

IT Orientation Effects on Obstacles and Facilitators of Innovation: An Emerging Economy Perspective in Mexico

Full Paper

Mariana G. Andrade Rojas
Nanyang Business School
Nanyang Technological University
mgabest2@gmail.com

Terence Saldanha
Carson College of Business
Washington State University
terence.saldanha@wsu.edu

Jiban Khuntia
Business School
University of Colorado Denver
jiban.khuntia@ucdenver.edu

Abhishek Kathuria
Faculty of Business and Economics
The University of Hong Kong
kathuria@hku.hk

Abstract

Innovation is a crucial determinant in the survival and growth of firms in emerging economies such as Mexico and other Latin American countries. These firms face obstacles in the form of institutional challenges and rigidity towards change. This study explores how two types of IT orientation to innovation – Internal IT Orientation to Innovation (IIOI) and External IT Orientation to Innovation (EIOI), help firms overcome three types of obstacles to innovation typically prevalent in LATAM economies- economic, policy, and internal. We argue that IIOI has a mitigating role for internal obstacles, while EIOI enables firms to overcome policy and economic obstacles to innovation. We argue that IIOI complements economic facilitators, and EIOI complements policy facilitators to innovation. Analyzing a unique dataset of Mexican firms, we provide empirical support for our hypotheses. The results contribute to theory and practice by highlighting how specific IT orientations help overcome specific obstacles and complement specific facilitators.

Keywords

Innovation, IT orientation, Emerging economy, obstacles.

Introduction

In the past two decades, countries in Latin America have taken a prominent role in the world economy as major sources of growth and targets of foreign investment. Several emerging economies including those in Latin America are tipped to be the main engine of global economic growth in the near future (Elliott 2014). For instance, Mexico has purchasing power to the tune of \$2.2 trillion dollar (World Bank 2011). In addition, by 2025, emerging economies will account for more than 45% of the global consumer base, with a significant number at the base of the pyramid (Atsmon et al. 2013). Consequently, emerging economies including Latin American economies have been attracting increasing attention of management practitioners and scholars in recent years. However, research on emerging economies is sparse in the Information Systems (IS) literature and several gaps remain in our understanding.

First, although emerging economies such as Mexico and other Latin American economies offer many opportunities to firms, they also pose severe challenges due to uncertainties and changes in economic, social, and legal institutions (Zhou and Poppo 2010). Under these circumstances, innovation is an important strategy for firm success. In general, empirical evidence supports the thesis that innovation is a key driver of financial performance

in emerging economies (Zhou and Li 2012). Despite an increasing interest in this topic, a critical aspect of innovation remains overlooked. Extant studies view innovation as a proxy for firm performance; however, it is merely a means to an end. According to the competitive advantage and resource based view (RBV) literatures, firm performance is the result of competitive advantage, which stems from unique resources and distinct capabilities that lend cost or differentiation advantages (Barney 2001; Porter 1985). Consequently, innovation, whether incremental or radical, process or product, results in firm performance if it impacts cost, quality, brand, or service; and it is these impacts of innovation that truly signify its effectiveness.

Second, in emerging economies, significant challenges inhibit firms from fulfilling their innovation related aspirations. These challenges lie both within and beyond the firm. While internal obstacles to innovation include resource and capability deficiencies and resistance to change, external obstacles to innovation (also coined as “institutional challenges” in existing research) are especially salient in emerging economy contexts. These challenges are manifested through two types of obstacles: policy and economic, and are a result of complex mechanisms for resource availability, legal enforcement, property rights, economic systems, government policies, and regulation. However, previous studies have tended to treat policy and economic obstacles (facilitators) similarly; ergo, it is unclear which of them play a more salient role in emerging economies, and how Information Technology (IT) may help overcome obstacles or leverage facilitators.

Third, prior studies suggest that IT provides a set of capabilities and flexible ways to operate, that in turn help a firm to adapt to complexities and lead it to perform better in challenging environments (Pavlou and El Sawy 2006; Saldanha et al. 2013). Research suggests that IT can play a role in emerging countries by compensating for poor infrastructure, whereas IT in developed economies may be a substitute for expensive human labor (Dewan and Kraemer 2000). Studies also suggest that embeddedness in an institutional environment may help a firm to leverage differentiation from IT. For instance, IT benefits incumbent firms by enhancing operational efficiency, whereas IT benefits startups or foreign firms by helping in communication with headquarters. Hence IT can play a key role in the puzzle of relatedness between institutional attributes and innovation. However, there is limited research related to strategic implications of IT in emerging economies (Roztocki and Weistroffer 2008). More specifically, how different types of IT help a firm to mitigate obstacles and complement facilitators to innovation remains a significant gap in the literature.

