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Global Diffusion of the Internet XVI: The Role of Economic Development and Firm Internationalization in Internet Business Practices

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Abstract:

Firms from emerging economies are rapidly becoming formidable competitors to established industry leaders from developed economies. Aside from anecdotal reports, there is little scholarly evidence concerning the operational details of how emerging economy firms are becoming competitive with developed economy firms. This article addresses the gap by building on the International Business, Strategy and Information Systems literature, and through an empirical analysis of original survey data for 468 firms across ten countries. We develop three primary empirical findings. First, despite the differences between emerging economy firms and developed economy firms, we find that emerging economy/high internationalization firms use marketing- and supply chain-oriented Internet business practices with about the same frequency as developed economy/high internationalization firms. Second, we find that emerging economy/high internationalization firms are more driven than developed economy/high internationalization firms to use Internet business practices to expand existing markets and enter new markets. Third, we find that emerging economy/high internationalization firms report relatively higher sales and customer service impacts from Internet business practices than do developed economy/ high internationalization firms. These findings suggest that emerging economy firms have used the Internet as a resource to position themselves as credible competitors to developed economy firms.

Keywords: Internet, international, adoption, success, IT strategy, IT business, survey, case study, organization, inter-organizational systems.

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I. INTRODUCTION AND LITERATURE OVERVIEW

Emerging economies are increasingly important to the global economic system. Emerging economies represent five of the six most attractive global business locations because of large consumer populations and low cost factors of production [Enderwick, 2009; UNCTAD, 2005]. In addition to attracting foreign direct investment (FDI) from other countries, emerging economies have become a source of outward FDI to other countries. Outward FDI from emerging economies increased from 3 percent of worldwide FDI in 1978–1980 to 17 percent in 2005 [UNCTAD, 2006].

At the same time, firms from emerging economies are rapidly becoming formidable competitors to established industry leaders from developed economies [Aguiar et al., 2006; Engardio et al., 2006]. For example, Embraer (Brazil) is the world's fourth largest aircraft manufacturer, Cemex (Mexico) is the world's third largest cement manufacturer, and Haier (China) is the world's fourth largest home appliance manufacturer. In some cases, emerging economy firms are expanding and strengthening their market positions by acquiring developed economy firms, such as Tata Motors' (India) acquisition of Jaguar (UK).

Prior International Business and Strategy research has examined various dimensions of emerging economy firms, including their organizational structure [Khanna and Rivkin, 2001], strategic advantages and weaknesses [Contractor et al., 2007; Hitt et al., 2005; Yiu et al., 2007], and expansion strategies and stages of growth [Khanna and Palepu, 2006; Luo and Tung, 2007; Thomas et al., 2007]. Firms internationalize their operations to achieve three sources of advantage: (1) the advantage of extending proprietary assets abroad, (2) the advantage of integrating activities across regions with different factor costs, and (3) the advantage of scale and scope through combining activities that would otherwise be spread across firms [Dunning, 1981, 1988].

Developed economy firms expand into emerging economies to achieve scale and scope economies, additional revenues to fund innovation, and to increase their overall market power [Hitt et al., 2005]. While developed economy firms have advantages in terms of financial capital, managerial capabilities, and technical skills, they need to learn about the local markets and institutions in emerging economies. Emerging economy firms expand abroad to achieve scale economies, and to diversify and reduce dependence on their home country [Contractor et al., 2007]. Emerging economy firms generally expand first into other emerging economies because they are more familiar with the institutions, consumers, and risks in emerging economies [Wright et al., 2005]. In fact, emerging economy firms frequently outperform developed economy firms in emerging economies because of their cultural familiarity and lower cost inputs [Yiu et al., 2007]. Emerging economy firms then expand into developed economies to seek new assets and greater market potential [Luo and Tung, 2007; Yamakawa et al., 2008]. In developed economies, emerging economy firms learn from their failures and successes, and from host country firms, as they continue to expand and establish their global operations [Thomas et al., 2007].

Strategy research has introduced frameworks to help global firms understand how to organize their operations to achieve competitive advantage. The firm is a value chain of primary and support activities within a value system that includes buyers and suppliers [Porter and Millar 1985]. Firms can achieve competitive advantage through superior coordination of primary and support activities internally within the firm and externally with buyers and suppliers, and by reducing the cost and enhancing the differentiation of their products and services. Competitive advantage and market leadership can be achieved through capabilities to build and maintain customer relationships, access to low-cost inputs via the supply chain, and operational excellence [Grant, 1991; Hagel and Singer, 1999; Treacy and Wiersema, 1993]. Strategy research also discusses the role of information technology (IT) in competitive advantage. IT permeates the value chain and can be used to coordinate primary and support activities [Porter and Millar 1985], and IT such as the Internet can redefine firms' structure and processes [Hagel and Singer, 1999].

Despite these important contributions from International Business and Strategy research, there is a knowledge deficiency concerning operational details of emerging economy firms [Aulakh, 2006; Yamakawa et al., 2008]. Information Systems (IS) researchers can address the deficiency, given the boundary spanning and integrative perspective of IS research [Sidorova et al., 2008]. At the country level, IS research has studied infrastructure issues that influence firms' access to the Internet and other IT [Dewan et al., 2005; Gregorio and Kassicieh, 2005; Petrazzini and Kibati, 1999; Sarkar and El Sawy, 2003]. At the firm level, IS research has focused on frameworks for firms' readiness to adopt electronic commerce [Grandon and Pearson, 2004; Jennex et al., 2004; Molla and Licker

2005a]. However, because the setting for most IS firm-level studies is a single country [Saffu et al., 2008; Haley, 2002], researchers have noted a lack of research highlighting differences in Internet business practices across emerging economy firms [Kaynak et al., 2005; Molla and Licker, 2005b].

