

**INFORMATION TECHNOLOGY CAPABILITY, ORGANIZATIONAL
CULTURE, AND EXPORT PERFORMANCE**

By

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To the Faculty of Washington State University:

The members of the Committee appointed to examine the dissertation of
MAN ZHANG find it satisfactory and recommend that it be accepted.

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INFORMATION TECHNOLOGY CAPABILITY, ORGANIZATIONAL CULTURE, AND EXPORT PERFORMANCE

Abstract

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Drawing on research in both international business and information systems, the goal of this dissertation seeks a better understanding of the relationship between information technology capability, organizational culture, and export performance in the context of born global firms. To fulfill this purpose three empirical studies are presented in this dissertation and are used to develop a theoretical model. To test the generalizability of the proposed model, data are collected from both China and the U.S.

The first empirical study reviews the literature on IT capability and develops a scale to measure IT capability. The results show that IT capability is a multidimensional construct consisting of four components, namely: IT architecture, IT human resource, IT infrastructure, and IT relationship resource. The second empirical study examines differences in how IT capability is perceived in China and the U.S. The third empirical study takes the resource-based view and argues that IT capability can be viewed as one of the firm's resources, and when leveraged well, will lead to better performance. It also argues that international marketing orientation, international entrepreneurial orientation, and organizational learning directly affect IT capability.

The central contributions of this dissertation are: first, it identifies and thereafter develops and validates an instrument to measure IT capability in the context of born global firms; second, it advances the literature of culture influence on IT implementation by investigating how Chinese business culture impacts IT capability in China; third, it integrates literature on international business, organizational culture, and information systems by investigating the influence of IT capability on firms' export performance; fourth, it contributes to the RBV by supporting the perspective that a firm's competitive advantage and performance are a function of complex inimitable resources that are embedded within the organization.

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CHAPTER ONE

INTRODUCTION

Overview

This dissertation investigates born global firms' IT capability and organizational culture in relation to export performance by means of three empirical studies. The dissertation begins with a scale development of IT capability. The second empirical study investigates the differences between perceived IT capability in China and the U.S. The third one examines the relationships between organizational culture, IT capability, and firm performance in international markets using primary data. In this introduction, the phenomenon of born global is first described. The purpose of the study, the major research question, and the scope of the study are then presented. Organization of the dissertation is also provided.

The 'Born Global' concept

Historically, many multinational enterprises (MNEs) developed from large, mature, domestic firms. However, recent technological innovations and the presence of increasing numbers of people with international business experience have established new foundations for MNEs (Oviatt and McDougall, 1994). The use of low-cost communication technology and transportation means enables small and young firms with limited resources to compete successfully in the international arena with older, established firms. The *Organization for Economic Co-operation and Development*, in 1997, reported that perhaps 1-2% of emerging business is now international at inception

and that the speed with which emerging businesses internationalize is accelerating (OECD, 1997). This phenomenon is called 'born global'. A born global is defined in this study as a production firm with an export percentage compared to total sale of 25% or more, which started exporting within three years after the firm's foundation. The concept of 'born global' was coined in a survey for *The Australian Manufacturing Council* by the consultants McKinsey (McKinsey and Company, 1993) and Rennie (Rennie, 1993). The consequences of this new type of exporters are clearly stated by Tamer Cavusgil in the first scholarly article about born global firms in 1994:

“There is emerging in Australia a new breed of exporting companies, which contribute substantially to the nation's export capital. The emergence of these exporters though not unique to the Australian economy, reflects two fundamental phenomena of the 1990s: 1) Small is beautiful 2) Gradual internationalization is dead.”

(Cavusgil, 1994, p.18)

Based on existing literature, the born global firms are said to possess the following characteristics (Jolly, Alahuhta, and Jeannet, 1992; Knight and Cavusgil, 1996):

- A global vision on the part of the founders early in the company's growth;
- A high-quality innovative product that based on a fundamental redefinition in an industry;
- A standardized product with early success in lead markets;
- Broad and rapid market access to build volume quickly;
- An early emphasis on follow-on products and breadth of competence; and,

- The creation of a tightly networked global organization.

In order to explain the differences and similarities between born global firms and other types of exporters, Madsen, Rasmussen and Servais (2000) conducted an empirical study and found that born global firms have a distinctive profile: they have a high share of foreign sales and resemble the most internationally oriented exporters with respect to internal capabilities and competitive platforms as well as their geographic scope. In the same vein, McDougall, Oviatt, and Shrader (2003) found that this type of firm is significantly different on the basis of entrepreneurial team experience, strategy, and industry structure. They are more entrepreneurially oriented, they use more aggressive strategies, and they operate in more channels of distribution. They compete on the basis of differentiation and place greater emphasis on satisfying customer needs. All of these are the foundation of their organizational culture, which is one of the most important driving forces in their internationalization process.

Prevalence of born global and the role of information technology (IT)

Several scholars and reports have identified changes and driving forces leading to the emergence of born global firms (e.g., Knight and Cavusgil, 1996; Madsen and Servais, 1997; Oviatt and McDougall, 1999). One common finding is the usage of information technology (IT) (Johnson, 2004).

IT has been an integral part of the operational and competitive environment of large organizations for many years. The continuing evolution in hardware and software technologies has led to a spiraling decline in IT costs for all organizations, such that even

the smallest of business organizations can afford to purchase needed IT. And the arrival of affordable broadband has permanently changed the small and medium sized enterprises (SME) IT landscape. *Beckett* (2003) reported that some 43% of SMEs were already hooked up to *Asymmetric Digital Subscriber Line* (ADSL) and 62% welcomed the faster Internet speeds broadband can deliver. Yet, the research findings, i.e., problems, solutions, and benefits of using IT that relate to the larger organizations may not necessarily apply to smaller firms such as born global firms (Riemenschneider and Mykytyn 2000) which are characterized by small size and reliance on cutting edge technology in the development of relatively unique products or process innovations.

Unlike traditional companies, management at born global firms does not see foreign markets as simple adjuncts to the domestic market: they begin exporting one or more products within a few years of their establishment and tend to export at least 25% of total production (McKinsey & Co., 1993). What responsible for this global pattern of SME growth lies in the dynamic interrelationships between changing consumer preferences, changing manufacturing and information technologies, and changing competitive conditions (Rennie, 1993).

Traditionally, it has been thought that firms need to build a strong domestic base before venturing into overseas markets. One reason is the high fixed costs of entering a new market at a distance, including the costs of gaining market information and of managing agents or representatives to provide quick, effective sales and service response. Dramatic changes have occurred in both these activities. Marketing theory argues that people seek information from a variety of sources when faced with risk or uncertainty. Specially, the greater the perceived risk of making a wrong decision, the greater the

propensity to engage in information search (Yeoh, 2000). In order to deal with these risks, small born global firms heavily depend on information technology because it has substantially lowered storage and retrieval costs (Rennie, 1993; Johnson 2004; Autio, Sapienza, and Almeida, 2000). Earlier studies predicted that it would be SME businesses that were more likely to adopt and benefit from IT because of their greater flexibility. Yet there is still limited research about smaller firms benefiting from it (Riquelme, 2002).

Culture and information technology (IT)

Business globalization has demanded rapid and efficient flows of information. The worldwide spread of information technology is well documented, with diffusion from developed to developing countries and the newly industrialized economies in Asia (Mody and Dahlman, 1992). There is little doubt that the diffusion and acceptance of IT has been as rapid in East Asia as anywhere in the world. Nonetheless, the United States remains the world leader in IT. Despite this rapid diffusion and indigenous development of IT, East Asia has not followed the U.S. in terms of sophisticated and integrated information system development. This is because of the impact of culture (Westwood, 1995).

Culture is an important variable in two important senses. First, because the way information is thought of, deployed, made use of, and valued varies across cultures. Second, information systems (IS) are embedded in other social systems. People interact

with IS through a human interface. The form of this interaction and the meaning it holds for people may be shaped by the culture in which it occurs. Recently, cultural differences are often cited as a reason that IS development in a global environment may differ from the strategies that have been found to be successful in the U.S. (Shore, 1998; Shore & Venkatachalam, 1994). Cultural differences have particularly proven to be a major obstacle in global IS development when Asian cultures are involved (Burnson, 1989).

The purpose, the research questions, and the scope of the study

This dissertation seeks a better understanding of IT implementation in born global firms, and focuses on the information technology capability (IT capability), which is defined as the firm's level ability to deploy IT-related resources. Extant literature shows that IT per se would not lead to better business performance (Brynjolfsson and Hitt, 1998). The resource-based view argues that it is the ability of using IT strategically (IT capability) that leads to superior performance (Bharadwaj, 2000; Ross, Beath, and Goodhue, 1996). Yet, in the existing literature, there is neither widely accepted definition nor scale of IT capability. So, in this research, we will define IT capability and develop a scale to measure it.

IT capability is argued to be very important to contemporary organizations (Bharadwaj, Sambamruthy, and Zmud 1999). Yet, most of the evidence is found in the U.S. or similar cultures (i.e., Santhanam and Hartono, 2003; Tippins and Sohi, 2003). How people view IT capability in other cultural context especially those very different ones such as China. There is no empirical research on it. Existing literature also shows

that IT capability has positive relationship with firm performance (Bharadwaj, 2000; Santhanam and Hartono, 2003). Yet, the results are constraint with larger firms. Whether IT capability influence born global firms' export performance, there is no empirical study to refer to.

Besides these, existing literature also shows that organizational culture is one of the major factors that influence IT implementation. And born global firms have some common organizational cultures that enable them to compete with larger firms in the international market. But there is no existing literature regarding what the relationship between organizational culture and IT capability is and how these two together influences born global firms' performance in the international markets.

Based on the above discussion, this research is designed to answer the following research questions:

- 1). What are the components of IT capability?
- 2). Are there any differences in perceived IT capability between born global firms in China and the U.S.?
- 3). Does IT capability affect firms' export performance?
- 4). Does organizational culture affect IT capability?

These research questions are addressed through three empirical studies. The first study addresses the first question by developing a multidimensional scale of IT capability. The second study addresses the question of country differences by comparing the perceived IT capability in two culturally different countries, namely China and the U.S. The third study examines the effects of organizational culture on IT capability and of IT capability on firm performance.

The research scope is China and the U.S. As you know, China is undergoing a technological revolution in the late 1990s. The country will play a major role in the computer-dominated world of the 21st century. Key to the role will be the availability of information. For today's IT professional in China, there is no more pressing need than for accurate, up to date technical information (Martinsons and Martinsons, 2002). And the U.S. is the giant in IT world and it has been leading the IT development for decades, its experience would be very useful to Chinese business managers. A comparison between the U.S. and China that might be of interest is the vast cultural differences between the two countries (Hofstede, 1980).

Organization of the dissertation

This dissertation consists of three manuscripts, and it is organized as follows:

Chapter One presents the general phenomenon of interest, demonstrates the worthiness of the study, and summarizes the topic of the study.

In Chapter Two, the first study is based around an empirical study designed to develop a scale to measure IT capability. It undertakes a careful assessment of the literature on the subject and identifies six models from which the final dimensions were derived.

The second study, in Chapter Three, empirically compares the perceived IT capability in China and the U.S. Born global firms in the manufacturing industry are studied. Theoretical foundations and research hypotheses are first introduced and developed. The research method is explained and results are presented and major findings are discussed.

The third study, in Chapter Four, examines the proposed relationships among organizational culture, IT capability, and performance of firms in international market in two countries, China and the U.S. The cross-cultural research method is described, and the results of the study and major research findings are presented and discussed.

The dissertation concludes in Chapter Five with a discussion of major findings, theoretical contributions, managerial implications, and limitations of the studies included. Potential avenues for future research are also presented.

CHAPTER TWO

INFORMATION TECHNOLOGY CAPABILITY: INSTRUMENT DEVELOPMENT AND VALIDATION IN A BORN GLOBAL CONTEXT

Introduction

Contemporary thinking on organizational capabilities has been profoundly influenced by the resource-based view and of the firm (Barney, 1991; Eisenhardt and Schoonenover, 1996). The proponents of this view argue that firms possess bundles of costly-to-imitate resources that are regarded as the fundamental drivers of superior performance (Bharadwaj, Sambamurthy, and Zmud, 1999). While firm resources are copied relatively easily by competition, capabilities are more difficult to replicate because they are tightly connected to the history, culture, and experience of the firm. Recent writings in the IS literature have also turned their attention toward the role of IT capability in enabling superior IT-based innovation and business performance. With increased emphasis on the strategic role of IT in contemporary organizations, it is imperative to gain a deeper understanding of the factors that govern a firm's IT capability. Yet, there exists little understanding as to what constitutes a firm's IT capability and how it could be measured (Bharadwaj 1999, 2000; Santhanam and Hartono, 2003). Given the widespread recognition in the IT literature about the importance of IT capability (Feeny and Willcocks, 1998 a, b), and the emergence of born global firms in numerous nations (e.g., Moen and Servais, 2002; Rennie, 1993), this study focuses on the development of an instrument to measure IT capability in the born global context. For the purpose of this study, we define born global firms as business organizations that from, or near, their early

founding seeks superior international business performance from the application of resources to the sale of outputs in multiple countries.

The issue of IT capability is particularly important in the context of born global firms. These firms expand abroad while they are still young, and they face both the liabilities of newness and foreignness. The value-adding processes of these firms are based on the creation and exploitation of knowledge and knowledge-intensive services and their attention will be focused on information acquisition, accumulation, and integration (Grant, 1996; Nahapiet and Ghoshal, 1998; Nonaka and Takeuchi, 1995).

Unlike many existing SMEs, that still do not use IT resources strategically, born global firms have the ability to use IT resources to reduce costs, improve customer service, create links with suppliers, and differentiate product/services and enable innovations (Kyobe, 2004).

Extant literature also shows that most of the studies conducted on strategic utilization of IT resources have concentrated on large-sized organizations. Little is known about firms' ability to use IT related resources in SMEs (Kyobe, 2004). Since capability is often a critical driver of firm performance (Eisenhardt and Martin, 2000; Makadok 2001; Teece, Pisano, and Shuen, 1997), it is essential for us to gain a better understanding of this kind of ability, namely IT capability, of born global firms. Thus, the objective of this study is to identify the dimensions of IT capability and to develop and validate an instrument for measuring the construct.

Theoretical foundation of the study

An overview of IT capability

In information system (IS) literature, different researchers have conceptualized IT capability from different perspectives. The concept of IT capability has been discussed more frequently in practitioner-based literature than in academic journals. Researchers examine IT capability from multiple perspectives including work design, process transformation, power relationships, and coordination. A review of extant literature reveals a gap in the classification of IT capability (Mulligan, 2002). There exists very little consensus as to what constitutes a firm's IT capability and how it is measured, and there are still no widely accepted definitions of IT capability.

Early explanation of IT capability explored the differences between capabilities and their utilization, identifying critical capabilities as: a lever to lower costs (Ross, Beath, and Goodhue, 1996); a means of building customer and supplier dependency (Bharadwaj 2000); and, an approach to discouraging new rivals and a spur to define new products (Parsons, 1983). The second stream of research used individuals or groups as the units of analysis, examining such issues as the impact of IT on an individual's potential power and influence within an organization through a survey of users of IS (Lee and Robertson, 1989). These power-based attributes include such characteristics as resource provision, irreparability, network centrality, expertise, and authority. Another stream of research focusing on group research used survey data to demonstrate the impact of IT on work group structuring (Lee and Treacy, 1989), including attributes such as standardization, specialization, locus of decision making, and centralization of decision control. The fourth stream of research explores the role of IT in business process

Table 2.1**Definitions of IT Capability in Existing Literature**

Authors	Conceptual Definition
Sambamurthy and Zmud (1992)	The internal capabilities on which its competitive strategies are based...it also refers to the managerial capabilities required for a firm to productively acquire, deploy, and leverage its IT investments.
Sabherwal and Kirs (1994) Sabherwal (1999)	The extent to which the technologies needed for manipulation, storage, and communication of information are available within the organization.
Ross, Beath, and Goodhue (1996)	The ability to control IT-related costs, delivers systems when needed, and effect business objectives through IT implementations.
Clark, Cavanaugh, Brown, and Sambamurthy (1997)	The ability to enhance competitive agility by delivering IT-based products, services, and business applications within short development cycle times; Build a highly skilled, empowered, and energized IS workforce with an entrepreneurial orientation toward leveraging technological knowledge into business applications.
Benzie (1997)	The ability to use effectively IT tools and information sources to analyze, process, and present information, and to model, measure, and control external events.
Teo and King (1997)	The capabilities of the IS function...can be operationalized in terms of general technical expertise and technological leadership in the industry...
Feeny and Willcocks (1998 a, b)	The pursuit of high-value-added applications of IT, and to capitalize on the external market's ability to deliver cost-effective IT services.
Bharadwaj (2000)	The ability to mobilize, and deploy IT-based resources in combination or co present with other resources and capabilities.
Byrd and Turner (2000)	The ability to easily and readily diffuse or support a wide variety of hardware, software, compunctions technologies, data, core applications, skills and competencies, commitments, and values within the technical physical base and the human component of the existing IT infrastructure.
Prasad, Ramamurthy, and Naidu (2001)	A firm's ability to use IT to support and enhance its distinctive competencies and skills in other business functions.
Grewal, Comer, and Mehta (2001)	An important organizational resource...plays a vital role in building sustainable competitive advantages and increasing the firm's capacity.
Mulligan (2002)	The highest level of IT capability is enterprise management systems. These systems display elevated levels of IT integration in the form of processing interdependence and may incorporate elements of task execution and communication but the primary focus of these systems is on knowledge and workflow management.

redesign, which identifies nine basic IT capabilities, suggesting that these capabilities drive a recursive relationship between IT and the redesign process (Davenport and Short, 1990). Table 2.1 presents definitions of IT capability in the existing literature.

According to table 2.1, IT capability has been defined in terms of its managerial capabilities (Sambamurthy and Zmud, 1992; Ross, Beath, and Goodhue, 1996) and technological skills (Teo and King, 1997; Sabharwal and Kirs, 1994; Sabherwal, 1999; Byrd and Turner, 2000). In this study, we synthesize these views and arrive at the following definition:

IT capability is a firm's ability to acquire, deploy, and leverage its IT investment in combination with other resources and capabilities as well as to support and enhance its distinctive competencies and skills in other business functions in order to achieve business objectives through IT implementations.

In this study, IT capability is viewed as a multidimensional construct. In reviewing IT literature, six models were identified that have dimensions underlying the IT capability construct. The models are shown in Table 2.2. They were proposed by Sabherwal and Kirs (1994, 1999); Ross, Beath, and Goodhue (1996); Feeny and Willcocks (1998 a, b); Bharadwaj et al. (1999); Byrd and Turner (2000); and Bharadwaj (2000). The resulting dimensions taken from combining these models are (1) IT architecture, (2) IT infrastructure, (3) Human IT resource, and (4) IT relationship resource.

Information retrieval and electronic communication from Sabherwal and Kirs (1994, 1999), Designing technical architecture and IS/IT governance from Feeny and Willcocks (1998 a, b), IT business process integration from Bharadwaj et al. (1999), and

Integration modularity from Byrd and Turner (2000) are combined as IT architecture in this study. Computing facilities from Sabherwal and Kirs (1994, 1999), technology asset from Ross, Beath, and Goodhue, (1996), IT infrastructure from Bharadwaj et al. (1999), and Bharadwaj (2000) are synthesized into our IT infrastructure. Computer-aided education from Sabherwal and Kirs (1994, 1999), human asset from Ross, Beath, and Goodhue, (1996), Business systems thinking and making technology work from Feeny and Willcocks (1998a, b), Business IT strategic thinking and IT management from Bharadwaj et al. (1999), IT personnel flexibility from Byrd and Turner (2000) and Human IT resource from Bharadwaj (2000) are combined into our IT human resource. Our last dimension of IT relationship resource comes from Ross, Beath, and Goodhue, 's (1996) relationship asset, Feeny and Willcocks' (1998a,b) relationship building, informed buying, contract facilitation, contract monitoring, vendor development and Bharadwaj et al.'s (1999) IT business partnerships and external IT linkages, and Bharadwaj's (2000) intangible IT-enabled resources. In the next section, we will discuss each dimension in more detail.

IT Architecture

IT architecture has been viewed as a designer with concerns for effectiveness (Fertuck, 1992). However, the search for a useful description of an information technology architecture revealed not one, but several. There were as many different definitions as there were studies of the topic (Gibson, 1994). Sullivan (1982) suggested that information technology architecture emerged slowly over time as organizations committed to some level of integration with an appropriate mix of form and context. As such, firms choose to

concentrate on one of the information systems components: processing, data storage, communications, or applications. Subsequent researchers chose to structure their approaches by targeting only one of these four components.