To address these research gaps, we develop a research model (see Figure 1) that examines how two types of IT Orientation towards Innovation: Internal and External, help a firm to overcome internal, policy, and economic obstacles to innovation. Building on prior literature, we suggest that a firm’s deployment of IT resources and capabilities towards building innovation is a manifestation of the orientation of its IT function. Hence we conceptualize *IT Orientation to Innovation* as the orientation of a firm’s IT function towards innovation. We define two types of IT orientation to innovation that, we posit, have an effect on overcoming obstacles and complementing facilitators to innovation. First, we define *Internal IT Orientation to Innovation (IIOI)* as the extent to which the information systems function in the firm promotes innovation inside the firm. Second, we define *External IT Orientation to Innovation (EIOI)* as the IT-based collaboration with the firm’s external constituents, such as market leaders, partners, suppliers, competitors, and clients.

Our dependent variable is multi-dimensional and measures the impact of innovation on price, quality, brand, and service, which are critical intermediate constructs towards achieving firm performance. Our empirical analysis using a unique data set collected through a survey of 394 firms in Mexico provides broad support for the hypotheses. The findings suggest that to foster innovation in emerging economies, firms need to have appropriate internal and external IT orientation to innovation because depending on the orientation of IT, it can have a distinct influence on how different institutional obstacles and facilitators influence innovation.

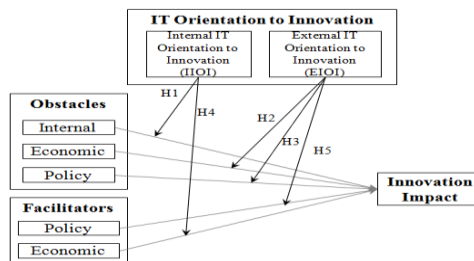


Figure 1. Research Model

Theory and Hypotheses

Role of IT in innovation

A growing body of literature in Information Systems (IS) suggests that IT plays a role in product development, process design, innovation capabilities, and firm operational performance (e.g. Andrade Rojas et al. 2015; Bendoly et al. 2009). Despite important advances in the role of IT in innovation, few research studies have explicitly related IT to firm innovation, barring some recent exceptions. As such, there is a need for a more nuanced understanding of how IT impacts firm innovation. Recently, the effect of IT on innovation has been captured in some studies where researchers have suggested that IT has evolved from enhancing efficiency to enabling innovation (Kawakami et al. 2015). For instance, IT-enabled absorptive capacity can enhance firm innovation (Joshi et al. 2010). Effective use of IT can advance innovation via enhancing collaboration among functional units, improving IS-business linkages (Gordon and Tarafdar 2007), and streamlining product development processes (Nambisan 2013). However, despite some progress, there is limited research on how IT can help overcome obstacles or enhance facilitators to innovation across a large sample of firms, especially in emerging economies.

Building on the strategic orientation literature (Gatignon and Xuereb 1997), which suggests that a firm's strategic behavior is a consequence of its orientation towards a strategic goal, we posit that an organization's deployment of IT resources and capabilities towards building innovation is the result of the orientation of its IT function. Accordingly, we conceptualize *IT Orientation to Innovation* as the orientation of an organization's IT function towards innovation.

Innovation can take place either within or beyond the boundary of a firm. Learning from partner firms or relational ties is a critical source for innovation and knowledge residing in the external environment (Ahuja 2000; Bao et al. 2012). Firms that have an internal locus of innovation innovate by acquiring, processing, integrating, and leveraging internal knowledge and resources. Firms with an external orientation towards innovation innovate by acquiring and processing knowledge and resources from external partners and integrating it with their own knowledge and resources to build innovations. Therefore we differentiate between two types of IT Orientation to Innovation. *Internal IT Orientation to Innovation* (IIOI) is the extent to which the information systems function in the firm promotes innovation inside the firm. Firms with high IIOI deploy IT to acquire and integrate internal knowledge and resources, such as IDEO's "Tube" (Andrade Rojas and Kathuria 2014). *External IT Orientation to Innovation* (EIOI) is the extent to which the firm promotes IT-based collaboration with the firm's external constituents, such as market leaders, partners, suppliers, competitors, and clients. This conceptualization of EIOI is consistent with the open innovation paradigm and firms with high EIOI deploy IT such as Starbucks' "mystarbucks.com" platform. We emphasize that we do not conceptualize IIOI and EIOI as dichotomous variables at two ends of a spectrum. Instead, a firm may have either one, neither, or both IT orientation to innovation simultaneously.

Institutional Obstacles and Facilitators to Innovation

Firms operating in emerging economies face rapidly changing environments coupled with slow moving, absent, or restrictive legal and regulatory systems. Institutional characteristics that impede innovation include underdeveloped capital markets, scarcity of skilled labor, lack of reliable market information, unstable political structures, weak legal processes, and regulatory hurdles (Li et al. 2010). Regulatory and economic factors can also strongly facilitate innovation by incentivizing or rewarding innovation. Facilitators include access to cheap capital, land and human resources, contract enforcement, and erecting of entry barriers through regulation. Therefore, we dichotomize these institutional obstacles and facilitators into two types, economic and policy.

