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PRODUCT INNOVATIONS IN EMERGING ECONOMIES: THE MODERATING ROLE OF COLLABORATIVE CAPACITY

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Abstract

Studies on enterprise innovations have established the relationships between a number of determinants and enterprise innovativeness. However, such studies in general have been conducted in developed economies. Recent literature has called for broadening innovation-related research to other contexts, such as countries that are not considered “developed.” This study aims at examining how firms innovate in emerging economies. Specifically, we focus on the role of collaborative capacity in product innovations. Primary data collected from an ICT project in India has been used to test the relevant hypotheses. Initial findings show that firm size, sales value, and external R&D will affect enterprise innovations in the presence of collaborative capacity.

Keywords: Product Innovations, Emerging Economies, Collaborative Capacity, Enterprise Group

1 INTRODUCTION

When economic crises affected economies across the globe in 2008, causing sales and income slump for companies, creativity still lived on, or even flourished, as companies were trying to figure out new ways to earn revenue more effectively and efficiently (Arndt 2009). In this age of knowledge-based competition, innovation is no longer something behind the veil, but something crucial for companies to survive.

It is not surprising that innovation-related research has been attracting a lot of attention in academia since early 1900's. One popular stream of innovation-related research relates to the investigation of antecedents of enterprise innovations. Years of research has shown that whether enterprises are able to innovate, and how well they can innovate tends to be determined by various factors, such as firm size (Baldrige & Burnham 1975; Blau & McKinley 1979; Damanpour 1996; Pierce & Delbecq 1977), organizational culture (Jassawalla & Sashittal 2002), knowledge management (Li & Kozhikode 2008), organizational resources (Damanpour 1991; Nohria & Gulati 1996), inter-organizational networks (Ahuja 2000; Chang et al. 2006; Faems et al. 2005; Goes & Park 1997; Mahmood & Mitchell 2004; Minkes & Foxall 1982; Powell et al. 1996; Teece 1989), and more recently IT technology (Fichman 2001a; Lyytinen & Rose 2003; Marcus 1981; Powell & Dent-Micallef 1997; Swanson 1994). However, most of these determinants of enterprise innovations have been identified through studies in developed countries, which Andersen et al. (2004) view as one of the major problems associated with innovation research. Indeed, Anderson et al. (2004) have suggested that researchers need to conduct more studies in different national contexts to test the generalizability of the conclusions drawn from past innovation research. Responding to their call, we place this study in the context of emerging economies. We propose to investigate *how enterprises innovate in emerging economies*. Specifically, we focus on product innovations and examine the role of collaborative capacity, which has been argued to play an effect on innovation in existing research and in anecdotes from practice. The context of our study is that of ICT (Information and Communication Technology) innovations in India, one of the prominent emerging economies today. Primary data collected from ICT innovative companies in India as part of a Euro-India ICT cooperation project is used for empirical analysis. .

The rest of the article is organized as follows. In the second section, related literature is reviewed, and research hypotheses are proposed; then, in the third section, the research methodology is briefly discussed, including how the data is analyzed; in the fourth section, the results are reported and elaborated upon; finally, the study's limitations are pointed out and future research opportunities are discussed.

2 LITERATURE REVIEW AND RESEARCH MODEL

2.1 Innovation and Product Innovation

The meaning of innovation in dictionary is *something new or the introduction of something different* (dictionary.com). In innovation literature, various definitions of innovation have been offered. Anderson et al. (2004) adopted West and Farr (1990)'s definition to distinguish innovation from creativity in their review. They emphasized that first of all innovation should consist of *application*, that is, innovation is more than an idea but a process of generating ideas and putting the ideas into practice; secondly, innovation occurs in three levels, including individual level, work group level, and organizational level; thirdly, innovation should be relatively novel to existing unit of adoption, which is correspondent to the dictionary definition that innovations don't have to be absolutely new as long as it is different in a significant way. Damanpour (1996) defined innovation as "a means of changing an organization, either as a response to changes in the external environment or as a pre-emptive action to influence the environment", which emphasizes the influence of innovations on organizations. Building on this broad perspective, innovations can be further divided into different categories, including product innovations, process innovations, administration innovations, environment innovations, and so on (Damanpour 1996). In this study, we focus on *product innovations* which are defined as the *market*

introduction of a new or significantly improved good or service with respect to its capabilities, user friendliness, components or sub-systems. Product innovations are critical for many enterprises as they are able to bring changes in markets, technology, and competition (Dougherty and Hardy 1996).