> *The goal of this article is to fill a knowledge deficiency concerning the operational details of emerging economy firms. We study the use, drivers, and impacts of Internet business practices, by level of country development and degree of firm internationalization.*

Since its deployment, the Internet has enabled innovative business practices and transformed the marketing, supply chain, and operational dimensions of competitive advantage. IT and the Internet have accelerated the capability of firms to coordinate processes and personnel across organizational and geographic boundaries [Mithas and Whitaker, 2007]. From a marketing perspective, the Internet enables the internationalization of advertising and marketing activities, identification of new international business opportunities and sales channels, and enhancements in delivery and communication, that together can lead to improved company image and customer satisfaction [Kaynak et al., 2005; Molla and Heeks, 2007]. From a supply chain perspective, the Internet improves the efficiency of gathering information and reduces the cost of forming partnerships, and facilitates purchasing and support of supplier-related initiatives [Kaynak et al., 2005; Molla and Heeks, 2007]. For this reason, customer- and supplier-related market forces are the most significant factor impacting the institutionalization of electronic commerce for firms [Molla and Licker, 2005b]. From an operational perspective, the Internet reduces costs, enhances market development, and improves competitiveness in local and global markets [Kaynak et al., 2005; Molla and Heeks, 2007].

This article leverages original survey data for 468 firms in ten emerging and developed economies to analyze the role of Internet business practices in the development of "a pack of fast-moving, sharp-toothed new multinationals that is emerging from the poor world" [*Economist*, 2007]. For example, Acer (Taiwan) developed a foundation in the personal computer (PC) industry by using the Internet to create a global production and marketing network. This enabled Acer to share marketing information with customers and suppliers, synchronize order fulfillment, and increase the efficiency and effectiveness of its production and sales operations [Hwang and Lo, 2003]. Acer built on this foundation by acquiring rival Gateway (USA), and is now the world's second largest PC vendor.

We focus our empirical analysis of survey data on two research questions:

1. Do emerging economy firms differ from developed economy firms in their use, drivers, and impacts of Internet business practices?
2. Does the degree of internationalization influence the use, drivers, and impacts of Internet business practices for emerging economy firms?

We complement analysis of survey data with case examples drawn primarily from Fortune Global 500 firms [*Fortune*, 2010]. We have three primary empirical findings. First, despite the differences between emerging economy firms and developed economy firms, we find that emerging economy/high internationalization firms use marketing- and supply chain-oriented Internet business practices with about the same frequency as developed economy/high internationalization firms. Second, we find that emerging economy/high internationalization firms are more driven than developed economy/high internationalization firms to use Internet business practices to expand existing markets and enter new markets. Third, we find that emerging economy/high internationalization firms report a relatively higher level of sales and customer service impact from Internet business practices than do developed economy/high internationalization firms. These findings suggest that the emerging economy firms have used the Internet as a resource to position themselves as credible competitors to established incumbents from developed economies.

II. DATA AND MODELS

Data for this study was collected through the Globalization and Electronic Commerce (GEC) project. The GEC project was led by the Center for Research on Information Technology and Organizations (CRITO) at the University of California, Irvine, and involved collaboration with a team of researchers from around the world. A centerpiece of the GEC project was a survey of 2,139 firms across ten countries (Brazil, China, Denmark, France, Germany, Japan, Mexico, Singapore, Taiwan, United States) to study their electronic commerce use, drivers, barriers, and impacts. The survey was conducted in early 2002, and involved a relatively equal proportion of firms for each country, of large firms (250 or more employees) and small firms, and of firms for the three industry sectors of manufacturing, retail/wholesale, and financial services. Because the objective of this article is to better understand Internet business practices of large firms, we focus on respondent firms with 250 or more employees. Of large firms

in the survey, 468 firms provided complete responses to the questions of interest for this study. For additional analysis based on the GEC survey, see Kraemer et al. (eds.) [2006].

Dependent Variables

The three sets of dependent variables in this study are all from the GEC survey, and correspond to the use, drivers, and impacts of Internet business practices. The first set of variables reflects whether or not the firm uses each of seven Internet business practices: advertising and marketing, sales, customer service and support, exchange operational data with business customers, purchases, exchange operational data with suppliers, and integrate business processes with suppliers or other business partners. Each Internet business practice is indicated by a binary variable (1 = yes, 0 = no). These business practice categories are consistent with prior research on electronic commerce in emerging economies [Kaynak et al., 2005; Molla and Heeks, 2007].

The second set of variables reflects the extent to which each of seven drivers played a role in the firm's decision to use Internet business practices: expand market for existing products, enter new businesses or markets, customer demand, improve coordination with customers and suppliers, supplier requirements, reduce costs, and competitors. Each driver is indicated by a five-point Likert item (1 = not at all, 5 = a great deal).[1] These driver categories are consistent with market drivers in prior research on electronic commerce in emerging economies [Grandon and Pearson, 2004; Molla and Licker, 2005b].

The third set of variables reflects the extent to which the firm experienced each of ten impacts from Internet business practices: increased sales, wider sales area, increased international sales, improved customer service, improved coordination with suppliers, decreased procurement costs, decreased inventory costs, more efficient internal processes, increased staff productivity, and improved competitive position. Each impact is indicated by a five-point Likert item (1 = not at all, 5 = a great deal). These impact categories are consistent with market drivers in prior research on electronic commerce in emerging economies [Kaynak et al., 2005; Molla and Heeks, 2007]. Because the goal of this article is to study operational details for emerging economy firms, we test the dependent variables separately rather than combining the dependent variables into factors.[2]

Explanatory Variables

Explanatory variables in this study are the two dimensions of whether a firm is from a developed or emerging economy and the extent of internationalization for the firm. International Business research defines criteria to categorize countries as developed economies and emerging economies. Emerging economies have experienced a rapid pace of economic development, dramatic changes to institutions and government policies, and structural macroeconomic and industry transformation [Hitt et al., 2005; Luo and Tung, 2007]. The term *emerging economy* connotes positive economic growth and market potential [Luo and Tung, 2007].

