The Effect Of Incubator Participation In Developed Market Direct Entry By Emerging Market Firms

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IN DEVELOPED MARKET DIRECT ENTRY
BY EMERGING MARKET FIRMS

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Ebetuel Pallares-Venegas

2012
THE EFFECT OF INCUBATOR PARTICIPATION IN DEVELOPED MARKET DIRECT ENTRY BY EMERGING MARKET FIRMS

by

EBETUEL PALLARES-VENEGAS, MBA

DISSERTATION

Presented to the Faculty of the Graduate School of The University of Texas at El Paso in Partial Fulfillment of the Requirements for the Degree of

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The dissertation process not only proved challenging from an academic perspective and challenging to balance, but I also credit the process – replete with its bitter moments – with teaching me valuable lessons about myself and others. I am grateful to God, and acknowledge His hand in everything.
ABSTRACT

Motivated by the increased resurgence of emerging markets, this dissertation draws from a milieu of academic disciplines and professional experiences to study a previously undocumented phenomenon. This study empirically measures the increase in emerging market firm (EMF) absorptive capacity obtained during their developed market entry by participating in incubators in the United States. This study lays out both a theoretical and an empirical model of product commercialization focusing on absorptive capacity and the moderating effect of incubator participation. This study employs a sample of high-technology firms from Mexico entering the United States during the time period from 2009 to 2011. The central question this study seeks to answer is: How does incubator participation make EMF developed market entry more successful? This study answers two additional questions: How does incubator participation increase EMFs absorptive capacity relevant to product commercialization? and How does the increase in such absorptive capacity (e.g., technological learning, market learning) lead to improved performance of developed market product commercialization success? While the hypotheses were not directly supported, this study showed that EMFs that participate in incubators are associated with higher economic performance as a result of developed market entry, and that EMFs that participate in incubators are associated with greater organizational learning. While causation was not demonstrated via significant regression results, other statistical tests support the general premises of both of my hypotheses. This study concludes by identifying areas for future research regarding the influence of absorptive capacity and social capital on emerging market firm developed market entry.
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CHAPTER ONE: INTRODUCTION

Globalization has increased market pressures around the world, but particularly in developed markets where both domestic and international firms compete. As incumbents, developed market firms enjoy the experience and resources that come with their continued presence in the market (Luo & Peng, 1999), while international firms that operate in developed markets, particularly emerging market firms (EMFs), do not enjoy the same advantages held by incumbents. In fact, they may face a liability of foreignness as noted by many scholars (e.g., Calhoun, 2002; Kostova & Zaheer, 1999; Mezias, 2002; Zaheer, 1995; Zaheer & Mosakowski, 1997). Despite the daunting challenges, they remain motivated in their developed market entry pursuits and driven by a number of mechanisms that facilitate their market entry.

While some scholars have distinguished between EMFs and developed market incumbent firms (e.g., Brouthers, O’Donnell & Hadjimarcou, 2005; Hitt, Dacin, Levitas, Arregle & Borza, 2000; Wright, Filatotchev, Hoskisson & Peng, 2005), there is little research that deals with EMFs as new entrants into developed markets. Past research in domestic (developed) market entry has studied high-technology firms, small-to-medium enterprises, and academia-industry collaborations (Branzei & Vertinsky, Deeds, 2001; 2006; Kodama, 2008); however, with little exception, EMFs engaged in developed market entry have been largely ignored (Tsai & Eisingerich, 2010).

More specifically, while some researchers have compared incumbents across market settings, there is little research that explores EMF developed market entry success. This study focuses on the phenomenon of EMF developed market entry and the role of incubators play in their developed market entry (product commercialization) success.
The motivation for this dissertation stems from the author’s experience of working with EMFs, primarily Latin American high-technology firms seeking market entry into the United States and Europe. While the general phenomena of EMFs is well covered in the extant literature (e.g., Brouthers et al., 2005; Hitt et al., 2000; Lecraw, 1993; Wells, 1983; Wright et al., 2005), the purpose of this dissertation is to answer the key question: *How does incubator participation make EMF developed market entry more successful?* This study expects that EMF incubator participation will make their developed market entry more successful, relies on several findings of prior scholarship. If firms can learn more about market conditions and attain additional information of what is required to succeed, they can reduce the uncertainty of market entry (Gulati, 1998; Hsu, 2006). This study answers two follow-on questions that further our understanding of this phenomenon: *How does incubator participation increase EMFs absorptive capacity relevant to product commercialization?* and *How does the increase in such absorptive capacity (e.g., technological learning, market learning) lead to improved performance of developed market product commercialization success?* To answer these questions, this study relies on the author’s direct knowledge of, and experience with, several EMFs entering the United States, as well as testing a series of hypotheses on a sample of firms from Mexico engaged in product commercialization in the United States. The reason that this study focuses on three more difficult research questions “How?” rather than the less difficult “Does?” questions are provided at the beginning of the Theory chapter.

This dissertation empirically measures the increase in absorptive capacity related to developed market entry that EMFs obtain from participating in an incubator in the United States. This study lays out both a theoretical and an empirical model of product commercialization focusing on absorptive capacity and the moderating effect of incubator participation. This study
employs a sample of high-technology firms from Mexico entering the United States during the time period from 2009 to 2011. The sample provides a robust set of data from which to test theoretical implications of incubator participation.

This dissertation encompasses six chapters. Chapter Two conducts a literature review of the EMF strategic decision making process applied to developed market entry, how firm resources contribute to product invention/adoption and product commercialization in the EMF’s home market, and how firm resources contribute to absorptive capacity (e.g., technological and market knowledge). This study discusses components of the product innovation process, including product invention/adoption, absorptive capacity, complementary assets and product commercialization, as well as the role incubator participation plays. Figure 1 below provides a model depicting the overall framework.

![Figure 1: EMF Developed Market Entry Moderated by Incubator Participation.](image)

Chapter Three outlines the theoretical framework supports this study’s thesis, that through incubator participation, EMFs enhance their absorptive capacity that, in turn, helps them achieve developed market entry (product commercialization) success. This study asserts that through the expansion of both technological and market knowledge – components of absorptive capacity – EMFs increase their likelihood of attaining developed market entry (product commercialization) success.
commercialization) success. Product commercialization success flows from appropriately capturing what customers want, and the fulfillment of those customer needs results from the acquisition, assimilation, transformation and exploitation of relevant knowledge necessary for successful product invention/adoption and product commercialization that comprise the overall product innovation process. This study presents a model of the product innovation process that helps frame the theoretical discussion. Therefore, this dissertation contributes to our better theoretical understanding of organizational learning/knowledge management and the resource-based view in the context of EMF developed market entry (product commercialization). In Chapter Four this study outlines the plan to empirically test these hypotheses drawing from constructs and variables operationalized in previous studies by applying a research design, sample framework, and statistical techniques. Chapter 5 reports the results of the data analyses including sample differences, factor analyses, regression diagnostics, regression analyses, and hypotheses tests. Chapter 6 discusses the results, recognizes the study’s limitations, identifies implications for future research and makes conclusions.

This dissertation makes make three contributions to management research. First, this study articulates the firm’s product innovation process which is the precursor to market entry (product commercialization). Second, this study explains the EMF’s motivation, decision-making and learning/knowledge processes, specifically highlighting the role played by absorptive capacity, that are involved in developed market entry (product commercialization). Third, this study conducts the very first study of its kind, highlighting the facilitating role that business incubators play in enhancing EMF developed market entry (product commercialization) success by helping to increase developed-market related technological and market knowledge (absorptive capacity) of EMFs that participate in incubator programs.
CHAPTER TWO: LITERATURE REVIEW

In this literature review, this study examines a number of theoretical constructs that cover the process by which emerging market firms (EMFs) gain initial technological and market knowledge from their home (emerging) market entry, and how they then target developed market entry. By virtue of its human and capital resources makeup, every firm embodies a measure of experiences and capabilities that presumably will be used to deliver a product to market (Uzzi, 1996). EMFs that seek to engage in developed markets face the task of harnessing the knowledge and experiences gained in their home (emerging) markets and applying it to a developed market that is new to them. Understanding the relationships between the constructs that contribute to EMF developed market entry (product commercialization) success requires an assessment of firm-specific capabilities that can be developed to improve the odds of success. Therefore, the literature review provides a brief overview of EMF developed market entry (strategic decision making), firm resources, dynamic capabilities, product innovation process, product invention/adoption, product commercialization, absorptive capacity, complementary assets and incubator participation and why these are necessary to commercialize products. While the aforementioned firm-specific capabilities are all important, my purpose is to focus on absorptive capacity, specifically technological and market knowledge, and how these contribute to successful product commercialization. Moreover, this study explores an additional construct, incubator participation, and how participation in a business incubator can enhance and contribute to product commercialization of EMFs.
EMF DEVELOPED MARKET ENTRY (STRATEGIC DECISION MAKING)

Scholars have examined emerging markets and EMFs primarily from three perspectives: (1) How and why do developed market firms enter emerging markets (Caves, 1971; Dunning, 1981; Vernon, 1966)? (2) How do developed market firms compete within the boundaries of emerging economies (Lecraw, 1979; Wells, 1983)? and (3) Why and how do firms from emerging markets enter other emerging markets (Dunning, 1998; Lecraw, 1993)? Emerging markets themselves have gone from being targets of developed market investments to sources of investment in developed and other emerging markets (Wright et al., 2005). While emerging markets have received significant amounts of foreign direct investment (FDI) inflows, their FDI outflows have increased from $65 billion in 1980 to $849 billion in 2002 (Filatotchev, Strange, Piesse, & Lien 2007; UNCTAD, 2003), and despite the 2008–2009 world economic crisis that dampened outward foreign direct investment flows (OFDI), the OFDI from developing economies toward developed economies registered a modest growth (Sauvant, Maschek & McAllister, 2010 UNCTAD, 2009). This change is due primarily to rapid economic development and government policies that favor economic liberalization (Hoskisson, Eden, Lau, & Wright, 2000). Hence, scholars have turned to addressing the phenomena of emerging market firms entering developed markets (Brouthers & Brouthers, 2003; Brouthers et al., 2005; Hitt et al., 2000).

Research about EMFs entering developed markets is particularly relevant because, just like developed market firms, the competitive advantages that EMFs exploit in their home markets motivate them to apply the same competences in international markets to further enhance their profitability (Porter, 1990). Moreover, the decision to enter a developed market, and the entry mode selected, is a strategic decision the EMF has to make (Nielsen & Nielsen,
EMF strategic decisions to conduct forays outside the domestic environment may be explained as the desire to expand across national and regional borders or markets for the purposes of exploiting opportunities (Rugman, 1980, 1981). This expansion sets the tone for future competition on the basis of the firm-specific advantages and the transfer of knowledge (Brouthers et al., 2005; Kostova, 1999; Madhok, 1997).

While EMFs decide to enter developed markets presumably for the purposes of extracting economic rents, Brouthers et al. (2005), Kogut and Zander (1993), and Love (1995) suggest that knowledge development and organizational learning motivations are essential parts of EMF strategic decisions to conduct developed market entry. Thus, EMF decisions to enter a new competitive landscape places emphasis on organizational learning to develop and maintain competitive advantages (Bettis & Hitt, 1995).