2.2 Antecedents of Enterprise Innovations

Since early 1990s, much of the efforts of researchers has been directed toward studying antecedents that may determine whether enterprises can innovate or not and also what abilities they must acquire to innovate.

Conducting a content analysis of innovation research published between 1997 and 2002, Anderson et al. (2004) categorized innovation antecedents into three groups by three different level of analysis: enterprise-level, working group/project-level and individual-level. Enterprise-level antecedents include factors such as firm size, organizational culture, organizational resources, and organizational structure; project-level antecedents include factors such as leadership style, team structure, and team climate; individual-level antecedents include factors personality, motivation and cognitive ability (Anderson et al. 2004). As we are interested in enterprise-level variables in this study, variables in this category are discussed in the rest of this section.

Firm size is one of the most studied enterprise-level factors that affect innovation. In most situations, firm size is expected to have a positive relationship with innovation (Baldrige & Burnham 1975). First of all, increased size leads to increased complexity, an attribute that is suggested to promote innovation (Blau & McKinley 1979). Secondly, increased size can create critical masses for certain problems that demand innovation (Baldrige & Burnham 1975). Thirdly, bigger organizations tend to have more slack resources for innovation (Damanpour 1996), and more interactions through external linkages (Baldrige & Burnham 1975). However, Damanpour (1996) has pointed out that despite the positive impact of size on innovation, large size can also have its down-side, such as less flexibility which may in turn obstruct innovation (Pierce & Delbecq 1977). Based on a meta-analysis, Damanpour (1996) pointed out that the association between firm size and innovation depends on other factors, such as environmental uncertainty and also how size is operationalized..

Slack resources are “resources in an organization that exceed the minimum requirements to produce a given level of organizational output” (Nohria & Gulati 1996). It is suggested that slack resources are valuable for organizations to develop innovations, because they allow organizations to afford huge expenditure associated with innovation development and innovation institutionalization, and more importantly, allow organizations to explore new ideas even before actual needs become evident (Damanpour 1991). However, Nohria and Gulati (1996) point out that instead of a linear positive relationship between slack resources and enterprise innovations, an inverse U-shape relationship exists, suggesting that too little *as well as* too much slack resources are detrimental to organizations’ innovating activities.

Organizational culture is another critical factor that influences innovation. What kind of organizational culture promotes innovation? By conducting an interpretive study to compare differences in culture between high-innovative companies and low-innovative companies, Jassawalla and Sashittal (2002) identified several features of highly innovation-supportive cultures; these include a) favouring collaboration, creativity, and risk-taking, b) having intensive meeting schedule to share information, develop and exchange ideas, and solve problems and conflicts, and c) leadership focusing on simultaneous change on a day-to-day base.

Research and development (R&D) activities are usually associated with idea generation and innovation development, which makes organizational R&D effort another significant factor that can affect organizational innovation. Relying on industrial data, Acs and Audretsch (1988) found out that there is a positive relationship between R&D expenditure and numbers of innovations in an organization, but the rate of increase in innovations decreases as R&D expenditure goes higher and higher. Similar to internal R&D activities, external knowledge acquisition is also imperative to enterprise innovations in emerging economies. A research on complementary conducted by Cassiman

and Veugeler (2006) shows that internal R&D and external knowledge acquisition are complementary innovation activities.