The categorization of emerging economies is frequently operationalized based on per capita gross domestic product (GDP) [Akbar and Samli, 2005; Burgess and Steenkamp, 2006; Hitt et al., 2005]. Consistent with this operationalization, we use per capita gross domestic product (GDP) data based on International Monetary Fund (IMF) International Financial Statistics for the year (2001) prior to the GEC survey to categorize GEC countries as shown in Table 1. As a robustness check for this classification, China, Brazil, Mexico, and Taiwan are categorized as emerging economies in the Organization for Economic Co-operation and Development (OECD) research [Aykut and Goldstein, 2006].[3]

International Business research discusses the manner in which firms internationalize their operations [Dunning, 1988; Johanson and Vahlne, 1977]. The GEC survey captures five items that reflect the extent of internationalization for firms: whether the organization has establishments outside the country (1 = yes, 0 = no), whether the organization has its headquarters outside the country (1 = yes, 0 = no), percent of sales outside the country (range 0–100 percent), percent of procurement spending outside the country (range 0–100 percent), and extent to which the organization is affected by competitors outside the country (1 = not affected, 5 = significantly affected). To compute the degree of internationalization for each firm, these five items are each normalized to a 0/1 scale and

[1] The GEC survey also included two government-related responses that are not addressed in this article, "Required for government procurement" and "Government provided incentives." These responses are not included in our analysis.

[2] As a robustness check, we performed factor analysis to examine how the separate variables loaded onto factors. The Internet business practices loaded onto two factors that could be described as transactions and integration, and the drivers and impacts (separate factor analyses) generally loaded onto two factors that could be described as market growth and operational considerations. These factors are reasonably consistent with prior research on international business and electronic commerce [Grandon and Pearson, 2004; Luo and Tung, 2007; Molla and Heeks, 2007].

[3] While Aykut and Goldstein [2006] also categorize Singapore as an emerging economy, the GDP per capita data does not support this categorization and we categorize Singapore as a developed economy in this article.

then summed together as a formative index [Diamantopoulos and Winklhofer, 2001], with a range of 0–5. Consistent with the call from prior research, our definition goes beyond international sales to reflect internationalization in a more comprehensive manner [Hassel et al., 2003; Lynch and Clayton, 2003]. Firms in the top half of the sample are categorized as high internationalization (mean 2.36), and firms in the bottom half of the sample are categorized as low internationalization (mean 0.39). A similar definition of internationalization has been used in prior research based on the GEC data [Kraemer et al., 2005].

Table 1: Classification of GEC Countries

	Country	2001 Per Capita GDP
Emerging economies	China	1,043
	Brazil	3,136
	Mexico	6,673
	Taiwan	13,030
Developed economies	Singapore	20,690
	France	22,658
	Germany	23,015
	Denmark	30,000
	Japan	32,168
	U.S.A.	35,523

Source: Euromonitor International from International Monetary Fund (IMF) International Financial Statistics

Using the criteria described above, we segment sample firms into four categories: emerging economy/high internationalization, emerging economy/low internationalization, developed economy/low internationalization, and developed economy/high internationalization. Each of the first three segments are indicated by a separate binary variable (1 = yes, 0 = no), and the fourth segment is the base category.

Control variables in this study are industry and firm size, as prior research shows that these two variables play a role in the operations and performance of emerging economy firms [Contractor et al., 2007; UNCTAD, 2004]. The GEC survey includes firms from the three industries of manufacturing, retail/wholesale, and financial services. The manufacturing and retail/wholesale industries are each indicated by a separate binary variable (1 = yes, 0 = no), and financial services is the base category. We operationalize firm size as the natural log of the number of employees at the establishment.

Descriptive Statistics and Correlation

Table 2 provides sample characteristics, Table 3 provides descriptive statistics for all firms in the sample and for each segment of firms, and Table 4 provides correlations between the dependent and independent variables. Because all variables are from the GEC survey, we assessed the potential for common method bias using Harman's one factor test [Podsakoff and Organ, 1986]. No one general factor accounted for the majority of covariance among the measures [Podsakoff et al., 2003], indicating that common method bias is not likely to be a concern in this dataset.

Table 2 shows that the sample contains a reasonably equal proportion of emerging economy firms and developed economy firms, and a reasonably equal proportion of manufacturing, financial services, and retail/wholesale firms. About two-thirds of the sample firms have 250–500 employees, and the remaining third of the sample firms have more than 500 employees.

For use of Internet business practices, column 1 of Table 3 shows that advertising and marketing is the most common use for the full sample of firms. Exchange of data with customers and exchange of data with suppliers are the second and third most common Internet business practices. Online sales to customers and integration of business processes with partners are the two least common Internet business practices.

For drivers of Internet business practices, column 1 of Table 3 shows that coordination with customers and suppliers is the leading driver across all firms in the sample, and expansion of existing markets and entry into new markets are the second and third leading drivers. Columns 2–5 indicate that the mean scores of these three drivers are higher for emerging economy firms than for developed economy firms.

Table 2: Characteristics for Sample Firms		
Category		Percentage
Countries	Emerging economies[4]	45.1
	Brazil 9.8	
	China 8.5	
	Mexico 16.2	
	Taiwan 10.5	
	Developed economies	54.9
	Denmark 9.8	
	France 3.0	
	Germany 9.6	
	Japan 10.0	
	Singapore 7.7	
	United States 14.7	
Industry	Manufacturing	38.9
	Financial services	30.8
	Retail / wholesale	30.3
Firm Size	250–500 employees	68.8
	501–1,000 employees	20.7
	> 1,000 employees	10.5

For impacts of Internet business practices, customer service is the leading impact across all firms in the sample, and efficiency of internal business processes is the second leading impact. While increased international sales, reduced inventory costs and reduced procurement costs are the three lowest impacts across all firms, columns 2–5 of Table 3 show that the average scores for these impacts are higher for emerging economy/high internationalization firms than for other firms.