EMFs presumably develop the necessary skills and wherewithal to compete at the same level as developed market firms. Guadalajara, Mexico is an example of this phenomenon as touted by the city’s economic development website, “The contribution of Guadalajara towards enabling the international expansion of high tech companies is recognized worldwide, earning the region its nickname as ‘Mexico’s Silicon Valley’” (Guadalajara High Tech, 2011). Another example is the rise of Indian high-technology EMFs such as Infosys, which rose from a being a little-known information technology company in India, to one with over 105,000 employees worldwide and market capitalization of over $35 billion (Economist, 2010). EMFs, particularly high-technology firms, are motivated in their strategic decisions to enter developed markets partly based on their strengths in technological and market knowledge (Karagozoglu & Lindell, 1998).
**Firm Resources**

Understanding what drives the performance of a firm and, indirectly, what drives EMFs to enter developed markets, inevitably requires an understanding of the sources of sustained competitive advantage, a major area of research in strategic management. Eisenhardt and Martin (2000) have posited that resources are what drive the competitive advantage of a firm, and that the dynamic capabilities – “the firm’s ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments” – enable firms to have short term competitive positions and build long-term competitive advantages through recombining resources into unique combinations (Kogut & Zander, 1992; Teece, Pisano & Shuen, 1997: 516). Building on the assumptions that strategic resources are heterogeneously distributed across firms and that these differences may remain stable over time, research has explored the link between firm resources and sustained competitive advantage (Amit & Schoemaker, 1993; Barney, 1991; Penrose, 1959; Wernerfelt, 1984). The link between firm resources and competitive advantage is product innovation, specifically products that are commercialized (Brown & Eisenhardt, 1995). One of the fundamental principles of the research stream is that the basis for a competitive advantage of a firm lies primarily in the application of the services that come from the bundle of valuable resources at the firm's disposal (Penrose, 1959; Rumelt, 1984; Wernerfelt, 1984). In addition to the heterogeneity of these resources, transforming a short-run competitive advantage into a sustained competitive advantage requires that these resources are not perfectly mobile (Barney, 1991; Peteraf, 1993). Effectively, this translates into valuable resources that are neither perfectly imitable nor substitutable without great effort and cost (Barney, 1991). If these conditions hold, the firm’s bundle of resources can assist the firm in sustaining a competitive advantage, which can then be exploited to exact profits from commercialized products.
Researchers have amply covered a variety of empirical indicators of the potential of firm resources to generate sustained competitive advantage. More formally, a firm's resources at a given time could be defined as those tangible and intangible assets which are tied semi-permanently to the firm (Caves, 1980). These resources, firm-specific assets difficult if not impossible to imitate, include trade secrets and certain specialized production facilities and engineering experience. Examples of resources include brand names, in-house knowledge of technology, employment of skilled personnel, trade contacts, machinery, efficient procedures, capital, etc. (Penrose, 1959). These, like other difficult-to-transfer assets among firms, drive up transactions and transfer costs because the assets may contain tacit knowledge (Teece et al., 1997).

**Dynamic Capabilities**

Dynamic capabilities are the set of specific and identifiable processes that serve as the antecedent organizational routines and strategic capabilities by which firms create value through resource configuration (Eisenhardt & Martin, 2000; Teece et al., 1997). The firm’s new product development (product innovation) process is a dynamic capability (Eisenhardt & Martin, 2000). Through absorptive capacity gained by the acquisition and assimilation of external knowledge gathered from alliance networks and other resources, firms create and enhance their dynamic capabilities (Eisenhardt & Martin, 2000). Firm dynamic capabilities not only provide external value but also enhance internal processes that enable organizational change and evolution (Amit & Zott, 2001). This process of investing in absorptive capacity is akin to knowledge exploration (Nemanich, Keller & Vera, 2007).

The ability of firms to employ their dynamic capabilities by recombining the services obtained from resources inside its boundaries represents a competitive advantage (Penrose, 1959;
Schumpeter, 1934). This ability to undertake resource recombination is an important source of novelty and innovation (Kogut & Zander, 1992; Schumpeter, 1934). While some dynamic capabilities are useful in integrating resources and others in reconfiguring resources within firms, other dynamic capabilities are useful in gaining and releasing resources (Eisenhardt & Martin, 2000). This process contributes to the combinative capabilities of firms (Kogut & Zander, 1992).

**PRODUCT INNOVATION PROCESS**

Schumpeter (1934) notes that there are five types of innovation: product, process, sourcing, marketing and organizational. While all are worthy of scholarly research, this study is only concerned with product innovation, the commercialization of a product invention (Freeman & Soete, 1997; Hill & Rothaermel, 2003). Specifically, this study is interested in the product innovation process, a multidisciplinary process in which many functional interfaces collaborate (Gupta, Raj & Wilemon, 1986). The product innovation process is a dynamic capability of the firm that utilizes other dynamic capabilities: strategic decision-making, resource allocation, absorptive capacity and complementary assets (Eisenhardt & Martin, 2000). The solution to a basic scientific puzzle or the invention of a new “product” only in a laboratory setting makes no direct economic contribution (Schumpeter, 1934). Product innovation includes not only product invention but also product commercialization through development, manufacturing, marketing, distribution, servicing, and later product adaptation and upgrading (Crossan & Apaydin, 2010). A product invention that moves from the lab into production and then into the market, thereby increasing economic value to the firm, would be considered a product innovation (Schumpeter, 1934). Thus, a product innovation differs from a product invention in that the commercialization of a product invention provides economic value and is diffused to other parties beyond the
discoveries (Schumpeter, 1934). Product innovation is a dynamic process (Teece, 2007; Utterback & Abernathy, 1975; Verona & Ravasi, 2003), and is therefore central to the aforementioned discussions on firm resources and dynamic capabilities.

The product innovation process begins with the strategic decision to enter the market and secure firm resources to be organized into a unique composite the firm can use. In this context, the firm is constantly learning and taking stock of the knowledge it needs to manage and set goals (Hurley & Hult, 1998; McKee, 1992). A presumed goal is to offer the market something of value, and that something needs to be created from the resource stock; thus, a firm can invent a product (von Hippel 1986; Roberts, 1991). The invention is also derived from, and contributes to, the absorptive capacity of the firm (Cockburn & Henderson, 1998; Cohen & Levinthal, 1990).

The firm navigates the product innovation process to usher the invention toward commercialization (Cagan & Vogel, 2002; Klepper, 1996; Utterback & Abernathy, 1975). Successful commercialization requires complementary assets (marketing, distribution, financial, etc.) so that the firm can appropriate rents for its product invention introduced into the target market (Teece, 1986). The stock of absorptive capacity of firm also contributes to product commercialization (Cohen & Levinthal, 1990; Tsai, 2001).

The product innovation process is thus encapsulated within the dynamic capabilities of the firm. This study turns its attention to the product invention and product adoption paradigm as part of the continuum of the product innovation process.

**PRODUCT INVENTION/ADOPTION**

While much has been written to distinguish between a technological invention and a commercial innovation (e.g., Hill & Rothaermel, 2003), it is worth reiterating the distinction,
because it is central to the measure of success that this study proposes. An invention is a
discovery, a novel way of achieving a new process, device, method or composition; it may be
arrived at by some serendipitous fluke or through long, painstaking and costly efforts (Arthur,
2007). While an invention may bring satisfaction to an individual or group, however, invention
by itself does not guarantee acceptance, usage, or economic value (Schumpeter, 1934). A
discovery that goes no further than the laboratory remains an invention. Inventions can be
derived from a myriad of disciplines, including industrial arts, engineering, applied sciences and
pure sciences, but the process for their widespread adoption requires an iterative process of
combining the invention with market introduction to end-users whom adopt and diffusion (Hill
& Rothaermel, 2003). Adoption and diffusion implies production and marketing tasks that
introduce the product into a market place (Garcia, Calantone, & Levine, 2003). While product
inventions are sourced within firm (Arthur, 2007), product adoptions are sourced externally via
vicarious learning (Damanpour & Schneider, 2006; Terlaak & Gong, 2008), and both require
commercialization to appropriate value for the firm (Mizik & Jacobson, 2003).

PRODUCT COMMERCIALIZATION

New products draw on new knowledge bases (Nelson & Winter, 1982). Firms access
new knowledge from the networks in which they socialize (Kogut & Zander, 1992). The
combination of absorptive capacity (a knowledge-laden resource) with the dynamic capability of
product innovation generates combinative capabilities (product inventions) that, coupled with
complementary assets of alliance partners, leads firms to innovate, e.g. commercialize product
inventions (Colombo, Grilli & Piva, 2006; Deeds & Hill, 1996; Koruna, 2004; Rothaermel,
2001). To avoid friction between incumbents and gain access to complementary assets, EMFs
and domestic new entrants often enter markets where their product commercializations cause
low-end disruptions (Christensen, Johnson & Rigby, 2002; Deeds & Hill, 1996). Undertaking resource recombination is an important source of novelty and innovation (Schumpeter, 1934), and new entrants often have an advantage over incumbents explained by technological capabilities or organizational dynamics (Christensen & Rosenbloom, 1995).

**Absorptive Capacity**

The dynamic capability of firms to recognize the value of, acquire, assimilate, transform, and exploit technological and market knowledge is known as absorptive capacity (Cohen & Levinthal, 1989; 1990; 1994; Langfield-Smith & Greenwood, 1998; Todorova & Durisin, 2007; Zahra & George, 2002). Absorptive capacity helps the firm to create value (Tsai, 2001). Absorptive capacity has been linked to a firm’s receptiveness to technological innovation (Kedia & Bhagat, 1988), as well as to its ability to use outside knowledge via alliance network resources (Koza & Lewin, 1998). Hence, organizational learning and innovation are linked by how well firms leverage their absorptive capacity to assimilate external knowledge (Ajuha & Katila, 2001). Moreover, absorptive capacity acts on the set of specific and identifiable processes that serve as the antecedent organizational routines and strategic capabilities by which firms create value, also known as dynamic capabilities (Eisenhardt & Martin, 2000; Teece, et al., 1997). In addition, absorptive capacity acts on the combinative capabilities of firms (Kogut & Zander, 1992), capabilities that enhance the ability of firms to efficiently recombine the internal resources of its dynamic capabilities and external resources into new resource combinations that are rare, valuable, hard to imitate and substitute, which is the essence of combinative capabilities (Koruna, 2004). Firms take their combinative capabilities and combine them with the complementary assets of alliance partners to innovate (Deeds & Hill, 1996; Galunic & Rodan, 1998; Kogut & Zander, 1992). Complementary assets include the accumulated know-how of
practical skill or expertise that allows one to do something smoothly and efficiency (von Hippel, 1988) that can only come about over time through a gradual evolutionary process (Barnett, Greve & Park, 1994). Knowledge is the source of new products (inventions), and firm growth and development depends on their ability to introduce (commercialize) new product inventions over time (Dougherty & Hardy, 1996; Penrose, 1959). As firms enter various markets, the experience gained is developed into new knowledge that enhances their absorptive capacity (Helfat & Raubitschek, 2002; Winter & Szulanski, 2001).

Firms can grow their knowledge base by either investing into internal knowledge development projects or by ‘grafting’ external knowledge base into the firm (Cohen & Levinthal, 1989, 1990, 1994). Thus, firms that have a greater capacity to learn should have a greater capacity to innovate and acquire relevant external knowledge by their interactions with other firms and markets (Shan, Walker & Kogut, 1994). Leveraging absorptive capacity allows firms to build up their own capabilities as well as create new combinations (Eisenhardt & Martin, 2000; Kogut & Zander, 1992; Nerker & Roberts, 2004).

