*., 2005). Irrespective of the terms used, it is widely acknowledged that such firms 'go international' soon after formation (Rialp *et al*., 2005, p. 135), breaking the rules of stage-wise internationalisation, typically associated with traditional and large organisations. Based on prior research (e.g. Knight & Cavusgil, 1996; Rasmussen & Madsen, 2002), we define born-global firms as *young* (i.e. 'born' after 1980) and *export-focused* (i.e. having export sales of at least 25%) *SMEs* (i.e. having less than 500 employees).

Research model

In developing our model, we drew on prior research that highlights the important role of both firm-level factors (e.g. Earl & Feeny, 1996) and environmental factors (e.g. Clemons, 2003) on a firm's initiative to develop IT capability. Earl & Feeny (1996) argue that there are three *firm-level 'imperatives'* (or drivers) of IT in global firms: (1) They not only strive to achieve

economies of scale but also 'go further' in an effort to seek/create new international opportunities – such a characteristic has been referred to as *international entrepreneurial orientation* (Knight & Cavusgil, 2004). (2) They focus on local responsiveness to markets and customer needs around the globe – this is referred to as *international marketing orientation* (e.g. Cavusgil & Zou, 1994). (3) They focus on knowledge creation and sharing, both within and across functional units and locations – this is referred to as the organisation's *learning orientation* (e.g. Sinkula *et al*., 1997). In this paper, we examine the influence of these three firm-level factors on IT capability.

In addition, researchers point to *environmental uncertainty* and *information intensity* as being two key *environmental factors* affecting the role of IT in enhancing the business performance of organisations (e.g. Bhatt, 2000; Clemons, 2003; Kearns & Lederer, 2004). Specifically, it has been argued that these two factors can 'influence the effectiveness of planning mechanisms and the firm's ability to earn adequate returns on IT investments' (Kearns & Lederer, 2004, p. 900); thus, these variables are also included in our model.

Finally, consistent with resource-based view (RBV)-based arguments, which suggest that IT is a form of organisational capability that can be developed into a valuable, rare and not easily imitable asset, thereby having a significant effect on firm performance (e.g. Bharadwaj, 2000; Wade & Hulland, 2004), we also sought to examine the effect of *IT capability* on born-global firms' *international performance*.

IT capability

IT capability is a complex construct and has been in the past conceptualised as managerial capabilities or as technological capabilities (Zhang *et al*., 2008a). Recently, researchers have proposed a more integrative view of IT capability, suggesting that it is composed of technical skills and information technologies within the firm (i.e. the technology components), as well as the managerial resources (e.g. Bharadwaj *et al*., 1999; Bharadwaj, 2000; Bhatt & Grover, 2005). Within the information systems (IS) discipline, the rich multidimensional RBV-informed conceptualisation of IT capability by Bharadwaj *et al*. has been widely adopted. Bharadwaj *et al*. (1999) define IT capability as *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*, and suggest that the IT capability construct is composed of six underlying dimensions (pp. 379–381). They are IT business partnerships, external IT linkages, business IT strategic thinking, IT business process integration, IT management and IT infrastructure.

IT business partnerships refer to the firms' ability 'to foster rich partnerships between the technology providers and technology users' (Bharadwaj *et al*., 1999). In other words, this sub-construct captures the existence of dialogue between business and IS professionals and the development of users' understanding of IT's potential. *External IT linkages* refer to the 'technology based linkages between the firm and its key business partners' (Bharadwaj *et al*., 1999). Specifically, it refers to IT such as extranets and other electronic distribution channels that can facilitate sophisticated interactions between suppliers and customers and foster the sharing of useful knowledge (Zaheer & Venkatraman, 1994). *IT business strategic thinking*

reflects the importance of integrating IT and business strategy (Feeny & Willcocks, 1998) and is concerned with the 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). The sub-construct of *business process integration* refers to the firm's ability to streamline existing business processes through the use of IT (Bharadwaj *et al*., 1999). IT-enabled process integration enables firms to improve cross-functional processes, which tend to be compartmentalised into silos, and consist of a large number of complicated interdepartmental processes, thereby making an organisation more flexible and agile. *IT management* refers to the firm's ability to effectively implement IT project management practices, systems development practices, IT evaluation and control systems, etc. Finally, a firm's *IT infrastructure* is composed of its computer and communication technologies, its technical platforms and its shared data stores (e.g. Bharadwaj, 2000). Wade & Hulland (2004) suggest that this multidimensional definition of IT capability proposed by Bharadwaj *et al*. helps clarify how IT capability affects a firm's financial and strategic performance. Given this acknowledgement, and the inclusive and comprehensive nature of the definition, we adopt the same in this study.

Environmental factors and IT capability

Kearns & Lederer (2004) argue that the two key environmental factors, environmental uncertainty and information intensity, affect the 'IT focus of the firm', and hence the extent to which a firm develops its IT capability. This, we believe, is true for born-global firms as well, where the need for information technologies and related capabilities is expected to depend on the *environmental uncertainty* in the export-market environment and the *information intensity* associated with the product/service exported.

