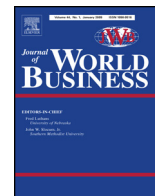




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## How valuable is information and communication technology? A study of emerging economy enterprises

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### ABSTRACT

Anchored at the knowledge management perspective, we address how information and communication technology (ICT) improves the productivity of emerging economy enterprises. We present the logic that ICT enhances firm performance because it is an important channel or facilitator of effective knowledge sharing and knowledge integration. We further argue that the conditions characterizing an emerging economy (i.e., a country's economic development) and emerging economy businesses (i.e., internationalization and quality assurance) would affect the extent to which ICT contributes to knowledge management, and thus to firm performance. Our hierarchical linear modeling analysis of 6236 firms from 27 emerging economies lends support to our arguments and predictions, suggesting that ICT is a critical investment that generates satisfactory returns for emerging economy enterprises, yet this investment–return relationship is further contingent upon the macro- and micro-level conditions facing these enterprises. ICT actually adds more value to productivity when a focal emerging economy is less economically developed, and when a focal firm reaches foreign markets or its quality control and assurance is superior.

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### 1. Introduction

Information and communication technology (hereafter, ICT) has improved rapidly and drastically in recent years, affecting business development in most countries of the world, including emerging economies. According to the International Telecommunication Union (ITU, 2013), the past decade has seen fast growth in ICT uptake worldwide, with an increase in all indicators (mobile-cellular telephone subscriptions, Internet access, mobile and fixed broadband subscriptions, etc.). Mobile-cellular subscriptions reached 6.8 billion by 2013—almost as many as the total global population. The fast move from using mobile to broadband has also enabled the rapid development of numerous new information and communication channels, such as social media, portable cloud computing, big data, and smart terminals. Undoubtedly, such development is shaping human life and creating new ways of operating and managing businesses.

Parallel to the above trend, research on ICT has begun to forge ahead in recent years. Prior studies looked at ICT conceptually, often

through a resource-based view, contending that firms can and do differentiate on the basis of their ICT resources, which then create firm-specific capabilities and contribute to sustained competitive advantage (Bharadwaj, 2000; Melville, Kraemer, & Gurbaxani, 2004; Mithas, Ramasubbu, & Sambamurthy, 2011; Ray, Muhanna, & Barney, 2005). Empirical efforts, though limited, have shown that ICT improves a firm's Tobin's *q* (Bharadwaj, Bharadwaj, & Konsynski, 1999) or profit ratio (Santhanam & Hartono, 2003) and can leverage firm-specific assets in the process of international diversification (Chari, Devaraj, & David, 2007). Most extant empirical studies emphasized U.S. firms and relied heavily on data collected from U.S. sources. For example, a widely used source is Information Week' (IW) 500 annual survey of chief information executives of U.S. firms.

We know generally little on how valuable or how important ICT is for emerging economy enterprises (hereafter, EEs), a gap requiring a significant attention for not only theoretical advancement but also practical implications. EEs are competing in an increasingly knowledge-intensive and interconnected global marketplace, and at the same time are coping with the overflow of data and information which serves as one of the most important

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issues influencing strategic business decisions, according to the 2012 IBM Global CEO study based on a survey of more than 1700 CEOs in 64 countries.<sup>1</sup> EEEs, while generally lack proprietary or core technologies, are taking advantages of ICT-enabled connectivity to gain access to knowledge, narrow the gap with market leaders in global competition, and exploit opportunities to leapfrog, both technologically and operationally (The Economist, 2007). Moreover, the information explosion era places a premium on an appropriate ICT strategy, which enables a firm to astutely manage knowledge and information database, make effective managerial decisions, and enhance its competitiveness. This ICT strategy is particularly important for EEEs as they are undergoing tremendous transformations and pursuing fast catch-up on the global stage. A properly designed and implemented ICT strategy fosters effective information and knowledge flows, and therefore is central to organizational learning, knowledge development, knowledge sharing and integration (Kogut & Zander, 1992). We thus use the knowledge-based view to explain how ICT helps EEEs to catch up and improve their competitiveness. Our research advances the theoretical development of both ICT and emerging economy firms and sheds light on the role of ICT in fostering knowledge integration and utilization and in compensating EEEs' weaknesses.