IT Orientation and Obstacles to Innovation

Our first hypothesis posits that Internal IT Orientation to Innovation (IIOI) is critical in overcoming internal obstacles to innovation impact. Internal obstacles such as lack of capabilities in organizational staff, organizational resistance to change, and lack of technological information are fundamental intra-organizational hindrances that can prevent innovation in a firm (Ahuja et al. 2008). Promotion of innovation by the IS function can help mitigate problems caused due to internal obstacles in at least two ways. First, IIOI can enhance innovation capabilities in organizational staff by imbuing a culture of innovation. Second, IIOI can enhance innovation by inculcating a training culture where technological information is disseminated to the internal staff. IT can also help overcome lack of human resource capabilities by building competency through training and learning. Hence we hypothesize:

H1: The firm's Internal IT Orientation to Innovation (IIOI) positively moderates the association between internal obstacles and innovation impact.

Prior research in strategic management suggests that innovation outcomes can be achieved by collaboration among firms (Ahuja et al. 2008). Economic obstacles such as economic risk, long period for innovation investment returns, and results uncertainty are a manifestation of economic challenges arising out of non-ideal institutional conditions. EIOI facilitates IT-based collaboration with partners, suppliers, and customers which can help overcome economic challenges by affecting the "effective" level of innovative inputs and knowledge pool consisting of its own internal R&D plus R&D units it benefits through collaboration (Katz 1986). The IT-based linkages form an information network, which facilitates knowledge spillovers. Firms that form such linkages gain access to this network, resulting in greater access to knowledge and increase in innovation impact. Furthermore, this network can enable faster commercialization of innovation through the sharing of opportunities and proceeds. As a result, economic challenges of risk, long time for investment returns, and uncertainty can be mitigated. Hence we posit:

H2: The firm's External IT Orientation to Innovation (EIOI) positively moderates the association between economic obstacles and innovation impact.

In emerging economies, firms may face greater obstacles in current legislation and lack of incentives from public policies for innovation, which may hamper the impact of innovation. However, External IT Orientation to Innovation (EIOI) facilitates IT-based collaboration linkages between firms which provide platforms for firms to share information, knowledge, and resources (Sambamurthy et al. 2003). The constant flow of information and interactions between firms enable them to implement strategies to overcome legislative challenges. Moreover, firms that faced those challenges in the past have documents and information that enable other firms to go through the legal processes faster and focus their resources on innovative efforts. Firms in emerging economies may lack the capabilities and resources to generate high impact innovations on their own; for instance, firms may rely on government-sponsored agencies or partner firms to innovate. Nonetheless, in developing economies, government sponsored agencies may lack resources and capabilities themselves, and not may provide the adequate support that firms require. EIOI promotes inter-firm IT-based collaborative efforts, which foster the co-development of resources and technology such that firms can rely on their partners to source knowledge, and information that firms cannot create internally due to capabilities and resource limitations. Hence we posit:

H3: The firm's External IT Orientation to Innovation (EIOI) positively moderates the association between policy obstacles and innovation impact.

IT Orientation and Facilitators to Innovation

Firms which have greater IIOI are able to create, synchronize, share, and combine information and resources across the firm (Mithas et al. 2011). When firms have access to local public services, financing opportunities, training and technical assistance, there are several mechanisms that firms need to translate these resources into innovation impact. First, firms should be aware of the existence and availability of resources. Second, firms should be able to recognize the synergies that public services, financing opportunities, and training and technical assistance can have with firms' internal resources. Third, once firms have accessed the resources, other units of the firm should be aware of the availability of those resources and be able to reutilize or recombine them appropriately for innovation. Given these three mechanisms, firms require IIOI such that firms can utilize and recombine their resources to generate impactful innovations. Hence we posit:

H4: The firm's Internal IT Orientation to Innovation (IIOI) positively moderates the association between economic facilitators and innovation impact.

IT-based collaboration and policy facilitators are two types of mechanisms through which firms can access resources to complement their internal resources and generate innovations with higher impacts. Policy facilitators such as favorable tax policies, supportive government functioning provide firms with external support and conditions conducive innovation. When such support is combined with the firm's External IT orientation to Innovation (EIOI), the effect of the facilitators would increase because IT-enabled partnerships with external constituents can enable faster and more effective leveraging of favorable tax policies and government functioning for innovation. Hence, we propose that the interaction of EIOI and policy facilitators will enhance firms' innovation impact. Thus:

H5: The firm's External IT Orientation to Innovation (EIOI) positively moderates the association between policy facilitators and innovation impact.