Mano (1982), Ein-Dor and Segev (1982), and Aken (1989) defined the architecture in terms of computing. Spencer (1985), Inmon (1989), and Meador (1990) focused on the data architecture. Barrett and Konsynski (1982) and Ahuja (1988) chose communications to define the architecture. Venkatraman (1991) and Keen (1991) defined the architecture in terms of applications. Gibson (1994) defines it as a high-level map of the information and telecommunications technological capabilities of the firm and argued that it is composed of four physical elements (computing compatibility, data transparency, communications connectivity, and applications functionality), and inclusive of three logical elements (planning, organizing, and control).

In summary, architecture defines the standardization and integration requirements of a firm's operating model (Ross and Westerman, 2004). It is the clarity and organizational consensus around technology, data and process standard. As companies mature in their architectures, they come to conceptualize their technologies and business processes in terms of well-defined components. A firm's enterprise architecture, by capturing the standardization and integration requirements of the business, provides a roadmap for introducing technology, data, and process standardization to maximize business benefits.

Table 2.2

Derivation of IT Capability Dimensions from Existing Models

Information Technology Capability Dimensions	Sabherwal and Kirs (1994, 1999)	Ross, Beath, and Goodhue (1996)	Feeny and Willcocks (1998 a, b)	Bharadwaj, Sambamurthy, and Zmud (1999)	Byrd and Turner (2000)	Bharadwaj (2000)
IT architecture	Information retrieval Electronic communication	Designing technical architecture IS/IT governance	IT business process integration	Integration modularity		
IT infrastructure	Computing facilities	Technology asset	IT infrastructure	IT infrastructure		IT infrastructure
IT human resource	Computer-aided education	Human asset	Business systems thinking Making technology work	Business IT strategic thinking IT management	IT personnel flexibility	Human IT resource
IT relationship resource		Relationship asset	Relationship building Informed buying Contract facilitation Contract monitoring Vendor development	IT business partnerships External IT linkages		Intangible IT-enabled resources

Well-designed enterprise architectures deliver significant benefits to a firm. Initially, the most apparent benefit is lower IT cost due to technology standardization, which reduces variation in skill requirements, simplifies troubleshooting, enhances interoperability, and reduces time to market. More mature architectures provide greater data and process standardization and start to segment standardized technology, data, and processes into reusable components.

In this paper, we synthesized these views into the following definition. IT architecture is a high-level map of information and technology requirements of the entire firm, composed of network, data, and application and technology sub-architecture. It provides a vision for how a firm will select and deploy its corporate IT resources.

IT Infrastructure

The value of IT infrastructure in today's organizations is growing in importance (Byrd and Turner, 2000). Many companies have placed the development of an effective IT infrastructure among the top concerns of their overall IT management. The trade journal *InformationWeek* reported that creating a strong and flexible IT infrastructure emerged as the number one priority in IT management (InformationWeek, 1999). Accordingly, IT infrastructure specialists Broadbent and Weill (1997) found that expenditures on IT infrastructures accounted for an average of 58% of organizational IT budgets and have increased at about 11% a year in recent years. An IT infrastructure provides the shared foundation of IT capability for building business applications and is usually managed by the information systems group. It comprises the computer and communication technologies and the shareable technical platforms and databases (Ross, Beath, and

Goodhue, 1996; Weill, Broadbent, and Butler, 1996). IT infrastructure is a shared information delivery base, the business functionality and a major business resource, and a key source for attaining long-term competitive advantage (Keen, 1991; McKenney, 1995). It is considerably more than just computers and the cables connecting them, i.e. IT hardware. IT infrastructure differs from applications in its purpose as a base for future applications rather than current business functionality, and in the way in which it must cope with the uncertainty of future needs (Grossman and Packer, 1989).

Based on the literature review, we define IT infrastructure as the extent to which data and applications can be shared through communication networks and accessed for organizational use. The main purpose of IT infrastructure is to provide consistent and quick information support throughout the organization to respond to dynamic challenges in the markets (Bhatt 2000). To deal with these challenges, more and more businesses will merge enterprise applications with their IT infrastructure to create a single IT platform to lower costs and simplify management over the next two years (Mohamed, 2005).

IT Human Resources

The value of information technology (IT) to modern organizations is almost undeniable. An IT staff that consistently solves business problems and address opportunities through information technology is a valuable human asset.

The requisite skills of IT personnel have become important, as the value of IT has risen in modern organizations. Along with technical skills, managerial, business, and interpersonal skills have been increasingly cited as mandatory for these technical

employees (Couger et al., 1995; Lee, Trauth, and Farwell, 1995). Research has suggested that those softer skills are crucial to programmers, systems analysts, database administrators, and other IT personnel in modern organizations (Cheney, Hale, and Kasper, 1989; Rockart, Earl, and Ross 1996; Ross, Beath, and Goodhue, 1996). Recent research and practitioner literature has stressed the value of a broad range of skills for IT professionals in meeting the operational requirements of modern organizations. To add value, IT professionals are called on to blend technical skills with a deep understanding of the business along with cultivating interpersonal skills. Bharadwaj (2000) argues that two kinds of skills, namely the technical skills and managerial skills, are the two critical dimensions of Human IT resources. Technical skills include programming, systems analysis and design, and competencies in emerging technologies; managerial skills include abilities such as the effective management of IS functions, coordination and interaction with user community, and project management and leadership skills (Capon and Glazer, 1987; Copeland and McKenney, 1988). She argues that firms with strong human IT resources are able to integrate the IT and business planning processes more effectively; to conceive of and develop reliable and cost effective applications that support the business needs of the firm faster than competition; to communicate and work with business units more efficiently; and to anticipate future business needs of the firm and innovate valuable new product features before competitors. In this study, we define IT human resource as technical skills, business understanding and planning, and problem-solving orientation.

IT Relationship Resource

By IT relationship resource, we mean the valuable relationship between the IT and business units. In order to have effective application of IT in the firm, IT management and business units need to share the risk and responsibility. Shared risk and responsibility require trust and mutual respect, and an ability to communicate, coordinate or negotiate quickly and effectively. Evidence of a strong relationship asset includes: 1) business partner ownership of all IT projects, 2) top management leadership in establishing IT priorities, 3) developing users' understanding of IT's potential, and 4) IT sourcing capability (Ross, Beath, and Goodhue, 1996; Bharadwaj, 2000; Feeny and Willcocks, 1998b).

Valuable IT relationship resource refers to the establishment of IT priorities. To do so, a number of firms have established committees of senior managers to act as IT steering committees to ensure that limited resources are invested wisely (Ross, Beath, and Goodhue, 1996). The committees also articulate organizational strategies and specify how IT should support them. The more IT staff people and clients worked together, the more they communicated, coordinated, negotiated, and shared together up and down the hierarchy, the stronger the partnership became and the more effective both were at planning and developing new applications, and using their current information technology (Powell and Dent-Micallef, 1997).

Relationship building is another valuable relationship resource. It involves developing users' understanding of IT's potential, and boosting users' feeling of ownership and satisfaction. It is very important in the fostering of mutual confidence,

harmony of purpose, and successful communication among those focused on the business and technical agendas (Feeny and Willcocks, 1998 b).

Sourcing capability is also evidence of good relationship resources. Firms can either use external vendors or internal IT departments to obtain IT services and decision makers within an organization are always faced with make-or-buy decisions for the various types of information systems that their organizations use. In an organization that decides to outsource most of its IT services, the informed buyer is the most important person after the CIO (Feeny and Willcocks, 1998 a). There are three main reasons why a firm wants to access outsourcing. They are improving IT, enhancing business performance, and generating new revenue (DiRomualdo and Gurbaxani, 1998).

Based on the discussion above, we define IT Relationship Resource as not only high levels of respect between the firm and its key business partners including customers, suppliers, and other external collaborators but also excellence in communication, coordination, and negotiation on both sides of the relationship as well as significant shared knowledge about the capabilities of information technology and the needs of the business.

Research method

Instrument design and validation

The purpose of this study is to develop a scale to measure IT capability. According to the existing literature, there are three ways of obtaining the measures of a construct (Torgerson, 1967): (1) fundamental measurement, where numbers are assigned according to natural laws to represent the construct (e.g., the measurement of volume or length); (2)

derived measurement, in which a construct is measured by relating it through laws to other constructs (e.g., density is measured by a ratio of mass to volume); and (3) measurement by fiat, where a construct is measured by arbitrary definition. Measurement by fiat is undertaken when there exists a common-sense concept that on a priori grounds seems to be important but for which there are no direct measures. Most constructs in social and behavioral sciences and in information system involve measurement by fiat (Sethi and King, 1991). In measurement by fiat, one or more observable construct properties are selected and their simple/weighted sum is taken as a measure of the construct. The difficulty with this process is that construct measures may be defined in a multitude of ways. To develop a measure that has desirable reliability and validity properties, Churchill (1979) recommended an eight-step procedure.

In this part of the study, we followed the guidelines of Churchill (1979) and Bagozzi et al. (1979), and took the following steps to ensure the validity and reliability of the instruments:

1). *Specification of the domain of construct* (i.e., conceptualization of the constructs and specification of their domain). The first step in operationalizing a construct is to delineate its domain constitutively and operationally (Kerlinger, 1964). A constitutive definition is one that defines a construct with other constructs (e.g., “weight” may be defined as the “heaviness” of objects). An operational definition assigns meaning to a construct by specifying the activities or operations that are necessary to measure it.

2). *Generation of the sample of items and establishment of content validity*. In this step, we need to review the past literature and derive the dimensions of the construct as well as a set of items for each dimension. In general, a construct should be measured

with multiple items. The use of single items has many limitations: an individual item has only a low degree of relationship with a particular construct (Blalock, 1974; Churchill, 1979); it has considerable specificity or a type of individuality which is not correlated with any general construct (Nunnally, 1967); it can categorize an entity into only a relatively small number of groups; and it is often unreliable.

3). Collection of *data*. The third step is to collect data using one of the following methods: laboratory experiments, field experiments, field studies, or survey research (Kerlinger, 1964). Methods should be selected based on their strengths and weaknesses (Jenkins, 1985).

4). Purification of *measures* (Calculating coefficient alpha for assessing reliability) and assessment of discriminant validity. This step empirically examines the extent to which there is an absence of measurement error in the items, or their reliability (Kerlinger, 1964; Nunnally, 1967). There are a number of ways of assessing reliability, such as correlating alternative forms of the measure against each other, split-half correlations, and test-retest. The most important is internal consistency, which requires calculating the alpha coefficient (the square root of the estimated correlation of the measure with errorless true scores). However, the alpha coefficient provides an unbiased estimate only if the scale is unidimensional.

The dimensionality of the construct may be examined by using factor analysis, either exploratory or confirmatory. Exploratory factor analysis is used to ascertain the underlying dimensions of data (Kim and Mueller, 1978a) and confirmatory analysis is used to test hypotheses regarding the number of dimensions. It is meaningful only when

there are specific expectations regarding which variable is likely to load on which factor (Kim and Mueller, 1978b)

5). *Assessment of convergent validity.* The preceding steps would produce an internally consist or internally homogenous set of items, which is a necessary, but not a sufficient, condition for construct validity (Nunnally, 1967). Construct validity refers to the extent to which a measurement instrument actually appraises the theoretical constructs it purports to assess (Carmines and Zeller, 1979). One type of the construct validity is convergent validity. It is achieved when a measure that correlates highly with other measures designed to measure the same thing.

In the following subsections, details of each of these steps have been provided.

Specification of the domain of construct

According to the guideline, researchers should conduct a thorough literature review to understand the definitions of the constructs of interest, and to make sure that an exhaustive list of factors has been identified. Our literature review was performed in this study wherein the definition of IT capability was clarified. Further, it was identified that IT capability is multidimensional (Bharadwaj, 2000; Bharadwaj, Sambamurthy, and Zmud, 1999; Sabherval and Kirs, 1994) and in order to build a comprehensive instrument of IT capability, it is important to include the constructs of IT Architecture, IT Human Resource, IT Infrastructure, and IT Relationship Resource. The operational definitions and scale sources are provided in Table 2.3.

Generation of the sample of items and establishment of content validity

The initial development of scale items was based on the work of Bharadwaj et al. (1999); Ross, Beath, and Goodhue, (1996); Sabherwal and Kirs (1994); Sabherwal (1999); Heijden (2000) and Grewal, Comer, and Mehta, (2001). Using the four dimensions from previous discussion, a content analysis of the IT literature was employed, resulting in a pool of items that were used in the development of the initial instrument.

Nunnally and Bernstein (1994, p.83) have suggested that one of the most important ways in which to establish the “scientific utility of a measuring instrument” is to establish the content validity. Content validity is not computed numerically. It is subjectively judged by the researchers. It represents the adequacy with which a specific domain of contents has been sampled (Nunnally, 1978). Determination of content validity, according to Nunnally (1978), is based on two criteria. First, to determine whether an instrument contains a representative collection of items. Second, to determine whether a satisfactory method to test the instrument is used.

To meet the first criterion, the variables and measures used for the study were based on extant literature. Through an extensive review of the past literature, an elaborate list of the items was generated. All the items in the instrument were on a 7-point Likert Scale anchored with Strongly Disagree and Strongly Agree at the two ends. The original instrument was shown to three academicians and twenty-nine IT professionals. Every round of the meeting and the pretest resulted in some modifications to the scale, in terms of addition/deletion of items, rephrasing of items, and so on. The proposed model and measures are shown in Table 2.4.

To meet the second criterion, the questionnaire was pilot tested with 20 small manufacturing firms from China to ensure that the instrument contained a representative collection of items.

Table 2.3

Construct Operationalization and Scale Sources

Construct	Conceptual Definition	Operational Definition	Theoretical Underpinnings
IT Architecture	A high-level map of information and technology requirements of the entire firm.	Degree to which a firm can effectively select and deploy its corporate IT resources.	Based on Fertuck (1992); Sullivan (1982); Gibson (1994)
IT Infrastructure	A shared information delivery base, the business functionality.	The extent to which data and applications through communication networks can be shared and accessed for organizational use.	Based on Sabherwal and Kirs (1994); Bharadwaj et al. (1999); Ross, Beath, and Goodhue, (1996)
IT Human Resource	An IT staff that consistently solves business problems and addresses opportunities through IT.	Level of IT staff's technical skills, business understanding, and problem-solving orientation.	Based on Ross, Beath, and Goodhue, (1996); Bharadwaj et al. (1999)
IT Relationship Resource	The valuable relationship between the IT and business units.	Level of trust and mutual respect, willingness of sharing risk and responsibility.	Based on Feeny and Willcocks (1998 a, b) Bharadwaj et al. (1999), Ross, Beath, and Goodhue, (1996)

Table 2.4

Hypothesized Dimensions of IT Capability and Their Proposed Measures

IT Architecture		IT Relationship Resource	
ITA1	There is consistency of IT policies throughout the enterprise.	ITRR1	Our IT department ensures ownership of the business with respect to ecommerce activities.
ITA2	IT and business executives share a vision for how IT will support the business.	ITRR2	The IT department of our organization maintains close relationship with business management.
ITA3	IT and business managers consult with each other regularly on business and technical decisions.	ITRR3	We have multi-disciplinary teams to blend business and technology expertise.
ITA4	IT staff regularly invest in technical, business, and interpersonal training.	ITRR4	We have good relationship between line management ¹ and IT service providers.
ITA5	There is consistency of IT application portfolios, which is a set of different types of IT applications, with business processes.	ITRR5	We have good line management sponsorship of IT initiatives.
ITA6	We restructure business work processes to leverage opportunities.	ITRR6	There is a climate that encouraging risk taking and experimentation with IT.
ITA7	We restructure IT work processes to leverage opportunities.	ITRR7	There is a climate that nurture IT project championship.
ITA8	There is clarity of vision regarding how IT contributes to business value.	ITRR8	We have technology-based links with customers.
ITA9	There is integration of business strategic planning and IT planning.	ITRR9	We have technology-based links with suppliers.
ITA10	Management has the ability to understand value of IT investments.	ITRR10	We use IT based entrepreneurial collaborations with external partners.
IT Infrastructure		IT Human Resource	
ITINF1	Communication devices for access of remote database.	ITHR1	Adequacy of the skill base.
ITINF2	Computer facilities for IT projects.	ITHR2	Appropriateness of network architectures.
ITINF3	Computer labs for employee instruction.	ITHR3	IT planning capabilities.
ITINF4	Appropriateness of the data architectures.	ITHR4	Technical support staff.
ITINF5	Appropriateness of network architectures.	ITHR5	Effectiveness of IT planning.
ITINF6	Adequacy of architecture flexibility.	ITHR6	IT projects management practice.
		ITHR7	Planning for security control, standards compliance, and disaster recovery.
		ITHR8	Systems development practices.
		ITHR9	IT evaluation and control systems.

¹ Line management refers to administration of the line functions of an organization and administration of activities contributing directly to the organization's output

Data collection

The final questionnaire for measuring IT capability was administered to small and medium-sized manufacturing firms in China. We randomly selected 240 sample firms that meet our criteria: 1) these firms were established after 1980, and 2) they export at least 25% of their product from or near their establishment date. A wide range of firms and industries was selected for two reasons. First, information technology continues to contribute significantly to greater effectiveness in a wide range of manufacturing industries. Second, a diverse sample increases the generalizability of the results.

We introduced these firms to our study and encouraged participation. Our efforts resulted in 180 firms agreeing to participate in the study. We assured confidentiality to all respondents to encourage candid responses. Our data collection efforts yielded 121 completed questionnaires (i.e., those who agreed to participate and did participate in the interviews) for a participation rate of 66.7% (121 of 180). Missing data and listwise deletion reduced the current analytic sample to 106, for an effective participation rate of 58.9%.

To test whether our respondents were different from non-respondents, we obtained the demographic data, namely the age of the firm and the number of full-time employees in the firm, from 28 non-respondents (those managers who agreed to participate but refused participation later) to compare with those of the study participants. We found no statistically significant differences in age of the firms and employee numbers. Please see Table 2.5 for details.

Table 2.5

Comparison of Responses and Non-responses

	F-Statistics: Test of Equality of variances (p-value)	T-Statistics: Equal variance assumed (p-value)	T-Statistics: Equal variances not assumed (p-value)
Age	0.005 (0.943)	-0.168 (0.867)	-0.164 (0.871)
Employee	2.311 (0.132)	0.805 (0.423)	0.739 (0.467)

Note: p-value is in parentheses.

Purification of measures and assessment of discriminant validity

Following the guidelines of Bagozzi et al. (1979), an exploratory factor analysis was conducted to establish the discriminant validity of the measures. A reliability coefficient (Cronbach, 1951) was also calculated for each measure. The Kaiser-Guttman rule (which states that factors with Eigen values >1 should be accepted) was used for identifying a number of factors and their constitution (See Table 2.6) based on an analysis of the data. The next few paragraphs describe the process of factor acceptance and labeling.

Three items loaded above 0.90 on factor one with a reliability coefficient of 0.9119. Each of these items is related to how firms plan and deploy IT related resources. It is about the policy of how to manage IT, and hence was labeled as IT architecture.

Three items loaded above 0.85 on the second factor with a reliability coefficient of 0.8719. Each of these items is related to the infrastructure of the firm's IT resources. Thus this factor is labeled as IT infrastructure.

Another three items loaded above 0.90 on the third factor with a reliability coefficient of 0.9520. Each of these items is related to the IT technical skills or managerial skills of the firm. Hence this factor is labeled as IT human resource.

The last three items loaded above 0.80 on the fourth factor with a reliability coefficient of 0.8811. Each of these items is related to the relationship between the technology providers and technology users. So, the last factor is labeled as IT relationship resource.

Table2.6
Results of Exploratory Factor Analysis

Indicator	Factor1	Factor2	Factor3	Factor4	Reliability Coefficient α
	IT Architecture	IT Infrastructure	IT Human Resource	IT Relationship Resource	
ITA1	0.939				0.9119
ITA2	0.917				
ITA3	0.910				
ITINF1		0.932			0.8719
ITINF2		0.907			
ITINF3		0.854			
ITHR1			.965		0.9520
ITHR2			.954		
ITHR3			.947		
ITRR1				.942	0.8811
ITRR2				.930	
ITRR3				.821	

Labels of variables: ITA=information technology architecture, ITINF=information technology infrastructure, ITHR=information technology human resource, ITRR=information technology relationship resource

Overall, the exploratory factor analysis helped to establish the multidimensionality of the construct of IT capability. Specifically, it showed that IT capability in born global context has distinct dimensions and can be broken down to the constructs of IT architecture, IT infrastructure, IT human resource, and IT relationship resource, as identified in prior literature.