This study makes several theoretical contributions. We demonstrate that ICT facilitates effective knowledge sharing and knowledge integration, a mechanism through which ICT enhances efficiency and competitiveness of EEEs. While past literature has acknowledged the importance of ICT, the underlying mechanisms through which superior firm performance is achieved are not clear (Bharadwaj, 2000). Our research enriches the ICT literature by addressing how ICT fosters organizational learning, knowledge sharing, and knowledge integration for latecomers in international competition, such as EEEs. These firms can benefit from the learning advantage of newness (LAN) because they possess fewer deeply embedded routines and face less cognitive complexity (Autio, Sapienza, & Almeida, 2000). ICT bolsters such advantages by allowing EEEs to quickly learn lessons from more experienced and resourceful competitors and gain access to up-to-date information and knowledge worldwide. ICT can perform as a strategic enabler that helps close the gap in competitiveness (i.e., productivity in this study) between EEEs and their benchmark targets such as competent firms in developed countries. Also, we present the logic of fit, suggesting that the positive effect of ICT on firm competitiveness is further determined by the alignment between the firm's ICT and its specific needs and capability for ICT-enabled knowledge sharing and integration. The macro-level (country development) and micro-level contingencies (the firm's quality control and internationalization) moderate the extent to which ICT contributes to competitiveness.

Our research also bears some significant practical implications, particularly for firms from emerging economies. Between 2010 and 2025, emerging economies are likely to contribute more than 70% of global GDP growth (McKinsey, 2012). Some large emerging economies such as BRIC countries have been able to leapfrog some developmental phases for their ICT industries that most developed countries had undergone. They treat ICT as an important propellant for both country- and firm-level competitiveness. EEE managers also view ICT as a pivotal means by which to better connect global resources, partners, and other outside stakeholders, and use these outside resources and partnerships to compensate for their competitive disadvantages and resource constraints. The

advancement of ICT – networking and telecommunication services, Internet and intranet access, e-mail, instant messaging, smartphones, VoIP, and Web conferencing – are forging closer and more interactive links between internal processes of EEEs and external connections with a wide array of global partners in international market (World Bank, 2007). To pave the way for rapid growth, EEEs managers need to recognize the importance of ICT as a catalyst for faster growth and higher productivity and a viable way to catch up with foreign competitors. Moreover, infrastructure availability and regulatory requirements vary across different emerging economies, the fact that is often corroborated with a country's development (Hoskisson, Eden, Lau, & Wright, 2000). Executives should be aware that firms across emerging economies, and within the same country and even the same industry, are highly heterogeneous in the breadth, intensity, domain and focus of ICT utilization. It is thus important not to pursue a one-size-fits-all solution when designing ICT strategies for firms in emerging economies.

Using data from the World Bank's Enterprise Surveys, we examined our hypotheses based on 6236 emerging economy enterprises across 27 emerging economies in 2007. Our hypotheses are generally supported. Overall, the present study extends extant ICT literature by exploring ICT's main effect and contingency effect in emerging economies and advances research on knowledge management for EEEs by diagnosing ICT's role in knowledge sharing and integration. This effort has been thus far largely overlooked. We theoretically construct a full path that links ICT, knowledge management, and performance together based upon knowledge-based view (Grant, 1996), but empirically acknowledge a limitation that we cannot directly quantify the mediating effect of knowledge sharing or knowledge integration per se due to the limitation of the World Bank's dataset. Instead, we offer an extensive discussion and conceptualization of how ICT nurtures knowledge sharing, integration and management in the context of emerging economies, which may serve as a foundation on which future empirical studies may build and follow up.

## 2. Theoretical development

### 2.1. ICT in emerging economies

A major characteristic of emerging economies is their recent transitions toward market-friendly institutions, which are accompanied by relatively fast economic growth rate (Hoskisson et al., 2000; Wright, Filatotchev, Hoskisson, & Peng, 2005). The institutions, commonly known as the "rules of the game" (North, 1990), are changing as a result of such transitions, and not fully known (Peng, Wang, & Jiang, 2008). Moreover, the rapid development of economies, the explosion in consumer demand, and the surging foreign direct investment all contribute to the dynamism of emerging markets. As argued by Duncan (1972), environmental dynamism is a critical contributor to the uncertainty facing the firm. Thus, compared with developed country firms, EEEs are expected to face greater uncertainty due to higher dynamism in both market and institutional environments. On the other hand, the relatively weak institutions of emerging economies, including, for example, underdeveloped factor markets, inefficient legal framework and its enforcement, weak intellectual property rights system, and information asymmetry (Khanna & Palepu, 1997), fail to ensure effective markets and may even undermine markets (Meyer, Estrin, Bhaumik, & Peng, 2009). To compensate for weak institutional support, EEEs are forced to rely more heavily on embeddedness in an inter-organizational or interpersonal network that facilitates collaboration and

<sup>1</sup> The 2012 IBM Global CEO Study, "Leading through Connections", can be retrieved from <http://www-935.ibm.com/services/us/en/c-suite/ceostudy2012/#>.

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