Methodology

Sampling and Data Collection

To test the hypotheses, we examine organizations operating in the five most relevant manufacturing sectors such as high technology, fashion and design, agrifood, automobiles, and plastic in Mexico. Mexico provides a relevant setting for assessing our model due to its complex and transactional economy. Mexico has been considered as a hub and bridge between South America and North America; therefore, the market changes rapidly and firms introduce new products and processes to cope with the market expansion and rapid environmental changes. The questionnaire was carried out in Spanish language. Then, to ensure the conceptual equivalence, two independent translators translated it into English and back translated it into Spanish. Furthermore, two academic experts who are proficient in both Spanish and English double checked the translations and found no significant differences between the concepts in English and Spanish.

A random sample of 420 firms was selected from a list of companies provided by Mexico's Statistic Bureau (INEGI). These companies are in the State of Jalisco, which is located in the western part of Mexico and it contributed 6.62% of the country's gross domestic product in 2010. The multiple innovations in Guadalajara, Jalisco's capital, awarded it the title of "The Mexican Silicon Valley". Jalisco is a high-tech cluster comparable to Guangdong, China or Dublin, Ireland (Kuchiki 2008). Interviewers were recruited and trained to conduct the surveys on-site, which is an important mean to obtain high quality data in developing economies (Li et al. 2008; Zhou and Wu 2010). After dropping some observations due to incompleteness, the final sample consisted on 394 firms.

Variables

Table 1 describes the variables and survey questions. The dependent variable is *Innovation Impact*, a multi-dimensional measure with summated indicators, measured with a four-item instrument reflecting innovation impact in four areas: price, service, quality, and design. *Internal IT Orientation to Innovation (IIOI)* is measured by the extent to which information systems function in the firm promotes innovation in the firm. *External IT Orientation to Innovation (EIOI)* measures IT-based collaboration with the firm's external constituents including market leaders, partners, suppliers, competitors and clients.

To account for the effects of extraneous variables that may influence innovation, we included several control variables. We use the natural logarithm of number of full time employees as an indicator of firm size because prior literature indicates that firm size accounts for scale and resource availability, which may positively influence innovation (Tanriverdi 2005). Staff dedicated to innovation, creativity elements, and federal support for innovation control for other factors that may affect innovation. Finally, we control for industry sector (Devaraj et al. 2007). Table 2 reports the descriptive statistics and correlations.

Variable	Definition (scale items)
Innovation Impact	-Innovation impact in (price, service, quality and design).
Internal Obstacles	-Lack of innovation capabilities in staff -Resistance to change -Lack of technological information about innovation.
Economic Obstacles	-Economic risk -Long periods for investment return -Uncertainty about results
Policy Obstacles	-Obstacles in current legislation -Lack of incentives from public policies for innovation
Economic Facilitators	-Quality of the local public services -Financing opportunities -Access to training and technical assistance
Policy Facilitators	-Tax policies -Government functioning -Communication and transportation

Internal IT Orientation to Innovation (IIOI)	Information systems function in the firm promotes innovation in the firm
External IT Orientation to Innovation (EIOI)	IT-enabled collaboration with the firm's external constituents (Market leaders, Competitors, Clients, and Suppliers)
Firm Size	Number of full-time employees during the last financial year, in thousands.
Staff dedicated to innovation	Percentage of staff dedicated to innovation activities
Creativity	Binary variable indicating presence of explicit elements for creative work in the firm
Federal/state support for innovation	Usage of federal or state support for innovation
Industry sector	Dummy variables representing industry sector of the firm.

Table 1. Description of Variables

Following prior research, we adopted a two-step approach to examine the validity and reliability of our measures. First, we conducted an exploratory factor analysis (principal components analysis with varimax rotation). This generated the expected number of factors, with high loadings (above 0.70) and low cross-loadings (below 0.30). Second, we ran confirmatory factor analysis. All variables exhibited sufficiently high reliability, with Cronbach's alphas above the minimum recommended values (Nunnally 1978). All factor loadings were significant ($p < 0.01$) and all average variances extracted (AVE) were greater than 0.50. Further, for each construct, the AVE was higher than the highest shared variance between all possible pairs of constructs. Overall, the model provided satisfactory fit for the data across all indices. Thus the measures demonstrated adequate convergent validity, reliability and discriminant validity (Hansen 1999).