Convergent validity

An established method for examining convergent validity is Campbell and Fiske's (1959) multitrait-multimethod matrix (MTMM) (Churchill, 1979; Devellis, 1991). However, Bagozzi et al. (1979) argue that, in recent years, confirmatory factor analysis (CFA) using the structural equation modeling (SEM) technique, which provides researchers with a chi-squared goodness-of-fit test for the model, is a better and more rigorous method for assessing convergent validity of an instrument. It will also help in establishing the unidimensionality of the indicators (Anderson and Gerbing, 1982).

In this study, we follow the guidelines of Anderson and Gerbing (1982) and Bagozzi et al. (1979) to test the convergent validity of the construct. We assessed the fit of our hypothesized model (IT capability) with a confirmatory factor analytic model using AMOS 4.0 (Arbuckle and Wothke, 1999).

Our objective in the EFA was to help us to get a general idea about the structure of our instrument and identify the "latent sources of variation and covariation" in our original instrument (Jöreskog and Sörbom, 1988). On the other hand, our objective in the CFA was to understand how well our final set of items (generated from the EFA) fit our dataset. The focus was on the creation of the measurement model in AMOS, which

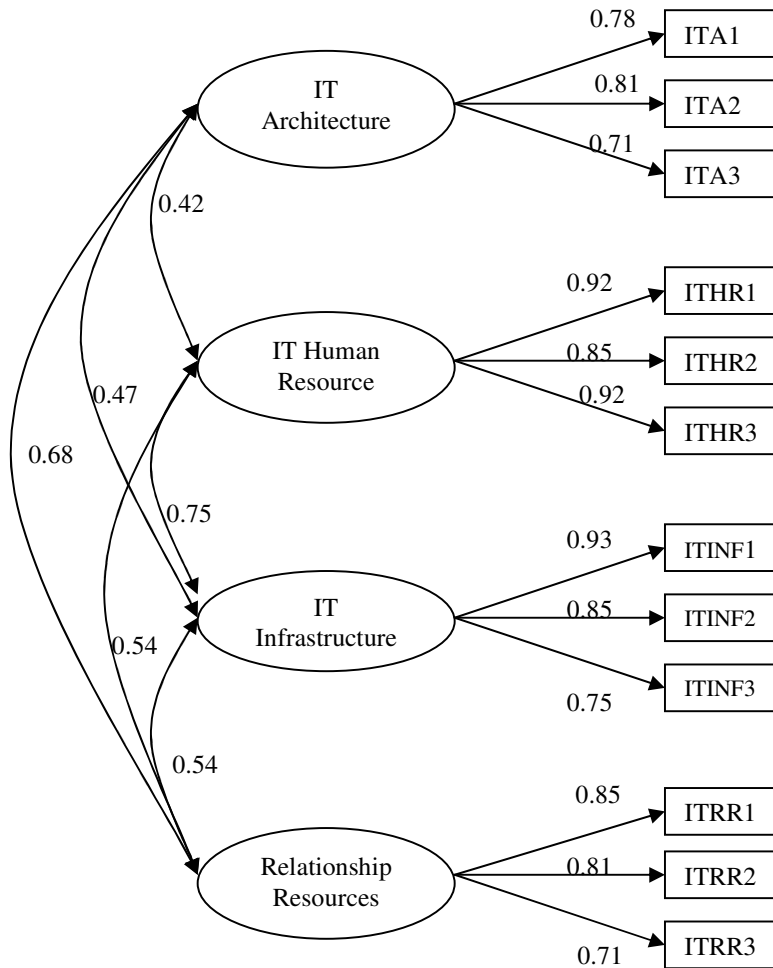
specified how the “latent variables or hypothesized constructs” were measured in terms of the observed variables (Jöreskog and Sörbom, 1988). After the creation of the models, the fit of the models was analyzed by using the maximum likelihood (ML) method that assumes that the “observed variables have a multinormal distribution” (Jöreskog and Sörbom, 1988, p21). Table 2.7 shows the measures, grouped into four dimensions that satisfied the unidimensionality and convergent validity criteria and Figure 2.1 shows the conceptual model and standardized coefficient of the model.

Table 2.7

Measures of IT Capability

Factor 1	Information Technology Architecture (ITA)
	<i>To what extent you agree/disagree with the following statements:</i>
ITA1	There is consistency of IT policies throughout the enterprise.
ITA2	IT and business managers consult with each other regularly on business and technical decisions.
ITA3	There is integration of business strategic planning and IT planning.
Factor 2	Information Technology Infrastructure (ITINF)
	<i>To what extent the following application is found in your organization:</i>
ITINF1	Appropriateness of the data architecture.
ITINF2	Computer facilities for IT projects.
ITINF3	Adequacy of architecture flexibility.
Factor 3	Information Technology Human Resource (ITHR)
	<i>To what extent the following resources are found in your firm:</i>
ITHR1	IT planning Capability.
ITHR2	IT evaluation and control systems.
ITHR3	Appropriateness of network architecture.
Factor 4	Information Technology Relationship Resource (ITRR)
	<i>To what extent you agree/disagree with the following statements:</i>
ITRR1	We have good line management sponsorship of IT initiatives.
ITRR2	We have a good relationship between line management and IT service providers.
ITRR3	The IT department of our organization maintains a close relationship with business management.

Figure 2.1 The Confirmatory Model for IT Capability:
Standardized Coefficient of the Model²



² Latent constructs are shown in ellipses, and observed variables are shown in rectangles. All coefficients are significant at $p < 0.001$.

All the path coefficients for the model have high t-values, and significant at the level of 0.01. In addition to the ML estimates, an important way in which the fit of a model can be assessed in SEM is by using the overall fit criteria such as the normed fit index (NFI), the comparative fit index (CFI), the Tucker Lewis index (or non-normed fit index, NNFI), and the root mean square error of approximation (RMSEA) (Jöreskog and Sörbom, 1988). To do so, we use AMOS 4.0 (Arbuckle and Wothke, 1999). The results are reported in Table 2.8.

Table 2. 8

Fit Statistics and Recommended Values for the Measurement Model

Fit statistics	Recommended values (Hair et al. 1998)	Value
$\chi^2_{(df)}$	Non significant	64.6 (48)
χ^2 / df	Between 1 to 2 or 3	1.35
Normed fit index (NFI)	>0.90	0.98
Tucker Lewis index (or non-normed fit index, NNFI)	>0.90	0.99
Comparative fit index (CFI)	>0.90	0.99
Root-mean-square error of approximation (RMSEA)	<0.08	0.06

Results in Table 2.8 show that all the criteria are satisfied. According to Hair et al. (1998), the chi-square should be non significant and its ratio to degree of freedom should be not more than 3. The results in our study shows that the chi-square is non significant at $p < 0.06$ and its ratio to degree of freedom is 1.35, which falls in between 1 to 2 or 3. Besides this, the recommended RMSEA value is less than 0.8, and our result of the

RMSEA is 0.06, which is very good. All the other fit indices are above 0.90. The Normed fit index (NFI) is 0.98, the Tucker Lewis index (NNFI) is 0.99, and the Comparative fit index (CFI) is 0.99. In all, the study scales were found to be reliable and valid.

Discussion and Implications

This paper reports on the development and validation of a measure of IT capability. The IT capability scale was found to demonstrate reliability, unidimensionality, and validity. Despite the increasing research attention paid to the concept of IT capability, to date there has been no comprehensive operational measure of IT capability. To our best knowledge, this study is among the first to provide a comprehensive, psychometrically sound, and operationally valid measure of a firm's IT capability.

Academic and managerial implications

The present study makes both academic and practical contributions, and suggests several applications for the research. Our academic contribution is to offer a significant advance to the current literature of IT capability. First, we explore the nature of IT capability and then develop a conceptual model of IT capability with four components, namely: IT architecture, IT human resource, IT infrastructure, and IT relationship resource. Though some of the ideas expressed in this conceptual model may be familiar to researchers, its value is in integrating these various notions to provide a more comprehensive picture of IT capability. Second, it provides empirical evidence on the testable scale that is both reliable and valid. This gives a new theoretical insight into how IT capability is

generated. Our conceptualization and empirical findings are encouraging. We have provided a useful foundation on which can be built further theoretical and empirical research in the field of information technology.

For business practitioners, the proposed scale could be used as a diagnostic tool to identify areas where specific improvements are needed, and to pinpoint aspects of the firm's IT capability that require work. For the results of an exercise to be meaningful, some benchmarks or norms should be used as a basis for comparison. In addition to aiding in the monitoring process, the four components in the IT capability model can also serve training needs by helping human resource managers develop appropriate training programs that can help in developing IT capability. Furthermore, top management can use this framework to develop synergy that is essential to the firm's IT capability between IT department and business unit.

In summary, IT capability is not so much a specific set of sophisticated technological functions as it is an enterprise-wide capability to leverage technology to differentiate from competition (Henderson and Venkatraman, 1993). To be able to do so, a firm is required to have a clear understanding of the critical components of IT capability and their role in supporting and shaping business strategy. This study represents a step toward a better understanding of the IT capability construct and its dimensions. It also offers managers a comprehensive inventory of IT-related sources and activities, which can be used to identify areas of strength as well as areas in need of improvement.

Limitations and future research

While we believe that this is a significant contribution, there are some limitations of the study and need future study to improve it. As mentioned earlier, the data were collected from China. Although it can be said that the samples represent a large number of businesses, it would be useful to obtain a broader and wider sampling frame from other countries. Since IT usage and information disclosure are influenced by cultures, it would be useful to test whether the existing model can be generalized to other countries. Future research needs to investigate whether the scale is cross-culturally valid.

Even though we argue that IT capability is important and developed a scale to measure it, we need to test whether IT capability really leads to better business performance in our future study.

Previous studies have suggested that culture, both national and organizational, may influence the application of IT; future studies should examine how people from different cultures perceive IT capability and how organizational culture influences the development of IT capability.

One more area of future research is the way in which capabilities are created and developed. Capabilities are argued to arise dynamically. Qualitative research could investigate how the capabilities of IT departments are formed and strengthened.

Conclusion

In this paper, we have advanced our knowledge of IT capability in the context of born global firms. In doing so, we addressed the question of what is capability and what are its components. Our empirical results show that there are four dimensions of IT

capability, namely IT architecture, IT human resource, IT infrastructure, and IT relationship resource. It is hoped that this study will prompt further research on IT implementation in born global firms.

CHAPTER THREE

A COMPARISON OF THE PERCEIVED IT CAPABILITY IN CHINA AND THE U.S.

Introduction

IT capability has become more important in contemporary organizations with the increased emphasis on the strategic role of IT (Bharadwaj, Sambamurthy, and Zmud, 1999). The continuing evolution in hardware and software technologies has brought about a spiraling decline in costs for all organizations, such that even the smallest of business organizations can afford to purchase needed IT (Riemenschneider and Mykytyn, 2000). While Beckett (2003) found that 71% of American SMEs were confident in their IT strategies, Kyobe (2004) found that many SME managers in some other countries are still ignorant about their business environment. They do not use IT resources to create links with suppliers, neither do they use them to differentiate products/services nor to enable innovations. Unfortunately, the causes of these differences are not well documented.

Existing information system literature shows that most of the hardware and software in information technology is based on designs that originated in North America. Much is from a very narrow corridor of California in the U.S. known as the “Silicon Valley.” This technology has been readily accepted in countries that have a Western culture similar to that of the U.S. Information systems that are used to run businesses worldwide are mainly from this culture and impose a Western way of doing business. While the Western developers of these systems are usually unaware of this inherent cultural bias, it has been noticed by users of IT in other cultures (Evers & Day, 1997).

The development of information systems is expanding to more locations throughout the world. They are developed in countries with different business and cultural environments. Culture is therefore an important variable in the development process and may introduce its own set of problems. Thus, the purpose of this study is to examine the differences of perceived IT capability in different cultures.

To fulfill the purpose of this study, we will focus on the U.S. and China for two major reasons. First, there is a close alliance between the two countries (Adler, Brahm, and Graham, 1992). For instance, there are currently a number of economical ties between the two nations, with both countries having subsidiaries and actively marketing goods and services in the other country. In addition, there are a large number of joint ventures and mergers taking place between companies in the U.S. and China (Calantone and Zhao, 2001). Many educational exchange programs also exist between the two countries. As a result, many scholars in China have been educated in the U.S. during the past few decades. Due to the numerous ties between the two countries, it might be reasonable to understand how people view of IT capability in these two countries.

A second reason why a comparison between the U.S. and China might be of interest is the vast cultural differences between the two countries (Hofstede, 1980). Cultural differences are often cited as a reason that IS development in a global environment may differ from the strategic use of IT that have been found to be successful in the U.S. (Shore, 1998; Shore and Venkatachalam, 1994). Cultural differences have particularly proven to be a major obstacle in global IS development when Asian offices are involved (Burnson, 1989). Thus, it is possible that culture differences could contribute to differences in the perceived IT capability of firms.

Literature review

Culture influence on IT implementation

National culture distinguishes the members of one group or category of people from another (Hofstede, 1980). Since each culture has unique values to guide human behavior, national culture strongly affects management practices including policy making (Earley, 1993; Garfield and Watson, 1997). It has also been demonstrated that the management of information technology is influenced by national culture (Abdul-Gader, 1997). Straub (1994) found that uncertainty avoidance is the major reason that caused the significant difference of the perception of usefulness and actual uses of emails and Faxes among Japanese and American knowledge workers. In the same vein, Png, Tan, and Wee (2001) found that uncertainty avoidance is negatively associated with IT infrastructure adoption at the corporate level. Besides these studies, Watson, Ho and Raman (1994) found that power distance has an effect on a GSS on equality of participation and consensus. Tan, Watson, and Wei, (1998) found that computer mediated communication is useful for alleviating majority influence in an individualistic but not a collectivistic culture. Along the same line, Hasan and Ditsa (1998) argue that IT empowers individuals in collective cultures. See more details in Table 3.1.

Even though many dimensions of culture have been studied in cross-cultural research, the most widely cited is individualism/collectivism (Tan, Watson, and Wei, 1998). An individualistic culture is one where ties between people are loose so that they base their self-understanding on their own actions, which are usually taken independently of what others think (Earley, 1994). A collectivistic culture is one where people are integrated into strong cohesive groups so that they base their self-understanding on the

reactions of others around them (Earley, 1994). This cultural attribute has been identified as being particularly different between Anglo-American and Chinese-based cultures. For example, Hofstede (1984), Harris and Moran (1987), and Triandis et al., (1988) have isolated the self-interest motive as being central to Anglo-American management theory and practice. On the other hand, the subjugation of self to group interests has been noted as a key characteristic of Chinese-based societies (e.g., Bond and Leung, 1984; Redding and Wong, 1986). Studies quantifying the degree of individualism/collectivism across countries, using an instrument first developed by Hofstede (1980) or variants thereof, have consistently supported this directional difference between Anglo-American and Chinese-based cultures (e.g., Chow, Shields, and Chan, 1991; Harrison 1992, 1993; O'Connor 1995). Along the same vein, Ralston et al. (1992, 1993) have pointed to the relative emphasis on group vs. individual interests as being a primary and enduring difference between Eastern and Western cultures. While the PRC was not in Hofstede's (1980) original sample, data from proximate countries (e.g., Taiwan), along with other research on Chinese culture (e.g., Earley 1994; Triandis, 1995; Kachelmeier and Shehata, 1997), strongly suggest that the Chinese culture lies toward the collectivist end of the continuum. Thus, we argue that China is a good representative of collective culture and the U.S. is a good representative of individualistic culture and the influence of cultural difference on the IT capability relationship in China and the U.S. can also reflect the situation of IT implementation in collectivistic-oriented, Eastern countries and individualistic-oriented Western countries.

Table 3.1
National Culture and Effects on IT

Authors	Cultural dimension	Findings
Straub (1994)	Uncertainty avoidance/ambiguity	Significant differences between American and Japanese knowledge workers in their perception of usefulness and actual use of emails and Faxes.
Png, Tan, and Wee (2001)	Uncertainty avoidance; Power distance	Uncertainty avoidance is negatively associated with IT infrastructure adoption at the corporation level.
Tan, Watson, and Wei, (1995)	Power distance; High and low context	The impact of a Group Support System will be different in high and low power distance countries.
Tan, Watson, and Wei, (1998)	Individualistic; collectivistic	Computer-mediated communication is useful for alleviating majority influence in an individualistic but not a collectivist culture.
Garfield and Watson (1998)	Power distance; Uncertainty avoidance	Countries that design national information infrastructure (NII) policies that are appropriate for their culture are likely to be more successful in the creation of an NII.
Nicholson and Sahay (2001)	Social culture	Social culture affects global outsourcing of software development.
Watson, Ho, and Raman (1994)	Power distance	Culture has an effect on a GSS on equality of participation and consensus.
Matheson and Tarjan (1998)	Research culture; Culture of a Japanese parent corporation	They have attributes that clash with the demands for commercialization of software in the domestic market.
Ulijn, Lincke, and Karakaya (2001)	High/low context	A context-reflecting culture (high) would need less language to disambiguate context, whereas a context-creating culture would require more.
Ping and Grimshaw (1992)	Power distance; Uncertainty avoidance	These values have influenced the application of western IT to China.
Yeung, Foster, and Ogunmokun (1995)	Power distance and rigid hierarchies	It has influence on the perceived needs on computer-based marketing information systems.
Hasan & Ditsa, 1999	Individualist vs. Collectivist	IT empowers individuals in collective cultures. It also creates groups across time and space.

Western information management in China

Cross-cultural differences pose an emerging challenge to the global information management community. There is a growing amount of evidence to indicate that profound differences in societal and organizational cultures limit the applicability of many management theories and practices (Ein-Dor, et al., 1993; Westwood, 1995). Management technologies developed for one context often cannot be readily transferred to another. Management of information systems is not immune to this phenomenon (Martinsons and Westwood, 1997). Thus, the capability that is related to strategic use of IT in western culture might not be perceived the same way in China.

Walsham (2000) argues that there are some Chinese culture attributes that might explain the phenomenon. The first is the importance of personal relationships in Chinese business culture. Chinese societies are based on networks of relationships. The needs of one's group, including one's family, supersede individual aspirations and their fulfillment. Private meetings rather than written memos or reports are the primary means of communication. The amount of information subordinates receive from their boss reflects the degree to which they are trusted (Martinsons and Westwood, 1997). This emphasis on informal face-to-face communication, and not on written information, implies a limited role for explicit IS, at least when addressing important or sensitive issues.

The second attribute is the fact that Chinese firms have more centralized structures than their American counterparts. Key decisions are made mostly by the proprietor, and if not by him, then often by a relative. This is especially true in smaller

firms. This practice also reduces the need to exchange information between Chinese managers and thus calls into question the role of an IS in decision-making.

The third attribute is that information is seen as a major instrument of personal power, and is fundamentally a personal asset rather than an organizational resource. Martinsons and Westwood pointed out that power is maintained by carefully controlling key information. Most management information is for top managers only, and remains in a soft form in the mind of the manager. Key details, ideas, and knowledge are selectively passed on to chosen individuals. Besides these, Chinese messages are comparatively terse in words, but rich in meaning. Subtle cues are used to enrich the explicit content. Thus for Chinese, little value is seen in codifying business information into a standardized form, especially if its context would be lost.

The fourth attribute is that Chinese managers' decision-making is not only personal and centralized, but also related to the view of knowledge as the subtle accumulation of experience absorbed over many years. Thus, high value is placed on intuition by the powerful and experienced leader rather than in a Western-style 'rational' analysis based on openly available data and criteria.

Finally, a fifth attribute is that Chinese philosophy emphasizes the need to accept the environment as a 'given' at any particular point in time, and the need to seek harmony with it. Thus, rather than trying to project and control the future, the tendency is focus on responding to present contingencies. Even though the trend towards globalization will undeniably blur the boundaries and distinctions between societal cultures, the management systems of the Chinese are likely to reflect their deeply-rooted values for

many decades to come (Martinsons and Westwood, 1997). For more details, see table 3.2.

Table 3.2

Western Beliefs That Foster The Use Of IS

Chinese cultural characteristic	Nature of constraint on IT
<ul style="list-style-type: none"> • Personal relationships are the preferred sources of business information. 	<ul style="list-style-type: none"> • Reliance on informal (primarily verbal) rather than formal (written) communication.
<ul style="list-style-type: none"> • Centralized decision-making. 	<ul style="list-style-type: none"> • Reduced need to exchange information between managers.
<ul style="list-style-type: none"> • Information is a major instrument of personal power. 	<ul style="list-style-type: none"> • Relatively little information is broadcast or made accessible.
<ul style="list-style-type: none"> • High context communications. 	<ul style="list-style-type: none"> • Data and information are perceived to lose much of their meaning if they are encoded.
<ul style="list-style-type: none"> • Decision-making based on intuition and experience. 	<ul style="list-style-type: none"> • Reduced need for data collection and analysis.
<ul style="list-style-type: none"> • People should adapt to the environment, rather than attempt to control it, in order to maintain harmony. 	<ul style="list-style-type: none"> • Reduced need for business planning and scenario development/analysis.