2.3 Collaborative Capacity

The concept of collaborative capacity was first brought up by community researchers referring to the conditions needed for coalitions to promote effective collaboration and build sustainable community change (Goodman et al. 1998). When it comes to the organizational context, collaborative capacity is conceptualized as *the ability of the enterprises to develop systems and structures for working with other enterprises within the enterprise network aimed at leveraging each other's competency*. To build collaborative capacity, collaborative network is one important approach. If an enterprise belongs to an enterprise group, it can usually achieve collaborative capacity through collaborating with other enterprises in the group. If not, the enterprise can choose to cooperate with other enterprises, customers, or suppliers. In innovation related literature, such inter-organizational collaboration has been seen to have an impact on innovations in enterprises (Ahuja 2000; Goes & Park 1997; Pierce & Delbecq 1977; Powell et al. 1996; Szeto 2000; Teece 1989). Pierce & Delbecq (1977), for example, suggested that inter-organizational interdependency help organizations with innovation development because of the shared information and shared resources. Moreover, Powell et al. (1996) revealed that the locus of innovation is within the networks of inter-organizational relationships, and such relationships are especially crucial for innovation in emerging industries. In addition, drawing on the results of a longitudinal study, Ahuja (2000) not only proved that direct ties and indirect ties an organization has in the inter-organizational network have a positive impact on innovation, but also demonstrated that increased number of structural holes will serve as a detriment to the organization. Finally, Szeto (2000) pointed out that inter-organizational networks contribute to the development of an organization's innovation capacity. In summary, it is clear that collaborative capacity is an influential variable pertaining to enterprise innovations, based on the studies conducted in developed countries.

Further, it appears that collaborative capacity is also important, or perhaps even more important in the context of emerging economies. Literature suggests that emerging economies have weak innovation infrastructures, due to the immature capital markets, the scarcity of resources, little protection of property rights, and weak pools of vertical intermediaries such as suppliers and distributors (Mahmood & Mitchell 2004). Such unique attributes of emerging economies makes it an imperative for enterprises in such economies to collaborate with other enterprises in their enterprise groups or other business groups to accomplish innovation development (Chang et al. 2006; Mahmood & Mitchell 2004). From the practice perspective, case studies have shown that enterprises in emerging economies tend to innovate by building collaborative networks.

3 HYPOTHESES DEVELOPMENT

As mentioned in the introduction, our overarching goal is to investigate *how enterprises innovate in emerging economies*. Innovation literature has established the relationships between a number of key innovation antecedents and enterprise innovations. However, given that these relationships were identified primarily in the context of developed economies, it is important to ascertain if they hold in the context of emerging economies. To this end, we identified five variables that can potentially impact enterprise innovations in India – we narrowed our focus on these 5 variables based on case studies we have undertaken for the Euro-India ICT cooperation project (citation withheld for anonymity). These five variables are: management experience abroad, firm size, sales value, in-house R&D, and external R&D. Research conducted in the context of advanced economies has shown that firm size, sales value, in-house R&D and external R&D are positively related to product innovations (Acs & Audretsch 1988; Cassiman & Veugelers 2006; Cohen & Klepper 1996; Damanpour 1991, 1996). Following this line, we hypothesize that they will work in the same way in the context of emerging economies. As for management experience abroad, Ayyagari et al. (2007) suggest that such

experience contributes to firm innovativeness in emerging economies. In this sense, we hypothesize that management experience abroad will positively impact product innovations.

As mentioned above, emerging economies have some unique characteristics that will influence enterprise innovations. Unlike advanced economies, the innovation infrastructures in emerging economies are weak (Mahmood & Mitchell 2004). Mahmood and Mitchell (2004) pointed out that it is difficult for enterprises to innovate in the same way as enterprises in advanced economies do, due to the immature capital markets, lack of resources necessary for innovation development, poor legal framework to protect property rights, and weak pools of vertical intermediaries such as suppliers and distributors. Mathew (2005) suggested that emerging economies (India specifically) followed a pattern of diffusion innovation, which means transferring innovation from first-generation innovators such as the U.S.A. This import-like approach at some level provides a solution to the problem of weak innovation infrastructure in emerging economies, but it is not a one-for-all strategy that organizations in emerging economies can rely on. Nowadays, emerging economies are under the pressure to develop their own innovations. As emerging economies are becoming more and more developed in every way, it is likely that the developed countries are unsure about sharing technology and innovation with emerging economies which are now their competitors (George & Prabhu 2003).