Variable	Mean	SD	1	2	3	4	5	6	7	8	9	10	11
1 Innovation	1.93	1.10	1.00										
2 Economic Obstacles	2.63	1.09	-0.20*	1.00									
3 Internal Obstacles	2.35	1.01	-0.27*	0.48*	1.00								
4 Policy Obstacles	2.43	1.04	-0.14*	0.49*	-0.54*	1.00							
5 Policy Facilitators	1.66	0.49	0.25*	-0.2**	-0.37*	-0.04	1.00						
6 Economic Facilitators	1.93	0.56	0.03	-0.02	-0.12*	-0.04	0.07	1.00					
7 IIOI	0.48	0.93	0.54*	-0.03	-0.13*	-0.10*	0.17*	-0.02	1.00				
8 EIOI	0.41	0.89	0.30*	-0.04	-0.04	0.03	0.01	-0.08	0.06	1.00			
9 Size	2.62	1.40	0.37*	-0.09	-0.19*	0.09	0.11*	0.05	0.34*	0.33*	1.00		
10 Staff for Innovation	0.59	1.06	0.52*	-0.16*	-0.21*	-0.00	0.13*	-0.04	0.20*	0.29*	0.32*	1.00	
11 Creativity	0.17	0.38	0.32*	-0.04	-0.08	-0.00	0.05	-0.00	0.24*	0.23*	0.26*	0.27*	1.00
12 Federal/state support for innovation	0.22	0.42	0.20*	0.05	-0.02	-0.04	-0.03	0.07	0.12*	0.29*	0.16*	0.24*	0.21*

Total observations, $N = 394$, * indicates significance at 5% level.

Table 2: Descriptive Statistics and Correlations

Analysis and Results

Table 3 shows the estimation results. Consistent with our expectations, we find that Internal Obstacles ($\beta = 0.20$, $p < 0.01$), Economic Obstacles ($\beta = -0.10$, $p < 0.10$), and Policy Obstacles ($\beta = -0.22$, $p < 0.01$) each have negative and significant coefficients, while Policy Facilitators has a positive and significant coefficient ($\beta = 0.30$, $p < 0.01$), and Economic Facilitators has a positive sign although not significant ($\beta = 0.01$, NS). Specifically, these results suggest that the Policy Obstacles, Economic Obstacles, and Internal Obstacles significantly hinder Innovation. Interestingly, we find that Policy Facilitators have a strongly positive direct effect on Innovation Impact, while the effect of Economic Facilitators is not statistically significant.

Column 4 includes all the two-way interaction terms to test the hypotheses. As column 4 shows, the interaction term (*Internal Obstacles x IIOI*) is significant and positive ($\beta = 0.20$, $p < 0.01$), supporting H1. We also find support for H2, as (*Economic Obstacles x EIOI*) is significant and positive ($\beta = 0.08$, $p < 0.05$). Likewise, we find support for H3 as the interaction term (*Policy Obstacles x EIOI*) is significant and positive ($\beta = 0.10$, $p < 0.05$). Moving to the facilitators, we find that the interaction term (*Economic Facilitators x IIOI*) is significant and positive ($\beta = 0.14$, $p < 0.05$), supporting H4. However the interaction (*Policy Facilitators x EIOI*) is non-significant; hence H5 is not supported.

	(1)	(2)	(3)	(4)
	Innovation	Innovation	Innovation	Innovation
Internal Obstacles	-0.11** (0.05)	-0.22*** (0.05)	-0.09* (0.05)	-0.20*** (0.05)
Economic Obstacles	-0.14*** (0.05)	-0.09* (0.05)	-0.15*** (0.05)	-0.10* (0.05)
Policy Obstacles	-0.19*** (0.06)	-0.23*** (0.06)	-0.19*** (0.05)	-0.22*** (0.05)
Economic Facilitators	0.09 (0.07)	0.06 (0.07)	-0.05 (0.07)	0.01 (0.06)
Policy Facilitators	0.24*** (0.09)	0.28*** (0.07)	0.26*** (0.10)	0.30*** (0.08)
IIOI	0.31*** (0.05)	-0.09 (0.07)	-0.10 (0.14)	0.32*** (0.13)
EIOI	0.10* (0.06)	0.18 (0.12)	0.21 (0.16)	-0.24 (0.16)
Internal Obstacles X IIOI		0.21*** (0.03)		0.20*** (0.03)
Economic Obstacles X EIOI		0.08** (0.04)		0.08** (0.04)
Policy Obstacles X EIOI		0.13*** (0.05)		0.10** (0.05)
Economic Facilitators X IIOI			0.23*** (0.07)	0.14** (0.07)
Policy Facilitators X EIOI			-0.07 (0.10)	-0.04 (0.07)
Size	0.06** (0.03)	0.08** (0.03)	0.06** (0.03)	0.08*** (0.03)
Staff Dedicated to Innovation	0.41*** (0.05)	0.37*** (0.04)	0.40*** (0.05)	0.36*** (0.04)
Creativity	0.28** (0.13)	0.13 (0.11)	0.26** (0.12)	0.12 (0.11)
Federal/state support for innovation	0.10 (0.10)	0.09 (0.09)	0.06 (0.10)	0.08 (0.10)
Sector dummies	included	included	included	included
R-squared	0.59	0.67	0.61	0.68
Observations	394	394	394	394

(1) Significance levels: ***p < 0.01, **p < 0.05, *p < 0.10

(2) Parentheses show robust standard errors.