Table 3: Descriptive Statistics for Dependent Variables					
	Mean (standard deviation)				
	(1) Full sample (n=468)	(2) Emerging high international (n=98)	(3) Emerging low international (n=113)	(4) Developed high international (n=136)	(5) Developed low international (n=121)
Uses					
Advertising marketing	0.68 (0.47)	0.66 (0.48)	0.60 (0.49)	0.69 (0.46)	0.76 (0.43)
Sales	0.36 (0.48)	0.35 (0.48)	0.27 (0.44)	0.32 (0.47)	0.52 (0.50)
Customer service	0.49 (0.50)	0.55 (0.50)	0.39 (0.49)	0.52 (0.50)	0.50 (0.50)
Exchange data customers	0.58 (0.49)	0.57 (0.50)	0.53 (0.50)	0.69 (0.46)	0.50 (0.50)
Purchases	0.50 (0.50)	0.43 (0.50)	0.37 (0.49)	0.58 (0.50)	0.58 (0.50)
Exchange data suppliers	0.57 (0.50)	0.54 (0.50)	0.65 (0.48)	0.61 (0.49)	0.49 (0.50)
Integrate processes partners	0.40 (0.49)	0.49 (0.50)	0.39 (0.49)	0.39 (0.49)	0.34 (0.48)
Drivers					
Existing markets	3.48 (1.26)	3.84 (1.13)	3.62 (1.28)	3.20 (1.16)	3.37 (1.36)
New markets	3.34 (1.31)	3.77 (1.14)	3.58 (1.37)	3.07 (1.17)	3.06 (1.42)
Customer demand	3.24 (1.34)	3.49 (1.34)	3.14 (1.43)	3.21 (1.25)	3.15 (1.37)
Coordination	3.58 (1.18)	3.91 (1.13)	3.77 (1.15)	3.49 (1.12)	3.25 (1.24)
Supplier requirements	2.55 (1.42)	2.99 (1.55)	2.78 (1.40)	2.54 (1.32)	2.00 (1.25)
Costs	3.21 (1.35)	3.50 (1.37)	3.67 (1.33)	2.89 (1.23)	2.89 (1.32)
Competitors	3.21 (1.36)	3.23 (1.46)	3.08 (1.39)	3.28 (1.20)	3.24 (1.45)
Impacts					
Sales	2.55 (1.21)	2.93 (1.12)	2.69 (1.30)	2.32 (1.17)	2.38 (1.15)
Sales area	2.62 (1.28)	2.99 (1.21)	2.62 (1.42)	2.54 (1.14)	2.40 (1.30)
International sales	1.96 (1.23)	2.70 (1.29)	1.73 (1.25)	2.15 (1.15)	1.36 (0.82)
Customer service	3.18 (1.22)	3.56 (1.15)	3.33 (1.26)	3.04 (1.17)	2.89 (1.19)
Coordination suppliers	2.93 (1.30)	3.24 (1.25)	3.05 (1.37)	3.02 (1.29)	2.46 (1.18)
Procurement costs	2.41 (1.25)	2.80 (1.30)	2.45 (1.32)	2.39 (1.21)	2.07 (1.12)
Inventory costs	2.21 (1.25)	2.70 (1.39)	2.23 (1.31)	2.15 (1.18)	1.86 (1.04)
Internal processes	3.05 (1.23)	3.50 (1.03)	3.15 (1.34)	2.89 (1.17)	2.78 (1.23)
Staff productivity	2.81 (1.22)	3.24 (1.18)	2.72 (1.37)	2.71 (1.06)	2.65 (1.19)
Competitive position	2.95 (1.26)	3.39 (1.22)	3.00 (1.39)	2.79 (1.13)	2.71 (1.21)

[4] Subtotals do not precisely tie to totals due to rounding.

Table 4 shows that emerging economy/high internationalization firms have a positive correlation with most drivers and impacts, and developed economy/low internationalization firms have a negative correlation with most drivers and impacts. Table 4 also shows that emerging economy/low internationalization firms have a negative correlation with many uses of Internet business practices. Among control variables, Table 4 shows that firm size has a positive correlation with most uses, financial services firms have a positive correlation with some uses, and manufacturing firms have a negative correlation with some uses. Overall, the data in Tables 3 and 4 suggest that emerging economy/high internationalization firms are relatively more driven to use Internet business practices and report relatively higher impacts of Internet business practices compared with other firms in the sample. These correlations are consistent with research that emerging economies offer greater potential for growth than developed economies, because emerging economies start from a lower base and have more opportunity to catch up [Abramovitz, 1986].