George and Prabhu (2003) pointed out that because of the increasing difficulty to import innovation, *enterprises start to explore (and often rely upon) inter-organization networks to promote enterprise innovations*. Other innovation related research conducted in the context of emerging economies also shows that enterprises in emerging economies innovate through business group (Chang et al. 2006; Mahmood & Mitchell 2004). As inter-organizational networks and business group both are reflections of collaborative capacity, we argue that collaborative capacity plays an important role in enterprise innovations in emerging economies. To be more specific, we hypothesize that collaborative capacity will follow a moderation model to impact enterprise innovations in emerging economies. We take Morris and Venkatesh (2010)'s approach to develop our hypotheses around the moderation effects of collaborative capacity on the relationships between the five key antecedents we have identified and product innovations in emerging economies:

H1: Collaborative capacity will moderate the relationship between firm size and product innovations in emerging economies.

H2: Collaborative capacity will moderate the relationship between sales value and product innovations in emerging economies.

H3: Collaborative capacity will moderate the relationship between management abroad experience and product innovations in emerging economies.

H4: Collaborative capacity will moderate the relationship between in-house R&D and product innovations in emerging economies.

H5: Collaborative capacity will moderate the relationship between external R&D and product innovations in emerging economies.

4 METHODOLOGY

4.1 Data

Primary data from ICT industry in India was used to test the research model. Data was collected through Euro-India ICT cooperation project. The survey was designed to capture the variables identified in the case studies. In the first step of the data collection, experts of the project scanned publically recorded IT innovations looking into all major journals and magazines from 2003-2007, to get the first sample of companies named innovative with IT. In the second step, they divided India into five regions (east, south-east, south, west, and north) and appointed an expert team for each region to filter the regionalized findings from the first step. In the third step, a sample of total 214 companies was left. Then, a survey team for each region was set up to contact the selected sample of companies. In each company, a managerial representative and a project manager were identified and were mailed to fill in the survey question on-line. If in doubt a person from the team would be available for contact.

The same people also kept contacting the respondents encouraging them to participate. In the end, 217 people took the survey. By screening the data we collected through Survey Monkey, we have got a sample size of 157.

4.2 Measurements

4.2.1 Dependent Variables

The dependent variable (product innovation) is coded as binary variables (0/1). If the enterprise has introduced either product or service innovation during the three-year period, we coded its product innovation as 1; if the enterprise has introduced neither product innovation nor service innovation, we its product innovation as 0.

4.2.2 Independent Variables

Size was measured by the number of full time employees. There are five levels of firm size: number of full time employees less than 250, from 251 to 500, from 501 to 2000, from 2001 to 10000, and more than 10001. These five levels were coded as 1 to 5 respectively. We took the average number for the three previous years as measurement for the size. Similarly, sales value was measured by the average number of the three years. Sales values of 1 to 5 represent less than 50 lakhs¹, from 51 lakhs to 1 crore, from 1 crore² to 50 crore, from 50 crore to 100 crore, and more than 100 crore. Management abroad experience was coded as binary. If the management has any experience abroad (studying, training, or working), the management experience abroad was coded as 1; otherwise, it was 0. In-house R&D was measured by whether the enterprise has engaged in any in-house R&D activity during the three years period; external R&D was measured by whether the enterprise has engaged in any external R&D activity (yes was codes as 1 and no was codes as 0). Collaborative capacity was operationalized by whether the enterprise belongs to an enterprise group³ or not (yes is coded as 1 and no is coded as 0).

5 RESULTS AND DISCUSSION

5.1 Data Analysis

Interaction Terms	B
Enterprise Group* Abroad Experience	-1.451
Enterprise Group* Size	-1.693*
Enterprise Group* Sales Value	2.677**
Enterprise Group* In-house R&D	1.838
Enterprise Group* External R*D	-2.466*
R ²	.317**
*: p< 0.05	
**: p< 0.01	

Table 1. Moderation Effects (N= 157, Missing Cases= 33)

We used logistic regression to test the moderation effects of enterprise group. Binary variables were mean centred before creating the interaction terms. The results (Table 1) show that the interactions between enterprise group and firm size, between enterprise group and sales value, and between enterprise group and external R&D are have a significant effect on product innovations ($p=.013$,

¹ 1 lakh equals 100,000 Indian Rupees; 1 Indian Rupee equals 0.02 USD

² 1 crore equals 10,000,000 Indian Rupees

³ A group consists of two or more legally defined enterprises under common ownership. Each enterprise in the group can serve different markets, or serve different product markets.