Source: Martinsons and Westwood (1997).

Hypotheses

IT capability is defined as a firm's ability to acquire, deploy, and leverage its IT investment in combination with other resources and capabilities as well as to support and enhance their distinctive competencies and skills in other business functions in order to achieve business objectives through IT implementations. In reviewing the IT literature, six models were identified that have dimensions underlying the IT capability construct. The models are shown in Table 2.2. They were proposed by Sabherwal and Kirs (1994, 1999); Ross, Beath, and Goodhue (1996); Feeny and Willcocks (1998 a, b); Bharadwaj et al. (1999); Byrd and Turner (2000); and Bharadwaj (2000). We empirically confirmed that it is a multidimensional construct. The resulting dimensions taken from combining these models are (1) IT architecture, (2) IT infrastructure, (3) IT human resource, (4) IT relationship resource. Based on the discussion in the preceding section, we develop our hypotheses in the next paragraphs.

IT Architecture

IT architecture is a high level map of information and technology requirements of the entire firm and it is the clarity and organizational consensus around technology, data, and process standards. It provides a vision for how a firm will select and deploy its corporate IT resources. Although IT architecture is considered extremely important in the U.S. (Vizard, 2000), it is different in China. In Chinese business, and especially smaller firms such as born global firms, the release of information that promotes conformity and

reinforces the existing relationship networks is encouraged. Conversely, messages that advocate radical change or undermine social stability tend to be suppressed (Martinsons, 1996). The Chinese are comfortable with limited access to information, because it is not perceived to be a public commodity. Moreover, their management systems do little to promote the release of timely or accurate information. This is especially true in born global firms. Most of the born global firms are SMEs and most of the SMEs in China are family businesses. These Chinese entrepreneurs typically keep information within an in-group, rather than disclosing it for public scrutiny or use (Redding, 1990; Wong 1985). Moreover, the storage, retrieval and transmission of electronic data could also expose their organizations to mischief or sabotage by computer hackers or cyberspace terrorists. Even though many Western firms implement open or distributed IT architectures, many Chinese executives continue to seek well-secured and centralized database management systems. Thus, we can see that the IT architecture in Chinese born global firms is pretty much fixed to the use of top management. Thus, we can argue that:

H1: U.S. firms have a higher level of IT architecture than Chinese firms.

IT Human Resource

IT human resource is considered a valuable human asset that consistently solves business problems and addresses business opportunities through information technology. It is related to IT technical skills, IT managerial skills, business understanding and planning, and problem-solving orientation. Even though these skills are important, they didn't gain enough attention in the Chinese firms. As discussed earlier, Chinese SMEs see little value in codified information, especially if its context would be lost (Walsham, 2000).

Decision-making is not only personal and centralized, but also related to the view of knowledge as the subtle accumulation of experience absorbed over many years. Thus high value is placed on intuition by the powerful and experienced leader rather than in a Western-style 'rational' analysis based on openly available data and criteria (Ping and Grimshaw, 1992; Martinsons and Martinsons, 1996). Thus, we can argue that:

H2: U.S. firms have a higher level of IT Human Resource than Chinese firms.

IT Infrastructure

By *IT infrastructure*, we mean the shared resource that data and applications access through communication networks for organizational use. The main purpose of IT infrastructure is to provide consistent and quick information support throughout the organization to respond to dynamic challenges in the markets (Bhatt 2000). Even though in China, SMEs are heavy IT spenders, most of the IT expenditures go to the physical IT infrastructure ([Chinanet](#), 2004). Most of the Chinese SMEs have not built integrated infrastructure for the better use of information (Krone, Garrett, and Chen, 1992). As mentioned earlier, information is seen as a major instrument of personal power, and is fundamentally a personal asset rather than an organizational resource. And power is maintained by carefully controlling key information. Most management information is for top managers only, and remains in a soft form in the mind of the manager. Key details, ideas, and knowledge are selectively passed on to chosen individuals. The concept of building a shared platform for information does not make any sense in Chinese business cultural context. Thus, we can argue that:

H3: U.S. firms have a higher level of IT Infrastructure than Chinese firms.

IT Relationship Resource

IT relationship resources means the valuable relationship between the IT and business units. In order to have the effective application of IT in the firm, management of IT and business units need to share the risk and responsibility (Ross, Beath, and Goodhue, 1996; Bharadwaj, 2000). Shared risk and responsibility require trust and mutual respect, and an ability to communicate, coordinate, or negotiate quickly and effectively. Relationships play a very important role in Chinese firms. The top manager is the central node for external communications. *Guanxi* connections, or personal relationships, are the preferred informational networks for the Chinese. Even in the age of the Internet, they remain a common substitute for more formal, impersonal, and abstract sources (Redding, 1990; Seagrave, 1995). Information on new products, new technologies, and new market possibilities is often accumulated by socializing with friends and acquaintances (Redding, 1990). Thus, trust and mutual respect play very important roles in long-term relationship building in the Chinese business context. Chinese businessmen put high value on business relationships. Yet, in the U.S., the gap in communication and understanding between business leaders and IT experts is well documented (Potts, 2004; Hoffman, 2003; Wilson, 1997). In order to solve the problems, a growing number of IT directors have appointed IT account or relationship managers to work with business units. These staffs are usually drawn from within IT and improve alignment and collaboration between business leaders and the IT department (Potts, 2004). Yet, as time goes by, having people acting as a “bridge” between the business and IT units can lead to uncomfortable issues about what the true added value is and also a possible conflict of loyalties. Does

the IT account managers represent the interests of the customer (the business) or the supplier (IT), or the middle ground? (Potts, 2004; Hoffman, 2003). Thus, we argue that:

H4: Chinese firms have a higher level of IT Relationship Resource than U.S. firms.

Research method

Research context

We chose born global firms for our sample because of the following reasons: 1) they are small exporters 2) they are an emerging phenomenon and heavily use IT during their internationalization process (Johnson, 2004; Yeoh, 2000). In order to test our hypotheses on the influence of culture, we selected China and the U.S. as the research settings. These countries provide rich research contexts due to differences in terms of their different cultural influences on IT implementations.

As known, China is undergoing a dramatic technological change in the late 1990s. The country will play the major role in the computer-dominated world of the 21st century. Key to the role will be the availability of information. For today's IT professional in China, there is no more pressing need than for accurate, up-to-date technical information (Martinsons and Martinsons, 2002). The U.S. is the Giant in IT world, and has been leading IT development for decades. Its experience would be very useful to Chinese business managers. A comparison between the U.S. and China might be of interest because of vast cultural differences between the two countries (Hofstede, 1980). Moreover, cultural differences are often cited as a reason that IT development in a global environment may differ from the strategies that have been found to be successful in the

U.S. (Shore, 1998; Shore & Venkatachalam, 1994). Cultural differences have particularly proven to be a major obstacle in global IS development when Asian cultures are involved (Burnson, 1989; Liu, Marchewks, and Ku, 2004). Thus, it is possible that cultural differences could contribute to differences in the perceived importance of IT capability.

Sample and data collection

To test the hypotheses, survey data were collected in both China and the U.S. The survey instrument was developed in several stages following generally recognized procedures (e.g. Fowler, 1988; Gerbing and Anderson, 1988; Joreskog et al., 2000; Nunnally, 1978; Churchill, 1979). In this study, IT capability is viewed as a multidimensional construct. The literature was searched to obtain information on the key constructs and scales appropriate for measuring them. Seven-point Likert scales were used to minimize executive response time and effort (Fowler, 1988).

Our sample consists of data from small and medium-sized manufacturing firms established after 1980 that exported at least 25% of their product from near the date of their establishment. We identified these companies from the *Directory of United States Exporters* and *CorpTech Directory of Technology Companies* in the U.S. A wide range of firms and industries was selected for two reasons. First, information systems continue to contribute significantly to greater effectiveness in a wide range of manufacturing industries. Second, a diverse sample increases the generalizability of the results. Appropriate key respondents were identified based on two criteria: a) possession of

sufficient knowledge, and b) adequate level of involvement with regard to the issues under investigation.

Companies were surveyed in the U.S. and China. Due to their different business and cultural environments, this study adopted mail survey in the U.S. and a survey that was personally distributed in China.

After the revision based on the pretest, the questionnaire was mailed to 682 companies in the U.S. with a cover letter explaining the importance of the study and requesting the help of the respondent (See Appendix A). A self-addressed, prepaid envelope was included. We offered the chance to win a gift certificate; three participating companies were picked in a lottery as winners. The first wave resulted in 143 invalid addresses. Following a three-wave mailing, 51 usable surveys were returned reflecting a response rate of about 9.5%.

In China, the same questionnaire was translated and given to Chinese businesses. Back-translation was used in order to increase the accuracy and similarity of the items and to test for the meanings of the Chinese words obtain an accurate translation. The Chinese sample for the study consists of the same type of firms. We randomly selected the sample firms that meet our criteria. We contacted the top management of 240 firms to introduce the study and ask for participation. A total of 180 agreed to participate in the study. We assured confidentiality to all respondents to encourage candid responses. Our data collection efforts yielded 121 completed questionnaires (i.e., those who agreed to participate and did participate in the interviews) for a participation rate of 66.7%. Missing data and listwise deletion reduced the current analytic sample to 106, for an effective participation rate of 58.9%.

Non-response bias analysis

The non-response bias was estimated in two countries separately. To test whether our respondents were different from non-respondents in China, we obtained the demographic data, namely age of the firms and employee numbers, from 28 non-respondents (those managers who agreed to participate but refused participation later) to compare with those of the study participants. We found no statistically significant differences ($p < 0.05$) in age of the firms and employee numbers between the two groups. Please see Table 3.3 for details.

Table 3.3

Comparison of Responses and Non-responses

	F-Statistics: Test of Equality of variances (p-value)	T-Statistics: Equal variance assumed (p-value)	T-Statistics: Equal variances not assumed (p-value)
Age	0.005 (0.943)	-0.168 (0.867)	-0.164 (0.871)
Employee	2.311 (0.132)	0.805 (0.423)	0.739 (0.467)

Note: p-value is in parentheses.

We used two methods to estimate non-response bias for our U.S. sample. The first approach involves dividing responses into early and late response groups on the basis of their arrival dates (Armstrong and Overton, 1977) while the second approach requires a random and equal split of responses. Then, a comparison of differences in the mean of responses between early and late groups and between two equally and randomly split groups can be conducted along key constructs of the study. Such comparison is

considered a valid test of non-response bias as documented and practiced by volume of studies (e.g., Li and Calantone, 1998; Wu, Mahajan, and Balasubramanian, 2004).

The U.S. questionnaires were initially divided into two groups based on their arrival dates. The first group of responses, the early response group, consisted of questionnaires received during the first four weeks of the survey period. Questionnaires received afterwards were considered late responses. The early response group included 26 firms or 50.9 % of total valid replied mails. The remaining 25 firms were grouped as late responses, and this accounted for 49.1% of the total responses.

These questionnaires were also categorized randomly into two groups. Following this approach, two data groups with an equal number of responses (i.e., 25) were generated. The means of the major constructs in this study were compared in both groupings, and no significant differences were found (see table 3.3 and 3.4). This suggests that non-response bias is not a concern.

Sample characteristics

On average, Chinese born global firms are larger than the U.S. ones. And both Chinese and U.S. born global firms invest heavily in IT, but, on average, U.S. firms invest more money on IT. As for sale revenue, Chinese born global firms receive higher sale revenue. Most of the respondents from China have shorter working experience than those of the U.S. ones. Table 3.4 presents descriptive statistics for the test subjects' work experience and their current situations.

Table 3.4**Comparisons of Early and Late Responses**

Construct	F-Statistics: Test of equality of variances (p-value)	T-Statistics: Equal variance assumed (p-value)	T-Statistics: Equal variances not assumed (p-value)
IT architecture	0.644 (0.426)	1.459 (0.151)	1.454 (0.153)
IT human resource	0.016 (0.899)	0.484 (0.630)	0.484 (0.631)
IT infrastructure	0.191 (0.664)	0.664 (0.510)	0.665 (0.509)
IT relationship resource	0.005 (0.942)	0.362 (0.719)	0.362 (0.719)

Note: p-value is in parentheses.

Table 3.5**Comparisons of Two Randomly and Equally Split Responses**

Construct	F-Statistics: Test of Equality of variances (p-value)	T-Statistics: Equal variance assumed (p-value)	T-Statistics: Equal variances not assumed (p-value)
IT architecture	0.466 (0.498)	1.701 (0.100)	1.672 (0.102)
IT human resources	0.069 (0.794)	0.315 (0.754)	0.309 (0.759)
IT infrastructure	0.00. (0.961)	0.897 (0.374)	0.896 (0.375)
IT relationship resources	0.230 (0.633)	0.124 (0.902)	0.122 (0.904)

Note: P-value is in parentheses.

Table 3.6
Sample Demographic Characteristics

Characteristic	China Sample	U.S. Sample
Number of employees		
Mean	293	189
Standard Deviation	310.6	349.4
Years worked for current company		
Mean	6.8	18.3
Standard Deviation	5.9	10.4
IT Investment*		
Mean	1.1×10^6	3.7×10^6
Standard Deviation	6.1×10^6	1.1×10^7
Sales revenue*		
Mean	1.0×10^8	7.2×10^7
Standard Deviation	9.7×10^8	1.7×10^7
Current positions in company		
Top management	24 (20.2%)	43 (87.7%)
Middle management	25 (21.0%)	4 (8.2%)
Lower management	32 (26.8)	2 (4.1%)
Other	38 (31.9)	-

Note: The unit of money is the U.S. dollar.

Measures

In order to measure the key constructs, namely IT architecture, IT human resource, IT infrastructure, and IT relationship resource, we use the following scale to measure IT capability. See Table 3.7.

Table 3.7

Measures of IT Capability

ITA	Information Technology Architecture <i>To what extent you agree/disagree with the following statements:</i>
ITA1	There is consistency of IT policies throughout the enterprise.
ITA2	IT and business managers consult with each other regularly on business and technical decisions.
ITA3	There is integration of business strategic planning and IT planning.
ITINF	Information Technology Infrastructure <i>To what extent the following the related application is found in your organization:</i>
ITINF1	Appropriateness of the data architecture.
ITINF2	Computer facilities for IT projects.
ITINF3	Adequacy of architecture flexibility.
ITHR	Information Technology Human Resource <i>To what extent the following resources are found in your firm:</i>
ITHR1	IT planning Capability.
ITHR2	IT evaluation and control systems.
ITHR3	Appropriateness of network architecture.
ITRR	Information Technology Relationship Resource <i>To what extent you agree/disagree with the following statements:</i>
ITRR1	We have good line management sponsorship of IT initiatives.
ITRR2	We have good relationship between line management and IT service providers.
ITRR3	The IT department of our organization maintains close relationship with business management.

Scale validation

Scale validation and data analysis are conducted with AMOs 4.0 in this study. The validity of measures was assessed by an initial CFA for each of the country, which is a more effective method for assessing unidimensionality than exploratory analysis (Calanton and Zhao, 2000). The purpose was to ensure cross-cultural equivalence of the constructs (Steenkamp and Baumgartner, 1998). If the measurement properties are the same for the two samples, factor patterns and factor loadings should be equal. Table 3.8 provides a summary of our scale assessment.

Table 3.8
Factor loadings and Cronbach Alpha

Items	China		The U.S.		Total	
	λ	α	λ	α	λ	α
ITA1	0.872	0.811	0.887	0.831	0.860	0.840
ITA2	0.854		0.871		0.885	
ITA3	0.829		0.834		0.865	
ITHR1	0.939	0.916	0.918	0.839	0.900	0.892
ITHR2	0.933		0.893		0.927	
ITHR3	0.905		0.795		0.894	
ITINF1	0.925	0.864	0.946	0.890	0.863	0.877
ITINF2	0.888		0.908		0.933	
ITINF3	0.853		0.869		0.897	
ITRR1	0.891	0.833	0.950	0.934	0.891	0.887
ITRR2	0.876		0.948		0.913	
ITRR3	0.836		0.922		0.908	

Labels of variables: ITA=IT architecture, ITHR=IT human resource, ITINF=IT infrastructure, ITRR=IT relationship resource.

The results show that all of the factor loadings are above 0.800 and all the cronbach alphas are above 0.800 too. This shows invariance of the measurement model.

Hypotheses Testing

In order to test the hypotheses in this study, we use ANOVA to analysis the data. To examine the perceived IT capability in two countries, a 2 (countries) X 4 (Components) mixed ANOVA was performed on the data.

The ANOVA results indicated a significant difference between IT architecture ($F=19.545$, $p<0.001$). Yet, the values of IT architecture of U.S. firms are higher than those of the Chinese firms. Thus, H1 is not supported. Even though U.S. firms in the U.S. receive higher scores on IT human resource, the difference is not significant ($F=5.368$, $p<0.226$). Thus H2 is not supported. It also shows that IT infrastructure is also perceived differently in these two countries ($F=5.368$, $p<0.022$), and the value of the U.S. IT infrastructure is higher than those of the Chinese firms. Thus, H3 is supported. H4 is also supported because the result shows strong differences of perceived IT relationship resource in these two countries ($F=6.025$, $p<0.015$). And the Chinese firms receive higher scores than the U.S. firms. Tables 3.9 and 3.10 show the results and the results of the hypotheses tests are summarized in Table 3.11.

Table 3.9**Results of Analysis of Variance**

Source		SS	df	Ms	F	Sig.
ITA	Between Groups	25.809	1	25.809	19.545	0.000**
	Within Groups	204.683	155	1.321		
	Total	230.493	156			
ITHR	Between Groups	2.229	1	2.229	1.248	0.226
	Within Groups	276.890	155	1.786		
	Total	279.118	156			
ITINF	Between Groups	12.095	1	12.095	5.368	0.022*
	Within Groups	349.230	155	2.253		
	Total	361.325	156			
ITRR	Between Groups	8.249	1	8.249	6.025	0.015*
	Within Groups	212.224	155	1.369		
	Total	220.473	156			

Note: * p<0.05, **p<0.001

Table 3.10**Mean scores and standard deviations on each component by country**

Component	Mean (S.D.)	
	China	U.S.
IT architecture	5.5 (0.99)	4.6 (1.42)
IT human resource	3.9 (1.40)	4.2 (1.17)
IT infrastructure	3.7 (1.48)	4.4 (1.52)
IT relationship resource	5.0 (1.00)	4.5 (1.45)

Table 3.11

Summary of Results for Hypothesized Relationships

Hypothesis	Constructs	Predicted relationship	Result
H1	IT architecture	U.S. > China	Not Supported
H2	IT human resource	U.S. > China	Not Supported
H3	IT infrastructure	U.S. > China	Supported
H4	IT relationship resource	U.S. < China	Supported

Discussion

The results of this study suggest that the four components of IT capability are viewed differently in two cultures: Individualism vs. Collectivism. The first difference between the two countries involved the perceived IT architecture. The results (see Tables 3.9 and 3.10) show that IT architecture is perceived as more important in Chinese born global firms than in the U.S. This is because even though Chinese managers are more controlling about the release of information, they pay more attention to policies and rules. This is reflected from their central decision-making styles.

One more surprising result is that there are no significant differences of the perceived IT human resource between the two countries' born global managers. This can be explained as that entrepreneurs in China have realized the importance of not only technological skills of IT but also managerial skills of IT.

Contributions, limitations and future research

Despite a large volume of literature discussing the cultural influence on IS development, there is a scarcity of empirical research investigating how firm's ability of deploying IT related resources, namely the IT capability, can be viewed in different cultural environments. Existing literature focuses more on how national culture influences IS development at the macro level. Limited research has been conducted in investigating specific aspects of IS development. We thus advance the literature by comparing the perceived IT capability in two culturally different countries, China and the U.S. The findings from this study support our argument that even though IT capability is important, it is viewed differently in different cultures.

The findings of our study have several implications for managers in the global marketplace, especially those who interact with Chinese business leaders. Our results show that even though Chinese management realizes that IT is very important in the modern business world, they are still reluctant to establish integrated information systems. They still rely on their personal information sources and make decisions based on their experience and intuition. As a result, those who interact with Chinese business leaders should be sensitive to and take account of the distinctively Chinese information management practice. On the other hand, relationship plays important roles in their businesses. Thus, foreign counterpart should take advantage of this valuable asset in developing IT capability.

One limitation of this study is related to the sample size in the U.S. Even though we tried our best, we couldn't increase our sample size to a more satisfactory level. The unequal size of the two samples might cause some bias of the final results. Another

limitation of this study is about the data collection methods. We used two different way to collect data for this study. We used on-site interviews to collect data in China, but used mail surveys in the U.S. Although we do not believe this influenced the results, we cannot completely discount the possibility.