While absorptive capacity is central to the development of capabilities and new combinations, it depends not only on R&D and other internal learning activities (Cohen & Levinthal, 1989, 1990, 1994) but interorganizational learning gained by the type and number of alliances in which EMFs and domestic new entrants are engaged (Lane & Lubatkin, 1998). Today, only a few firms adhere to the go-it-alone path to innovation (Hughes, Hughes and Morgan, 2007; Kogut & Zander, 1992; Sarkar, Aulakh, & Madhok, 2009; Taylor, 1990), while many firms actively develop their absorptive capacity by pursuing interorganizational learning via alliance networks (Ajuha & Katila, 2001; Koza & Lewin, 1998). Hence, if absorptive capacity is essential to the development of capabilities and new combinations thereof, exploring
the link between alliance networks and firm capabilities should tell us something about how firms go about doing this.

Cohen and Levinthal (1989, 1990) conceptualized absorptive capacity as a firm-level construct, while Lane and Lubatkin (1998) approach it as a learning dyad akin to the student—teacher pairing whereby the ability of a firm to learn from another firm is determined by the characteristics of that relationship. Therefore, the absorptive capacity of a firm is not based solely on the internal knowledge a firm can convert into capabilities faster than its rivals (D’Aveni, 1995; Prahalad and Hamel, 1990; Teece and Pisano, 1994), but also on how the firm manages the milieu of relationships it has with other firms and external players, e.g., universities, consulting firms, business incubators.

The search for relevant information, or acquisition, concerning their industry is an everyday affair (Daft, Sormunen & Parks, 1988; Jansen, Van den Bosch & Volberda, 2005; Wilkens, Menzel & Pawlosky, 2004). While management promotes the use of relevant industry information (Sidhu, Commandeur & Volberda, 2007; Veugelers & Cassiman, 1999), it is also likely that management expects firms to absorb information outside of their relevant industry as well (Jansen et al., 2005; Laursen & Slater, 2006).

The effectiveness of a firm’s absorptive capacity requires knowledge assimilation of ideas and concepts via internal communication (Shu, Wong & Lee, 2005), as well as provisioning of problem solving support (Schmidt, 2010). Both, internal communication and problem solving support necessitates quick information flow (Bontis, Crossan & Hulland, 2002; Teo, Wang, Wei, Sia, & Lee, 2006; Tiwana & McLean, 2005; Vorhies & Harker, 2000) on some periodic basis (Farrell, 2000; Hult, Ketchen & Slater, 2004; Kohli, Jaworski & Kumar, 1993; Pavlou & El Sawy, 2007; Vorhies & Harker, 2000).
The firm acquires knowledge and transforms it into a structure useful to employees for market entry (product commercialization) purposes (Collins & Smith, 2006; Jansen et al., 2005; Liao, Fei & Chen, 2007; Pavlou & El Sawy, 2007). This transformation includes both internal and external sources of technological and market knowledge (Tiwana & McLean, 2005). Firms are then able to apply the acquired knowledge in their everyday practices (Ettlie and Pavlou, 2006).

Technical and market knowledge is exploited when firms improve upon an invention or build a prototype of product (Nambisan, Agarwal & Tanniru, 1990). Thus, the firm is leveraging its absorptive capacity to adapt its products in according to the new knowledge (Flatten, Engelen, Zahra & Brettel, 2011). This ability to exploit new knowledge allows the firm to launch innovative products and services promptly (Liao, 2007).

Alliances have also been the subject of researchers exploring determinants of absorptive capacity. Several studies have looked at how firms respond to technological discontinuity created by the emergence of a new field, for instance how pharmaceutical firms respond to advances in biotechnology or the adoption of video banking (Nicholls-Nixon, 1993; Pennings & Harianto, 1992). In addition to mainstream measures of absorptive capacity, including R&D expenditures and number of patents, the use of and the number of alliances influence a firm’s absorptive capacity. An interesting aspect of alliances and how they impact absorptive capacity is termed by Nicholls-Nixon (1993: 200) as “conscious management” of these alliances; that is, the mastery of alliance management skills, plays an important role, along with selecting what external knowledge to value and assimilate, in building a firm’s absorptive capacity.
**COMPLEMENTARY ASSETS**

Complementary assets are resources that increase the marginal returns of other related assets, e.g., movie studios and cinemas, and help firms appropriate value from the product inventions they introduce into markets (Lachmann, 1947; Stieglitz & Heine, 2007; Teece, 1986). When EMFs or domestic new entrants do not possess complementary assets (Teece, 1986), they can quickly gain access to other firms’ complementary assets through strategic alliances (Mitchell & Singh, 1993; Shan, 1990; Pisano, 1990). The process of investing in complementary assets is akin to exploitation (Nemanich et al., 2007). Moreover, EMFs’ and domestic new entrants’ abilities to develop new products and market them hinges on their abilities to access complementary assets that allow them to appropriate the rents from their innovations (Teece, 1986). These complementary assets include the accumulated know-how of practical skill or expertise that allows one to do something smoothly and efficiently (von Hippel, 1986) that can only come about over time through a gradual evolutionary process (Barnett et al., 1994). Firm-level theories of technological change suggest that a firm’s innovativeness is an outcome of increases in its knowledge base, some partially obtained from its past alliances (Griliches, 1990; Gulati, 1998; Henderson & Cockburn, 1996; Lichtenberg & Griliches, 1984).

Incumbents, because of their experience, market knowledge, sheer size, and existing value networks in the local market, are often the most logical source of complementary assets (Deeds & Hill, 1996; Tripsas, 1997). If EMFs and domestic new entrants are unable to gain access to these complementary assets, they stand to be shut out of the market or vulnerable to having their rents appropriated by incumbent firms (Deeds & Hill, 1996; Teece, 1986). Moreover, when complementary assets are unavailable to EMFs, incumbents maintain their dominant market positions, further imperiling the success of these new entrants (Tripsas, 1997).
If incumbents are a logical source of complementary assets and alliance networks provide the social exchange and learning context from which to draw these resources, how should EMFs and domestic new entrants approach alliances with incumbents? In a longitudinal study of industry and firm performance in the biotechnology industry, Rothaermel and Hill (2005) find that symbiotic coexistence between incumbents and new entrants is possible when new entrants introduce technology that enhances the value of the incumbents’ complementary assets. If the marketing and sales activities of incumbents are largely unaffected by disruptive technological change, the value of these activities may even be enhanced, making the incumbents more attractive as alliance partners to new entrants (Teece, 1992). Hence, new entrants stand a better chance of forging alliances with incumbents when they make low-level disruptions (i.e., innovations) to existing markets that involve major changes to incumbents’ technology but not to their complementary assets (Mitchell, 1989). For instance, if marketing and sales activities of incumbents are largely unaffected by technology changes, the value of these activities may even be enhanced if they are specialized assets, making the incumbents more attractive as alliance partners to new entrants enhancing the possibility of sharing their complementary assets with them (Shan & Hamilton, 1991; Teece, 1992). If EMFs and domestic new entrants know that they need to access the complementary assets of incumbents in their alliance networks, where do they begin? This study introduces an external participant, the incubator, as a moderator of the absorptive capacity–product commercialization relationship.

**Incubator Participation**

Entering new markets is fraught with market uncertainty (Lieberman & Montgomery, 1998). However, if firms can learn more about market conditions and attain additional information of what is required to succeed, they can reduce the uncertainty of market entry
Firms discover information that reduces market uncertainty through their interactions in the market (Hayek, 1945; White & Hamermesh, 1981). These interactions are akin to socialization in a number of ways, e.g., supplier relationships, human resource flows, trade association memberships, interlocking directorates, relationships among individual employees and prior strategic alliances including distribution, manufacturing, marketing and R&D (Mizruchi & Stearns, 1988).

One way firms can enter the market is by participating in a business incubator that provides preparation and complementary resources to firms. Business incubators are programs designed to accelerate the successful development of entrepreneurial companies by providing business support resources and services, developed and orchestrated by incubator management and offered both in the incubator and through its network of contacts (Gwynne, 1998; Peña 2004). Moreover, incubators are a form of alliance that embodies interorganizational learning mechanisms (Fang, Tsai, & Lin, 2010.). While incubators vary in the way they deliver their services, organizational structure, and the types of clients they serve, businesses often compete for acceptance into incubators, because successful completion of a business incubation program increases the likelihood that a start-up company will stay in business for the long term (Lalkaka, 2002; Wolfe, Adkins, & Sherman, 2001).

Incubators differ from research and technology parks in their dedication to start-up and early-stage companies. Research and technology parks, on the other hand, tend to be large-scale projects that house everything from corporate, government or university labs to very small companies. Most research and technology parks do not offer business assistance services, which are the hallmark of a business incubation program. However, many research and technology
parks house incubation programs (Papagiannidis, Li, Etzkowitz & Clouser, 2009; Sun, Ni & Leung, 2007).

Although most incubators offer their clients office space and shared administrative services, the heart of a true business incubation program is the services it provides to start-up companies. The amount of time a company spends in an incubation program can vary widely depending on a number of factors, including the type of business and the entrepreneur's level of business expertise. Life science and other firms with long research and development cycles require more time in an incubation program than manufacturing or service companies that can immediately produce and bring a product or service to market. On average, incubator clients spend 33 months in a program (Erlewine, 2007). Many incubation programs set graduation requirements by development benchmarks, such as company revenues or staffing levels, rather than time in the program.

In many countries, incubation programs are funded by regional or national governments as part of an overall economic development strategy. In the United States, however, most incubation programs are independent, community-based and resourced projects. The U.S. Economic Development Administration is a frequent source of funds for developing incubation programs, but once a program is open and operational it typically receives no federal funding; few states offer centralized incubator funding. Rents and/or client fees account for 59% of incubator revenues, followed by service contracts or grants (18%) and cash operating subsidies (15%) (Erlewine, 2007).

Notwithstanding the proliferation of incubators in the United States and globally, Amezcua (2010) finds that business incubation leads to failure sooner than predicted, and the organizational structure of incubators can very well affect the performance expectations of
incubated firms. Additionally, the survival of a firm participating in an incubator appears to falter post-incubation when compared to non-incubated peers. While incubator participation may slow down employment and sales losses, firm growth cannot be attributed to incubator participation alone. What incubators do that appears to help firms do is to adapt to environmental conditions post-incubation, since incubated firms exhibit faster employment and sales growth than non-incubated firms (Amezcua, 2010). In fact, university-sponsored incubators appear to perform best with respect to decreased firm failure rates, greater employment growth and sales growth (product commercialization) and greater knowledge spillovers (increased absorptive capacity) that give their participants an advantage in comparison to firms that participate in non-university affiliated incubators. That advantage could emanate from the growing, and possibly more effective, role that universities and their technology transfer offices play in the market entry (product commercialization) process, including offering facilities, specialized assistance by faculty and department resources, to students and the community at large (Amezcua, 2010). Higher quality incubation participation takes longer subject to the quality of the staff of the incubator (e.g., experienced staff versus less experienced staff are high determinants of incubator quality). Hence, examining incubator participation quality appears more important to firm success than just studying incubator participation alone.