Table 4: Correlation Between Independent and Dependent Variables

	Emerging high international	Emerging low international	Developed high international	Developed low international	Manufacturing	Retail wholesale	Financial services	Firm size
Independent variables								
Emerging high international	1.00							
Emerging low international	–0.29*	1.00						
Developed high international	–0.33*	–0.36*	1.00					
Developed low international	–0.30*	–0.33*	–0.38*	1.00				
Manufacturing	0.04	–0.13*	0.25*	–0.17*	1.00			
Retail wholesale	–0.02	0.13*	–0.07	–0.03	–0.53*	1.00		
Financial services	–0.02	0.01	–0.19*	0.21*	–0.53*	–0.44*	1.00	
Firm size	0.07	–0.04	0.11*	–0.14*	0.08	–0.11*	0.03	1.00
Uses								
Advertising marketing	–0.02	–0.10*	0.01	0.10*	–0.07	–0.05	0.12*	0.08
Sales	–0.02	–0.11*	–0.06	0.19*	–0.24*	0.03	0.22*	0.13*
Customer service	0.06	–0.12*	0.04	0.02	–0.17*	–0.03	0.21*	0.14*
Exchange data customers	–0.01	–0.06	0.15*	–0.09	0.09	–0.11*	0.02	0.14*
Purchases	–0.07	–0.14*	0.11*	0.10*	–0.01	–0.01	0.02	0.09*
Exchange data suppliers	–0.03	0.08	0.05	–0.10*	0.04	0.03	–0.07	0.12*
Integrate processes partners	0.10*	–0.01	–0.01	–0.07	–0.06	–0.00	0.06	0.18*
Drivers								
Existing markets	0.15*	0.06	–0.14*	–0.05	–0.09	0.09*	0.00	0.05
New markets	0.17*	0.10*	–0.13*	–0.13*	–0.03	0.05	–0.01	–0.06
Customer demand	0.10*	–0.04	–0.01	–0.04	–0.01	–0.04	0.04	0.09
Coordination	0.14*	0.09	–0.05	–0.17*	0.01	0.08	–0.09	0.04
Supplier requirements	0.16*	0.09*	–0.01	–0.23*	0.05	0.11*	–0.16*	0.02
Costs	0.11*	0.19*	–0.15*	–0.14*	–0.13*	0.16*	–0.02	0.06
Competitors	0.01	–0.05	0.03	0.01	–0.10*	–0.05	0.15*	0.01
Impacts								
Sales	0.16*	0.06	–0.12*	–0.08	–0.05	0.05	0.01	0.07
Sales area	0.15*	0.00	–0.04	–0.10*	0.07	–0.02	–0.06	–0.07
International sales	0.31*	–0.10*	0.10*	–0.29*	0.20*	–0.08	–0.13*	0.01
Customer service	0.16*	0.07	–0.08	–0.14*	–0.01	–0.06	0.07	0.12*
Coordination suppliers	0.12*	0.05	0.04	–0.21*	0.08	0.06	–0.15*	0.12*
Procurement costs	0.16*	0.02	–0.01	–0.16*	–0.02	0.10*	–0.08	0.05
Inventory costs	0.20*	0.01	–0.03	–0.17*	0.01	0.12*	–0.14*	0.06
Internal processes	0.19*	0.05	–0.08	–0.13*	0.03	–0.09*	0.06	0.07
Staff productivity	0.18*	–0.04	–0.05	–0.08	–0.01	–0.02	0.03	0.08
Competitive position	0.18*	0.02	–0.08	–0.11*	–0.05	–0.04	–0.10*	0.08

* Correlation significant at $p < 0.05$

Estimation Models

Because of differences in the nature of the dependent variables for use and drivers/impacts, we estimate these models using probit and ordinary least squares (OLS) respectively. Our data for uses of Internet business practices appear as binary variables. The OLS approach for modeling binary dependent variables is not appropriate because of heteroskedastic error distribution, and a linear model may result in predicted probabilities below zero or above one. To overcome these issues, we used the probit approach to estimate the use models [Greene, 2000; Long, 1997]. The functional form of the use estimation models is as follows:

$$Probability\ (Use=1) = \Phi\ [\beta X + \varepsilon] \qquad (1)$$

where the Xs are explanatory and control variables, and βs are parameters for the respective variables. Φ denotes the normal cumulative distribution function (the area under the normal curve).

Our estimation models for drivers and impacts of Internet business practices are as follows:

$$Driver = Constant + \beta_1 Emerging\ Economy\ High\ Internationalization + \beta_2 Emerging\ Economy\ Low\ Internationalization + \beta_3 Developed\ Economy\ Low\ Internationalization + \beta_4 Manufacturing + \beta_5 Retail + \beta_6 Firm\ Size + \varepsilon \quad (2)$$

$$Impact = Constant + \beta_1 Emerging\ Economy\ High\ Internationalization + \beta_2 Emerging\ Economy\ Low\ Internationalization + \beta_3 Developed\ Economy\ Low\ Internationalization + \beta_4 Manufacturing + \beta_5 Retail + \beta_6 Firm\ Size + \varepsilon \quad (3)$$

We used the OLS approach to estimate equations (2) and (3). We tested for multi-collinearity by computing condition indices. The highest variance inflation factor (VIF) was 1.56, indicating that multi-collinearity is not a concern in our analysis [Belsley et al., 1980]. We accounted for heteroskedastic error distribution and calculated heteroskedasticity-consistent errors for all our models [White, 1980].

III. RESULTS AND DISCUSSION

Table 5 shows the probit results of equation (1) for each use of Internet business practices. For convenience, numerical labels are provided for the columns with dependent variables, and alphabetical labels are provided for the rows with independent variables. In row A, there is a lack of significance for most marketing- and supply chain-oriented Internet business practices in emerging economy/high internationalization firms. This suggests that despite the differences between emerging economy and developed economy firms discussed above, emerging economy/high internationalization firms use marketing- and supply chain-oriented Internet business practices with about the same frequency as developed economy/high internationalization firms.

Table 5: Results for Use Equations (Probit)

	(1) Advertising marketing	(2) Sales	(3) Customer service	(4) Exchange data customers	(5) Purchases	(6) Exchange data suppliers	(7) Integrate processes partners
(A) Emerging high international	–0.120 (0.491)	–0.006 (0.971)	–0.026 (0.881)	–0.314* (0.068)	–0.401** (0.017)	–0.162 (0.341)	0.232 (0.172)
(B) Emerging low international	–0.288* (0.093)	–0.298* (0.098)	–0.495*** (0.004)	–0.448*** (0.008)	–0.540*** (0.001)	0.156 (0.358)	–0.010 (0.951)
(C) Developed low international	0.146 (0.415)	0.397** (0.021)	–0.238 (0.166)	–0.368** (0.029)	0.007 (0.996)	–0.195 (0.242)	–0.134 (0.437)
(D) Manufacturing	–0.363** (0.019)	–0.799*** (0.000)	–0.794*** (0.000)	–0.023 (0.877)	–0.098 (0.503)	0.166 (0.265)	–0.272* (0.075)
(E) Retail wholesale	–0.286* (0.075)	–0.231 (0.135)	–0.427*** (0.006)	–0.254* (0.095)	0.017 (0.910)	0.178 (0.248)	–0.105 (0.496)
(F) Firm size	0.182* (0.051)	0.300*** (0.001)	0.260*** (0.002)	0.176* (0.051)	0.181** (0.045)	0.276*** (0.004)	0.328*** (0.000)
Constant	–0.343 (0.577)	–1.879*** (0.001)	–0.996* (0.078)	–0.518 (0.382)	–0.875 (0.138)	–1.581** (0.011)	–2.160*** (0.000)
Observations	468	468	468	468	468	468	468
Pseudo R^2	0.029	0.095	0.066	0.030	0.033	0.028	0.036
Wald X^2	17.46	54.35	41.56	19.41	20.16	16.31	22.25
prob > X^2	0.008	0.000	0.000	0.004	0.003	0.012	0.001

coefficient (two-tailed *p* value in parentheses)

* significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent

We provide some case examples to illustrate the ways in which emerging economy/high internationalization firms use marketing- and supply chain-oriented Internet business practices. Cemex (Mexico), the world's third-largest cement producer, uses the Internet as part of its customer service strategy. The pre-mixed cement market is characterized by short time windows during which the product must either be delivered to customers or spoil. To make matters even more complex, Cemex has extensive operations in emerging economies that are frequently characterized by poor roads, high traffic, and irregular construction schedules. To address these challenges, Cemex equips its delivery trucks with Internet-enabled Global Positioning System (GPS) technology [Raskob, 2002]. Customers can use the Internet to check the status of their orders and monitor shipments and deliveries to ensure that their construction projects remain on schedule. This is an example of how emerging economy firms can use the Internet to overcome some of the disadvantages of a poor transportation and communications infrastructure to deliver world class customer service.

Quanta Computer (Taiwan) uses the Internet to exchange operational data with suppliers and customers. In its role as a leading designer and manufacturer of notebook computers for customers such as Hewlett-Packard (USA) and Dell (USA), Quanta must coordinate its operations with the production and delivery operations of its suppliers. Based on forecasts from customers and in-house estimates, Quanta publishes a thirteen-week schedule for suppliers and updates this schedule daily on its extranet [Einhorn, 2001]. Quanta's suppliers are able to access the schedule and make necessary production schedule adjustments that will result in timely delivery to Quanta. Customers use EDI or Internet-based tools to place orders from Quanta's order management system, known as Shanghai Direct Ship. Purchase orders for components are generated by the ERP system and put on a secure website for suppliers to download. According to Quanta, IT and the Internet provide a competitive advantage by enabling the firm to offer build-to-order production to its customers [interviews with Quanta managers, 2004].

Haier, the world's fourth largest appliance company, is considered by some observers to be China's first global brand. Haier uses its external business-to-business network iHaier to find the best suppliers and establish close partner relationships [Chen et al., 2004]. Functionality present in iHaier includes ordering, automated stock replenishment, payment processing, and production-related control processes. Suppliers can use iHaier to present their service offerings, inquire about forecast demand, check accounts receivable, receive payment information for goods, and send or receive suggestions on how to improve operations. Haier coordinated its Internet implementation as part of a broader set of organizational and strategic initiatives. Prior to deploying iHaier, Haier reengineered its business processes and organizational structure to facilitate Internet-based supply chain management and integration [Chang and Li, 2003].

While row A of Table 5 shows limited differences between emerging economy/high internationalization firms and developed economy/high internationalization firms, row B shows that emerging economy/low internationalization firms use many marketing- and supply chain-oriented Internet business practices with less frequency than developed economy/high internationalization firms. This distinction between emerging economy/high internationalization and emerging economy/low internationalization firms suggests that the Internet may play a helpful role as emerging economy firms strive to expand beyond their home markets.

Among control variables, rows D and E of Table 5 show that manufacturing firms and retail/wholesale firms use some Internet business practices less than do financial services firms. This result is consistent with analysis by the United Nations Conference on Trade and Development [UNCTAD, 2004], which also shows that manufacturing and trade firms lag services firms in the adoption of electronic commerce. Row F of Table 5 shows that large firms are more likely to use Internet business practices. This result is consistent with the theory that slack resources and economies of scale enable large firms to adopt administrative innovations [Dewar and Dutton, 1986; Mock and Morse, 1977]. The control variable results provide added confidence for our model.

Table 6 shows the OLS results of equation (2) for each driver of Internet business practices. Numerical labels are provided for the columns with dependent variables, and alphabetical labels are provided for the rows with independent variables. Columns 1 and 2 of row A show that emerging economy/high internationalization firms are relatively more driven than developed economy/high internationalization firms to use Internet business practices to expand existing markets and enter new markets.

Banco Bradesco (Brazil) is one emerging economy firm that uses the Internet to expand and enter new markets for its products and services. Only 30 percent of Brazilian consumers have bank accounts, which leaves significant room for growth in that banking market. At the same time, Brazilians who use the Internet spend considerable time online—in June 2005 Brazil led all countries in the Ibope/NetRatings rankings of user time spent online with seventeen hours per month. To tap into this growth potential, Banco Bradesco offers over 250 types of transactions for individual and corporate customers online, and has significantly increased the proportion of its customers that use online banking from 0.5 percent in 1996 to 9.5 percent in 1999 to 38 percent in late 2005. About 10 percent of Banco Bradesco's customer transactions are conducted over the Internet [DeGouvea and Kassicieh, 2002]. During the growth phase, Banco Bradesco estimated that about half of its new customers chose the bank because of its Internet banking capabilities [Economist Intelligence Unit, 2001].

Column 6 of Table 6 shows that emerging economy firms are relatively more driven than developed economy firms to use Internet business practices to reduce costs. Haier has achieved a lower cost structure than peer firms using its iHaier B2B portal. In 2001, Haier's cost of finished products was 8 percent of sales, compared with 30 percent for all other China domestic firms. The same year, logistics accounted for 7 percent of Haier's commodity costs, compared with the China national average of 15 percent [Chen et al., 2004]. Samsung (South Korea) has also used Internet business practices to achieve a reduction in costs. Samsung Electronics America's Digital IT Division (DITD) launched a partner portal to provide catalog information and marketing tools to 13,000 resellers. This portal helped

Samsung achieve a 25 percent reduction in marketing costs related to improved service and better ability to segment resellers [Schneider, 2004].