Environmental uncertainty refers to 'those situations where the probability of the outcome of events is unknown' (Duncan, 1972, p. 317). Literature suggests that environmental uncertainty is composed of three components (Duncan, 1972, p. 317): (1) the lack of clarity of information; (2) the time span in which feedback is received; and (3) the uncertainty in the causal relationships.

Kearns & Lederer (2004, p. 902) note that uncertain environments create need for more innovation, and consequently, firms facing such environments rely more heavily on IT-related capabilities. Specifically they argue that environmental uncertainty: (a) places time constraints on decision-making; (b) requires that the IT plan be aligned with the business plan; and (c) needs IT resources to 'continue to support business strategies and take advantage of emerging opportunities'. All of these requirements increases a firm's dependency (and by extension, its investments) on IT capability (Kearns & Lederer, 2004). Further, it has been argued that during times of environmental uncertainty, superior capabilities of collecting information (e.g. IT) can enable a firm to 'stumble' upon unexpected information, which can be beneficial in achieving competitive advantage (Barney & Clark, 2007, p. 45). Similar to large firms, born-global firms also have high information processing/acquisition needs in uncertain environments (e.g. Karimi *et al*., 2004), and this, in turn, should prompt decision-makers to develop greater IT capability.

H1: There is a positive relationship between environmental uncertainty and IT capability in born-global firms.

Similar to environmental uncertainty, the *information intensity* may also be argued to drive an organisation's development of its IT capability. Information intensity is the extent to which organisations dealing with certain products/services are dependent on information (Bhatt, 2000; Kearns & Lederer, 2003). Teo & King (1997a,b) suggest that in high information-intensive industries, operation of products or services require substantial information processing. For example, firms operating in industries with complex products, such as an aircraft, require substantially more information than in industries with simple products, such as furniture (Kearns & Lederer, 2003). It has been argued that firms operating in more information-intensive environments are likely to make a higher level of investment in IT capability (e.g. Teo & King, 1997a,b; Kearns & Lederer, 2004) so as to maintain their ability to rapidly change business processes, products and activities (Bhatt, 2000).

H2: There is a positive relationship between information intensity and IT capability in born-global firms.

Firm factors and IT capability

As discussed earlier, drawing on the suggestions of Earl & Feeny (1996), our model proposes the effect of three different firm-level factors on IT capability in born-global firms. The factors are: international marketing orientation, international entrepreneurial orientation and organisational learning.

International marketing orientation refers to a mindset associated with the achievement of superior performance by focusing on and being responsive to the needs of customers located in other countries (e.g. Cavusgil & Zou, 1994). Specifically, marketing orientation has been defined as the process of: (1) generating marketing intelligence; (2) disseminating marketing intelligence; and (3) responding to marketing intelligence (e.g. Kohli & Jaworski, 1990). Knight & Cavusgil (2004, p. 130) define it as '*a managerial mindset that emphasizes the creation of value, via key marketing elements, for foreign customers*'. Pelham (2000) suggests that firms with such an orientation must have greater flexibility and better capacity for speeding up innovation. Such firms would need to gather and analyse more information about customers' needs and to interact more efficiently with them, and thus strive to develop superior IT capability.

H3: There is a positive relationship between international marketing orientation and IT capability.

International entrepreneurial orientation refers to the firm's overall innovativeness and proactiveness in the pursuit of international opportunities (Knight & Cavusgil, 2004). McDougall & Oviatt (2000, p. 903) define it as 'a combination of innovative, proactive and risk-seeking behavior that crosses national borders'. Having an international entrepreneurial orientation implies that these firms make a 'leap' into several international markets, as opposed to gradual

expansion across national borders (e.g. McDougall *et al*., 1994). Such entrepreneurial firms continually seek new capabilities, including technologies, that improve organisational performance (e.g. Zahra *et al*., 2000; Choi & Shepherd, 2004) and enable them to plan flexibly, set realistic goals and make strategic changes responsibly. They thus, frequently depart from existing ways of work and invest in new technologies (Lumpkin & Dess, 1996), which provide analytical decision-making support and open networking possibilities with potential partners.

H4: There is a positive relationship between international entrepreneurial orientation and IT capability in born-global firms.

Organisational learning orientation refers to an organisational focus towards creating, disseminating and utilising knowledge for smooth adaptation to marketplace changes as well as for questioning taken-for-granted organisational values and practices and revising them (Sinkula *et al*., 1997). A learning orientation influences what kind of information is gathered, how it is interpreted, evaluated and shared (e.g. Dixon, 1992; Sinkula *et al*., 1997). Earl & Feeny (1996), amongst others, argue that a focus on learning usually prompts an organisation to invest more on the informating capabilities of IT, such as superior communication networks for fostering sharing and learning, and globally accessible knowledge bases and related processes for codifying and distributing scarce expertise and best practices.

H5: There is a positive relationship between organisational learning orientation and IT capability.