**SUMMARY**

The focus of this dissertation is on how incubators enhance EMF developed market entry changes of success. To understand this, the market entry (product commercialization) process is examined. To develop a new product invention (internally sourced) or product adoption (externally sourced), a firm must possess the required absorptive capacity, which consists of relevant technological, market, and other forms of knowledge (Arthur, 2007; Cohen & Levinthal,
When the EMF enters its home (emerging) market by commercializing its product invention/adoption, it accesses, and further develops, its absorptive capacity in relevant knowledge areas (Helfat & Raubitschek, 2002; Winter & Szulanski, 2001). However, EMFs successful in their home (emerging) markets face daunting challenges when they attempt to enter developed markets (Gwynne, 1998). EMFs can enter by themselves into costly trial-and-error market learning, or they can partner with developed market firms, specialized consulting firms, or business incubators. In the next chapter, this study focuses on the last-named agency, the business incubator, and how it helps EMFs obtain developed market entry (product commercialization) success.
CHAPTER THREE: THEORY

The goal of this dissertation is to analyze the effect incubator participation has on developed market direct entry success by emerging market firms (EMFs). This study’s thesis is that through incubator participation, EMFs enhance their developed market entry success. Thus, this study focuses on the firm’s dynamic capability of product innovation as explained by organizational learning/knowledge management and resource-based view theories (e.g., Barney, 1991; Eisenhardt & Martin, 2000; March, 1991; Nonaka, 1994; Teece et al., 1997).

The key research question this dissertation addresses is: How does incubator participation make EMF developed market entry (product commercialization) more successful? While the academic literature is silent on EMF incubator participation and developed market entry success, the practitioner literature (e.g., Gwynne, 1998) indicates that foreign firms are more successful in their developed market entry after incubator participation. Hence, employing research questions with “Does” in lieu of “How” risks posing questions that have already been answered. Moreover, research questions with “How” focus on the role that organizational learning, via absorptive capacity, plays in EMF developed market entry success. Incubator research has often focused on the success of incubators or how to measure their performance (Grimaldi & Grandi, 2005; Lerner & Haber, 2001; Meyer, 2003). While past research has coupled incubators and firms in their domestic markets (Akçomak, 2009; Amezcuia, 2010; Carayannis & von Zedtwitz, 2005; Hsu & Chiang, 2001), it has not yet addressed EMF incubator participation in the context of developed market entry. This study’s expectation that EMF incubator participation will make their developed market entry more successful relies on several findings of prior scholarship. If firms can learn more about market conditions and attain
additional information of what is required to succeed, they can reduce the uncertainty of market entry (Gulati, 1998; Hsu, 2006). Firms discover information that reduces market uncertainty through their interactions in the market (Hayek, 1945; White & Hamermesh, 1981). Business incubators provide firms with the opportunity to learn and incorporate lessons into their business decisions (Amezcua, 2010). In terms of employment and sales growth, businesses associated with business incubators are more successful than non-incubated firms (Mian, 1997).

To reinforce the relevance of this research stream, this study answers two follow-on questions that further our understanding of this phenomenon: How does incubator participation increase EMFs absorptive capacity relevant to developed market entry (product commercialization)? “Absorptive capacity refers to a firm’s ability to recognize the value of new external knowledge, assimilate it, and apply it to commercial ends” (Flatten et al., 2011: 100). Business incubators provide clients a variety of services that includes both business and technical assistance (Amezcua, 2010; Scillitoe & Chakrabarti, 2010). There are demonstrable differences in the absorptive capacity of entrepreneurs that indicate variation in their ability to recognize opportunities (Shane, 2000). Greater absorptive capacity leads to a higher likelihood of finding opportunities (Shane, 2003), where firms discover information used to reduce market uncertainty (Hayek, 1945; White & Hamermesh, 1981). Thus, business incubators are a valuable source of knowledge (Scillitoe & Chakrabarti, 2005; 2010). Moreover, businesses associated with incubators tend to be more successful at forming beneficial commercial and technologically based cooperative relations (Colombo & Delmastro, 2002).

How does the increase in such absorptive capacity (e.g., technological learning, market learning) lead to improved performance of EMF developed market (product commercialization) success? Absorptive capacity provides firms with the strategic flexibility to adapt and evolve,
and thus, create a sustainable competitive advantage (Zahra & George, 2002). Absorptive capacity helps the firm recognize the value of developed market-related knowledge, acquire it, assimilate it, transform it, and exploit it for economic gain (Todorova & Durisin, 2007). Technological know-how often requires external sources of competencies for innovation (Cockburn, Henderson & Stern, 2000; Deeds, DeCarolis & Coombs, 1998). Greater understanding of market preferences also helps define product commercialization strategy, which can increase the potential for commercialization success (Scillitoe & Chakrabarti, 2010). Successful product commercialization flows from appropriately capturing what customers want (Flatten et al., 2011), specifically, the acquisition, assimilation, transformation and exploitation of knowledge are essential elements for product innovation (Flatten et al., 2011; Camison & Fores, 2010). Figure 2 below provides a depiction of the theoretical model that I posit EMFs utilize.

**Figure 2. Theoretical Model: Developed market Entry by EMFs.**
The theoretical model represents five dynamic capabilities of the firm: strategic decision-making, resource allocation, absorptive capacity, complementary assets and product innovation process, the latter including product invention/ adoption and product commercialization. The firm’s product innovation process relies on the other four dynamic capabilities for its effective operation, supporting Leinwand and Mainardi’s (2010) assertion that, to achieve coherence, firms must internally align their differentiating dynamic capabilities, numbering three to six at most, with the right external market positions. An important success measure for any firm, particularly those participating in an incubator, is market entry (product commercialization). Therefore, the aforementioned theoretical prisms of organizational learning/knowledge management and resource-based view are uniquely suited to inform our understanding of dynamic capabilities in the context of market entry (product innovation) conducted by EMFs.

The decision to innovate by a firm, in this case an EMF, is a strategic decision (Cyert & March, 1963) because it leads firms to search for and obtain resources (Bower, 1970). The resources are embodied in the heterogeneity and stability they represent to the firm as means of generating a sustainable competitive advantage (Barney, 1991). Resource acquisition is crucial for the firm's long-term success (Stevenson & Gumpert, 1985). Firm managers make judgments about which resources are more or less important based on their expectations about the future of the firm (Glade, 1967; Penrose, 1959). Therefore, firms focus on exploration, which then leads to product invention (Atuahene-Gima, 2005; Danneels, 2002; Garcia, Calantone & Levine, 2003; Greve, 2007; Yalcinkaya, Calantone & Griffith, 2007). This requires an EMF to invest in absorptive capacity that includes technological, and market knowledge (Cohen & Levinthal, 1990; March, 1991; Nemanich et al., 2007).
The firm’s product innovation focus now shifts from exploration to exploitation in the emerging market, because the firm moves from product invention to product commercialization; EMFs invest in developing and accessing the requisite complementary assets necessary to manufacture, market, and sell the product invention (Teece, 1986; Nemanich et al., 2007). Deriving value from resource exploitation requires coordinated efforts on behalf of the EMF (Sirmon, Hitt & Ireland, 2007). Ultimately, the EMF’s efforts are rewarded when it enters the emerging market via successful product commercialization (Utterback, 1971). Through the process of emerging market entry (product commercialization), the EMF obtains valuable technological and marketing knowledge that increases its absorptive capacity (Cohen & Levinthal, 1990).

Many EMFs reach a point when they either saturate their domestic markets or simply set their sights on developed markets (Burgel & Murray, 2000; Hitt et. al., 2000). However, the EMF lacks all the necessary knowledge required to successfully enter and succeed in developed markets (Gwynne, 1998). Thus, the EMF takes stock of the resources it possesses to deliver its products (exploitation), and the resources it needs to seek out successfully enter the developed market (exploration). The EMF has several other avenues to learn more about the developed market: (1) it can partner with a developed market firm for its developed market entry (product commercialization); (2) it can seek advice from specialized consulting firms which understand the developed market challenge facing EMFs, and (3) it can partner with a business incubator that is experienced in assisting EMFs in developed market entry. If the EMF has unlimited resources, it can engage in trial-and-error market learning, entering a variety of markets. This is a resource-intensive practice termed replication (Winter & Szulanski, 2001), or product sequencing (Helfat & Raubitschek, 2000). Of course, it is difficult to imagine that the developed
market would wait for an EMF to learn all the ins-and-outs of successful market entry until it finally hits its stride. Hence, the reason that an EMF chooses to participate with an incubator is to gain the additional technological and market knowledge needed to quickly enter the developed market (Gwynne, 1998; Peña, 2004).

Through the experience gained in the emerging market product innovation process, the EMF increases its absorptive capacity (Todorova & Durinsin, 2007; Zahra & George, 2002). Moreover, EMFs possesses an understanding of what is required to be successful in their emerging markets. However, while some EMFs may have a sense of the development market success requirements, either through previous educational, business or other relevant experiences attained by one or more members of its management team, there is a definitive difference between the context of the emerging market and developed market (Collins, 1990; Malhorta, Ulgado, Agarwal & Baalbaki, 1994; Slater & Mohr, 2006). The differences in the requirements inherent in these two types of markets are not always fully understood by EMFs (Gwynne, 1998). This often leads EMFs to explore for resources that will support future exploitation of market opportunities in a developed market. Thus, an EMF may decide to participate with an incubator as a means of absorbing relevant developed market technological and market knowledge necessary to successfully enter the market (Gwynne, 1998). While the most relevant developed market knowledge is not codified in a manner that is compact and easy to assimilate, but tacit and often complex (Polanyi, 1962), the EMF can gain such knowledge through face-to-face interactions between EMF and incubator personnel (Gwynne, 1998).

Much of the reason behind the existence of incubators is precisely to afford participants an economical way to learn, develop competencies, and exploit resources in a way that begets successful product commercialization (Hsu, Shu, Yu, Yu & Lo, 2003; Peters, Rice &
EMF incubator participation is an efficient way to best understand developed market entry success criteria (Gwynne, 1998). Incubator participation involves knowledge transfer to overcome barriers not only between firms (Lane & Lubatkin, 1998), but also within the firm (Szulanski, 2003).

Participation in an incubator does not automatically assure successful product commercialization in a developed market. While much has been written about the quality of incubators, their structures, the services offered, and the attributes of successful incubator managers (Allen & McCluskey, 1990; Gassman & Becker, 2006; McAdam, Galbraith, McAdam & Humphreys, 2006), participants have to play their role. EMF incubator participation requires that the EMF possesses the necessary absorptive capacity to recognize valuable knowledge, and then acquire, assimilate, transform and exploit it in a manner relevant to the success of product commercialization (Cohen & Levinthal, 1990; Todorova & Durisin, 2007; Zahra & George, 2002). The EMF’s initial stock of resources that led them to having relevant absorptive capacity in the first place could have only been developed through prior emerging market product commercialization (Gwynne, 1998).

The absorptive capacity possessed by firms previously engaged in successful product commercialization embodies relevant technological and market knowledge, whereby increases in such knowledge leads to increases in the firms’ absorptive capacity (Cohen & Levinthal, 1990; Todorova & Durisin, 2007; Zahra & George, 2002). For instance, the cause-and-effect linkages between increased technological and market knowledge that leads to increased firm absorptive capacity has been cited in the drug research and discovery process of pharmaceutical firms (Cockburn & Henderson, 1998), as well as the innovation process of manufacturing and financial services (Liao, Wu, Hu & Tsuei, 2009).
Thus, relevant absorptive capacity contributes to product commercialization success (Cohen & Levinthal, 1990; Todorova & Durisin, 2007; Zahra & George, 2002), and as an EMF approaches a developed market to commercialize its products, increases in absorptive capacity through greater developed market knowledge tends to increase its product commercialization success (Gwynne, 1998). Therefore, this study hypothesizes that:

**Hypothesis 1.** EMFs that develop *additional* technological and market knowledge (absorptive capacity) relative to a targeted developed market will tend to achieve greater market entry (product commercialization) success relative to that targeted developed market than EMFs that do not develop such additional knowledge.