Table 3. Estimation Results

The effects of control variables are largely in expected directions. For instance, consistent with prior research, firms with greater size have more innovation impact, thus suggesting that large firms are more likely to benefit from their larger resource base. Likewise, percentage of staff dedicated to innovation, and creativity in the firm have positive and significant coefficients.

We conducted validity tests such as F-tests of joint significance of interaction terms, Harman's one-factor and the marker variable tests for common method bias, tests for outliers and influential observations, variance inflation factors (VIF) for multicollinearity. These tests showed favorable results and provides robustness checks to our findings.

Discussion

The objective of this study was to explore how internal and external IT orientation help overcome obstacles and complement facilitators of innovation. To summarize our results, we find that Internal IT Orientation to Innovation (IIOI) mitigates internal obstacles to innovation, whereas External IT Orientation to Innovation (EIOI) mitigates economic and policy obstacles. Further, IIOI complements economic facilitators whereas EIOI

complements policy facilitators. Next, we discuss the implications and contributions of our findings, note the limitations of this study, and draw our conclusions.

Before discussing the contributions, we acknowledge the limitations of the study, which can be starting points for future research. First, since our research is based on cross-sectional data, a longitudinal study would help understand how the relationships between innovation and its obstacles, facilitators, and IT orientation change over time. Second, our sample consists of firms from a relatively more developed area in Mexico. Samples from lesser-developed areas will enable greater generalizability of our findings and allow future researchers to draw implications regarding the role of economic development on the efficacy of IT orientation towards innovation. Finally, extending the model by incorporating additional variables will enrich our understanding of why and how IT matters for innovation.

Our study contributes to the literature in the following ways. First, our study adds to the IS literature by conceptualizing IT Orientation to Innovation, which we believe is a significant dimension of IT strategy, especially in an emerging economy. We conceptually explicate this into two types – Internal IT Orientation to Innovation (IIOI), and External IT Orientation to Innovation (EIOI). Due to significant institutional challenges faced by firms in Latin America, it is pertinent that their IT functions appropriately orient themselves internally and/or externally towards innovation. Our findings indicate the significance of IT orientation towards boosting innovation for firms operating in Latin America. We also find that IT orientation improves innovation through two ways: by mitigating the negative effect of institutional and internal obstacles to innovation, and by increasing the positive effect of institutional facilitators to innovation. This process explains how IT orientation is beneficial to firm innovation and thus enriches existing theory by injecting a new concept – IT Orientation to Innovation, into the IT business value literature (Kohli and Grover 2008) and IT and innovation literature (Nambisan 2013).

Second, our research fills an important gap by examining the process by which IT Orientation to Innovation affects innovation. Recent studies have found mixed results regarding the effect that IT has on innovation (Han and Ravichandran 2006). Our findings illustrate a potential underlying reason: firms whose *IT Orientation to Innovation* is aligned with the type of obstacles or facilitators to innovation they face are able to overcome these obstacles and leverage the facilitators more effectively. Such firms consequently exhibit stronger impacts of IT on innovation in empirical studies (Joshi et al. 2010), while studies that find relatively weaker effects may be sampling firms whose *IT Orientation to Innovation* is not aligned with innovation obstacles or facilitators faced by them (Kleis et al. 2012). Further, by uncovering contingent forces that either circumscribe or amplify the effects of IT, our study enriches understanding and development of a contingent view of IT value.

Third, our findings provide insights into the role of institutional obstacles and facilitators to innovation in Latin American economies. Specifically, we dichotomize these into economic and policy obstacles and facilitators. These results also suggest that while institutional challenges matter in emerging economies, research in these contexts should pay specific attention to policy related institutional challenges as the implication is that if research neglects these challenges in examining aspects of firm performance, it may yield inaccurate results.

It warrants emphasis that although the main effects of internal, economic, and policy obstacles and economic and policy facilitators to innovation are not formally examined in the current study, they are significant in the regression model. These results are consistent with prior research and indicate a robust effect of contingencies on innovation.

Finally, our study empirically demonstrates the phenomenon of Innovation Impact. Prior research on innovation measures innovation through varied methods, including patent counts, R&D investment and subjective measures (Saldanha et al. 2016 (forthcoming)). However, firms pursue innovation as a means to enhance firm performance. Our conceptualization of innovation impact builds on the competitive advantage and RBV traditions to ascertain the effect of innovation on cost advantage and differentiation advantage. Thus we enrich the literature by offering a new conceptualization and measure of innovation that is closer to the phenomenon of interest and not merely an intermediate step towards performance.