IT capability and international performance

The positive relationship between IT capability and firm performance has been validated in prior research (e.g. Bhatt & Grover, 2005). Barney & Clark (2007, p. 156) suggest that several dimensions of IT including IT management skills (based on the 'socially complex relations within the IT function, between the IT function and other business functions in a firm, and between the IT function and a firm's suppliers and customers'), amongst others, can enhance a firm's competitive advantage. It has been argued that IT capability can potentially lead to high performance in export-focused organisations as well due to the following reasons: (1) the pursuit of high value-added applications of IT to maintain a competitive edge (Feeny & Willcocks, 1998); (2) the reduction of costs for communicating with foreign customers/suppliers and for gathering information about foreign competitors; and (3) the support/enhancement of distinctive competencies and skills in other business functions (Prasad *et al*., 2001). While we are not aware of empirical studies specifically exploring the impact of IT capability on international performance of born-global firms, fragmented literature on SMEs indicates that such firms are also likely to benefit. Arenius *et al*. (2006) e.g. suggest that born-global firms can realise superior international performance by developing greater IT capability, especially given that IT has the ability to mitigate the effects of two key constraints faced by these organisations – the liability of foreignness and resource scarcity.

H6: There is a positive relationship between IT capability and the performance of born-global firms.

Cross-cultural differences in the predictors of IT capability

Our third research question in this study was directed towards understanding the cross-national differences (if any) in the predictors and effects of IT capability. As discussed earlier, China and the USA have distinct cultures. China differs significantly from Western cultures on many established cultural dimensions (e.g. it has high power distance and high collectivism as opposed to Western nations such as the USA, which have low power distance and high individualism). In addition, there are other aspects of the Chinese culture that affect how IT is perceived and utilised. We discuss these cultural characteristics below.

Based largely on Confucianism, the Chinese management culture is known to emphasise issues such as personal relationships amongst people, morality and organisational citizenship behaviour, control by a 'paternalistic' figure and harmony within organisations (Bond, 1991; Pun *et al*., 2000). In Confucianist China, managers tend to avoid the use of IT-based communication, because it can potentially lead to status equalisation (Martinsons & Westwood, 1997). The Chinese business culture also adheres to 'horizontal coordination' through guanxi and 'personal networks' (Hofstede, 2001, p. 362; Shin *et al*., 2007). Because of this emphasis on guanxi and personalism, Chinese organisational members initiate and maintain contact and communication through written memos and face-to-face interaction (Martinsons & Westwood, 1997) rather than IT. Further, Davison & Ou (2010) have also argued that owing to guanxi and the reliance on 'in-group' communications, the Chinese preference for communication and knowledge sharing technologies are also different. Instead of formal knowledge repositories and communication portals, informal, low-budget tools, such as IMs or blogs, which are synergistic with informality and flexibility, and are also affordable for resource-poor SMEs, have been more preferred. Another unique Chinese cultural characteristic is termed as 'adjusting trust' (Du *et al*., 2011b). This type of trust refers to the relationship that originates from the interactive adjustment of trust amongst a trustor and a trustee, in an effort to keep a balance between a trustor and a trustee. Such adjustments often occur without the intervention of IT.

Further, the Chinese culture also emphasises high-context communication (e.g. Davison, 2002). The inability of IT to appropriately capture the context results in many Chinese managers finding little value in the use of IT for both internal and external communication, especially in situations of high uncertainty or high information intensity. Finally, the nature of Chinese language makes it a challenge to translate systems developed by Western organisations to the Chinese language, accurately and thoroughly (e.g. Zhang *et al*., 2008b). Even if they are translated, significant rework is often required, leading to inefficiencies, and a lessened effect of IT on the performance (Davison, 2002).

H7: Drivers of IT capability and the effect of IT capability on the performance of born-global firms will be different in China and in the USA.

RESEARCH METHOD

Data collection

To test the hypothesised relationships, we used a survey methodology. First, the survey was administered to born-global firms in China in 2004. Consistent with the widely accepted definition of born-global firms by Knight & Cavusgil (1996), we operationalised born-global firms as follows: (1) these firms were established after 1980 (i.e. they are relatively young) and entered foreign markets from or soon after their inception; and (2) international sales constitute *at least* 25% of their total sales, indicating strong export focus.

In China, to overcome problems related to the absence of adequate postal systems and lack of reliable archival data (Li & Atuahene-Gima, 2001), instead of the 'mail survey' approach, the alternate (and often recommended) 'key informant technique' was used (e.g. Lambe *et al*., 2002). In order to increase the accuracy of our data, prior to administering the surveys, they were pilot tested. Data were collected using an on-site interview, whereby a trained interviewer completed the questionnaire based on the responses of a designated key informant in the organisation (e.g. Li & Atuahene-Gima, 2001; Bhatt & Grover, 2005). This practice contributed to gaining access to the right respondents, to ensuring correct/consistent understanding of the terms and to obtaining more accurate responses (Li & Atuahene-Gima, 2001). Our data collection effort focused on organisations located in and around Chengdu and Zhengzhou in Western and Central China, respectively. Top management of 180 of the 240 firms contacted in China agreed to participate in the study. Our data collection efforts finally yielded 136 completed questionnaires. Given that our study was focused on born-global firms (which, as mentioned earlier, are a type of SMEs), from this data set of 136 completed questionnaires, we deleted those firms that had more than 500 employees (this is an often used, although not universally accepted criterion for organisations to be classified as SMEs). Deletion of the firms with greater than 500 employees and having other missing data reduced the Chinese data set to 81 firms.