While firms can adopt a go-it-alone strategy, it may prove costlier than anticipated. One way to maximize the likelihood of success is to seek out mechanisms designed to assist firms. EMFs have several options regarding developed markets: (1) they can partner with developed market firms; (2) they can obtain advice from consulting firms which specialize in EMF developed market entry, or (3) they can partner with business incubators that specialize in assisting EMFs in developed market entry. This dissertation focuses on the third option. While the quality of business incubators can vary, incubator participation can be a relatively quick and cost-effective mechanism by which an EMF can increase its stock of relevant technological and market knowledge (absorptive capacity), and thus can be better positioned to enter a developed market that is new to it (Gwynne, 1998; Peña 2004). Therefore, this study hypothesizes that:
**Hypothesis 2.** Effective (high-quality) EMF incubator participation regarding a targeted developed market tends to lead to those EMFs developing additional technological and market knowledge (absorptive capacity) related to that targeted developed market, and therefore tends to help those EMFs achieve greater market entry (product commercialization) success relative to that targeted developed market than EMFs that either experience low-quality incubator participation or do not participate at all in incubator programs.

The two aforementioned hypotheses will be operationalized in the next chapter. This chapter makes three theoretical contributions to the fields of management, marketing and international business. First, the product innovation process “black box” is opened and analyzed with respect to its various components and applied to the EMF developed market product commercialization success. Specifically, this study assesses the role of organizational learning and knowledge management, embodied as firm absorptive capacity, as essential to EMF developed market entry decisions via incubator participation as a means achieving developed market entry (product commercialization) success. Second, this study links two components of the absorptive capacity construct, technological and market knowledge, to present a more tangible form of the product innovation process and how it contributes to developed market entry (product commercialization) success. Third, this study connects incubator participation quality with increases in EMF absorptive capacity that contributes to EMF developed market entry (product commercialization) success.
CHAPTER FOUR: METHODOLOGY

RESEARCH METHODOLOGY AND DESIGN

The purpose of this chapter is to put theory into practice by outlining an approach to analyze how organizational learning and knowledge management, in the form of absorptive capacity, influence emerging market firms’ developed market product commercialization success. This approach includes arranging conditions for collection and analysis of data in a manner that aims to combine relevance to the research study (Cook, 1965). While many management studies are theoretical contributions or practitioner oriented pieces, they often forego empirical investigation (Eisenhardt & Santos, 2002). Therefore, a good research design, planned and structured around the research project in such a manner that maximizes the validity of the research findings (Mouton & Marais, 1996), is needed as an important prerequisite to organization studies if we are to advance our understanding of this field (Grunow, 1995).

This chapter includes descriptions of the study population, research design, measures, statistical models, and data collection efforts. Furthermore, the study population includes selection criteria evaluation, time period and data sources, while the research design describes the key assumptions. This study operationalizes the constructs and hypotheses by proposing dependent, independent and control variables and measures derived from the literature (Bacharach, 1989). The statistical models that are employed include theoretical bases and data models to infer causation (Freedman, 2005). The measurement of key variables is discussed in the subsequent section, which is followed by a description of statistical techniques that are used. The chapter closes with a brief summary.
The research methodology and design hinge on longitudinal data analysis using hierarchical multiple regressions. The level of analysis is the firm while the unit of analysis is the EMF’s product innovation process, and all data pertain to the EMF, not to individuals. Therefore, both primary data (survey questions) and secondary data (government archival data) allow me to study to compare the differences in increased absorptive capacity relative to the target developed market across the subject firms. The constructs are derived from theory, and the variables are adapted from the literature. Previously validated measures are used. Hierarchical multivariate regressions are used on the data sets to test the two hypotheses presented in the theory chapter.

This study’s research design satisfies the three criteria for causation. The first is temporal precedence, which is established through longitudinal design as changes in the suspected cause (independent variables) occur before changes in outcome or behavior (dependent variable), while the second is covariation of the cause and effect, which establishes that a change in treatment is accompanied by a change in the behavior, measured by the correlation between independent variables and the dependent variable (Babbie, 2001). The third criteria is that no other plausible alternative explanations remain, addressed by control variables for firm characteristics and other forms of EMF developed market assistance (Babbie, 2001).

**Study Population**

Participants for the study were derived from a database of Mexican emerging market firms that have commercialized their products and services in the United States (Lopez, 2011). A subset of these firms have participated in incubator programs in the United States since 2008, as part of the TechBA (2012) program, a Mexican government sponsored program (Medina, 2011). The other subset contains the control group; those Mexican firms that did not participate.
in an incubator program yet also commercialized their products and services in the U.S. (Comunidad de Negocios, 2011). This study anticipated generating a random sample of several hundred possible participants, and further expected that approximately a third would respond and choose to participate in the study. This anticipated high response rate was founded on the endorsement by the government entity and the incubators, who volunteered to conduct outreach to participants. All potential EMF respondents were firm executives with ample business experience and information about the specific areas of interest to the researchers. Participants were primarily male, upper-middle to upper class, and with a high degree of fluency in English. Participation in the study was voluntary, and no coercive recruitment methods were utilized or allowed. At any point in the survey process, a participant could choose to opt out. The online survey was estimated to last no more than 15 minutes, and therefore did not represent an undue hardship on participants. Moreover, the level of involvement anticipated by human subjects was quite limited. Furthermore, the identity of the respondents has been and will be kept confidential. UTEP IRB approval was obtained prior to data collection (see Appendix A).

The Mexican government maintains a roster of Mexican firms that have engaged in product commercialization abroad, as well as firms that have participated in eight incubators abroad (Comunidad de Negocios, 2011). All such Mexican firms are registered with the Secretariat of the Economy—through its various satellite offices maintained through the Republic, which collect extensive data on firm characteristics as a means of better supporting their economic activity—both within and outside of Mexico. Specifically, the Secretariat of the Economy’s mission is to “promote and create public policies and programs oriented at the growth and improvement of employment opportunities, growth and improvement of firms, and the growth and increase of entrepreneurs” (Comunidad de Negocios, 2011). Through its various
departments, this government organization provides support for all businesses in Mexico, and keeps track of small-to-medium enterprises, entrepreneurs and large companies engaged in foreign markets, regardless of entry mode, e.g., exporting, direct investment and joint ventures. The Mexican government organization’s database encompasses the population from which the sample was drawn. Therefore, the Mexican government, through its Secretariat of the Economy, remains the best source of firm contact data (Lopez, 2011).

The government agreed to release the contact information for educational purposes as presented by this research proposal (Medina, 2011). Participating firms opted-in and logged-in to respond to the survey, and were presented with a consent form, informing them of the study’s goals and the pledge to maintain the confidentiality of the respondent. The respondent’s answers were stripped of any unique identifiers. A random ID was assigned to respondents, which also facilitated the merging of survey data with the archival. Data was only reported in aggregate form so as not to identify any specific respondents. The Mexican government, through its past data collection efforts, provided annual foreign sales data for firms engaged in developed market entry. Although the data contained the aggregate of all foreign sales, it also identified sales by country. This dissertation was focused on U.S. sales achieved by Mexican EMFs.

**Research Design**

The empirical research design was intended to provide a structure and strategy of investigation to obtain answers to this study’s research questions (Creswell, 2009). The research design described the key assumptions, which in this dissertation included focusing on a specific area of the product innovation process. The research questions were crystalized through a formal study (Buchanan & Bryman, 2007), and through the incorporation of survey research, This study intended to provide a quantitative or numeric description of trends, attitudes,
or opinions of a population by studying a sample of that population with the intent of
generalizing from a sample to a population (Babbie, 2001). Specifically, this study focused on
the contributions of absorptive capacity to the developed market product commercialization
success that EMFs exhibit. Thus, the purpose of this study was to identify a causal-explanatory
relationship (Buchanan & Bryman, 2007). The causal explanation incorporated measures of
validity and reliability (Dowdy, Wearden & Chilko, 2004). The objective was to demonstrate
high internal and external validity by using previously established measures and incorporating a
number of controls. With respect to reliability; the intent was for the results of a study to be
reproduced under a similar methodology, thus testing the research instrument (Buchanan &
Bryman, 2007).

There were two key assumptions. The first was that increasing technological and market
knowledge, relative to the developed market, tends to increase EMFs’ chances of target
developed market entry (product commercialization) success. This assumption was tested
empirically using a longitudinal hierarchical multivariate regression model. The other key
assumption was that incubator participation has a positive influence on EMF absorptive capacity.
The quality of incubator participation was also measured.

This study’s interest was also in understanding the effect incubator participation quality
has on EMF absorptive capacity, a measure of organizational knowledge, and whether or not that
increased knowledge leads to improved performance in the form of developed market entry
(product commercialization) success as evidenced by sales growth.

**VARIABLES**

*Dependent variable.* The dependent variable was degree of successful product
commercialization. The performance variable was *sales growth*, defined as year-over-year sales,
because it was indicative of successful product commercialization (Agarwal & Bayus, 2002). Entrepreneurs value sales and revenue growth (Davidsson & Wiklund, 1997). The Mexican government has collected annual sales data (domestic and foreign by market) for purposes other than this dissertation. This measure of financial performance captured the product commercialization success (Cooper & Kleinschmidt, 2007). Whether incubated firms perform better than non-incubated firms is an important empirical question that can help inform practice.

**Independent variables.** For the independent variables, four dimensions (variables) were used from the construct absorptive capacity: acquisition, assimilation, transformation, and exploitation, to measure how firms secured and applied technological and market knowledge (Cohen & Levinthal, 1990; Todorova & Durisin, 2007). These four dimensions (variables) were operationalized and validated into robust measures utilizing rigorous pre-testing and two large-survey based studies involving German research-intensive companies (Flatten et al., 2011).

**Acquisition.** The acquisition of relevant information by firms concerning their industry is an everyday affair (Daft, Sormunen & Parks, 1988; Jansen et al., 2005; Wilkenset al., 2004). While management promotes the use of relevant industry information (Sidhu et al., 2007; Veugelers & Cassiman, 1999), it is also likely that management expects firms to acquire information outside of their relevant industry as well (Jansen et al., 2005; Laursen & Slater, 2006).

**Assimilation.** The effectiveness of a firm’s absorptive capacity requires market knowledge assimilation of ideas and concepts via internal communication (Shu et al., 2005), as well as provisioning of problem solving support (Schmidt, 2010). Both, internal communication and problem solving support necessitates quick information flow (Bontiset al., 2002; Teo et al.,
2006; Tiwana & McLean, 2005; Vorhies & Harker, 2000) on some periodic basis (Farrell, 2000; Hult et al., 2004; Kohli et al., 1993; Pavlou & El Sawy, 2006; Vorhies & Harker, 2000).

Transformation. The firm acquires knowledge and transforms it into a structure useful to employees for product commercialization purposes (Collins & Smith, 2006; Jansen et al., 2005; Liao et al., 2007; Pavlou & El Sawy, 2006). This transformation includes both internal and external sources of technological and market knowledge (Tiwana & McLean, 2005). Firms are then able to apply the acquired knowledge in their everyday practices (Ettlie and Pavlou, 2006).