This study helps explain the influence of culture on perceived IT capability in two different countries. Even though it produced very interesting results, how much of the variance could be attributed to culture in the study is not clear. Future study should include more countries into the study.

Conclusion

In this study, we addressed the question of how IT capability is perceived in different cultures. The results of this study show that U.S. firms place higher average value in terms of IT infrastructure and IT human resources. Even though the latter does not show significant differences between the two countries, it still reflects the fact that the U.S. born global firms have better IT infrastructure and more advanced managerial and technical skills. Chinese firms on the other hand, have a higher score on IT relationship resource reflecting the importance of relationship in Chinese businesses. One interesting finding is that Chinese born global business managers pay closer attention to the IT architecture. This is explainable since Chinese businessmen are still using centralized decision-making style and they are especially concerned about how information is stored and retrieved. We hope our research inspires more interest in the cultural influence on specific IT implementations.

CHAPTER FOUR

ORGANIZATIONAL CULTURE, INFORMATION TECHNOLOGY CAPABILITY, AND PERFORMANCE OF THE BORN GLOBAL FIRM

Introduction

During the past decade, increased attention has been given to the growing number of new and young firms that choose to compete in the international marketplace (McDougall et al., 2003). By leapfrogging some of the traditional intermediate stages of internationalization, these firms have become significant global players themselves in a relatively short time. And they are prime examples of “born global”. The phenomenon of born global has been studied under different labels: “International New Ventures” (McDougall et al., 1994), “Instant International” (Preece et al., 1999), “Global Start-ups” (Mamis, 1989; Jolly et al., 1992), and “Born Globals” (Rennie, 1993; Knight and Cavusgil, 1996; Madsen and Servais, 1997).

Born global firms are characterized by smaller size and reliance on cutting edge technology in the development of relatively unique product or process innovations (Knight and Cavusgil, 1996). Extant literature has shown that the widespread emergence of born global firms in many nations has become an important IB phenomenon (e.g., Moen and Servais, 2002; Rennie, 1993). They operate internationally from an early stage in their development (Rennie, 1993; Knight and Cavusgil, 1996; Madsen and Servais, 1997). They have the potential to become a leading species in the ecosystem of international trade and they might be seen to herald a more diverse international business system in which any firm can succeed internationally (Knight and Cavusgil, 2004). Unaided by investments already in place or markets already developed, these companies

have overcome two drawbacks-that of being start-ups and that of competing against global players (Jolly et al., 1992).

How born global firms successfully handle these drawbacks in the international markets has been the subject of much research. Oviatt and McDougall (1994) present a framework that describes four necessary and sufficient elements for the existence of this type of firm. Knight and Cavusgil (1996) explain the critical factors and implications associated with their arrival. McDougall et al. (2003) empirically tested the difference between born global firms and domestic new ventures. They found out that international new ventures use more aggressive strategies, and they operate in more channels of distribution than did domestic new ventures in order to survive in the international markets. Yeoh (2000) found that global start-ups engage in greater information search in order to compete with global players than domestic firms do. And Johnson (2004) argues that information technology is a very important facilitating factor for the international process of born global firms.

In summary, existing literature has focused mainly on examining why these entrepreneurial firms are going international at such an early age and what are the factors that influence their success in international markets. Two answers to these questions are heavy use of information technology and unique corporate cultures (e.g. Knight and Cavusgil, 1996; Madsen and Servais, 1997; Oviatt and McDougall, 1999). Unfortunately, there is no research explaining the relationship between IT, organizational culture, and firm's performance in the international market in born global literature.

The purpose of this research, therefore, is to examine the relationship between strategic use of information technology, organizational culture, and born global firms'

performance in international markets. We test the proposed relationships in both China and the U.S. To better understand the relationships between organizational cultures, IT capability, and firm performance better, we had in-depth interviews with three born global firms. The remainder of this paper is organized as follows: We first summarize the interviews and follow with review of the existing literature and relevant theory. The resource-based view (RBV) is chosen as a theoretical foundation for this work because we treat information technology capability as a source of a firm's competitive advantage. We present our conceptual models based on the literature review and interviews. Hypotheses are then stated followed by the research methods and data analysis. We conclude with contributions, limitations, and future research opportunities.

Introduction to the three cases

An email was sent to 12 firms requesting their participation in the email interview; three of them agreed to participate after explaining the purpose of the study. For confidentiality, the three firms are referred as firms A, B, and C. The email interviews were conducted by asking the participants some open-ended questions: 1) what prompts their firm to get into international markets at such a young age? 2) How do they describe their corporate culture? 3) What about IT usage in their firms? How is IT used? 4) How do they describe the relationship between IT implementation and corporate culture? Please see Table 4.1 for the details of the cases.

Table 4.1**IT, Organizational Culture, in Three Cases**

	Firm A	Firm B	Firm C
Year Founded	1995	1986	1987
Employee numbers	19	90	20
Industry	Manufacturing	Manufacturing	Manufacturing
International markets	Europe and Asia	NA	Europe (1/3), Japan (1/3), U.S. (1/3)
Reasons for early internationalization	Recognize the market and feel it is obtainable with the use of Internet.	View international market as a better long-term strategy.	In order to achieve market penetration.
Early export amount near foundation	65% of its total product.	75% of its total product.	65% of its total product.
Major products	Human serology diagnostic products	Projector and management tools and wireless technology	X-ray products
IT expenditure	\$125,000	\$5,000	\$150,000
IT usage	To satisfy the regulatory requirement.	Managing global markets.	Conduct business in the areas of manufacturing, accounting, etc.
Organizational culture	From the founder whose background is from Johnson and Johnson; Satisfy customer needs.	Reinvest profit in new product and new market development; providing excellent customer service and remaining “cost effective by design.”	Great service and on-time delivery, mixed with technical innovation.
IT vs. organizational culture	Inquire of international markets for “customer designed” product with IT.	IT allows us to live up to the corporate culture.	IT is set up to support the culture. IT is entirely driven by the corporate culture.
Special comments	“IT is this company’s life blood”	“Our customer base has been extremely loyal.”	“IT does not create culture in our company.”

Firm A was founded in 1995 in California. It develops and manufactures human serology diagnostic products. The total employee number is 19. Recognizing that a medical diagnostic firm has markets outside of the U.S. and that these markets are just as obtainable as those in the U.S., firm A began an aggressive program to obtain international business simultaneously with domestic businesses. It exported about 65% of its product right after establishment. According to the president of firm A, it operates in a strictly “regulated” industry. Its primary customers are “governments of each country.” With governments consuming its products, they regulate it strictly in order to save government money and to protect their populations. The president said without heavy IT investment, it would not be possible for firm A as a small company to complete all of the regulatory requirements. When a product is ordered, it is quality controlled and entered online. When shipped, that product is tracked all the way back to its components per regulations and if something goes wrong the complaints are gathered online and relayed for investigations and possible recall. All of this used to take manpower but now is done with a sophisticated IT system. Files can be put on their Web site for international inspection and use for their own regulatory bodies. The company estimates that for 200 products, it has more than 35,000 documents online in real time. IT is the company’s lifeblood, said the president.

The founder of firm A describes it as a worldwide corporation. He has a background at Johnson and Johnson and he has been trying to foster the same corporate culture as Johnson and Johnson in firm A. It is very marketing oriented, inquiring of international markets for “custom designed” products which meets their needs. Not to do so would constitute a lost of opportunity, the president said. They are also very self-

controlled. There are no secretaries in this company and have been none for many years. Everyone can access documentation and the availability of “the world’s library” allows a small company like firm A to do everything that once was only possible for the large one.

Founded in 1986, firm B is a recognized projection pioneer and innovator, producing the industry’s most comprehensive line of business and home projectors, projector management tools, and wireless technology. It has 90 fulltime employees. It saw the market changes and viewed international markets as a better long-term strategy for their products. Thus, it exported 75% of its total products near the establishment of the company.

Firm B uses IT extensively in managing global markets. It uses an external Web site and links plus email, including digital photographs and video, as its main avenues of communications for sales and technical support. Its instrument is designed to be diagnosed and re-programmed via the Internet. It also uses IT in-house. It has a network of more than 30 computers for software and firmware development, testing, and storage; mechanical and electronic engineering; computer-controlled machine tools; inventory management, production planning, accounting and payroll; Web site for employee information and interoffice email; generation of sales literature and other desktop publishing.

Firm B emphasizes on customers’ value. It uses IT to provide quick and affordable service to customers in remote locations. IT allows it to live up to its culture of providing excellent customer service and remaining “cost effective by design.” Firm B is interested in making a profit through win-win interaction. In order to provide customers with enduring and versatile products, it is willing to take risks. It is also very

entrepreneurial and learning oriented. Firm B learns from its experience and reinvests profits in new product and new market development to secure the company's future.

Firm C was founded in 1987. It mainly produces X-ray products. There are only 20 employees in this company. Most of its customers for its initial product were located outside of the US. The ratio is 1/3 Europe, 1/3 Japan, and 1/3 U.S. About 65% of total sales were exported near the establishment of the firm. Firm C also heavily invested in IT. It uses IT in the areas of manufacturing, accounting, engineering documents, and statistical analysis.

While management focused on great service and on-time delivery mixed with technical innovation in the past, now they are changing to more of a high-quality, high-volume manufacturing culture.

In summary, all three firms are typical born global firms. They are all established after the 1980's, and they started to get involved in the international markets right after their establishment. In order to survive in the international market, they all heavily depend on IT regardless of what industry they are in. Due to the competition and rapid change in the international markets, these firms are learning from doing and heavily invest in innovation. They survive by developing new products. They all emphasize customer value. Providing good customer service and satisfying their needs are among the most important features of their corporate culture. In summary, these three firms are all very internationally marketing oriented, internationally entrepreneurial oriented and organizational learning oriented.

Existing literature shows little consistent record about IT per se and firm performance (Brynjolfsson and Hitt, 1998; Santhanam, 2003). The evidence of SMEs

such as born global firms that benefit directly from IT is even skimpier (Riquelme, 2002). To explain how IT contributes to superior business performance, we take resource-based view and treat IT-related resources as a firm's source of competitive advantage, which, if leveraged well, will lead to better business performance. Extant research and our case studies also show that certain organizational cultures, e.g. international marketing orientation, international entrepreneurial orientation, and organizational learning, are closely related to firms' ability to use IT. We argue that there must be direct relationships between them. In the next section, we introduce the relevant theory and our conceptual model.

Resource-based view of information technology

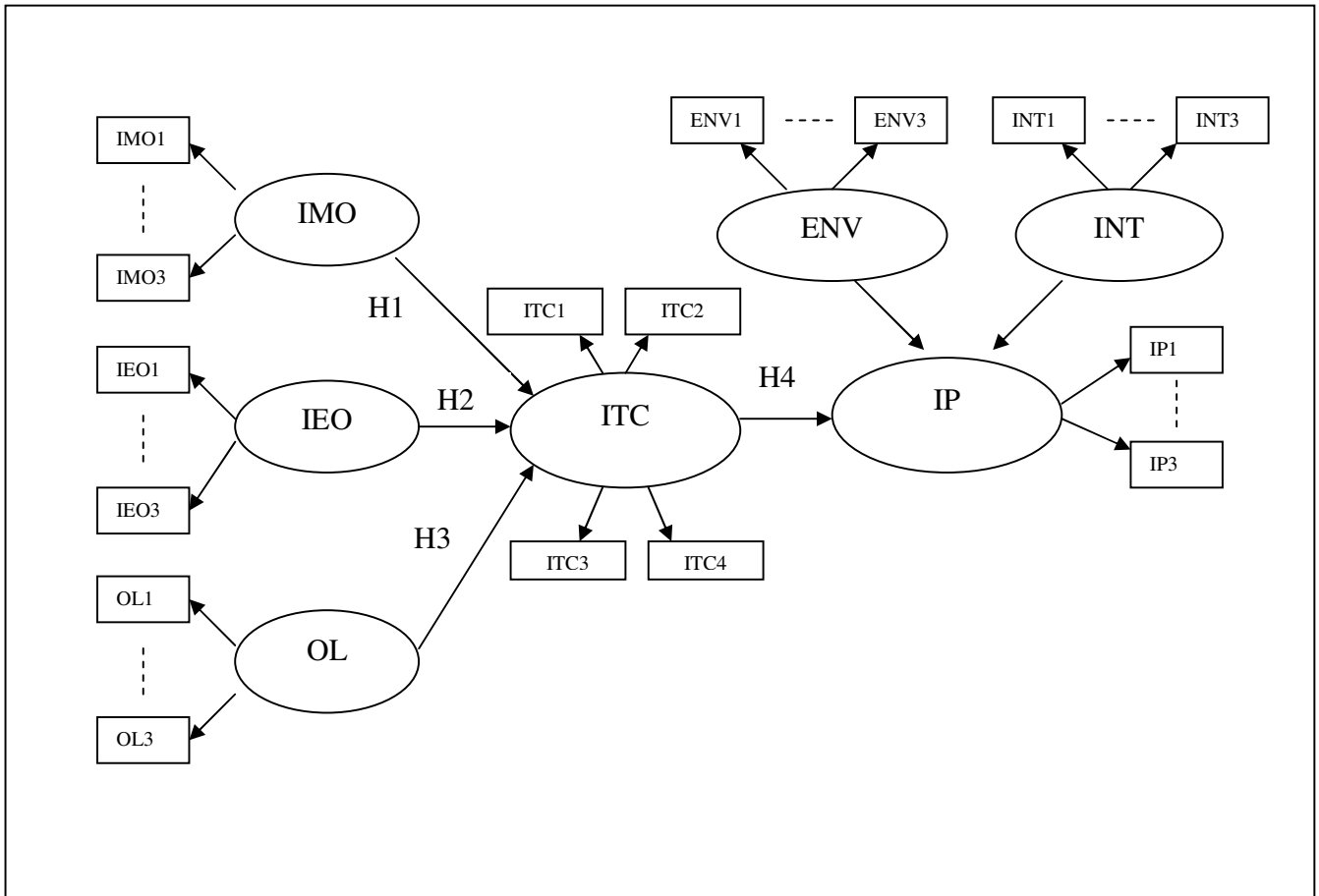
The resource-based view (RBV) started to appear in IS research in the mid-1990s (Wade and Hulland 2004). It is based on the precept that firms competed on the basis of resources that are heterogeneously distributed among them, which lead to observed variability in financial performance across firms (Barney, 1991; Peteraf, 1993). Prior to 1990, most of the literature focused on the importance of information technology and its potential to alter a wide range of strategic and industry structure variables, including cost positions, scale economies, and bargaining power (Cash and Konsynski, 1985; Porter and Millar, 1985; Clemons, 1986). According to the RBV, IT per se may not generate a sustainable advantage, because it can be commoditized through competitive imitation and acquisition (Clemons and Row, 1991). More recently, there is growing evidence that competitive advantage often depends on the firm's superior deployment of capabilities (Christensen and Overdorf 2000; Bharadwaj 2000) as well as intangible assets (Hall 1997;

Feeny and Willcocks, 1998). Based on RBV, this advantage may result from development of capabilities over an extended period of time that become embedded in a company and are difficult to trade. Alternatively, the firm may possess a capability that is idiosyncratic to the firm. For example, an IS expert with specialized knowledge who is loyal to the firm (Tippins and Sohi 2004).

Based on the literature review of RBV, we argue that there is a positive relationship between IT capability and firm performance, and that IT capability is influenced by certain organizational culture. We will study international marketing orientation, international entrepreneurial orientation, and organizational learning in this study. Figure 4.1 shows the conceptual model and hypothesized relationships. In this model, IT capability is conceptualized as a multidimensional construct consisting of four factors: IT architecture, IT human resource, IT infrastructure and IT relationship resource. The contention of our model is that IT capability positively affects a firm's performance in international market (Autio, Sapienza, and Almeida, 2000; McDougall et al., 1994). Each firm's unique base of resource-derived capabilities drives its export performance (Knight and Cavusgil, 2004). And the three organizational culture attributes positively influence IT capability. Accordingly, we develop and test four hypotheses representing: a) the relationship between international market orientation and IT capability; b) the relationship between international entrepreneurial orientation and IT capability; c) the relationship between organizational learning and IT capability; and, d) the relationship between the components of IT capability and a firm's performance in international markets.

Figure 4.1

Conceptual Model and Hypothesized Relationships



Notes: IMO= international marketing orientation
 IEO=international entrepreneurial orientation
 OL=organizational learning
 ITC= information technology capability
 ENV=environmental uncertainty
 INT=information intensity
 EP=export performance

Hypotheses

International marketing orientation and IT capability

Globalization is facilitating the emergence of customers who are better organized, have more information, and are generally more demanding (Knight and Cavusgil, 2004).

Within their markets, marketing-oriented firms seek to offer products and services whose value buyers perceive to exceed the expected value of alternative offerings. The urge to continuously provide superior buyer value and attain superior performance drives the firm to create and maintain a business culture that fosters the requisite business behaviors.

Superior information technology enables firms to leverage information and communication technologies to interact more efficiently with channel members and customers, and to obtain various other benefits (Clark, 1987; Zahra, Ireland, and Hitt, 2000). Thus, we can argue that international marketing orientation can foster information technology capability.

H1: There is a positive relationship between international marketing orientation and IT capability.

International entrepreneurial orientation and IT capability

Having international entrepreneurial orientation implies that these firms make the leap into international markets because of unique entrepreneurial competences and outlook (e.g., Autio, Sapienza, and Almeida, 2000; McDougall et al., 1994). International entrepreneurial orientation is associated with innovativeness, managerial vision, and proactive competitive posture in the pursuit of international markets (Covin and Slevin, 1989; Dess et al., 1997). Entrepreneurship derives from “the capability of small firms to

leverage resources and transform existing markets through innovation” (Steensma et al., 2000:951). This basic innovativeness gives rise to new ideas and creative processes, reflecting a willingness to depart from existing technologies (Lumpkin and Dess, 1996). Entrepreneurial firms continually seek new capabilities that improve organizational performance (e.g., Lumpkin and Dess, 1996; Miller and Friesen, 1984; Mintzberg, 1973; Zahra, Ireland, and Hitt, 2000). We then can argue that:

H2: There is a positive relationship between international entrepreneurial orientation and information technology capability.

Organizational learning and IT capability

Although the link between organizational learning and information technology has only begun to be explored, two related streams of research can be identified. The first adopts organizational learning as a means for explaining and resolving the problems of implementing and using new information technologies in organizations. The second stream of research develops applications of information technology to support the processes of organizational learning and knowledge management (Robey et al., 2000). The resource based view of IT suggests that firms can and do differentiate themselves on the basis of their IT resources. A firm’s IT infrastructure, its human IT skills, and its ability to leverage IT for intangible benefits serve as firm-specific resources, which in combination create a firm-wide IT capability. While each of the individual IT resources are complex to acquire and difficult to imitate, firms that achieve competitive advantage through IT have also learned to combine effectively their IT resources to create an overall IT capability. The development of such capability takes time and effort and involves

experiential learning (Bharadwaj, 2000). It requires a lot of teamwork to create a shared information base and consistently solve business problems and addressing opportunities through information technology. Organizational learning is viewed as one type of organizational culture (Slater and Narver, 1995). It emphasizes managerial vision, leadership, communication, and teamwork within human systems (Senge, 1990). Thus, we can argue that:

H3: There is a positive relationship between organizational learning and IT capability.

IT capability and export performance

From a resource-based perspective, capabilities are difficult to imitate because of idiosyncratic development of resources that have little value outside the context of a specific firm. This inimitability can form the basis of competitive advantage (Lei et al., 1996; Bharadwaj 2000; Powell and Dent-Micallef, 1997). IT capability has been defined as capability of IS function (Teo and King, 1997); the ability to underpin the pursuit of high-value-added applications of IT and to capitalize on the external market's ability to deliver cost-effective IT services (Feeny and Willcocks, 1998 a, b); or firm's ability to use IT to support and enhance their distinctive competencies and skills in other business functions (Prasad, Ramamurthy and Naidu; 2001), etc. Drawing from these views we define IT capability as a firm's ability to productively acquire, deploy, and leverage its IT investment in combination with other resources and capabilities as well as to support and enhance their distinctive competencies and skills in other business functions in order to achieve business objectives through IT implementations.

IT capability is viewed as a multidimensional construct. Researchers view it as containing different dimensions. In reviewing the IT literature, six models were identified that have dimensions underlying the IT capability construct. The models are shown in Table 1.2. They were proposed by Sabherwal and Kirs (1994, 1999); Ross, Beath, and Goodhue (1996); Feeny and Willcocks (1998 a, b); Bharadwaj et al. (1999); Byrd and Turner (2000), and Bharadwaj (2000). The resulting dimensions taken from combining these models are: IT architecture, IT infrastructure, IT human resource, and IT relationship resource.