Next, the survey was administered to firms in the USA. In the USA, firms were identified primarily via two databases: *Directory of United States Exporters* and *CorpTech Directory of Technology Companies (version 2000)*. Data collection in the USA yielded 185 complete questionnaires. After applying the same criteria used for the Chinese sample (consistent with the criteria of Knight & Cavusgil, 2004), the USA data set was reduced to 66 firms.

The descriptive statistics of the sample (i.e. age, number of employees, exports) are provided in Table 2, showing that the firms were young SMEs, with high proportion of revenues coming from exports.

Measures

All measures used in the survey were adapted from established studies. In preparing for data collection in China, the scales were professionally translated to Chinese, with back-translation

Table 2. Descriptive statistics of the sample

Characteristic	Total sample	China subsample	US subsample
Number of employees			
Mean	137	202	57
Standard deviation	151	162	84
Ages of the firms (years)			
Mean	12.15	8.71	16.36
Standard deviation	6.74	5.42	5.75
Current percentage of foreign sales (%)			
Mean	59.22	65.94	50.97
Standard deviation	24.66	26.09	20.05

and refinements undertaken by two independent bilinguals, as suggested by Douglas & Craig (1983). Unless otherwise stated, items were measured on a scale of 1 (strongly disagree) to 7 (strongly agree).

IT capability, the core construct in this study, was measured using the scale 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 (Wade & Hulland, 2004). Further, the scale had been validated in prior studies based on a survey of senior executives, and thus seen as appropriate for our study, which also uses organisational survey data.

Firm performance, especially of large and multinational organisations, is often measured using objective financial indicators. However, objective financial measures are difficult to obtain in the case of SMEs or 'born-globals', *especially in China*. Consequently, in this study, we drew on a scale developed by Zou *et al*. (1998) to measure perceived international performance of firms. The scale incorporates two components of export performance: financial and strategic. Further, the scale also takes into consideration the firm's performance relative to its competitors, which has been viewed as a superior approach to measuring performance (Wade & Hulland, 2004).

All of our independent variables were measured by drawing on existing instruments. *Information intensity* was measured using Bhatt's (2000) scale, which adapts Teo and King's instrument to assess global firms. *Environmental uncertainty* was measured using Karri's (2001) scale, which is a recent modified version of Duncan's (1972) well-established instrument, and assesses both the environmental turbulence that an organisation faces and the level of technological uncertainty in which an organisation operates. We measured *international marketing orientation* and *international entrepreneurial orientation* using Knight & Cavusgil's (2004) scale that has been widely adopted in the context of born-global firms. Finally, *organisational learning orientation* has been typically measured using a variety of different scales (e.g. Sinkula *et al*., 1997; Hurley & Hult, 1998). In this study, we have drawn on Hurley & Hult's (1998) scale. Please see Appendix I for the instruments.

Analyses and results

In order to assess our research questions 1 and 2, in the first phase of the data analysis, we tested our model using our entire sample of born-global firms (i.e. our sample consisted of both Chinese and USA born-global firms). Partial least squares (PLS)-Graph version 3.00 (free software developed by Dr. Wynne W. Chin) was used for analysing the data. Our choice of the analysis technique (partial least square) was based on the following considerations: (1) PLS works well with small to medium sample sizes (Chin, 2001; Chin *et al*., 2003); and (2) PLS has been shown to be a superior technique when the model has second-order factors (e.g. Chin *et al*., 2003), such as IT capability and international performance in this study. In the first stage, we assessed the validity and reliability of the measurement model, and in the second stage, we assessed the hypothesised relationships (e.g. Chin, 2001; Gefen & Straub, 2005).

VALIDITY AND RELIABILITY

We first assessed the item validities (including significance and magnitude of factor loadings), followed by the estimation of the average variance explained, construct reliability and discriminant validity. All *items loaded significantly* on their respective constructs (Gefen & Straub, 2005). Further, most items had a *loading above 0.70*, and none of the items (retained for the analysis of the hypothesised relationships) had a loading below 0.50 (Hulland, 1999); (2) the *composite reliabilities* of each of the items were above 0.70 (Hulland, 1999); and finally, (3) the average variance extracted (AVE) of all but one of the constructs were over the threshold value of 0.50[1] (see Table 3, which shows square roots of the AVE on the main diagonal). We would like to note that our initial confirmatory factor analysis revealed that one item for each of the constructs – information intensity, environmental uncertainty and IT management had a loading less than 0.50. Consistent with prior research (e.g. Hulland, 1999), these items were dropped from the sample prior to analysing the hypothesised relationships.

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, as suggested in prior research (Gefen & Straub, 2005) (please see Table 3).

HYPOTHESIS TESTING

To test our hypotheses, we created a hierarchical component model using repeated manifest variables (to address the issue of second-order factors), following the guidelines of Chin *et al*. (2003). Specifically, we repeated the manifest variables (or measurement items) for the multiple dimensions of IT capability and international performance twice: once for each of the dimensions, and once for the second-order factors. All of the path coefficients from IT

[1]Environmental uncertainty had an AVE of 0.449 that may be considered fairly close to 0.50.