Exploitation. Technical and market knowledge is exploited when firms improve upon an invention or build a prototype of product (Nambisan, Agarwal & Tanniru, 1999). Thus, the firm is leveraging its absorptive capacity to adapt its products in according to the new knowledge (Flatten, et al., 2011). This ability to exploit new knowledge allows the firm to launch innovative products and services promptly (Liao, 2007).

Moderation (interaction) variable(s). The moderation variable used was incubator participation quality to account for the quality of incubator as perceived by the EMF respondent.

Control variables. Three key elements of EMF characteristics were controlled because these characteristics may influence the developed market product commercialization success. These elements were firm age, firm size and firm resources. Older firms have been shown to have more experience, and may enjoy greater advantages over younger firms with respect to international growth (Autio, Sapienza & Almeida, 2000). Small firms are consistently constraint in their growth because of their size (Beck, Demirguc-Kunt & Maksimovic, 2005). Firm resources afford larger firms greater flexibility in appropriating economic rents through product commercialization vis-à-vis smaller firms (Autio, Sapienza & Almeida, 2000; Bloodgood, Sapienza & Almeida, 1996). Given the variety of entry modes, prior developed market entry
experience was controlled for by accounting for (1) developed market partnerships and (2) access to advise from specialize consulting firms; two variables operationalize these options.

**Measures**

The study used longitudinal data analysis to assess the EMFs that entered the developed market in one year (study time period 2010), and captured their performance data for the following year (study time period 2011). Furthermore, incubator participation and incubator quality were incorporated into the statistical models as moderation (interaction) effects.

*Dependent variable measure.* Consistent with firm growth literature, I relied on Gibrat’s (1931) proportional growth model (Coad, 2007; Sutton, 1997). Therefore, *sales growth* was measured as the log difference between sales at time $t$ and sales at time $t - 1$ as indicated by the equation:

$$\text{Growth}_{i,t} = \log (\text{SALES}_{i,t}) - \log (\text{SALES}_{i,t-1})$$

Annual sales figures were first adjusted to 2009 dollars based on the consumer price index before being log transformed (base 10).

*Independent variable measures.* For the independent variables that comprised the absorptive capacity construct, the scale items were based on past research conducted with German firms, but they were minimally reworded to remove any ambiguity in their use with firms entering the developed market of the United States. The use of perceptual responses is quite common in management research (Lane, Salk, & Lyles, 2001; Simonin, 2004). All survey items were scored on a 7-point Likert scale. In their study, Flatten et al. (2011), fourteen measures of absorptive capacity were identified, broken down into four variables, which exhibited acceptable Cronbach (1951) coefficient alpha ($\alpha$), a measure of internal consistency, across four dimensions (Churchill, 1979; Nunnally, 1978). To measure the increase in the four
dimensions of absorptive capacity, the score for each item in the year before the EMF entered the United States was subtracted from the score of its counterpart item in the year after the EMF entered the United States. (See Appendix B.)

*Acquisition* (ACQUI) was measured using three items operationalized by Flatten et al. (2011). The three items were measured by a series of scaled, seven-point items (1 = Strongly Disagree to 7 = Strongly Agree) for each of the three variables. The α for acquisition in the Flatten et al. (2011) study was .79 and .73 for the first and second study respectively. (See Appendix B items A.1-3 and E.15-17.)

*Assimilation* (ASSIM) was measured using four items operationalized by Flatten et al. (2011). The four items were measured by a series of scaled, seven-point items (1 = Strongly Disagree to 7 = Strongly Agree) for each of the three variables. The α for acquisition in the Flatten et al. (2011) study was .91 and .85 for the first and second study respectively. (See Appendix B items B.4-7 and F.18-21.)

*Transformation* (TRANS) was measured using four items operationalized by Flatten et al. (2011). The four items were measured by a series of scaled, seven-point items (1 = Strongly Disagree to 7 = Strongly Agree) for each of the three variables. The α for acquisition in the Flatten et al. (2011) study was .91 and .93 for the first and second study respectively. (See Appendix B items C.8-11 and G.22-25.)

*Exploitation* (EXPLO) was measured using three items operationalized by Flatten et al. (2011). The three items were measured by a series of scaled, seven-point items (1 = Strongly Disagree to 7 = Strongly Agree) for each of the three variables. The α for acquisition in the Flatten et al. (2011) study was .82 and .80 for the first and second study respectively. (See Appendix B items D.12-14 and H.26-28.)
Moderation (interaction) variable measures. Incubator Participation was a binary variable indicating whether or not an EMF participated with an incubator. Incubator Participation Quality was an ordinal 1-10 scale of incubator quality as measured by the EMF respondents. The assumption was made that the 1-10 scale represented an underlying continuous latent variable of incubator participation quality as perceived by the EMF respondents, where 10 represented an EMF evaluation of its incubator effectiveness as 100%, a 5 represented a 50% effectiveness rating, and so on; this assumption is reasonable where there are five categories or more, and here there were ten categories (Torra, Domingo-Ferrer, Mateo-Sanz & Ng, 2006). Applying this assumption, the 1-10 ordinal ratings were transformed into 0.1-1.0 continuous ratings, with the value of zero (0.0) reserved for EMFs that did not participate with an incubator. Incubator participation has been found to impact sales growth (Amezcua, 2010); however, this study was interested in the moderating effect incubator participation quality had on the relationship between EMF absorptive capacity and EMF developed market entry (product commercialization) success.

Control variable measures. Firm age was measured in years and logarithmically (base 10) transformed. Firm resources and size was measured by firm total assets logarithmically (base 10) transformed. Prior developed market entry experience was controlled for by accounting for (1) developed market partnerships and (2) access to specialize consulting firm advice, also coded as binary variables during the same years (Salkever, 1976).

Statistical Analysis

Statistically valid inferences were drawn carefully from collected data subjected to the appropriate statistical techniques. The data was analyzed using standard IBM SPSS Statistics Standard software (SPSS 20.0). IBM SPSS Statistics reported the statistical results (Model
Summary, Coefficients, etc.) as each block of variables was entered into the analysis. In addition, IBM SPSS Statistics tested the key statistic used in evaluating the hierarchical hypothesis: change in the coefficient of multiple determination ($R^2$), which is a model fit statistic for each additional block of variables (Cohen, Cohen, West & Aiken, 2003).

The order that variables entered into the regression equation were determined by using a statistical model. The statistical model called for three successive blocks of variables: control, independent and interaction variables. The null hypothesis for the addition of each block of variables to the analysis was that the change in $R^2$ (contribution to the explanation of the variance in the dependent variable) is zero. If the null hypothesis was rejected, then the interpretation would indicate that the variables in block 2 (predictor set of variables) had a relationship to the dependent variable, after controlling for the relationship of the block 1 variables to the dependent variable (Cohen et al., 2003). The third block was the moderating (interaction) variables – absorptive capacity measures multiplied by the incubator participation quality continuous scale variable – and the same statistical analysis above was conducted.

**DATA COLLECTION**

The research method incorporated data from a combination of secondary data and survey data collected from Mexican EMFs. The collection efforts were facilitated by a strong relationship with the Mexican government, who is supportive of this research. Two independent data sets comprised of the same respondent firms were utilized. The first was a convenient sample from archival data collected by the Mexican government for purposes unrelated to this research. This data set was used to provide the dependent variable measure. The second data set was derived from an online survey sent out to respondents who provided answers to the bulk of the control and independent variables. Hence, this study eliminated the possibility of common
method variance between the independent variables and the dependent variable (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003).

Recruitment was via email, wherein invitation recipients opted in and were directed to a survey site, SurveyMonkey™. This popular online survey site has robust a survey engine, data security procedures, a programming framework suitable for this study’s survey, and met the standards set forth by The University of Texas at El Paso’s Institutional Review Board (SurveyMonkey, 2012). The field period began in early March 2012 and closed within two weeks. The survey was optimized to facilitate efficient responses, thus diminishing respondent fatigue.

**SUMMARY**

This chapter put theory into practice by outlining an approach to analyze how absorptive capacity influenced emerging market firms’ developed market market (product commercialization) success. The sample was drawn from a population of Mexican firms that were engaged in developed market entry (product commercialization), relying on a unique survey instrument and secondary data collection and analysis. The research design described the key assumptions that operationalized the hypotheses, and the longitudinal research design and hierarchical multivariate regression statistical models employed to test for causation.
CHAPTER FIVE: RESULTS

PURPOSE AND SCOPE

The purpose of this chapter is to describe this study’s data analysis and report the results of how incubator participation influenced emerging market firms’ (EMFs’) developed market product commercialization success. The analysis departed from previous qualitative and theoretical management studies of emerging market firms entering developed markets by conducting an empirical investigation (Eisenhardt & Santos, 2002). Careful attention was placed to ensure the validity of the research findings (Mouton & Marais, 1996), since this is an important prerequisite to advancing organization studies (Grunow, 1995).

This chapter reports data collection, sample differences, factor analyses, regression diagnostics, regression analyses, and hypotheses tests. The key assumptions of the research design were followed and the theoretical constructs were appropriately operationalized (Bacharach, 1989). The chapter closes with a detailed analysis of the results, which are then discussed in the concluding chapter.

DATA COLLECTION

Participants for the study were derived from a database of Mexican emerging market firms that have commercialized their products and services in the United States (Lopez, 2011). A subset of these firms has participated in incubator programs in the United States since 2008, as part of the TechBA program, a Mexican government sponsored program (Medina, 2011). While the Mexican government endorsed the study and conducted independent outreach, the anticipated high response rate fell short. A total of 335 Mexican EMFs responded to the survey. Incubator
participant (treatment group) firms provided 211 survey responses, which were reduced to 146 firms on which the Mexican government had performance data. The group of 146 firms was further reduced to 85 firms because some survey responses contained insufficient information from which to extract meaningful data, i.e., 61 of the 146 responding firms failed to complete the entire survey. While there was data for 146 firms in the treatment group who had all had some level of incubation participation, the 85 participants that provided sufficient data for analysis were those that had participated by physically deploying personnel to a given incubator on a full or part-time, and thus could rate the quality of the incubator, an important variable in our study.

With respect to the control group (incubator non-participant) firms, out of a population of 1,100 such firms that the Mexican government had contact data, performance data was available for only 124 firms. From that group of 124 firms, 81 firms responded to the survey with sufficient information to be included in the control group. While the control group drew from a large population, obtaining completed surveys was challenging within the established field research period, given constraints imposed by the Mexican government in advance of presidential elections whereby much activity halted so as not be perceived as favoring any given party during the campaign period that commenced April 1, 2012.

A total of 166 responses represent the resulting data set utilized in the analysis. The Mexican government, through its past data collection efforts, provided annual foreign sales data for firms engaged in developed market entry, and this was collated to the 166 responses obtained from the survey respondents. The study focused on the growth in U.S. sales achieved by Mexican EMFs over a period of two years, from 2009 (one year before U.S. market entry) to 2011 (one year after U.S. market entry). There were no missing values and only two coding errors were identified and corrected.
SAMPLE DIFFERENCES

To ensure that both the control and treatment groups were not significantly different from each other, two-sample t-tests for differences in means of firm characteristics variables were conducted using Minitab 16. Two-sample t-tests for equality of means were conducted for firm size, as given by the number of employees (FIRMEMPL) and total assets (TOTAS), as well as for firm experience using firm age (FIRMAGE) as a proxy, and sector (services versus other). There were no significant differences between FIRMAGE, FIRMEMPL and sector, however, there was a significant difference in TOTAS, where the treatment group was significantly \( (p = 0.004) \) larger in total assets than the control group. Including TOTAS as a control variable in the study’s regression models controlled for this significant difference. Further, the use of U.S. firm partners and consultants to provide U.S. market entry assistance was surveyed. While the mean differences in use of U.S. firm partners was not significant, control group firms had higher \( (p = 0.002) \) use of consultants to facilitate their product commercialization in the United States, perhaps to compensate for their lack of incubator participation.