Information technology architecture and export performance. Architecture sets rules for distributing hardware, software, and support. These rules specify what kinds of data to share and how to store them, where to locate servers, and how to support applications and technologies. As IT becomes distributed throughout firms and even beyond their boundaries, IT managers and their business partners need a clear vision of where to locate individual technology components and responsibility for those components. A well-defined architecture takes time and effort, and involves experiential learning (Bharadwaj, 2000; Ross, Beath, and Goodhue, 1996). It always involves a change of longstanding policy, logistic and overcome huge cultural clashes. Thus, it is hard to be imitated. Flexible IT architecture is especially important for born global firms because in order to provide quick and affordable service to customers in remote locations, they must be able to update their information faster than their competitors. Open and flexible IT architecture enables born global firms to reach this goal. Thus, it can be argued that superior IT architecture is positively related to firm performance in international markets.

IT human resources and export performance. This research identifies four major dimensions of IT human resource: technical skills, managerial skills, and business thinking and IS planning skills, and problem solving skills (Bharadwaj, 2000; Bharadwaj, Sambamurthy, and Zmud, 1999; Ross, Beath, and Goodhue, 1996; Bassellier et al., 2000; Feeny and Willcocks, 1998 a, b; Heijden, 2000; Byrd and Turner, 2000; Lee, Trauth, and Farwell, 1995).

Technical IT skills include programming and systems analysis and design, as well as competencies in emerging technologies (Bharadwaj, 2000). These skills are highly valued to build bridges between old systems and new, to deliver data across locations and applications, and to recognize opportunities to apply new technologies as they become available (Ross, Beath, and Goodhue, 1996). Managerial IT skills includes effective management of IS functions, coordination and interaction with the user community, and project management and leadership skills (Capon and Glazer, 1987; Copeland and McKenney, 1988; Bharadwaj, 2000). The managerial ability to coordinate the multifaceted activities associated with the successful implementation of IT systems is a key distinguishing factor of successful firms. Business thinking skills refers to the management's ability to envision how IT contributes to business value and the ability to integrate IT planning with the firm's business strategies (Bharadwaj, 1999). Related IS planning skills require IS managers to be able to identify business opportunities on time within limited budgets (Segars and Grover, 1998). Problems solving skills refer to the distribution of analysis and solving problems to every IT staff manager (Ross, Beath, and Goodhue, 1996).

Taking the RBV perspective, it is clear that all of these skills are difficult to acquire and complex to imitate. Technical and managerial skills evolve over long periods of time through the accumulation of experience. Managerial skills, most of the time, are tacit and dependent on other interpersonal relationships, which may take a long time to develop. Business thinking and planning skills also require long-term learning and accumulation of experience.

All of the above-mentioned skills are related to strategic utilization of IT. Yet, most of the studies conducted on strategic utilization of IT resources have concentrated on large-sized organizations (Kyobe, 2004). However, strategic utilization of IT is extremely important to SMEs if they want to survive in the international market. The skills mentioned above would also help smaller firms, such as born global firms, to provide customer services and links with suppliers (Tati, 2001), marketing capability (Duncombe and Heeks (2001), differentiation of products/services (Eeden, 2001), better innovation capability (Motwani et al., 1999), and reduction in costs (Duncombe and Heeks, 2001). All of these are said to influence a firm's performance in international markets. So, we can argue that superior IT human resource can serve as a source of competitive advantage and it will ultimately lead to better firm performance.

IT infrastructure and export performance. A firm's IT infrastructure is comprised of its computer and communication technologies and its shareable technical platforms and databases (Ross, Beath, and Goodhue, 1996; Bharadwaj, 2000; Weill et al., 1996). The IT platform determines the degrees of freedom a firm enjoys in its business plans. A non-integrated IT infrastructure dominated by system incompatibilities severely restricts an organization's business choices. Resource-based theorists contend that physical assets,

such as infrastructure, can serve as sources of competitive advantage when they outperform equivalent assets of competitors (Barney, 1991; Rumelt, 1984). Yet, it is often argued that physical IT resources can be purchased or duplicated fairly easily by competitors, and thus can't serve as sources of competitive advantage. However, building an integrated infrastructure takes time and effort, and involves experiential learning. Neo (1988) found that the most successful IT implementers were the ones that had previously implemented similar systems and had accumulated experience. Time compression diseconomies make it difficult for newcomers to catch up by simply "throwing money" at the effort and purchasing IT systems. Born global firms are big spenders for IT infrastructure, yet only those who can build an integrative IT infrastructure can succeed in international markets.

IT relationship resource and export performance. Creation of strong global networks is one of the most important features for born global firms (Jolly et al., 1992). These networks consist of relationships with suppliers, customers, and producers. And, IT is an essential tool to maintain these relationships. Viewed from RBV, we can see that the development of external linkage demands an extremely dedicated effort from management because blending of business and IT experience through multi-disciplinary teams and encouraging risk sharing and experimentation with IT will not be achieved within a short time. Contract facilitation and monitoring skills also require many years for highly skilled employees to develop. It is difficult to ensure that problems and conflicts are solved fairly and promptly. A win-win situation is ideal for all firms, yet it also takes many years to achieve. Thus, we can argue that superior IT relationship resource can

serve as sources of competitive advantage and will lead to better firm performance.

Hence, it can be argued:

H4: There is a positive relationship between IT capability and firm performance in the international market.

Research context

The hypothesized relationships in this study are tested in two countries, namely China and the U.S. The reasons that we take these two countries as study context is threefold: First, China and the U.S. provide contrasting research contexts due to their differences in level of economic development and national competitiveness (Foreign Policy, 2001, 2003). Second, the number of SMEs exporting to China surged by 310 percent, compared to 129 percent for large-company exporters from 1992 to 2001, according to the *Office of Trade and Economic Analysis* (2003). Among these SMEs, many can be classified as born global firms (OECD, 1997). It is meaningful to study the born global phenomenon in these two countries. Third, China and the U.S. are also very culturally different (Hofstede, 1980, 1990) and cultural differences have proven to be a major obstacle in global IS development when Asian cultures are involved (Burnson, 1989).

Research method

Sample

Our sample consists of small and medium-sized manufacturing firms established after 1980 that exported at least 25% of their total products from near their establishment date.

Both China and the U.S. have a large number of exporters in manufacturing industries. We selected our target firms from a wide range of industries for two reasons. First, information technology continues to contribute significantly to greater effectiveness in a wide range of manufacturing industries. Second, a diverse sample increases the generalizability of the results. In the U.S., firms were identified primarily via two databases: the *Directory of United States Exporters* and *CorpTech Directory of Technology Companies*. We use personal contacts identified firms in China.

Survey design and data collection

The main research instrument in this study was a questionnaire. Questionnaires were initially developed in English and revised after discussing with 8 experts and managers and a pretest with 38 firms. It was then translated into Chinese and back-translated by two independent bilinguals using the method suggested by Douglas and Craig (1983). This involves original translation, back-translation, and extensive refinements until the translated instruments possessed both conceptual and functional equivalences (Cavusgil and Das, 1997; Green and White, 1982; Mintu, Calantone, and Gassenheimer, 1994).

Companies were surveyed in the U.S. and China. Due to their different business and cultural environments, this study adopts a mail survey in the U.S. and a survey that was personally distributed.

In the U.S., the final questionnaire was sent to 682 manufacturing firms across the country. The first wave resulted 143 invalid addresses. Following a three-wave mailing, 51 usable surveys were returned, reflecting a response rate of about 9.5%. In China, the

same questionnaire administered to Chinese firms. The Chinese sample for the study consists of the same type of firms. We contacted the top management of 240 firms to introduce the study and ask participation in China. A total of 180 agreed to participate in the study. We assured confidentiality to all respondents to encourage candid responses. Our data collection efforts yielded 121 completed questionnaires (i.e., those who agreed to participate and did participate in the interviews) for a participation rate of 66.7% (121/180). Missing data and listwise deletion reduced the current analytic sample to 106, for an effective participation rate of 58.9%.

Non-response bias analysis

To test whether our respondents were different from non-respondents in China, we obtained demographic data, age of companies and employee numbers, from 28 non-respondents (those managers who agreed to participate but failed to participate later) to compare with those of the study participants. We found no statistically significant differences in age of companies and employee numbers. Please refer to Table 3.3 for details.

We used two methods to estimate non-response bias for our U.S. sample. The first involved a comparison of differences in the mean of responses between early and late groups. To do so, we divided the responses into early and late response groups on the basis of their arrival dates (Armstrong and Overton, 1977). The second was a comparison between a random and equal split of responses. To do so, we equally and randomly split groups. The comparisons were conducted along key constructs. Such comparison is considered a valid test of non-response bias as documented and practiced

by a volume of studies (e.g., Li and Calantone, 1998; Wu, Mahajan, and Balasubramanian, 2004).

Following this approach, the completed questionnaires were initially divided into two groups. Questionnaires received after the fourth week was considered late response. The questionnaires were also categorized randomly into two equal groups. The means of the major constructs in this study were compared in both groupings, and no significant differences were found (see Tables 3.4 and 3.5 for details). Thus, we can conclude that non-responses bias is not an issue in this study.

Measures

The samples of items used to measure key constructs in this study and the sources of the scales are summarized in the Appendix A. While all the key constructs are measured by using adapted scales from existing literature, IT capability is measured using the scale developed in Chapter Two. The following section discusses all the measures in detail.

Dependent variable:

Export performance (EP) **The** dependent variable in this study is export performance. It is defined as the extent to which financial and other goals are achieved as a function of business strategies. Performance comprises expectations about the achievement of these objectives with such measures as profitability, sales growth, market share, and general international success. In this study, we adopted the scale of Zou et. al. (1998).

Independent variable

International marketing orientation (IMO) Marketing orientation refers to a culture in which organizations strive to create superior value for their customers (and superior performance for the business) by focusing on customer needs and long-term profitability (Becherer et al., 2003). It has been defined as the process of generating marketing intelligence, disseminating marketing intelligence, and responding to marketing intelligence in order to provide superior customer value (Kohli and Jaworski, 1990; Narver and Slater, 1990). International marketing orientation refers to a managerial mindset that emphasizes the creation of value via key marketing elements for foreign customers (Cavusgil and Zou, 1994). In this study, we adapted the scale from Knight and Cavusgil (2004) to measure international marketing orientation.

International entrepreneurial orientation (IEO) International entrepreneurial orientation reflects a firm's overall innovativeness and proactiveness in the pursuit of international markets (Knight and Cavusgil, 2004). Having an IEO implies that these firms make the leap into international markets because of unique entrepreneurial competences and outlook (e.g. Autio, Sapienza, and Almeida, 2000; McDougall et al., 1994). The scale captures the extent to which the firm's strategic leaders are innovative, proactive, and risk seeking. We adopted the scale from Miller and Friesen (1984) and Knight and Cavusgil (2004) to measure international entrepreneurial orientation in this study.

Organizational learning orientation (OL) Learning orientation is a set of organizational values that defines the ability to create, disseminate, and utilize knowledge (Sinkular, Baker, and Noordewier, 1997). Learning can be considered as a process whereby

members in an organization are stimulated to continually strive for new approaches and acquire, as well as share, knowledge consequential to interactions with environments (Argyris, 1991). Organizational learning orientation goes beyond one that adapts to changes in the marketplace, but relates to knowledge questioning values that lead to generative learning (Sinkula, Baker, and Noordewier, 1997). Thus, organizational learning culture manifests itself in a behavioral norm that impacts the development and processing of market information (Deshpande and Webster, 1989; Deshpande, Farley, and Webster, 1993). To measure this construct, we adopted the scale from Hurley and Hult (1998).

Control variable

To account for extraneous sources of variation in firm performance, we include information intensity and environment uncertainty as two control variables in this study.

Information Intensity (INT) Information intensity is measured by the perceived extent to which products and services of the divisions are dependent on information. Complex products, such as the design of an aircraft, require a lot more information than those of simple products, such as design of a table or chair. Moreover, in the operation of complex products/services, the contents of information also increase, as customer requirements become quite specific. In some cases, increasing information contents in the products/services enable customers to order customized products/services, thus creating the need to capture, store, and manipulate customer-related information (Bhatt 2000).

Environment Uncertainty (ENV) Environment uncertainty is operationalized in this research in terms of technological uncertainty and environmental turbulence. Existing research shows that the more uncertain the environment, the more information needed by firms to deal with the environment (Feeny and Willcocks, 1998b). This study adopted the existing scale, whose reliability and validity has been tested, from Karri (2001).

Measure Development and Validation

General measurement approach

Given the scarcity of prior empirical research, we developed the scale to measure IT capability. We adopted existing scale to measure the rest of constructs, international marketing orientation, international entrepreneurial orientation, organizational learning orientation, information intensity, and environment uncertainty and export performance. A confirmatory factor analysis by means of AMOS 4.01 (Arbuckle, 1999) was used to assess the psychometric properties of the scales to validate the measures (Anderson and Gerbing, 1988; Fornell and Larcker, 1981). AMOS is a new structural equation-modeling program that has recently gained popularity among academic scholars.

Scale assessment

Table 4.2 provides a summary of our scale assessment. The validity of measures was assessed by an initial CFA for each of the two groups, from China and the U.S. An unconstrained CFA was conducted that allowed factor structure to vary across samples. The results revealed a high level of consistency in model form and measurement across the two groups. Factor loading for each indicator to its respective construct was significant and all loadings are above 0.70, as can be seen in Table 4.2.

To test the equivalence of the measurement model across the Chinese and U.S. samples, we conducted a constrained CFA. If the measurement properties are the same for the two samples, factor structure and factor loadings should be equal. Therefore, we set the factor structure to be invariant in the constrained model and compare this model with an unconstrained model. The results indicated identical factor patterns. Compared with the unconstrained model, the difference in χ^2 value of 419.5 with d.f. of 219 suggests that factor structure was indifferent across samples. The constrained model also exhibited a good fit, the χ^2 of the model was 897.8 with d.f. =421, the ratio of χ^2 to d.f. was 2.1, the CFI was 0.96, and the IFI was 0.97.

Results and discussion

Individual structure model

When the measurement issues were satisfied, the structural model in Figure 1 was tested for each of the two groups, China and the U.S. The Chinese model converged well. Four paths were all statistically significant, as shown in table 4.3. The χ^2 was 474.76 with d.f.

of 203, the CFI was 0.96, the IFI was 0.96, and the NFI was 0.94. Tests showed that an additional path would not improve the model.

Table 4.2

Factor Loadings and Cronbach Alpha

	China		The U.S.		Total	
	λ	α	λ	α	λ	α
IMO1	0.759	0.76	0.840	0.70	0.792	0.74
IMO2	0.838		0.711		0.799	
IMO3	0.872		0.825		0.853	
IEO1	0.897	0.87	0.885	0.91	0.890	0.89
IEO2	0.882		0.937		0.907	
IEO3	0.886		0.954		0.920	
OL1	0.916	0.90	0.860	0.77	0.885	0.86
OL2	0.912		0.897		0.906	
OL3	0.919		0.730		0.857	
INTEN1	0.829	0.70	0.889	0.73	0.809	0.72
INTEN2	0.749		0.841		0.797	
INTEN3	0.725		0.872		0.791	
ENV1	0.834	0.76	0.762	0.70	0.809	0.73
ENV2	0.775		0.813		0.789	
ENV3	0.854		0.807		0.832	
IP1	0.930	0.91	0.947	0.93	0.937	0.92
IP2	0.933		0.944		0.935	
IP3	0.897		0.924		0.909	

Unconstrained model: $\chi^2 = 478.3$ (d.f. = 203), CFI=0.97, IFI=0.96.

Constrained model: $\chi^2 = 897.8$ (d.f. = 421), CFI=0.96, IFI=0.97.

Labels of variables: IMO=international marketing orientation, IEO=international entrepreneurial orientation, OL=organizational learning orientation, INTEN=information intensity, ENV=Environment uncertainty, EP=export performance

Table 4.3

Results of Path Analysis of Individual Models

	Hypothesis	China	United States	Multi-group
Model Fit:				
χ^2 (d.f. =203)		474.76	330.56	806.12 (d.f. =406)
CFI		0.96	0.96	0.96
IFI		0.96	0.96	0.96
NFI		0.94	0.91	0.93
RMSEA		0.11 (0.09-0.12)	0.11 (0.08-0.13)	0.08 (0.07-0.09)
Standardized path coefficient				
IMO-ITC	H1: >0	0.657***	0.337*	
IEO-ITC	H2: >0	0.513***	0.215*	
OL-ITC	H3: >0	0.326***	0.531***	
ITC-IP	H4: >0	0.566***	0.314**	
INT-IP		- 0.015	- 0.206	
ENV-IP		0.389***	0.344**	

- Notes: 1). Labels of variables: IMO=international marketing orientation, IEO=international entrepreneurial orientation, OL=organizational learning orientation, INT=information intensity, ENV=Environment uncertainty, EP=export performance.
- 2). Fit indices: CFI= Comparative fit index, IFI= incremental fit index, NFI=Normed fit index.
- 3). ***p<0.001, **p<0.01, *p<0.05.

The U.S. model also converged well. As shown in table 4.3, the four paths were also statistically satisfied. All fit indices for the U.S. model were at an acceptable level ($\chi^2=330.56$, d.f. =203; CFI=0.96, IFI= 0.96, NFI=0.91). Modification indexes showed that no additional path should be released.

Examining the path coefficients across samples, we found some differences. Path coefficients from international marketing orientation to IT capability are 0.657 for the Chinese model, and 0.337 for the U.S. model. Path coefficients from international entrepreneurial orientation to IT capability are 0.513 for the Chinese model, and 0.215 for the U.S. model. And the path coefficients from organizational learning to IT capability are 0.566 and 0.314, and from IT capability to performance is 0.566 and 0.314, respectively.

Multigroup Model

Individual path models for Chinese and U.S. firms were different. We believe one reason that caused the difference is in the organizational culture and the perception of IT capability. On the basis of CFA analysis and individual path model results, we performed a multigroup simultaneous path analysis to test for similarities and differences in the relationships among organizational culture, IT capability and performance.

The objective of the multigroup analysis was to determine whether the path coefficients were equal across the two groups. To test which paths were different, we used the multiple-group comparison method of AMOS. We first constrained one path to be equal across the two samples and then freely estimated this path. An insignificant χ^2

between the constrained and unconstrained models with respect to the degrees of freedom would suggest an equal path coefficient across two groups. A significant difference would imply that at least one path coefficient is statistically different between the two groups. We then conducted a paired a paired comparison to detect differences between them. See results in Table 4.4.

Table 4.4

Goodness-of-Fit Statistics for Tests of Invariance across China and the U.S.

Model Description	χ^2	df	$\Delta\chi^{2a}$	Δ df	Statistical Significance
1. Combined baseline models (China and U.S.)	806.05	406	-	-	-
2. IT cap-Performance path constrained	809.37	407	3.32	1	<0.10
3. IMO-IT cap path constrained	806.12	407	0.07	1	NS
4. IEO-IT cap path constrained	806.99	407	0.94	1	NS
5. OL-IT cap path constrained	812.40	407	6.35	1	<0.05

Notes: 1). $\Delta\chi^2$, difference in χ^2 values; Δ df, difference in degree of freedom.

2). All models compared with Model 1.

For the IT capability-performance path, the constrained model produced a χ^2 of 809.37 with 406 d.f., and the χ^2 of the unconstrained model was 806.05 with 407 d.f. The difference was 3.32 with one d.f. (significant at 0.10), which suggests that the path coefficient was unequal across the two. For organizational learning-IT capability path,

the χ^2 unconstrained model is 812.40. The difference of the χ^2 between the constrained model and the unconstrained model is 6.35 with one degree of freedom suggests that that path coefficient was unequal across the two group.

The results of the multigroup comparison are summarized in Table 4.5. The tests indicated that the path from international marketing orientation, and international entrepreneurial orientation to IT capability was equal, whereas the paths from organizational learning, to IT capability and IT capability to performance are different.

Table 4.5

The Results of Multigroup Comparison

Constraint	Results of Multigroup Comparison
IT Capability - performance	China > U.S.
International marketing orientation –IT capability	China = U.S.
International entrepreneurial orientation –IT capability	China = U.S.
Organizational learning –IT capability	China > U.S.

Results and discussion

The results of the single-model tests and multigroup model comparison are given in Tables 4.3, 4.4, and 4.5. We base our discussions about the general hypotheses (H1 – H4) on the results of individual path models. The discussion of cross-country comparisons will be based on the multigroup model results.