Table 3. Composite reliabilities, correlation between constructs and square root of AVEs (Average variance extracted)

Construct	Composite reliability	1	2	3	4	5	6	7	8	9	10	11	12	13
Information intensity	0.829	**0.741**												
Environmental uncertainty	0.801	0.410	**0.670**											
International market orientation	0.813	0.242	0.193	**0.771**										
International entrepreneurial orientation	0.904	0.208	0.157	0.438	**0.809**									
Organizational learning orientation	0.866	0.131	0.020	0.185	0.230	**0.787**								
IT business partnerships	0.909	0.293	0.197	0.176	0.327	0.370	**0.817**							
External IT linkages	0.881	0.365	0.248	0.078	0.166	0.078	0.397	**0.844**						
Business IT strategic thinking	0.897	0.335	0.137	0.105	0.363	0.306	0.523	0.370	**0.863**					
IT business process integration	0.848	0.278	0.134	0.129	0.289	0.334	0.519	0.119	0.645	**0.807**				
IT management	0.919	0.302	0.263	0.308	0.312	0.265	0.486	0.210	0.258	0.230	**0.834**			
IT infrastructure	0.940	0.221	0.308	0.283	0.256	0.200	0.440	0.051	0.279	0.254	0.614	**0.916**		
International financial performance	0.906	0.188	0.200	0.482	0.449	0.262	0.134	-0.097	0.092	0.180	0.215	0.281	**0.873**	
International strategic performance	0.945	0.255	0.258	0.429	0.550	0.290	0.214	0.116	0.200	0.209	0.246	0.253	0.726	**0.922**

Bold-faced numbers: square roots of AVE.

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capability to its six dimensions were high and significant, with coefficients for three of the six paths being over 0.70[2] (Chin *et al*., 2003). Similarly, both the path coefficients from overall performance to financial and strategic performance were over 0.70. This suggested that our second-order factors were indeed indicated by the underlying first order factors.

Results also provide support for most of the hypotheses in our model. Hypothesis 1 predicted that information intensity would have a significant effect on IT capability. This hypothesis was supported ($b = 0.250$, $p < 0.01$). Hypothesis 2, where we predicted that environmental uncertainty would play a positive role on IT capability, was also supported ($b = 0.150$, $p < 0.05$). Contrary to expectations, Hypothesis 3, where we predicted that international marketing orientation would positively affect born-global firms' IT capability, was not supported ($b = 0.008$, $p > 0.10$). Hypothesis 4, which predicted the positive effect of international entrepreneurial orientation on IT capability, was supported ($b = 0.283$, $p < 0.01$). Similarly, organisational learning orientation had a positive effect on IT capability, supporting Hypothesis 5 ($b = 0.294$, $p < 0.01$). The environmental and firm factors explained 38.9% of the variance in IT capability. Finally, as hypothesised in Hypothesis 6, IT capability had a significant positive effect on international performance of born-global firms ($b = 0.284$, $p < 0.01$), explaining approximately 8.1% of the variance on the international performance. We summarise the results in Figure 1 and in Table 4 (column 2).

Cross-national analysis

In order to empirically assess Hypothesis 7, we split our data set into two parts: one consisting of the firms in China ($n = 81$) and the other consisting of firms in the USA ($n = 66$). We then tested our model separately using the two data sets. For the most part, results are fairly consistent with the test of the model using the entire data set. That is, in both China and the USA, information intensity, environmental uncertainty, international entrepreneurial orientation and organisational learning orientation had a significant (or marginally significant) positive effect on IT capability (see Table 4). Consistent with the results based on the entire data set, international marketing orientation did not have a significant effect on IT capability. Finally, IT capability had a significant effect on the international performance of the born-global firms in both countries. We note that while the effect of some of the predictors were significant at $p < 0.10$ (especially in the case of the US firms), it is possible that these significance levels are artefacts of low sample size measurement variable ratio, rather than indicative of weak relationships.

DISCUSSION OF THE RESULTS

Drawing primarily on RBV and research on IT capability in large firms, this study posited a number of relationships linking potentially relevant *environmental* and *firm-level factors* to the

[2]The coefficient of the paths from IT capability to external IT linkages, IT business process integration and IT infrastructure were 0.443, 0.647 and 0.668, respectively, which we believe is adequate.