$p=.006$, $p=.042$). In this sense, H1, H2 and H5 are supported while H3 and H4 are not. To further test the moderation effects of enterprise group on the relationship between these three variables and product innovations, we split the data by enterprise group (whether the enterprise belongs to an enterprise group or not) and regressed product innovations on all five independent variables. The results suggest that when enterprise group equals 0, firm size does not have an effect on product innovations ($p=.125$), while when enterprise group equals 1, firm size is showing a significant negative impact on product innovations ($p=.018$). As for sales value, in the group of enterprise group being 0, sales value does not significantly influence product innovations ($p=.406$), whereas in the group of enterprise group being 1, sales value is have a significant positive effect on product innovations ($p=.010$). Finally, external R&D does not affect product innovations when enterprise group equals 0 ($p=.999$), while it shows a significant negative effect on product innovations when enterprise group equals 1 ($p=.044$). The results also show that management experience abroad and in-house R&D do not significantly impact product innovations in either group. In addition, when enterprise group equals 0, the model itself is not significant ($p=.306$), while when enterprise groups equals 1, the model is significant ($p=.001$) and the five variables explain about 28% of variance in product innovations.

5.2 Discussion

From above results, we can see that whether the enterprise belongs to an enterprise group moderates the effects of firm size, sales value, and external R&D on product innovations in emerging economies. All these three variables significantly impact product innovations *only when the enterprise is part of an enterprise group*. When the enterprise is not part of an enterprise group, no significant relationship is found between three variables and product innovations. This finding is consistent with the argument that enterprises in emerging economies innovate through collaborative capacity. Because of the weak innovation infrastructure, it does not matter how big the enterprise is, how much sales value it has made and whether it is engaged in external R&D, the enterprise won't be able to make product innovations unless it collaborates with other enterprises in the enterprise group. Furthermore, the model with the five variables is able to predict product innovations *only when* the enterprise is engaged in an enterprise group, which again supports our argument about the role of collaborative capacity in enterprise innovations in emerging economies. Another interesting finding is that size and external R&D are both negatively associated with product innovations when the enterprise is in an enterprise group. This suggests that as long as enterprises in emerging economies belong to an enterprise group, they are able to help each other out. Thus, even small firms can benefit from the help of others and from collaboration. As for external R&D, the results imply that when enterprises are part of an enterprise group, external R&D is simply not helpful in promoting product innovations. The reason behind might be that as enterprises mainly collaborate with other enterprises in the group to innovate, extra spending in external R&D will not lead to creation of innovations, possibly due to the weak innovation infrastructure. Finally, management experience abroad and in-house R&D show no effects on product innovations, irrespective of the level of collaborative capacity.

6 LIMITATIONS AND FUTURE RESEARCH

This research does have some limitations. First of all, the data we used to test our research questions was collected through a survey. The measurements of each variable were based on the answers of the managers rather than objective numbers. In this sense, the accuracy of the responses may be questioned, though this concern exists for a large proportion of survey studies.. Secondly, we operationalized the collaborative capacity as whether the enterprise belongs to an enterprise group, which may be seen as an over-simplification of the concept, given that collaborative capacity may consist of multiple facets (Foster-Fishman et al. 2001).

The initial findings of this paper suggest that factors such as firm size, sales value, and external R&D what have been proved to be antecedents of enterprise innovations in developed economies will also impact enterprise innovations in emerging economies only when enterprises are part of an enterprise

group. When enterprises do not belong to an enterprise group, these factors are shown no effects on how well enterprises innovate. Future studies of enterprise innovations in emerging economies can investigate what factors determine enterprise innovations when an enterprise has low collaborative capacity. Furthermore, in this study, we only focused on one type of enterprise innovations – product innovations. It is also worth investigating whether other types of enterprise innovations, such as process innovation and environmental innovation, also follow the same model as product innovations in emerging economies in the future studies.

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