So in emerging economies of Latin America, which kind of IT orientation to innovation should firms focus more upon – Internal or External? Our findings suggest that both types of IT orientation can enable a firm to achieve better innovation impact on cost and differentiation advantage. More importantly, managers should clearly understand which type of obstacles to innovation are overcome by which type of IT orientation to innovation. If a firm faces a lack of resources, capabilities or a resistance to innovation, a focus on Internal IT orientation is desirable. In such cases, managers should concentrate IT based efforts on promoting and supported innovation within the firm. On the other hand, if the firm's innovation is hindered by institutional obstacles, including

economic or policy obstacles, managers should develop external IT orientation to innovation. To do so, IT managers should focus their efforts on developing and supporting IT based collaboration and innovation with external constituents such as customers, suppliers, competitors, and governmental agencies. Most importantly, firms should carefully identify the type of obstacles they face and choose their IT orientation to innovation accordingly.

Taken together, the results contribute to theory and practice by highlighting how specific IT orientations to innovation (internal and external) help overcome specific obstacles (internal, policy, and economic) and help complement specific facilitators (policy and economic) to enable innovation that impacts key drivers of cost and differentiation advantages in Latin America.

Acknowledgements

We gratefully acknowledge the helpful comments of the review team which improved the paper substantially.

REFERENCES

- Ahuja, G. 2000. "Collaboration Networks, Structural Holes, and Innovation: A Longitudinal Study," *Administrative Science Quarterly* (45:3), pp. 425-455.
- Ahuja, G., Lampert, C. M., and Tandon, V. 2008. "Moving Beyond Schumpeter: Management Research on the Determinants of Technological Innovation," *The Academy of Management Annals* (2:1), pp. 1-98.
- Andrade Rojas, M., and Kathuria, A. 2014. "Competitive Brokerage: External Resource Endowment and Information Technology as Antecedents," *Best Paper Proceedings of the Academy of Management Annual Meeting*, Philadelphia.
- Andrade Rojas, M. G., Kathuria, A., and Lee, H.-H. 2015. "Attaining Operating Performance through Pas De Trios of It, Competitive Brokerage and Innovation," in: *Thirty Sixth International Conference on Information Systems*. Fort Worth, Texas.
- Atsmon, Y., Child, P., and Kopka, U. 2013. "Perspectives on Retail and Consumer Goods Spring 2013," in: *Perspectives on retail and consumer goods*. McKinsey.
- Bao, Y., Chen, X., and Zhou, K. Z. 2012. "External Learning, Market Dynamics, and Radical Innovation: Evidence from China's High-Tech Firms," *Journal of Business Research* (65:8), pp. 1226-1233.
- Barney, J. B. 2001. "Resource-Based Theories of Competitive Advantage: A Ten-Year Retrospective on the Resource-Based View," *Journal of Management* (27:6), pp. 643-650.
- Bendoly, E., Rosenzweig, E. D., and Stratman, J. K. 2009. "The Efficient Use of Enterprise Information for Strategic Advantage: A Data Envelopment Analysis," *Journal of Operations Management* (27:4), pp. 310-323.
- Devaraj, S., Krajewski, L., and Wei, J. C. 2007. "Impact of Ebusiness Technologies on Operational Performance: The Role of Production Information Integration in the Supply Chain," *Journal of Operations Management* (25:6), pp. 1199-1216.
- Dewan, S., and Kraemer, K. L. 2000. "Information Technology and Productivity: Evidence from Country-Level Data," *Management Science* (46:4), pp. 548-562.
- Elliott, L. 2014. "Mint Condition: Countries Tipped as the Next Economic Powerhouses," <http://www.theguardian.com/business/2014/jan/09/mint-condition-countries-tipped-economic-powerhouses> (-:-), pp. -.
- Gatignon, H., and Xuereb, J.-M. 1997. "Strategic Orientation of the Firm and New Product Performance," *Journal of marketing research*, pp. 77-90.
- Gordon, S. R., and Tarafdar, M. 2007. "How Do a Company's Information Technology Competences Influence Its Ability to Innovate?," *Journal of Enterprise Information Management* (20:3), pp. 271-290.
- Greene, W. H. 2008. *Econometric Analysis*. Granite Hill Publishers.
- Han, S., and Ravichandran, T. 2006. "Does It Impact Firm Innovativeness: An Empirical Examination of Complementary and Direct Effects," *AMCIS 2006 Proceedings*, p. 91.
- Hansen, M. T. 1999. "The Search-Transfer Problem: The Role of Weak Ties in Sharing Knowledge across Organization Subunits," *Administrative Science Quarterly* (44:1), pp. 82-111.