The difference between the total assets of the control group firms and the total assets of the treatment group firms can be explained by the recruitment efforts of the Mexican government that aimed to recruit the most visible and affluent firms to participate in the incubation program (Medina, 2011). To ensure that participating firms would have the financial wherewithal to sponsor an expatriate to live in the United States and interact with the incubators, the Mexican government selected firms that held greater total assets (Medina, 2011). The control group appears to be comprised of firms that share many of the same characteristics of treatment group firms, save they are smaller in terms of total assets.
The combined data was comprised of five control variables, including firm age (FIRMAGE), total assets (TOTAS), and three binary variables: previous experience with foreign market partner prior to market entry (PREPARTNER), previous experience with foreign market consultants (PRECONSULT), and sector – services versus other - (SECTOR). Predictor variables included either binary incubator participation (before and after non-interaction models) or continuous incubator quality (during interaction model) and four firm absorptive capacity factors, derived through factor analyses from 14 items measuring firm absorptive capacity before U.S. market entry, and 14 similar items measured after U.S. market entry. All continuous variables, including the four factors, were mean-centered to minimize the multicollinearity found in regression models that include interaction variables (Aiken & West, 1991).

In addition, to compare control group versus treatment group relative learning via technological/market knowledge acquisition, assimilation, transformation and exploitation, two-sample t-tests for equality of means were conducted of the 14 items mean differences, i.e., comparison of the average of the remainder of all firms’ rating for each item before market entry subtracted from rating for that item after market entry. Significant mean differences were found, all in favor of the treatment (incubator participant) group, for the following items: ACQ2 (p = 0.099), TRANS2 (p = 0.015), TRANS3 (p = 0.000), TRANS4 (p = 0.039), EXPL1 (p = 0.007), EXPL2 (p = 0.003). (For more details about these items, please see the 14 items listed in the online survey found in Table 1.) Hence, in comparison to the non-incubator participant group, the incubator participant group experienced significant learning increases in three of the four factors of absorptive capacity, one in technical/market knowledge acquisition, three in such knowledge transformation, and two in such knowledge exploitation. This finding offers partial support to H2 because it shows that being an EMF incubator participant, on average, leads to
greater acquisition, transformation and exploitation of technological/market knowledge needed for developed market entry (product commercialization).

Using MiniTab 16, two-sample t-tests for equality of means were conducted on the before-and-after differences for both the control and treatment groups across the fourteen factors. The treatment group means are significantly different (larger) than the control group counterpart means in several items. Hence, the treatment group benefited from incubator participation primarily in the transformation and exploitation of technological and market-related knowledge.

Table 1: Survey 14-Item Sample Differences

<table>
<thead>
<tr>
<th>Survey Item</th>
<th>Variable Name</th>
<th>Full Description</th>
<th>Level of Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ACQ1</td>
<td>The search for relevant information concerning our industry is every-day business in our company.</td>
<td>p = 0.380</td>
</tr>
<tr>
<td>2</td>
<td>ACQ2</td>
<td>Our management motivates the employees to use information sources within our industry.</td>
<td>p = 0.099</td>
</tr>
<tr>
<td>3</td>
<td>ACQ3</td>
<td>Our management expects that the employees obtain information beyond our industry.</td>
<td>p = 0.745</td>
</tr>
<tr>
<td>4</td>
<td>ASSIM1</td>
<td>In our company ideas and concepts are communicated cross-departmental.</td>
<td>p = 0.615</td>
</tr>
<tr>
<td>5</td>
<td>ASSIM2</td>
<td>Our management emphasizes cross-departmental support to solve problems.</td>
<td>p = 0.497</td>
</tr>
<tr>
<td>6</td>
<td>ASSIM3</td>
<td>In our company there is a quick information flow, e.g., if a business unit obtains important information it communicates this information promptly to all other business units or departments.</td>
<td>p = 0.125</td>
</tr>
<tr>
<td>7</td>
<td>ASSIM4</td>
<td>Our management demands periodical cross-departmental meetings to interchange new developments, problems, and achievements.</td>
<td>p = 0.477</td>
</tr>
</tbody>
</table>
Table 1: Survey 14-Item Sample Differences (Continued)

<table>
<thead>
<tr>
<th>Survey Item</th>
<th>Variable Name</th>
<th>Full Description</th>
<th>Level of Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRANS1</td>
<td>TRANS1</td>
<td>Our employees have the ability to structure and to use collected knowledge.</td>
<td>p = 0.160</td>
</tr>
<tr>
<td>TRANS2</td>
<td>TRANS2</td>
<td>Our employees are used to absorbing new knowledge as well as to prepare it for further purposes and to make it available.</td>
<td>p = 0.015</td>
</tr>
<tr>
<td>TRANS3</td>
<td>TRANS3</td>
<td>Our employees successfully link existing knowledge with new insights.</td>
<td>p = 0.000</td>
</tr>
<tr>
<td>TRANS4</td>
<td>TRANS4</td>
<td>Our employees are able to apply new knowledge in their practical work.</td>
<td>p = 0.039</td>
</tr>
<tr>
<td>EXPL1</td>
<td>EXPL1</td>
<td>Our management supports the development of prototypes.</td>
<td>p = 0.007</td>
</tr>
<tr>
<td>EXPL2</td>
<td>EXPL2</td>
<td>Our company regularly reconsiders technologies and adapts them according to new knowledge.</td>
<td>p = 0.003</td>
</tr>
<tr>
<td>EXPL3</td>
<td>EXPL3</td>
<td>Our company has the ability to work more effectively by adopting new technologies.</td>
<td>p = 0.197</td>
</tr>
</tbody>
</table>

**FACTOR ANALYSES**

The constructs for absorptive capacity, specifically technological learning and market learning, are derived from theory, with the variables adapted from the literature. Absorptive capacity measures have been validated in past studies (Flatten et al., 2011), and were incorporated as the previously mentioned 14 items. A factor analysis used IBM SPSS 20.0 to arrive at factor scores. A total of twenty-eight items were surveyed, fourteen representing technological and market knowledge measured one year before the firms started doing business in the United States, and fourteen representing the same measures one year after the firms started doing business in the United States. A series of factor analyses were conducted, first with the
pre-market entry factors, then with the post-market entry factors, and finally the “differences” factors that captured changes between pre- and post-market entry measures.

Factor analysis has three basic decision points: (1) deciding the number of factors; (2) choosing an estimation method; and (3) choosing a rotation method (Johnson & Wichern, 2002). This study adopted the approach taken by Flatten et al. (2011) who identified four absorptive capacity factors. Maximum likelihood was chosen as the estimation method for all three models: pre-market entry, post-market entry, and the “differences.” The rotation method was orthogonal (Varimax). Both Kaiser-Meyer-Olkin’s (KMO; Kaiser, 1974) measure (0.776, \( \chi^2 = 1,066.175 \)) and Bartlett’s (1937) test of sphericity (p = 0.000, df = 91) for all three models were significant indicating that factor analysis was appropriate.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Initial Eigenvalues</th>
<th>Extraction Sums of Squared Loadings</th>
<th>Rotation Sums of Squared Loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>% of Variance</td>
<td>Cumulative %</td>
</tr>
<tr>
<td>1</td>
<td>4.855</td>
<td>34.680</td>
<td>34.680</td>
</tr>
<tr>
<td>2</td>
<td>2.347</td>
<td>16.765</td>
<td>51.445</td>
</tr>
<tr>
<td>4</td>
<td>1.032</td>
<td>7.369</td>
<td>68.415</td>
</tr>
<tr>
<td>5</td>
<td>9.937</td>
<td>8.894</td>
<td>75.109</td>
</tr>
<tr>
<td>6</td>
<td>7.411</td>
<td>5.291</td>
<td>80.400</td>
</tr>
<tr>
<td>7</td>
<td>5.56</td>
<td>3.968</td>
<td>84.368</td>
</tr>
<tr>
<td>8</td>
<td>4.40</td>
<td>3.431</td>
<td>87.799</td>
</tr>
<tr>
<td>9</td>
<td>3.81</td>
<td>2.721</td>
<td>90.520</td>
</tr>
<tr>
<td>10</td>
<td>3.66</td>
<td>2.614</td>
<td>93.134</td>
</tr>
<tr>
<td>11</td>
<td>3.12</td>
<td>2.230</td>
<td>95.364</td>
</tr>
<tr>
<td>12</td>
<td>.261</td>
<td>1.862</td>
<td>97.226</td>
</tr>
<tr>
<td>13</td>
<td>.202</td>
<td>1.443</td>
<td>98.669</td>
</tr>
<tr>
<td>14</td>
<td>.186</td>
<td>1.331</td>
<td>100.000</td>
</tr>
</tbody>
</table>

Table 2: Factor Analysis Total Variance Explained (Differences Model)

A total of three models were ran, the first taking into account the pre-market entry scores, the second taking into account the post-market entry scores. The results of the third model, the
differences between pre-and-post market entry, are depicted in Table 3. In all cases, the same fourteen factors loaded into the same four factors.

<table>
<thead>
<tr>
<th>Table 3: Factor Analysis Factor Loadings (Differences Model)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factor</td>
</tr>
<tr>
<td>--------</td>
</tr>
<tr>
<td>DACQ1</td>
</tr>
<tr>
<td>DACQ2</td>
</tr>
<tr>
<td>DACQ3</td>
</tr>
<tr>
<td>DASSIM1</td>
</tr>
<tr>
<td>DASSIM2</td>
</tr>
<tr>
<td>DASSIM3</td>
</tr>
<tr>
<td>DASSIM4</td>
</tr>
<tr>
<td>DTRANS1</td>
</tr>
<tr>
<td>DTRANS2</td>
</tr>
<tr>
<td>DTRANS3</td>
</tr>
<tr>
<td>DTRANS4</td>
</tr>
<tr>
<td>DEXPL1</td>
</tr>
<tr>
<td>DEXPL2</td>
</tr>
<tr>
<td>DEXPL3</td>
</tr>
</tbody>
</table>

**Regression Diagnostics**

Multivariate regressions assume that the data are independent, linear in relationships, normal in distribution, and have errors with constant variance, homoscedasticity (Johnson & Wichern, 2002; Neter, Kutner, Nachtsheim & Wasserman, 1996). Care was taken that control and treatment group data were independent and the factor analyses were orthogonal, significantly minimizing correlation between the four factors. Univariate data graphical displays indicated that most of the variables, especially the four factors, were non-linear and non-normal, characteristics that can be attributed in part to the bimodal nature of the sample containing the
control and treatment groups. However, when the individual variables were incorporated into a multivariate regression model, the three assumptions of multivariate normality, linearity (model fit), and multivariate homoscedasticity (constant error variance) were tested using SAS/STAT® Proc Reg (SAS, 1999), and all assumptions were met.