Table 6: Results for Driver Equations (OLS)

		(1) Existing markets	(2) New markets	(3) Customer demand	(4) Coordination	(5) Supplier requirements	(6) Costs	(7) Competitors
(A)	Emerging high international	0.619*** (0.000)	0.683*** (0.000)	0.272 (0.118)	0.436*** (0.004)	0.488** (0.012)	0.579*** (0.001)	–0.113 (0.535)
(B)	Emerging low international	0.379** (0.021)	0.464*** (0.006)	–0.057 (0.746)	0.295** (0.045)	0.272 (0.131)	0.707*** (0.000)	–0.211 (0.247)
(C)	Developed low international	0.164 (0.342)	–0.061 (0.727)	–0.054 (0.758)	–0.186 (0.244)	–0.433** (0.012)	–0.020 (0.909)	–0.302* (0.084)
(D)	Manufacturing	–0.097 (0.516)	–0.030 (0.843)	–0.127 (0.420)	0.138 (0.310)	0.345** (0.031)	-0.145 (0.368)	–0.552*** (0.001)
(E)	Retail wholesale	0.187 (0.226)	0.053 (0.738)	–0.141 (0.403)	0.249* (0.089)	0.501*** (0.002)	0.338** (0.033)	–0.433** (0.011)
(F)	Firm size	0.103 (0.238)	–0.123 (0.177)	0.149 (0.103)	0.046 (0.508)	0.017 (0.854)	0.131 (0.116)	–0.004 (0.968)
	Constant	2.561*** (0.000)	3.848*** (0.000)	2.380*** (0.000)	3.051*** (0.000)	2.103*** (0.001)	2.071*** (0.000)	3.731*** (0.000)
	Observations	468	468	468	468	468	468	468
	R^2	0.047	0.059	0.018	0.052	0.085	0.093	0.031
	F	4.30	5.17	1.60	4.13	7.89	8.76	2.30
	prob > F	0.000	0.000	0.144	0.001	0.000	0.000	0.034

coefficient (two-tailed *p* value in parentheses)
* significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent

Among control variables, rows D and E of Table 6 show that manufacturing firms and retail/wholesale firms are relatively more driven than financial services firms to use Internet business practices because of supplier requirements. This result is consistent with the notion that the production and movement of physical products have business process implications that differ from the considerations for intangible services [Bardhan et al., 2010; Rai and Sambamurthy, 2006].

Table 7 shows the results of OLS equation (3) for each impact of Internet business practices. Numerical labels are provided for the columns with dependent variables, and alphabetical labels are provided for the rows with independent variables. Columns 1–4 of row A show that emerging economy/high internationalization firms report a higher level of sales and customer service impact from Internet business practices compared with developed economy/high internationalization firms. For example, the Samsung partner portal discussed above also enabled Samsung DITD to achieve a 30 percent increase in commercial sales in the Americas. Samsung's products and business processes have contributed to the firm's global brand value of $16.8 billion [Kiley, 2007], placing Samsung ahead of developed-economy firms such as Sony (Japan), Dell, and Canon (Japan). This suggests that emerging economy firms may be more motivated than developed economy firms to deploy Internet business practices to enable customer relationships.

Columns 6–9 of row A in Table 7 show that Internet business practices also translate into operational benefits for emerging economy/high internationalization firms. For example, the Internet enables Quanta Computer to receive orders on a continuous basis and gives Quanta's customers greater flexibility to customize their orders. "We used to have one purchase order for 1,500 computers, now we have one purchase order for each machine," said a Quanta deputy director [Einhorn, 2001]. While Quanta manufactures computers for original equipment manufacturers (OEMs), such as Hewlett-Packard and Dell, Quanta now has the capability to do a degree of build-to-order and direct ship to end customers who place their orders with the OEMs.

Column 3 of rows B and C in Table 7 show that low internationalization firms from emerging and developed economies report a lower impact for international sales, consistent with the low internationalization focus of these firms. Column 5 of rows D and E show that manufacturing and retail/wholesale firms report a higher impact for supplier coordination. This is consistent with the result from Table 6 above that manufacturing and retail/wholesale firms are more driven to apply Internet business practices by supplier requirements. The consistency of empirical results across equations provides added confidence for our model.

Table 7: Results for Impact Equations (OLS)

		(1) Sales	(2) Sales area	(3) International sales	(4) Customer service	(5) Coordination suppliers	(6) Procurement costs	(7) Inventory costs	(8) Internal processes	(9) Staff productivity	(10) Competitive position
(A)	Emerging high international	0.601*** (0.000)	0.479*** (0.003)	0.606*** (0.000)	0.511*** (0.001)	0.260 (0.118)	0.401** (0.017)	0.575*** (0.001)	0.608*** (0.000)	0.520*** (0.001)	0.558*** (0.000)
(B)	Emerging low international	0.361** (0.025)	0.113 (0.504)	–0.325** (0.048)	0.309** (0.049)	0.100 (0.562)	0.036 (0.826)	0.090 (0.578)	0.293* (0.074)	0.001 (0.995)	0.172 (0.305)
(C)	Developed low international	0.073 (0.634)	–0.120 (0.469)	–0.711*** (0.000)	–0.143 (0.356)	–0.415** (0.012)	–0.303* (0.058)	–0.207 (0.157)	–0.113 (0.472)	–0.062 (0.683)	–0.149 (0.344)
(D)	Manufacturing	–0.071 (0.604)	0.194 (0.185)	0.326** (0.024)	–0.169 (0.200)	0.310** (0.036)	0.025 (0.864)	0.215 (0.124)	–0.101 (0.464)	–0.107 (0.440)	–0.314** (0.028)
(E)	Retail wholesale	0.080 (0.608)	0.019 (0.906)	–0.030 (0.824)	–0.262* (0.075)	0.366** (0.018)	0.287* (0.065)	0.464*** (0.002)	–0.315** (0.037)	–0.074 (0.630)	–0.287* (0.066)
(F)	Firm size	0.129 (0.130)	–0.160* (0.055)	–0.104 (0.170)	0.180** (0.026)	0.191** (0.024)	0.075 (0.330)	0.086 (0.291)	0.086 (0.307)	0.115 (0.175)	0.109 (0.227)
	Constant	1.528*** (0.007)	3.422*** (0.000)	2.615*** (0.000)	2.072*** (0.000)	1.551*** (0.007)	1.832*** (0.001)	1.370** (0.011)	2.486*** (0.000)	2.072*** (0.000)	2.364*** (0.000)
	Observations	468	468	468	468	468	468	468	468	468	468
	R^2	0.047	0.038	0.175	0.062	0.071	0.051	0.075	0.061	0.040	0.056
	F	4.12	3.19	20.76	5.51	6.99	4.15	6.03	5.96	3.55	4.47
	prob > F	0.001	0.004	0.000	0.000	0.000	0.001	0.000	0.000	0.002	0.000