General results of hypothesis testing

According to H1, the more the firm is internationally marketing oriented, the higher the IT capability. The single model result shows that the coefficient between them is 0.621 ($p < 0.001$) for the Chinese model; the coefficient is 0.395 ($p < 0.001$) for the U.S. model. Both models support H1, which confirms our expectation that IT capability is highly influenced by a firm's international marketing orientation. H2 states that the more the firm is internationally entrepreneurial oriented, the higher the firm's IT capability. The coefficient between these two variables is 0.472 ($p < 0.001$) in China and 0.329 ($p < 0.001$) in the U.S. Both the sample models supported H2. According to H3, there is a positive relationship between firm's organizational learning orientation and IT capability. Results show that the coefficient is 0.384 ($p < 0.01$) in China and 0.156 ($p < 0.01$) in the U.S. These results supported H3 that the more the firm is organizationally learning oriented, the higher its IT capability. H4 states that the higher the firm's IT capability, the better the firm's export performance. The coefficients are 0.553 ($p < 0.01$) and 0.299 ($p < 0.10$). Thus, the last hypothesis is also supported. The results also show that environment uncertainty significantly influences a firm's export performance in both countries, yet information intensity does not. The summaries of results for hypothesized relationships are shown in Table 4.6.

Cross-national comparison

Multigroup tests revealed some differences between the two countries (refer to Tables 4.4 and 4.5). A multigroup comparison test indicated that the path coefficient from IT capability to export performance is not equal across the two countries. It is stronger in

China than in the U.S. (China>U.S.). This is consistent with the results from our second empirical study. IT capability received a higher score in China than it did from the U.S. We argued that Chinese business culture has been an obstacle to the implementation of IT for many years. Things are changing.

Table 4.6

Summary of Results for Hypothesized Relationships

Hypothesis	Constructs	Predicted Relationship	Results
H1	International marketing orientation and information technology capability	Positive	Supported
H2	International entrepreneurial orientation and information technology capability	Positive	Supported
H3	Organizational learning and information technology capability	Positive	Supported
H4	Information technology capability and export performance	Positive	Supported

And this study offers good evidence of how fast China is catching up with the advanced technologies; IT is one of them. As it is known, one of China's strategic policies is to import foreign intellect to speed up its economic construction and social development. By the end of 1996, China had imported more than 600,000 foreign experts and sent 320,000 experts abroad to study or for training. Vigorously introducing foreign talents and learning from foreign advanced science, technology, and managerial know-how have

played an important role in China's socialist construction (Wattanavitukul, 2002). Moreover, there are more and more overseas Chinese students returning to China after graduation. The number of "sea turtles," the nickname for returnees to China, is growing rapidly. In 2002, 180,000 Chinese students went back home, up 47 percent from 2001 (Wattanavitukul, 2002). In summary, this paper confirmed that even though there is still some gap between IT development in China and the U.S., the difference is becoming less significant than before.

Another interesting finding is the difference in the link between organizational learning orientation and IT capability. The multigroup comparison reveals that the path coefficient from learning to IT capability is significantly different across samples. There is a stronger relationship between learning and IT capability in China than in the U.S. We believe this is because China is in the catching up stage with the Western management style and thus those who learn faster and better survive in the competition. Whereas in the U.S., even though learning is important, it is not the distinguishing factor.

Theoretical contributions

This study contributes to both international business and information systems literature by linking organizational culture and information technology capability to born global firms' performance in international markets. The success of a strategy is linked to proper development and building of core and distinctive capabilities which enable a firm to create a competitive advantage. IT plays a significant role in supporting this goal (Kyobe, 2004). It is often argued that effective utilization of IT or IT capability supports

or even shapes the strategies of many organizations (Henderson and Venkatraman, 1999). Yet most of the studies conducted on IT capabilities have concentrated on large-sized organizations. Little is known about IT capabilities in the born global firms. Thus, in this research, we aim to fill the gap in existing international business and information systems literature by examining the influence of IT capability on export performance of born global firms. In our framework, we propose that IT capability is effective in enhancing firm performance and international marketing orientation; international entrepreneurial orientation and organizational learning are some organizational cultures that foster the development of IT capability.

We believe that this research makes significant contributions to the literature on born global. Traditional theories such as monopolistic advantage theory (Hymer, 1976, Caves, 1982), product life cycle theory (Vernon, 1966), stage theory of internationalization (Johanson and Vahlne, 1977), oligopolistic reaction theory (Knickerbocker, 1973), and internalization theory (Hennart, 1982; Rugman, 1981; and Buckley and Casson, 1976), have failed to explain the formation of born global (McDougall et al., 1994). The application of the resource based view to explain the phenomenon helps expand the body of knowledge in both international business and information systems. Based on the resource based view, IT capability is treated as the source of competitive advantage for firms and if leveraged well will lead to superior performance in international markets. Our study contributes to the RBV by supporting the perspective that a firm's competitive advantage and performance are a function of complex inimitable resource that is embedded within the organization.

Managerial Contributions

To business practitioners, this study illustrates the significant role of IT capability in enhancing the export performance of born global firms. It also identifies some antecedents of IT capability, international marketing orientation, international entrepreneurial orientation, and organizational learning orientation. From a practical and managerial standpoint, many important insights can be gained from this research. First, our study demonstrates to managers that information technology cannot assure business success. They need to develop IT capability. This means that firms need to know how to mobilize and deploy IT-based resources in combination or co-present with other resources and capabilities in the firms. Second, our study also found out that learning is very important especially for Chinese firms. Those who learn faster will develop superior IT capability faster, which in turn will bring better firm performance. Thus, firms need to invest in learning. Only the fastest learners can gain the competitive advantage and compete successfully (Parkhe, 1997). Third, our study also found that organizational cultures have effects on IT capability. Certain organizational cultures, such as international marketing orientation, international entrepreneurial orientation, and organizational learning, give rise to specific capabilities, such as IT capability, suitable for success in foreign markets. Managers should be proactive in creating such kinds of organizational cultures.

Conclusion

Existing literature shows that born global firms are heavy users of IT. Yet, only a few of them utilize their IT resources strategically. Many born global firms are still ignorant of

their competitive environment and do not use IT resources to facilitate the formation of links with suppliers and customers or differentiation of products/services and innovation. This study proposes a conceptual framework to investigate IT capability effects on firm performance of born global firms and empirically tests the hypothesized relationships. It confirms that firms who can build superior IT capability can have sustained competitive advantage in the international markets. This study also contributes further to the existing literature by identifying some organizational cultures that have positive relationships with IT capability. They are international marketing orientation, international entrepreneurial orientation, and organizational learning orientation.

CHAPTER FIVE

CONCLUSION

This dissertation is comprised of three papers relating to the influence of IT capability on performance in the context of born global firms. The first paper reviews the literature on IT capability and refines its definition. It also developed a scale to measure IT capability and empirically tested its reliability and validity using primary data from the China sample. The second paper compares the difference between perceived IT capability in China and in the U.S. And the third paper examines how organizational culture and IT capability together influence born global firms' performance in international markets.

Given that born global is a relatively new phenomenon, there is a scarcity of empirical research investigating strategic factors that influence its export performance. IT capability as one such factor has only been studied in larger firms in the Western culture. It has not been studied in the context of small firms such as born global firms in Chinese culture. Thus, the three empirical papers are among the first research that explores the effects of IT capability on born global firms. Hence, there are several significant contributions of this dissertation: first, the examination of the development of IT capability and validation of the scale in the context of born global firms in Chinese culture; second, literature on international business, information systems, and international entrepreneurship are integrated to address the effects of IT capability on firms' export performance; third, the application of the resource based view to explain the phenomenon helps expand the body of knowledge in both international business and information systems. Based on a resource based view, IT capability is treated as the source of competitive advantage of firms which, if leveraged well, will lead to superior

firm performance. In the next few paragraphs, the major findings of each paper are summarized.

The first paper in this dissertation develops a scale to measure IT capability. The purpose of this paper is to gain a better understanding of IT capability. In this study, IT capability is viewed as a multidimensional construct. In reviewing the IT literature, six models were identified that have dimensions underlying the IT capability construct. The models are shown in Table 1.2. They were proposed by Sabherwal and Kirs (1994, 1999); Ross, Beath and Goodhue (1996); Feeny and Willcocks (1998 a, b); Bharadwaj, Sambamurthy, and Zmud, (1999); Byrd and Turner (2000); and Bharadwaj (2000). The resulting dimensions taken from combining these models are: IT architecture, IT infrastructure, IT human resource, and IT relationship resource. The reliability and validity of the scale were tested using data collected from China. Results show that the scale is highly reliable and valid.

The second paper tested the differences of perceived IT capability in terms of the four dimensions in two countries, China and the U.S. The reason we hypothesize that managers in China and the U.S. view IT capability differently is due to the cultural differences between these two countries. Existing literature shows that cross-cultural differences limit the applicability of many management practices (Ein-Dor, Segev, and Orgad, 1993; Westwood, 1995). Moreover these differences have particularly proven to be major obstacles in global IS development when Asian partners are involved. Our results show that three dimensions out of four are perceived as significantly different between these two countries. They are IT architecture, IT infrastructure, and IT relationship resources. The one exception is IT human resource. We argue that the

reason why this hypothesis is not supported is because those Chinese emerging business managers are catching up with technical skills and managerial skills regarding IT.

The third paper included in this dissertation presents an empirical study that tests the hypothesized relationships between organizational culture, IT capability, and export performance of born global firms. We take the resource-based view and argue that IT capability can be treated as a firm resource of competitive advantage that if leveraged well will lead to better firm performance. We also identified three organizational cultures, namely international marketing orientation, international entrepreneurial orientation, and organizational learning, and argue that they will have a positive influence on IT capability. We used a structure equation model with AMOS 4.01 to analyze the data. And the results show that all the hypothesized relationships are significant.

IT capability is a very important organizational capability of born global firms. It directly influences firms' performance in international markets. Thus, small firms like born global firms should pay considerable attention in developing IT capability. IT investment itself is not enough. Born global managers should understand that IT capability is a firm-level ability and it is related to IT policy making, IT technical and managerial skills, IT infrastructure, and IT relationship building. All of these are equally important in developing IT capability. Moreover, managers should help build certain organizational cultures such as international marketing orientation, international entrepreneurial orientation, and organizational learning because these organizational cultures foster the development of IT capability. Even though we believe that we made significant contributions to the literature, many issues remain to be addressed. It is hoped

that this research will inspire more studies on the issue of culture, capability, and born global firms.

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APPENDICES

APPENDIX A

Measures

Measures

IT Capability: New scale drawn from Bharadwaj, Sambamurthy, and Zmud(1999); Ross, Beath, and Goodhue (1996); Sabherwal and Kirs (1994); Grewal, Comer, and Mehta (2001); and Heijden (2000).

ITA Information Technology Architecture

To what extent you agree/disagree with the following statements:

- ITA1 There is consistency of IT policies throughout the enterprise.
- ITA2 IT and business managers consult with each other regularly on business and technical decisions.
- ITA3 There is integration of business strategic planning and IT planning.

Scale items anchored by “Strongly Disagree” (1) to “Strongly Agree” (7).

ITINF Information Technology Infrastructure

To what extent the following the related application is found in your organization:

- ITINF1 Appropriateness of the data architecture.
- ITINF2 Computer facilities for IT projects.
- ITINF3 Adequacy of architecture flexibility.

Scale items anchored by “Not Much” (1) to “Extensively” (7).

ITHR Information Technology Human Resource

To what extent the following resources are found in your firm:

- ITHR1 IT planning Capability.
- ITHR2 IT evaluation and control systems.
- ITHR3 Appropriateness of network architecture.

Scale items anchored by “Not Much” (1) to “Extensively” (7).

ITRR Information Technology Relationship Resource

To what extent you agree/disagree with the following statements:

- ITRR1 We have good line management sponsorship of IT initiatives.
- ITRR2 We have good relationship between line management and IT service providers.
- ITRR3 The IT department of our organization maintains close relationship with business management.

Scale items anchored by “Strongly Disagree” (1) to “Strongly Agree” (7).

Export performance: Scale adapted from Zou, Taylor, and Osland (1998).

- IP1 The financial export performance of this firm.
- IP2 The strategic export performance of this firm.
- IP3 Satisfaction with this firm.

Scale items anchored by “Strongly Disagree” (1) to “Strongly Agree” (7).

International Marketing Orientation: Scale adapted from Knight and Cavusgil (2004).

- IMO1 Marketing planning process.
- IMO2 Effectiveness of pricing.
- IMO3 Effectiveness of distribution.

Scale items anchored by “Much Worse” (1) to “Much Better” (7).

International entrepreneurial orientation: Scale adapted from Miller and Friesen (1984); and Knight and Cavusgil (2004).

- IEO1 The prevailing organizational culture at our firm is conducive to active exploration of new business opportunities abroad.
- IEO2 Management continuously communicates its mission to succeed in international markets for firm employees.
- IEO3 Management develops human and other resources for achieving our goals in international markets.

Scale items anchored by “Strongly Disagree” (1) to “Strongly Agree” (7).

Organizational Learning Orientation: Scale adapted from Hurley and Hult (1998).

- OL1 Sales growth position relative to competition.
- OL2 Sales growth rate.
- OL3 Market share relative to competition.

Scale items anchored by “Very Unsatisfactory” (1) to “Very Satisfactory” (7).

Information Intensity: Scale adapted from Bhatt (2000).

- INT1 The firm needs a lot of product/service related information for customization.
- INT2 The product/service R&D requirements are high.
- INT3 Customers need a lot of product/service related information for ordering products/services.

Scale items anchored by “Strongly Disagree” (1) to “Strongly Agree” (7).

Environment Uncertainty: Scale adapted from Karri (2001).

- ENV1 Competition in product quality.
- ENV2 Adapting products for overseas markets.
- ENV3 Finding low cost competitors.

Scale items anchored by “Not Much” (1) to “Very Much” (7).

APPENDIX B
COVER LETTER AND QUESTIONNAIRE

Date:

Dear

We sincerely appreciate your precious time to assist us with this research. This research project is conducted by International Business Institute at Washington State University. The purpose of this research is to understand how organizational culture influences information technology capability and affects firm's performance in international markets.

If you would like to receive a summary of the results, please indicate this in the questionnaire. If you are not in the right position to participate in our study, please forward the enclosed questionnaire to someone you think may be appropriate.

Please complete the questionnaire and return to us in the enclosed postage-paid envelope as soon as possible. All responses will be held confidential, with only aggregate results used in the study.

As a small way of saying thanks and to show you our appreciation, please include your business card along with the completed questionnaire to be entered into a lottery for

Three \$100 Amazon.com gift certificates

Please contact me with questions and concerns at (509) 335-7175, College of Business and Economics, Washington State University, Pullman, WA 99164-4851 or by email: mzhang@wsu.edu.

Sincerely,

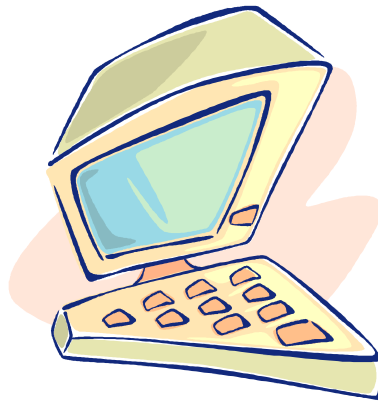
Patriya Tansuhaj
Director and Professor
International Business Institute

Sincerely,

Man Zhang,
Ph.D. Candidate

QUESTIONNAIRE

INFORMATION TECHNOLOGY CAPABILITY, ORGANIZATIONAL CULTURE AND FIRM PERFORMANCE*



CONDUCTED BY:
INTERNATIONAL BUSINESS INSTITUTE
COLLEGE OF BUSINESS AND ECONOMICS

WASHINGTON STATE
 **UNIVERSITY**
World Class. Face to Face.

Summary data desired? Yes _____ No _____

*Please Read Both Sides of the Survey, Thank You!

Thank you for taking the time to participate in the study. This questionnaire should take about 20 minutes to complete. *All responses are strictly confidential and no information which could reveal your firm's or your own identity will be used in any data reporting nor will it be shared in its individual form with any outside party without your expressed permission to do so.*

Q1. The firm has been established for _____ years

Q2. Percentage of total sales accounted for by exports from or near the founding of the firm is about _____%

Q 3. How is your firm's business activity divided between domestic and foreign markets?

Domestic market _____%

Foreign market _____%

Total 100%

Q4. Please indicate the following information about your firm in the last fiscal year:

(Please write down just one number between 0-100):

Percentage of total sales accounted for by exports _____%

Percentage of total profits accounted for by exports _____%

Q5. The following statements are related to the information technology architecture of your firm. Please indicate to what extent you agree/disagree with the following statements.

In our firm...		Disagree							Agree
a	There is consistency of IT policies throughout the enterprise.	1	2	3	4	5	6	7	
b	IT and business executives share a vision for how IT will support the business.	1	2	3	4	5	6	7	
c	IT and business managers consult with each other regularly on business and technical decisions.	1	2	3	4	5	6	7	
d	IT staff regularly invest in technical, business, and interpersonal training.	1	2	3	4	5	6	7	
e	There is consistency of IT application portfolios with business processes ³ .	1	2	3	4	5	6	7	
f	We restructure business work processes to leverage opportunities.	1	2	3	4	5	6	7	
g	We restructure IT work processes to leverage opportunities.	1	2	3	4	5	6	7	
h	There is clarity of vision regarding how IT contributes to business value	1	2	3	4	5	6	7	
i	There is integration of business strategic planning and IT planning	1	2	3	4	5	6	7	
j	Management has the ability to understand value of IT investments	1	2	3	4	5	6	7	

³ IT application portfolios refer to the collection of different types of IT applications

Q6. The following statements are related to the information technology infrastructure of your firm. Please indicate the extent to which the related application is found in your organization.

		Not much						Extensively
a	Communication devices for access of remote database	1	2	3	4	5	6	7
b	Computer facilities for IT projects	1	2	3	4	5	6	7
c	Computer labs for employee instruction	1	2	3	4	5	6	7
d	Appropriateness of the data architectures	1	2	3	4	5	6	7
e	Appropriateness of network architectures	1	2	3	4	5	6	7
f	Adequacy of architecture flexibility	1	2	3	4	5	6	7

Q7. Please choose the number that most accurately describes your firm's performance during the last three years, relative to all other direct competitors:

		Unsatisfactory					Satisfactory	
a	Customer retention	1	2	3	4	5	6	7
b	Sales growth	1	2	3	4	5	6	7
c	Profitability	1	2	3	4	5	6	7
d	Return on investment	1	2	3	4	5	6	7

Q8. Please use the scale provided to indicate the extent to which you agree or disagree with the following statements regarding the information intensity of your industry.

		Disagree						Agree
a	The firm needs a lot of product/service related information for customization	1	2	3	4	5	6	7
b	The product/service is complex to understand or use correctly	1	2	3	4	5	6	7
c	The product/service R&D requirements are high	1	2	3	4	5	6	7
d	The selling of product/service requires specialized knowledge	1	2	3	4	5	6	7
e	Customers need a lot of product/service related information for ordering products/services	1	2	3	4	5	6	7

Q9. Please indicate the extent to which the following information technology human resources are found in your firm.

	Not at all							Extensively
a	Adequacy of the skill base	1	2	3	4	5	6	7
b	Appropriateness of network architectures	1	2	3	4	5	6	7
c	IT planning capabilities	1	2	3	4	5	6	7
d	Technical support staff	1	2	3	4	5	6	7
e	Effectiveness of IT planning	1	2	3	4	5	6	7
f	IT project management practice	1	2	3	4	5	6	7
g	Planning for security control, standards compliance, and disaster recovery	1	2	3	4	5	6	7
h	Systems development practices	1	2	3	4	5	6	7
i	IT evaluation and control systems	1	2	3	4	5	6	7

Q10. The following statements are related to the relationship resources of your firm. Please indicate to what extent you agree/disagree with the following statements.

		Disagree							Agree
a	Our IT department ensures ownership of the business with respect to ecommerce activities	1	2	3	4	5	6	7	
b	The IT department of our organization maintains close relationship with business management	1	2	3	4	5	6	7	
c	We have multi-disciplinary teams to blend business and technology expertise	1	2	3	4	5	6	7	
d	We have good relationship between line management ⁴ and IT service providers	1	2	3	4	5	6	7	
e	We have good line management sponsorship of IT initiatives	1	2	3	4	5	6	7	
f	There is a climate that encouraging risk taking and experimentation with IT	1	2	3	4	5	6	7	
g	There is a climate that nurture IT project championship	1	2	3	4	5	6	7	
h	We have technology based links with customers	1	2	3	4	5	6	7	
i	We have technology based links with suppliers	1	2	3	4	5	6	7	
j	We use IT based entrepreneurial collaborations with external partners	1	2	3	4	5	6	7	

⁴ Line management refers to administration of the line functions of an organization; administration of activities contributing directly to the organization's output

Q11. The following statements are related to the international entrepreneurial orientation of your firm. Please indicate to what extent you agree/disagree with the following statements.