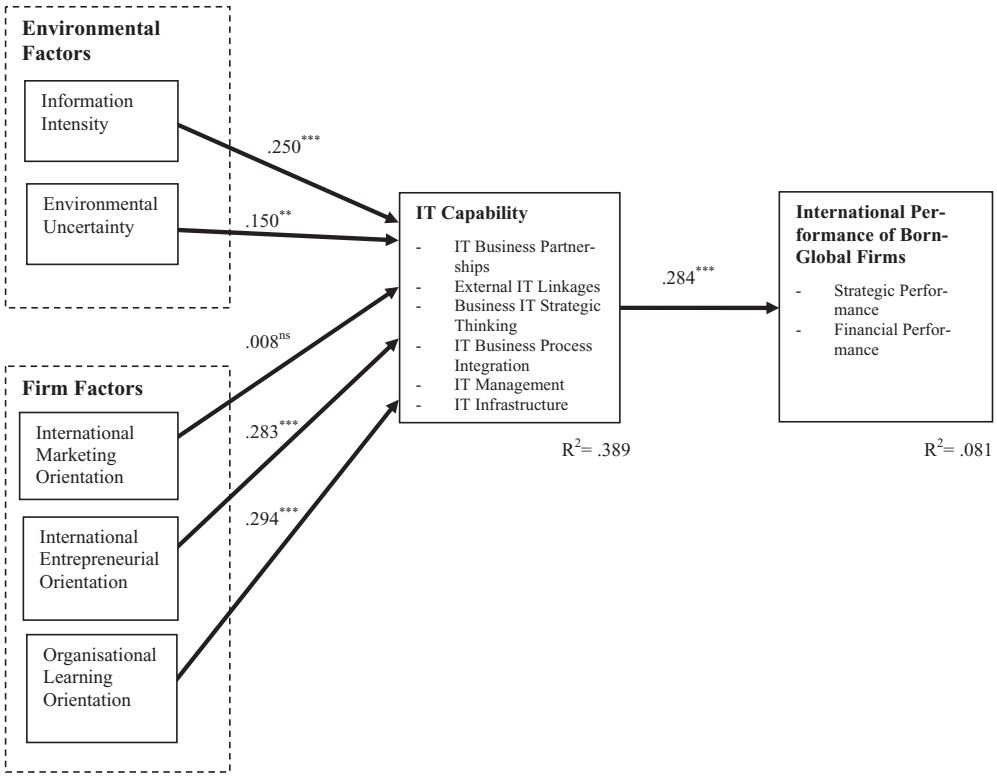

Figure 1. IT capability model of born-global firms with path coefficients.

Table 4. Final results

Nature of the effect	Entire sample (hypothesis support)	China sample only ($n = 81$)	US sample only ($n = 66$)
Information intensity → IT capability	0.250*** (H1 supported)	0.266***	0.199**
Environmental uncertainty → IT capability	0.150** (H2 supported)	0.214*	0.161*
International market orientation → IT capability	0.009 ns (H3 not supported)	0.030 ns	0.025 ns
International entrepreneurial orientation → IT capability	0.283*** (H4 supported)	0.334***	0.280**
Organizational learning orientation → IT capability	0.294*** (H5 supported)	0.246***	0.287***
IT capability → international performance	0.284*** (H6 supported)	0.429***	0.321***

***$p < 0.01$; **$p < 0.05$; *$p < 0.10$; ns, not significant.

level of IT capability in *born-global firms* and the *IT capability of the firms* to *their international performance*. All but one relationship (international marketing orientation → IT capability) were found to be significant. Overall, the results validate the theory suggesting that certain firm-level orientations and environmental conditions indeed prompt born-global organisations to develop

IT-based competencies that then become valuable in helping the firms survive and/or thrive in the hypercompetitive global marketplace. We believe *more research is needed* to make sense of the result indicating that international market orientation does not influence IT capability. One possible explanation we offer is that born-global firms with high market orientation tend to rely more on hands-on experiential observations, personal relationships and face-to-face connections (e.g. Vaughan, 1999) of owners, managers or personnel, rather than on activities that are enabled by IT capabilities, such as *computer-mediated* relationship management and *systematic* acquisition, analysis and dissemination of data about markets. Specifically, the lack of the significant relationship can be explained by the idea of 'creolisation' (Abbott *et al*., 2010), which encompasses four interconnected processes in cross-cultural interactions: boundary spanning, cultural hybridity, mixed identity and network expansion. In cross-cultural interactions involving firms, the four processes of creolisation (either in together or separately) play an important role. Indeed, 'creoles', who span boundaries, act as bridge heads with mixed identity and cultural hybridity and are constantly expanding their networks not only play important role in cross-cultural communication but also on knowledge exchange and relationship management (Abbott *et al*., 2010). It can be argued that, owing to the high extent of cross-cultural interactions that born-global firms engage in, these firms (even those with high market orientation) tend to take more comfort in relying on 'creoles' for gaining information about their customers and reaching out to them than on the activities that are enabled by IT capability.

One of the objectives of this study was also to assess the cross-cultural *differences* in the drivers and effects of IT capability in Chinese- and US-based firms. While our initial expectation (based on the unique cultural characteristics of China as compared with the USA) was that different drivers would lead to IT capability in born-globals in China and in the USA, our results indicated otherwise. In fact, the results suggest that there is uniformity in the predictors of IT capability in born-global firms irrespective of the national context (which may also be attributed to the idea of creolisation due to which all international-focused firms irrespective of their national contexts rely on similar techniques for cross-cultural interactions). This result may also be explained by drawing on existing research on national/cultural contexts.

Two different research traditions guide studies associated with national/cultural contexts – the divergence perspective and the convergence perspective. Researchers adopting the *divergence* perspective argue that national cultural differences shape organisational behaviours and that 'there is no culture free context of organizations' (Sorge, 1982/3, p. 136). The *convergence perspective*, on the other hand, holds that 'the logic of industrialism will eventually lead us all to a common society where ideology will cease to matter' (Kerr *et al*., 1960, p. 101), with the implication that 'management philosophies and practices around the world should become more and alike' (Hofstede, 2001, p. 34).