- Joshi, K., Chi, L., Datta, A., and Han, S. 2010. "Changing the Competitive Landscape: Continuous Innovation through It-Enabled Knowledge Capabilities," *Information Systems Research* (21:3), pp. 472-495.
- Katz, M. L. 1986. "An Analysis of Cooperative Research and Development," *The RAND Journal of Economics*, pp. 527-543.
- Kawakami, T., Barczak, G., and Durmuşoğlu, S. S. 2015. "Information Technology Tools in New Product Development: The Impact of Complementary Resources*,†," *Journal of Product Innovation Management* (32:4), pp. 622-635.
- Kleis, L., Chwelos, P., Ramirez, R. V., and Cockburn, I. 2012. "Information Technology and Intangible Output: The Impact of It Investment on Innovation Productivity," *Information Systems Research* (23:1), pp. 42-59.
- Kohli, R., and Grover, V. 2008. "Business Value of It: An Essay on Expanding Research Directions to Keep up with the Times," *Journal of the Association for Information Systems* (9:1), p. 1.
- Kuchiki, A. 2008. *The Flowchart Approach to Industrial Cluster Policy*. Palgrave Macmillan.
- Li, J. J., Poppo, L., and Zhou, K. Z. 2008. "Do Managerial Ties in China Always Produce Value? Competition, Uncertainty, and Domestic Vs. Foreign Firms," *Strategic Management Journal* (29:4), pp. 383-400.
- Li, J. J., Poppo, L., and Zhou, K. Z. 2010. "Relational Mechanisms, Formal Contracts, and Local Knowledge Acquisition by International Subsidiaries," *Strategic Management Journal* (31:4), pp. 349-370.
- Lindell, M. K., and Whitney, D. J. 2001. "Accounting for Common Method Variance in Cross-Sectional Research Designs," *Journal of Applied Psychology* (86:1), p. 114.
- Mithas, S., Ramasubbu, N., and Sambamurthy, V. 2011. "How Information Management Capability Influences Firm Performance," *MIS Quarterly* (35:1), p. 237.
- Nambisan, S. 2013. "Information Technology and Product/Service Innovation: A Brief Assessment and Some Suggestions for Future Research," *Journal of the Association for Information Systems* (14:4), pp. 215-226.
- Nunnally, J. 1978. "C.(1978). Psychometric Theory." New York: McGraw-Hill.
- Pavlou, P. A., and El Sawy, O. A. 2006. "From It Leveraging Competence to Competitive Advantage in Turbulent Environments: The Case of New Product Development," *Information Systems Research* (17:3), pp. 198-227.
- Porter, M. E. 1985. "Competitive Advantage: Creating and Sustaining Superior Performance," *New York*).
- Roztock, N., and Weistroffer, H. R. 2008. "Information Technology Investments in Emerging Economies," *Information Technology for Development* (14:1), pp. 1-10.
- Saldanha, T., Mithas, S., and Krishnan, M. S. 2016 (forthcoming). "Leveraging Customer Involvement for Fueling Innovation: The Role of Relational and Analytical Information Processing Capabilities," *MIS Quarterly* (-:-), pp. -.
- Saldanha, T. J. V., Melville, N. P., Ramirez, R., and Richardson, V. J. 2013. "Information Systems for Collaborating Versus Transacting: Impact on Manufacturing Plant Performance in the Presence of Demand Volatility," *Journal of Operations Management* (31:6), pp. 313-329.
- Sambamurthy, V., Bharadwaj, A., and Grover, V. 2003. "Shaping Agility through Digital Options: Reconceptualizing the Role of Information Technology in Contemporary Firms," *MIS Quarterly* (27:2), pp. 237-263.
- Tanriverdi, H. 2005. "Information Technology Relatedness, Knowledge Management Capability, and Performance of Multibusiness Firms," *MIS Quarterly* (29:2), pp. 311-334.
- Wall, T. D., Jackson, P. R., Mullarkey, S., and Parker, S. K. 1996. "The Demands—Control Model of Job Strain: A More Specific Test," *Journal of Occupational and Organizational Psychology* (69:2), pp. 153-166.
- Zhou, K. Z., and Li, C. B. 2012. "How Knowledge Affects Radical Innovation: Knowledge Base, Market Knowledge Acquisition, and Internal Knowledge Sharing," *Strategic Management Journal* (33:9), pp. 1090-1102.
- Zhou, K. Z., and Poppo, L. 2010. "Exchange Hazards, Relational Reliability, and Contracts in China: The Contingent Role of Legal Enforceability," *Journal of International Business Studies* (41:5), pp. 861-881.
- Zhou, K. Z., and Wu, F. 2010. "Technological Capability, Strategic Flexibility, and Product Innovation," *Strategic Management Journal* (31:5), pp. 547-561.