		Disagree						Agree
a	Top management tends to see the world as our firm's marketplace	1	2	3	4	5	6	7
b	The prevailing organizational culture at our firm is conducive to active exploration of new business opportunities abroad	1	2	3	4	5	6	7
c	Management continuously communicates its mission to succeed in international markets to firm employees	1	2	3	4	5	6	7
d	Management develops human and other resources for achieving our goals in international markets	1	2	3	4	5	6	7
e	Our top management is experienced in international business	1	2	3	4	5	6	7

Q12. Most business will be some mixture of the various descriptions noted below. Indicate the degree to which these qualities reflect your firm.

		Disagree						Agree
My firm is very:								
a	personal. It's like an extended family. People seem to share a lot of themselves.	1	2	3	4	5	6	7
b	dynamic and entrepreneurial. People are willing to stick their necks out and take risks.	1	2	3	4	5	6	7
c	formalized and structural. Established procedures generally govern what people do.	1	2	3	4	5	6	7
d	production oriented. The major concern is with getting the job done. People aren't very personally involved.	1	2	3	4	5	6	7

		Disagree						Agree
The head of my firm is generally considered to be:								
a	a mentor, sage, or a father or a mother figure.	1	2	3	4	5	6	7
b	an entrepreneur, an innovator, or a risk taker.	1	2	3	4	5	6	7
c	a coordinator, an organizer, or an administrator.	1	2	3	4	5	6	7
d	a producer, a technician, or a hard-driver.	1	2	3	4	5	6	7

		Disagree						Agree
The glue that holds my firm together is:								
a	loyalty and tradition. Commitment to this firm runs high.	1	2	3	4	5	6	7
b	a commitment to innovation and development. There is an emphasis on being first.	1	2	3	4	5	6	7
c	formal rules and policies. Maintaining a smooth-running institution is important here	1	2	3	4	5	6	7
d	an emphasis on tasks and goal accomplishment. A production orientation is shared.	1	2	3	4	5	6	7

		Disagree						Agree
My firm emphasizes:								
a	human resources. High cohesion and morale in the firm are important.	1	2	3	4	5	6	7
b	growth and acquiring new resources. Readiness to meet new challenges is important.	1	2	3	4	5	6	7
c	permanence and stability. Efficient, smooth operations are important.	1	2	3	4	5	6	7
d	competitive actions and achievement. Measurable goals are important.	1	2	3	4	5	6	7

Q13. The following statements are related to the environmental uncertainty of your industry. Please indicate to what extent they are found in your industry.

		Not much						Very much
a	Competition in product quality	1	2	3	4	5	6	7
b	Differences in product standards	1	2	3	4	5	6	7
c	Adapting products for overseas markets	1	2	3	4	5	6	7
d	Finding new markets for our products	1	2	3	4	5	6	7
e	Emerging low cost competitors	1	2	3	4	5	6	7
f	Emergence of new technologies	1	2	3	4	5	6	7

Q14. Please indicate whether your firm is worse or better than your main competitors in terms of your firm's international marketing orientation in the international markets in the following areas:

		Much worse						Much better
a	Knowledge of customers and competitors	1	2	3	4	5	6	7
b	Marketing planning process	1	2	3	4	5	6	7
c	Development or adaptation of the product	1	2	3	4	5	6	7
d	Effectiveness of pricing	1	2	3	4	5	6	7
e	Advertising effectiveness	1	2	3	4	5	6	7
f	Effectiveness of distribution	1	2	3	4	5	6	7
g	Image of your firm	1	2	3	4	5	6	7
h	Ability to use marketing tools to differentiate this product	1	2	3	4	5	6	7
i	Control and evaluation of marketing activities	1	2	3	4	5	6	7

Q15. Please indicate your level of satisfaction with your firm's performance in each of the following areas.

	Unsatisfactory							Satisfactory
a	1	2	3	4	5	6	7	
b	1	2	3	4	5	6	7	
c	1	2	3	4	5	6	7	
d	1	2	3	4	5	6	7	
e	1	2	3	4	5	6	7	
f	1	2	3	4	5	6	7	
g	1	2	3	4	5	6	7	
h	1	2	3	4	5	6	7	

Q16. Please indicate the extent to which you agree or disagree with the following statements regarding the learning orientation of your firm.

	Disagree							Agree
a	1	2	3	4	5	6	7	
b	1	2	3	4	5	6	7	
c	1	2	3	4	5	6	7	
d	1	2	3	4	5	6	7	

Q17. Please use the scale provided to indicate the extent to which you agree or disagree with the following statements regarding the export performance of your firm's export activities

	Disagree							Agree
Financial export performance of this export venture:								
a	1	2	3	4	5	6	7	
b	1	2	3	4	5	6	7	
c	1	2	3	4	5	6	7	

	Disagree							Agree
Strategic export performance of this export venture								
a	1	2	3	4	5	6	7	
b	1	2	3	4	5	6	7	
c	1	2	3	4	5	6	7	

		Disagree					Agree	
Satisfaction with the export venture:								
a	The performance of this export venture has been very satisfactory	1	2	3	4	5	6	7
b	This export venture has been very successful	1	2	3	4	5	6	7
c	This export venture has fully met our expectations	1	2	3	4	5	6	7

Q18. How important is it to you to:

		Not important					Very important	
a.	Have a job which leaves you sufficient time for your personal or family life	1	2	3	4	5	6	7
b.	Have considerable freedom to adopt your own approach to the job	1	2	3	4	5	6	7
c.	Have challenging work to do	1	2	3	4	5	6	7
d.	Fully use your skills and abilities on the job	1	2	3	4	5	6	7
e.	Have good physical working conditions	1	2	3	4	5	6	7
f.	Have training opportunities	1	2	3	4	5	6	7

Q19. The number of full-time employees of your firm _____

Q20. (1) How many years has your company been using IT for business purposes?

_____ (2)What proportion of the firm employees use IT (eg. Computer, internet) on the daily basis _____ to accomplish business tasks? _____%

(3)What proportion of the work day of the typical employee is spent using IT? _____%

Q21. Sales revenues last year \$ _____

Q22. Please estimate your firm's IT investment last year \$ _____

Q23. How long have you worked for your firm? _____ years

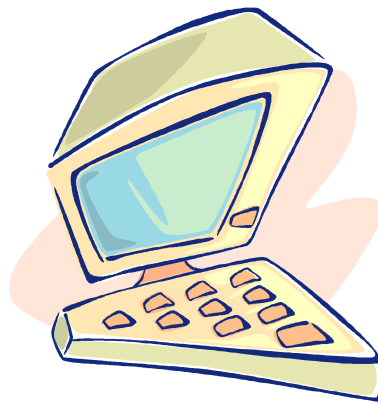
Q24. What is your position now? _____ **For how many years?** _____

Thank you for your participation. Please return this completed questionnaire in the provided envelope. If you would like a summary of the results of this survey, please include your business card with this questionnaire and I will be happy to mail it to you upon completion of the study.

调查问卷

博士论文研究课题

信息技术力量, 企业文化与企业业绩



研究单位:
国际商业研究院
经济商业学院
华盛顿州立大学

WASHINGTON STATE
 UNIVERSITY

World Class. Face to Face.

博士论文研究课题

感谢您抽出时间参与这项调查。完成这份问卷大概需要 20 分钟。所有回收的问卷将严格保密，未经您的许可，任何有可能泄漏贵公司或您本人身份的信息都不会在任何数据报告中使
用，也不会以其个体的形式泄露给任何其他组织。

第一部分

Q1. 贵公司名称: _____

Q2. 联系地址: _____

Q3. 贵公司所从事的行业 _____

Q4. 贵公司主要出口产品

1). _____

2). _____

3). _____

4). _____

Q5. 问卷回答人联系方式: 电话 _____ 或 email _____

第二部分

Q1. 贵公司已经成立_____年了

Q2. 贵公司成立伊始 (或成立后不久), 出口占总产值的百分比约是_____%
(请只写下 0-100 中的一个数字)

Q3. 贵公司在国内和国外市场的业务是如何划分的? (请只写下 0-100 中的一个数字)

1). 国内市场 _____%

2). 国外市场 _____%

总计 100%

Q4. 请给出贵公司在上一个财政年度的以下信息 (请只写下 0-100 中的一个数字):

1). 出口在整个销售额中所占的百分比约_____%

2). 出口在整个利润额中所占的百分比约_____%

Q5. 以下陈述与贵公司的信息技术结构有关。请选出您在多大程度上同意以下各项陈述。

在我们公司…	强烈反对	反对	部分反对	中立	部分同意	同意	完全同意
a. 企业中存在信息技术方针的一致性	1	2	3	4	5	6	7
b. 信息技术管理人员和商业业务管理人员在信息技术如何支持业务经营方面看法一致	1	2	3	4	5	6	7
c. 信息技术经理和业务经理定期就业务和技术决策问题交换意见	1	2	3	4	5	6	7
d. 信息技术人员定期参加技术, 业务和人际关系的培训	1	2	3	4	5	6	7
e. 信息技术应用组合与商业经营程序相符	1	2	3	4	5	6	7
f. 重新调整经营工作的程序以捕捉机遇	1	2	3	4	5	6	7
g. 重新调整信息技术工作的程序以捕捉机遇	1	2	3	4	5	6	7
h. 对信息技术如何提高企业价值有清晰的想法	1	2	3	4	5	6	7
i. 业务战略计划与信息技术计划相结合	1	2	3	4	5	6	7
j. 管理层有能力认识到信息技术投资的价值	1	2	3	4	5	6	7

Q6. 以下陈述是关于公司的信息技术基础设施。请选出与您的公司最相符的一项。

	不够						极充足
a. 用于访问远程数据库的通信设备	1	2	3	4	5	6	7
b. 用于信息技术项目的计算机设施	1	2	3	4	5	6	7
c. 用于员工培训的计算机实验室	1	2	3	4	5	6	7
d. 数据结构的适用程度	1	2	3	4	5	6	7
e. 网络结构的适用程度	1	2	3	4	5	6	7
f. 结构的灵活性	1	2	3	4	5	6	7

Q7. 与贵公司的直接竞争对手相比，请选出最确切描述贵公司在过去三年的业绩的一项。

	非常不满意	不满意	有点不满意	中立	有点满意	满意	非常满意
a. 顾客保有力	1	2	3	4	5	6	7
b. 销售量的增长	1	2	3	4	5	6	7
c. 利益率	1	2	3	4	5	6	7
d. 投资回报率	1	2	3	4	5	6	7

Q8. 以下陈述是关于贵公司所在行业的信息强度，请选出您在多大程度上同意以下各项陈述。

	强烈反对	反对	部分反对	中立	部分同意	同意	完全同意
a. 企业需要大量与产品或服务相关的信息来满足客户的需求	1	2	3	4	5	6	7
b. 产品或服务很复杂，难以理解或正确使用	1	2	3	4	5	6	7
c. 产品或服务的研究与开发要求很高	1	2	3	4	5	6	7
d. 销售产品或服务需要专门的知识	1	2	3	4	5	6	7
e. 顾客在购买产品或服务时需要大量与产品/服务相关的信息	1	2	3	4	5	6	7

Q9. 请评估贵公司信息技术人力资源在以下项目的表现。

	不够						极充足
a. 专业技能的充足性	1	2	3	4	5	6	7
b. 信息网络架构的合理性	1	2	3	4	5	6	7
c. 信息技术的计划能力	1	2	3	4	5	6	7
d. 技术支持人员	1	2	3	4	5	6	7
e. 信息技术计划的有效性	1	2	3	4	5	6	7
f. 信息技术项目管理的实行	1	2	3	4	5	6	7
g. 安全控制计划，标准贯彻计划，及事故后重建的计划	1	2	3	4	5	6	7
h. 系统开发的实施	1	2	3	4	5	6	7
i. 信息技术的评估和控制系统	1	2	3	4	5	6	7

Q10. 以下陈述与贵公司的关系资源有关。请选出您在多大程度上同意以下各项陈述。

		强烈反对	反对	部分反对	中立	部分同意	同意	完全同意
a.	我们的信息技术部门负责电子商务活动	1	2	3	4	5	6	7
b.	我们的信息技术部门同业务管理层保持紧密联系	1	2	3	4	5	6	7
c.	我们拥有跨领域人才组成的小组将技术与商业技能融合在一起	1	2	3	4	5	6	7
d.	生产线管理层与信息技术服务人员的 relationship 良好	1	2	3	4	5	6	7
e.	信息技术能动性得到生产线管理层的良好支持	1	2	3	4	5	6	7
f.	公司存在鼓励利用信息技术进行风险尝试的氛围	1	2	3	4	5	6	7
g.	公司存在培育信息技术项目优胜者的氛围	1	2	3	4	5	6	7
h.	我们与顾客存在基于信息技术的联系	1	2	3	4	5	6	7
i.	我们与厂商存在基于信息技术的联系	1	2	3	4	5	6	7
j.	我们同企业伙伴的合作建立在信息技术基础上	1	2	3	4	5	6	7

Q11. 以下陈述是关于贵公司的国际企业导向。请选出您在多大程度上同意以下各项陈述。

		强烈反对	反对	部分反对	中立	部分同意	同意	完全同意
a.	高层管理人员认为我们的市场应该面向全世界	1	2	3	4	5	6	7
b.	我们公司的主导组织文化有助于我们积极探索国外新的商业机遇	1	2	3	4	5	6	7
c.	管理层不断地向雇员传达要在国际市场成功的企业使命	1	2	3	4	5	6	7
d.	公司通过开发人力和其他资源来实现在国际市场的目标	1	2	3	4	5	6	7
e.	我们的高层管理人员具备国际商业的经验	1	2	3	4	5	6	7

Q12. 大多数企业是以下不同描述的混合。请选出这些特性在多大程度上反映了贵公司情况。

我们公司是：

		强烈反对	反对	部分反对	中立	部分同意	同意	完全同意
a.	友好的。象一个扩大的家庭。人们愿意相互分享。	1	2	3	4	5	6	7
b.	充满活力的和勇于尝试新事物的。人们愿意冒险	1	2	3	4	5	6	7
c.	结构严谨和程式化的。员工的所有行为都在确定的管理程序之下进行	1	2	3	4	5	6	7
d.	注重实效的。人们主要关心的是完成工作。	1	2	3	4	5	6	7

公司的领导一般被看作是:

	强烈反对	反对	部分反对	中立	部分同意	同意	完全同意
a. 导师, 德高望重的人, 或是父亲或母亲的形象	1	2	3	4	5	6	7
b. 一个企业家, 革新者, 或是勇于承担风险的人	1	2	3	4	5	6	7
c. 一个协调者, 组织者或是一个管理者	1	2	3	4	5	6	7
d. 一个生产者, 技术人员	1	2	3	4	5	6	7

公司团结在一起的纽带是:

	强烈反对	反对	部分反对	中立	部分同意	同意	完全同意
a. 忠诚和传统。对公司承担义务很重要。	1	2	3	4	5	6	7
b. 创新和发展。强调成为第一的重要性。	1	2	3	4	5	6	7
c. 正式的规定和政策。保持平稳经营是很重要的。	1	2	3	4	5	6	7
d. 强调完成任务和实现目标, 注重实效。	1	2	3	4	5	6	7

公司强调:

	强烈反对	反对	部分反对	中立	部分同意	同意	完全同意
a. 人力资源。高的凝聚力和士气是很重要的。	1	2	3	4	5	6	7
b. 发展和获得新的资源。随时准备迎接新的挑战。	1	2	3	4	5	6	7
c. 持久和稳定性。有效率的, 平稳的操作是很重要的。	1	2	3	4	5	6	7
d. 竞争性的活动和成绩。有可衡量的目标是很重要的。	1	2	3	4	5	6	7

Q13. 以下各项与贵公司所从事行业的环境不确定性有关。请选出这些描述在多大程度上反映了贵行业的情况。

	不多/ 不强烈						极多/ 极强烈
a. 产品质量的竞争	1	2	3	4	5	6	7
b. 产品标准的不同	1	2	3	4	5	6	7
c. 为适应海外市场的产品调整	1	2	3	4	5	6	7
d. 为产品寻找新的市场	1	2	3	4	5	6	7
e. 低成本竞争者的出现	1	2	3	4	5	6	7
f. 新技术的出现	1	2	3	4	5	6	7

Q14. 在国际市场中，请指出贵公司就国际市场导向而言是否比其主要竞争对手好或是差。

	差很多						好很多
a. 对顾客和竞争者的了解	1	2	3	4	5	6	7
b. 市场计划进程	1	2	3	4	5	6	7
c. 产品的开发和调整	1	2	3	4	5	6	7
d. 价格效力	1	2	3	4	5	6	7
e. 广告效力	1	2	3	4	5	6	7
f. 销售效力	1	2	3	4	5	6	7
g. 公司的形象	1	2	3	4	5	6	7
h. 利用行销手段来使自己的产品有别于其它产品的能力	1	2	3	4	5	6	7
i. 行销活动的控制和评估	1	2	3	4	5	6	7

Q15. 请选出您对贵公司在以下几个方面业绩的满意程度。

	非常不满意	不满意	有点不满意	中立	有点满意	满意	非常满意
a. 销售增长相对于竞争对手	1	2	3	4	5	6	7
b. 销售增长率	1	2	3	4	5	6	7
c. 市场份额相对于竞争对手	1	2	3	4	5	6	7
d. 公司投资的回报	1	2	3	4	5	6	7
e. 净利润相对于竞争对手	1	2	3	4	5	6	7
f. 投资回报相对于竞争对手	1	2	3	4	5	6	7
g. 销售利润	1	2	3	4	5	6	7
h. 资金周转相对于竞争对手	1	2	3	4	5	6	7

Q16. 请选出您在多大程度上赞同以下各项对您公司的企业学习导向的描述。

	强烈反对	反对	部分反对	中立	部分同意	同意	完全同意
a. 除了正式培训以外，公司还提供个人发展的机会	1	2	3	4	5	6	7
b. 公司鼓励管理人员参加正式的发展活动，比如培训，专业讲座，座谈会等	1	2	3	4	5	6	7
c. 公司有对职员的个人发展提供指导和建议的顾问	1	2	3	4	5	6	7
d. 职业管理是公司职员和管理人员共同的责任	1	2	3	4	5	6	7

Q17. 请选出您在多大程度上赞同以下各项对贵公司在出口业务各方面业绩的描述。

金融方面的出口业绩

	强烈反对	反对	部分反对	中立	部分同意	同意	完全同意
a. 有很大收益	1	2	3	4	5	6	7
b. 创造了很大的销售量	1	2	3	4	5	6	7
c. 增长迅速	1	2	3	4	5	6	7

战略出口业绩

	强烈反对	反对	部分反对	中立	部分同意	同意	完全同意
a. 提高了我们的国际竞争力	1	2	3	4	5	6	7
b. 巩固了我们的战略地位	1	2	3	4	5	6	7
c. 显著提高了我们的国际市场份额	1	2	3	4	5	6	7

满意程度

	强烈反对	反对	部分反对	中立	部分同意	同意	完全同意
a. 出口业绩一直非常令人满意	1	2	3	4	5	6	7
b. 出口业务一直非常成功	1	2	3	4	5	6	7
c. 出口业务总能达到我们的期望	1	2	3	4	5	6	7

Q18. 请选出以下陈述对你的重要性:

	不重要						很重要
a. 有份能留给你充足个人和家庭生活时间的工作	1	2	3	4	5	6	7
b. 有相当的选择自己的工作方式的自由	1	2	3	4	5	6	7
c. 有份有挑战性的工作	1	2	3	4	5	6	7
d. 充分施展自己的才能到工作中去	1	2	3	4	5	6	7
e. 好的物质工作条件	1	2	3	4	5	6	7
f. 有培训的机会	1	2	3	4	5	6	7

Q19. 贵公司全职雇员的人数: _____

Q20. 1) 公司使用信息技术(如:计算机,因特网)进行商业活动的年数: _____年

2) 需使用信息技术进行日常工作的员工占贵公司员工总数的百分比: _____%

3) 员工每日使用信息技术进行日常工作的时间占他们每日总工作时间的
百分比: _____%

Q21. 贵公司去年的销售收入大约 _____元

Q22. 请估计贵公司去年在信息技术上的投资 _____元

Q23. 您在贵公司工作了多久? _____年

Q24. 您的职位是什么? _____您在这个职位上工作的时间 _____年

感谢您的参与。如果您希望收到一份研究结果,请在回函中附加一张名片。我很愿意在研究结束后把结果寄给您。