While the IS discipline has paid considerable attention on the role of culture (e.g. Leidner & Kayworth, 2006), and have derived rich insights on technology implementation and use in different cultural contexts, much of the prior research has adopted the divergence perspective, examining the role of *cross-cultural differences* in a variety of IS-related phenomenon of interest (e.g. Tan *et al*., 1998). Our research, on the other hand, suggests that little cross-cultural differences exist in the drivers of IT capability and the effect of IT capability on the

international performance of born-global firms. This is particularly interesting, given that the firms in the study were embedded in the diverse home contexts of China and the USA. We believe that this result is an indication of the strong effects of globalisation on born-global firms and lends support to the convergence hypothesis.

The convergence hypothesis suggests that efforts by organisations to survive in an uncertain global arena create similarities amongst the organisations and lead them to model after each other (DiMaggio & Powell, 1991; Stohl, 2001). We believe that the above perspective could apply to born-global firms, which benefit from modelling themselves after other born-global organisations that they perceive as successful (DiMaggio & Powell, 1991), irrespective of their national origin. Further, owing to the fact that born-global organisations are relatively young, it may be argued, that 'reliance on established, legitimated procedures of peers enhances the born-global firms' 'legitimacy and survival characteristics' (DiMaggio & Powell, 1991, p. 75). Finally, simultaneous operations in multiple foreign markets require born-global firms to be agile and prepared to adjust themselves to the changing environments of the foreign nations. Owing to this, such firms find it 'easier to mimic other organisations than to make decisions on the basis of systematic analyses of goals since such analyses would prove painful or disruptive' (DiMaggio & Powell, 1991, p. 75), or even time consuming (which born-global organisations can ill afford). We would like to emphasise that we are not proposing that there are no differences amongst individuals or organisations embedded in distinct national cultures; instead, we are highlighting a particular case where due to certain unique characteristics and circumstances faced by born-global firms, the *convergence* rather than the divergence perspective provides a meaningful explanation.

Limitations and future research

One potential limitation of the study arises from the specific research methodology employed. We used a cross-sectional survey technique to collect the data, where a single respondent provided assessment of the predictor and the criterion variables. Recently, some researchers have raised common method variance (CMV) concerns regarding such studies (Podsakoff *et al*., 2003). However, our use of established instruments (Podsakoff *et al*., 2003), the widely known Harmon's single-factor test (e.g. Podsakoff *et al*., 2003; Bhatt & Grover, 2005), and confirmatory factor analysis, viewed as a 'sophisticated test' of CMV (Podsakoff *et al*., 2003, p. 889), suggest that our study is not significantly affected by this form of data collection.

Another possible limitation of the study arises from the low sample size, especially in examining our third research question, which involved splitting the data set into two. While, the ratio of sample size to the number of measurement variables in the study was low for the cross-cultural analyses, given that the results were significant, we may infer that sample size was not a major concern.

One more possible limitation of our study could be related to the fact that we did not specifically examine the role of the type of business that the born-global firm is engaged in on their IT capability. It is likely that an IT outsourcing supplier might have greater IT capability

compared with an export-oriented manufacturer (Du *et al.*, 2011a). Future research will need to specifically examine the role of the nature of business on a born-global firm's IT capability.

Finally, while we have alluded to the role of creolisation in our study (especially in explaining some of our results), we have not explicitly examined its role in the context of IT capability. Because creoles might also need to rely on IT to communicate with foreign partners, future research should examine the role of creolisation on a born-global firm's IT capability.

IMPLICATIONS AND CONTRIBUTIONS

Theoretical implications

In terms of theoretical directions for research focusing on export-focused SMEs, this study suggests that RBV provides a potentially useful lens for investigating aspects of born-global firms, for which traditional theories such as monopolistic advantage theory (Caves, 1982), product life cycle theory (Vernon, 1966) and stage theory of internationalisation (Johanson & Vahlne, 1977) have not proved to be particularly useful (McDougall *et al.*, 2003). Wade & Hulland (2004, p. 110) argue that RBV provides the 'groundwork for a set of mutually exclusive and exhaustive information systems assets and capabilities' and provides a 'useful way to measure the strategic value of IS resources'. Our study confirms that there are benefits to using RBV to assess the IT capability, its antecedents and its effects on the strategic value (i.e. international performance) in the born-global context.

More broadly, for the IS discipline, the study reaffirms that *IT capability does play an important role*, particularly in born-global firms in the USA and China, two diverse national contexts. Further, the implication for research on export-focused SMEs, which appears to focus solely on the traditional business functions such as marketing, HR, and finance (e.g. Ball *et al.*, 2006) while paying little attention to IS, is that *it needs to direct attention to the importance of understanding (and investing in) IT-based systems* in firms with a global scope.

Finally, the study makes an important contribution to the existing body of cross-cultural research in IS. As discussed earlier, cross-cultural research in general draws on either the divergence or the convergence perspective. Our study indicates that in the context of born-global organisations, which are dynamic, young and follow rapid internationalisation, *the convergence perspective explains much of their technology-related behaviours and outcomes*. Our hope is that this study will contribute to the awareness of the community of global IT scholars that the divergence and the convergence perspectives 'capture the dialectical tensions inherent in the globalization' (Stohl, 2001, p. 326), and will caution us against the *unquestioning use* of one particular view. Indeed, it would be useful to identify contingency factors that determine when the convergence or the divergence perspective becomes relevant. Moreover, organisational culture is strongly influenced by national culture. Future research should focus more on how the interaction between organisational culture and national culture influence the development of IT capability. In addition, the impact of IT capability may be socially contingent (Nakata *et al.*, 2008). Future research might explore social contingencies of IT capability. Such variables can be organisational identification (Ashforth & Mael, 1989), and

Guanxi (Davison, 2002) network, if study is taken in Asian context. Additionally, qualitative, in-depth methods may offer insights on the dynamics of IT impacts.