coefficient (two-tailed *p* value in parentheses)
* significant at 10 percent ; ** significant at 5 percent; *** significant at 1 percent

An important issue for emerging economy/high internationalization firms is whether they can effectively use the Internet to directly reach end consumers, bypassing the developed economy brand name suppliers and large retailers that currently act as intermediaries. ASUSTeK (Taiwan) is one emerging economy firm that is making this transition. While ASUSTeK may be better known as a contract manufacturer for Apple iPods, ASUSTeK now sells branded notebooks in several markets, including the highly successful eeePC netbook. In 2008, ASUSTeK spun off its contract manufacturing businesses and retained its branded product lines. While the question of whether other emerging economy firms can also make this transition relates to overall management practices including marketing and logistics, the Internet business practices and IT skills that emerging economy firms develop as a supplier to developed economy firms can serve as a valuable enabler of these strategies.

IV. CONCLUSIONS AND IMPLICATIONS

This article addresses the research questions of whether emerging economy firms differ from developed economy firms in their use, drivers, and impacts of Internet business practices; and whether the degree of firm internationalization influences the use, drivers, and impacts of Internet business practices for emerging economy firms. Our empirical analysis of data on 468 firms across ten countries shows that despite the differences between emerging economy firms and developed economy firms, emerging economy/high internationalization firms use marketing- and supply chain-oriented Internet business practices with about the same frequency as developed economy/high internationalization firms. Our empirical analysis also shows that emerging economy/high internationalization firms are relatively more driven to use Internet business practices to expand existing markets and enter new markets, and are more likely to report increases in sales, sales area, international sales, and customer service compared with developed economy/high internationalization firms.

These empirical findings are consistent with the notion that the Internet is an enabler of forces that lead to a flatter and more fluid global competitive landscape [Friedman, 2006]. Our analysis suggests that emerging economy/high internationalization firms recognize the potential of the Internet to connect with current and potential customers, form collaborative supplier partnerships, and are motivated to leverage these relationships to compete with established industry leaders from developed economies. The Internet is giving emerging economy firms the tools they need to challenge the developed world's strategic advantage in key industries, because it allows them to form partnerships that can conduct product development, marketing, logistics, and customer service activities as effectively and efficiently as their more mature rivals. Our case examples provide added insights on how emerging economy firms are incorporating the Internet into their business strategies and using the Internet to develop a virtual global presence that can compete more effectively in existing and new markets.

As emerging economy/high internationalization firms move further into using the Internet to integrate data and processes across geographic locations and firm boundaries, they will create virtual organizations that can compete in industries that have been dominated by developed economy firms with a more traditional, hierarchical, and formal organizational structure. We see a clear example of this phenomenon in the IT service industry. Infosys (India) has grown into a billion-dollar firm by providing IT services to North American and European clients from offshore locations, where solutions were traditionally provided onsite by developed economy vendors such as IBM (USA) and EDS (now HP Enterprise Services, USA). Low cost programming talent in India enables Infosys to compete

effectively on price, but Infosys must then coordinate its offshore teams with onsite teams and client staff. Infosys achieves this coordination using IT and Internet-based project management applications and integrated development tools, combined with various process and organizational mechanisms such as the Capability Maturity Model [Carmel, 2006]. Competition from emerging economy firms such as Infosys, TCS (India), and Wipro (India) is one factor that has forced developed economy IT vendors to expand their offshore presence and develop their own IT-enabled methods to manage their global operations. IBM now has over 70,000 employees in India, more than in any other country outside the U.S.

This article has implications for research and practice. From a research perspective, this article contributes to the IS, International Business and Strategy literature by studying the operational details of emerging economy firms in a cross-country setting, and identifying criteria to evaluate operational differences across emerging economy firms and developed economy firms. One limitation of this article is that the measures for use, drivers, and impacts of Internet business practices are perceptual. While prior research indicates that executives have accurate perceptions on the operational details of firms [Tallon et al., 2000; Venkatraman and Ramanujam, 1987], future research could address this limitation by incorporating primary data for firm-level operational characteristics and performance outcomes. While this article focuses on the use of Internet business practices, previous research suggests that ultimately the competitive advantage of a technology is attributable to the firm's management skills and processes that surround the technology [Mata et al., 1995]. Future research could more closely study the relationship between operational characteristics and management processes by including operational, strategic, and institutional elements in a single study.

From a managerial perspective, this article facilitates a more complete understanding of the operational characteristics of emerging economy firms and of the strategic challenges and opportunities presented by these firms. As emerging economy firms leverage the Internet and IT into their marketing, supply chain, and operational strategies, they position themselves as more credible competitors to established incumbents from developed economies. At the same time, their IT infrastructure and linkage with customers and suppliers enables emerging economy firms to form partnerships and integrate processes with developed economy firms. The response of developed economy firms to these challenges and opportunities will help shape the future role of emerging economy firms in the dynamic global marketplace.

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