Practical implications

The study also offers some important practical contributions. First, the study highlights the importance of IT capability to the performance of born-global firms. Given that born-global firms are 'resource-poor' and have to make decisions regarding resource allocations very carefully, the study's results should be seen as an encouraging sign by managers/owners of such firms that resources spent in developing IT capability is not a 'waste', and has a significant effect on their performance. Managers should realise this point when it comes to carefully selecting where to allocate their scarce resources. IT capability should be near the top of their list.

The results of our study also provide highlights to born-global firms in high information intensity and uncertain environments that they should heavily invest in their IT capability. Specifically, managers of firms in high information intensity industries/products can use their IT capability to offer more customised products/services to their customers, thereby realising high performance. Similarly, it is also important for firms in uncertain environments to invest in IT capability, as such investments can help them develop the required agility, the necessary sense and response capabilities to help counterbalance the uncertainty. Such capabilities also foster internal innovation.

Further, our results also indicate that investments in IT capability require some understanding of the firm's internal culture as well. Specifically, if the firm emphasises a strong learning orientation, and has fostered an entrepreneurial spirit, then it should invest strongly on IT capability. Strong IT infrastructure can help such firms sustain the required high levels of innovation, collaboration and communication, characteristic of highly entrepreneurial and learning firms, and thereby enable higher performance.

Conclusion

As we have discussed earlier, our study on born-global firms examines the effect of relevant environmental and firm-level factors on IT capability, and the effect of IT capability on the export performance of such firms in both China and the USA. Results from our survey of Chinese and US born-global organisations indicate that environmental factors such as information intensity and firm-level factors such as international entrepreneurial orientation prompt born-global firms to develop IT capability. Results also strongly confirm that IT capability affect the performance of born-global firms. Consistent with the 'convergence' perspective in cross-cultural research, our comparative analysis of the Chinese and US born-global firms revealed no differences in the factors affecting the development of IT capability. While our study offers several theoretical and practical contributions, and also outlines certain avenues for future research, clearly, there is much to be learned about the role of IT capability in these new organisational forms operating in the global arena, and we hope this study provides a much-needed impetus and a useful step in this direction.

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Appendix I. Instrument for measuring the drivers and consequences of it capability in born-global firms

IT capability (6 sub-constructs) (Bharadwaj *et al*., 1999)

IBP	**IT business partnerships (5 items)**
	We have multidisciplinary 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 encourages risk taking and experimentation with IT
	There is a climate that nurtures IT project championship
EIT	**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
BIT	**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
BPI	**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
ITM	**IT management (6 original items; however, item 5 was dropped from the analysis due to its poor psychometric properties)**
	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
INF	**IT infrastructure (3 items)**
	Appropriateness of the data architectures
	Appropriateness of network architectures
	Adequacy of architecture flexibility
IMO	**International marketing orientation (3 items)** (Knight & Cavusgil, 2004)
	Knowledge of customers and competitors
	Marketing planning process
	Effectiveness of distribution
IEO	**International entrepreneurial orientation (5 items)** (Knight & Cavusgil, 2004)
	Top management tends to see the world as our firm's marketplace
	The prevailing organisational culture at our firm is conductive to active exploration of new business opportunities abroad
	Management continuously communicates its mission to succeed in international markets to firm employees
	Management develops human and other resources for achieving our goals in international markets
	Our top management is experienced in international business

Appendix I. Cont.

OL	**Organisational learning orientation (4 items)** (Hurley & Hult, 1998)
	Our firm provides opportunities for individual development other than formal training
	Our firm encourages managers to attend formal developmental activities such as training, professional seminars, symposia, etc.
	There are people at our firm who provide guidance and counsel regarding one's career
	Career management is a shared responsibility of both employee and the manager
INTENT	**Information intensity** (Bhatt, 2000) **(5 original items; item 2 was dropped from the analysis due to its poor psychometric properties)**
	The firm needs a lot of product/service-related information for customisation
	The product/service is complex to understand or use correctly
	The product/service R&D requirements are high
	The selling of product/service requires specialised knowledge
	Customers need a lot of product/service-related information for ordering products/services
ENVIR	**Environment uncertainty** (Karri, 2001) **(6 original items; item 2 was dropped from the analysis due to its poor psychometric properties)**
	Competition in product quality
	Differences in product standards
	Adapting products for overseas markets
	Finding new markets for our products
	Emerging low-cost competitors
	Emergence of new technologies
Firm's international performance (2 sub-constructs) (Zou *et al*., 1998)	
FP	**Financial performance (3 items)**
	Has been very profitable
	Has generated a high volume of sales
	Has achieved rapid growth
SP	**Strategic performance (3 items)**
	Has improved our global competitiveness
	Has strengthened our strategic position
	Has significantly increased our global market share