Table 4: Descriptive Statistics and Correlation Matrix (Differences Model)

<table>
<thead>
<tr>
<th></th>
<th>MEAN</th>
<th>STANDARD DEVIATION</th>
<th>LOG SALESGROWTH</th>
<th>LOG FIRM AGE</th>
<th>LOG TOTAL ASSETS</th>
<th>SECTOR</th>
<th>PRE-PARTNERSHIPS</th>
<th>INCUBATOR QUALITY</th>
<th>ASSIMILATION (DIFF)</th>
<th>EXPLOITATION (DIFF)</th>
<th>TRANSFORMATION (DIFF)</th>
<th>ACQUISITION (DIFF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOG SALESGROWTH</td>
<td>0.180</td>
<td>0.008</td>
<td>-1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>LOG FIRMAGE</td>
<td>0.566</td>
<td>0.146</td>
<td>0.466 **</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>LOG TOTAL ASSETS</td>
<td>0.389</td>
<td>0.117</td>
<td>0.312 **</td>
<td>0.463 **</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>SECTOR</td>
<td>0.626</td>
<td>0.490</td>
<td>-0.389</td>
<td>0.425 **</td>
<td>0.289 **</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>PRE-PARTNERSHIPS</td>
<td>0.380</td>
<td>0.488</td>
<td>0.163</td>
<td>0.322 **</td>
<td>0.367 **</td>
<td>-0.093</td>
<td>-</td>
<td>-0.855 **</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>INCUBATOR QUALITY</td>
<td>3.370</td>
<td>3.410</td>
<td>-0.951</td>
<td>1.104</td>
<td>0.316 **</td>
<td>-0.053</td>
<td>-0.106</td>
<td>-0.191 **</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>ASSIMILATION (DIFF)</td>
<td>0.181</td>
<td>0.878</td>
<td>-0.355</td>
<td>0.640</td>
<td>-0.089</td>
<td>0.005</td>
<td>-0.050</td>
<td>-0.026</td>
<td>0.696</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>EXPLOITATION (DIFF)</td>
<td>0.060</td>
<td>0.906</td>
<td>1.50</td>
<td>-0.177</td>
<td>-0.194</td>
<td>-1.254</td>
<td>-0.006</td>
<td>-1.683 **</td>
<td>0.191</td>
<td>0.094</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>TRANSFORMATION (DIFF)</td>
<td>0.171</td>
<td>0.843</td>
<td>1.18</td>
<td>0.964</td>
<td>0.135</td>
<td>-1.338</td>
<td>0.021</td>
<td>0.177</td>
<td>0.308 **</td>
<td>0.046</td>
<td>1.49</td>
<td>-</td>
</tr>
<tr>
<td>ACQUISITION (DIFF)</td>
<td>0.172</td>
<td>0.989</td>
<td>0.973</td>
<td>0.926</td>
<td>0.685</td>
<td>0.054</td>
<td>0.123</td>
<td>0.078</td>
<td>-0.130</td>
<td>-0.097</td>
<td>0.81</td>
<td>0.012</td>
</tr>
</tbody>
</table>

* N = 100
** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Table 4, Descriptive Statistics and Correlation Matrix, provides the Pearson Correlations with two-tailed significance tests for the regression model variables. The dependent variable, U.S. sales growth, and two control variables, firm age and firm total assets, all underwent logarithmic (base 10) transformations. Four of the control variables were significantly correlated with the dependent variable: firm age (p < 0.01), firm total assets (p < 0.01), sector (p < 0.01), and prior use of partnerships (p < 0.05). The incubator quality variable was significantly correlated (p < 0.01) with firm total assets which, in turn, were significantly correlated with U.S. sales growth. The large standard deviations, relative to the mean values for the four factor predictor variables, indicate lack of significance.
REGRESSION ANALYSES

Hierarchical multivariate regressions were used to test the two hypotheses presented in Chapter 3. Several models were developed, including pre-market entry, post-market entry factors, and the “differences” model that took into account the differences between the pre-market entry and post-market entry factors. In addition, the full model considered four interactions between the incubator participation measure and the four absorptive capacity factors.

A set of five control variables comprised the first block of the regression model. These five control variables were firm age, total assets, sector (services industry versus other), use of partner firm(s) prior to U.S. market entry, and use of consultant(s) prior to U.S. market entry. Firm age and total assets were both transformed using the logarithm base 10 and mean-centered. The second block included incubator participation (IPARTICI) and the factor regression scores for the four absorptive capacity factors differences, all mean-centered. Lastly, the interaction variables were introduced as the products of incubator quality and each of the four absorptive capacity factors. Table 5 denotes the results of the multivariate regression analysis, performed using IBM SPSS 20.0. The overall model statistics denote a significant and robust model explaining over half of the variance with an adjusted $R^2$ of 0.553. Furthermore, the F-value is 15.56 and highly significant ($p < 0.0001$); therefore, model fit is excellent.

Multicollinearity in this model is not a significant problem, with variance inflation factors (VIFs) ranging from 1.143 to 2.961, above the minimum VIF value of 1.000 but well below the maximum VIF value of 10 (Neter et al., 1996). A VIF of 2.00 for a variable indicates that twice its variance can be explained by correlation with other predictors than if there were zero correlations between that variable and the other predictors.
Statistical power is the probability that the statistical test will reject the null hypothesis when the null hypothesis is false, i.e. the probability of not committing a Type II error (Cohen, 1988). Examining the model with 14 predictors (including control, independent and interaction variables) and 166 observations, at the 0.05 significance level, the full differences regression model has a statistical power of 0.69, in proximity to the “gold standard” of 0.80 statistical power (Cohen, 1988). Hence, the results of this study can be viewed with moderate confidence.

Table 5: Full Model for Incubator Participation Interactions with “Differences” Factors

<table>
<thead>
<tr>
<th>Incubator Quality Model</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>VIF (Model 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>1.279 ****</td>
<td>1.294 ****</td>
<td>1.285 ****</td>
<td></td>
</tr>
<tr>
<td>Control variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Firm age</td>
<td>0.034</td>
<td>0.034</td>
<td>0.024</td>
<td>1.884</td>
</tr>
<tr>
<td>Total assets</td>
<td>0.774 ****</td>
<td>0.792 ****</td>
<td>0.791 ****</td>
<td>1.903</td>
</tr>
<tr>
<td>Sector</td>
<td>-0.228 ***</td>
<td>-0.221 ***</td>
<td>-0.226 ***</td>
<td>1.143</td>
</tr>
<tr>
<td>Partnerships</td>
<td>0.018</td>
<td>0.014</td>
<td>0.004</td>
<td>1.441</td>
</tr>
<tr>
<td>Consultants</td>
<td>-0.030</td>
<td>-0.060</td>
<td>-0.049</td>
<td>1.513</td>
</tr>
<tr>
<td>Main effects variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incubator Quality</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assimilation Differences</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exploitation Differences</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transformation Differences</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acquisition Differences</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interaction variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incubator Quality X Assimilation Differences</td>
<td></td>
<td></td>
<td>-0.012</td>
<td>2.565</td>
</tr>
<tr>
<td>Incubator Quality X Exploitation Differences</td>
<td></td>
<td></td>
<td>0.004</td>
<td>2.808</td>
</tr>
<tr>
<td>Incubator Quality X Transformation Differences</td>
<td></td>
<td></td>
<td>0.021</td>
<td>2.084</td>
</tr>
<tr>
<td>Incubator Quality X Acquisition Differences</td>
<td></td>
<td></td>
<td>-0.013</td>
<td>1.536</td>
</tr>
</tbody>
</table>

R-square                                    0.570     0.584     0.591
Adjusted R-square                           0.557     0.557     0.553
F-values                                    42.428 **** 21.726 **** 15.560 ****
Degrees of Freedom                          5          10        14

n = 166
* p < .05
** p < .01
*** p < .001
**** p < .0001

The full model statistics identified two control variables as significant, firm size as given by total assets, and industry sector (services, e.g., software, versus other, e.g., manufacturing).
The more total assets an EMF has, the more likely its U.S. sales growth will be. Also, firms that were in the services sector will be more likely to see U.S. sales growth. The interaction terms were not significant. In the second stage of the differences model, incubator quality was found to be significant (p < 0.05) and negative, contrary to H2 and the differences model correlation matrix. Robustness checks using multiple regressions using the five control variables and either the incubator participation (binary) or the incubator quality (continuous) predictor variables also yielded negative, significant results (p < 0.05 and p < 0.10, respectively). (A similar check using the five control variables and four absorptive capacity factors yielded no significant results for any of the four factors). These consistent findings indicate that EMFs that participated in incubators, especially those with high quality experiences, experienced lower U.S. sales growth. Anecdotally, some EMFs that participated with incubators reported taking more time to enter the U.S. market than EMFs that did not participate with incubators, resulting in lower U.S. sales growth. This suggests that this study’s research design of a relatively short time period may be thwarting its ability to demonstrate the positive influence of incubators in transferring knowledge and experience to EMFs on the latter’s developed market entry product commercialization success. This leads to the conclusion that the four factors extracted did not contribute to firm U.S. sales growth in any significant manner.

HYPOTHESES TESTS

Employing a unique data set, comprised of a control and treatment groups of Mexican firms active in the U.S. market, this study sought to test two hypotheses. The first hypothesis posited that increasing absorptive capacity would increase firm performance, and the second posited that participation in a high quality incubator would increase the likelihood of firm performance given the interaction with four absorptive capacity factors. Neither hypothesis was
fully supported, although $H_1$ and $H_2$ were partially supported based on uni variate item differences two-sample t-tests for equality of means and correlations of some absorptive capacity factors with incubator quality. The data collection, analyses and results of this study provide a foundation, in the next chapter, to explore theoretical reasons explanations of the study’s results.
CHAPTER SIX: CONCLUSION

“I have not failed. I’ve just found 10,000 ways that won't work.” Thomas Edison remarking about his work before the invention of the light bulb on the 10,001st attempt.

This chapter concludes this study about how incubator participation contributes to the success of emerging market firm (EMF) developed market entry. This discussion recaps study assumptions, research design and empirical results. The limitations of the study are also identified, as are implications for future research. Finally, conclusions regarding this study’s hypotheses are drawn to serve as the basis for research extensions.

DISCUSSION

This study assumed that 14 items that measured four absorptive capacity factors, developed in a study of German firms (Flatten et al., 2011), would be valid in a study involving Mexican firms. Moreover, this study also pushed the boundaries of the four factors by testing them in the context of cross-border learning whereby Mexican firms entering the United States. Based on the results of the factor analyses, this assumption proved valid and further confirmed the role of absorptive capacity in organizational learning.

Another assumption made was that the effect size of learning gained by incubator participants, measured by the before-and-after U.S. market-entry differences in each of the four absorptive capacity factors, would be strong enough to influence a short-term economic variable, U.S. sales growth. This effect-size assumption did not hold. A review of the management and organizational behavior literature did not identify effect sizes for organizational learning, but one can surmise that such effect sizes would not be as strong as those for economic predictor
variables, e.g., firm total resources, in influencing economic dependent variables, e.g., U.S. sales growth. Most scholars would agree that organizational learning has great influence on firm performance but that its effects are more long-term rather than short-term in nature and, that long-term, intangible organizational learning has greater impact on intermediate factors such as the firm’s decision-making, e.g., market-entry decision, than directly on short-term, tangible firm performance.

This study’s research design combined perceptual responses, from EMFs that did and did not participate in incubators, with archival U.S. sales growth data, thus avoiding common method variance. However, in hindsight, the research design was probably too ambitious given that organizational learning, a long-term, non-economic variable, was predicted to impact firm short-term economic performance (year-over-year sales growth). Instead, the research design could have focused on firm short-term intangible variables such as decision-making, e.g., the decision to enter a developed market or not. Of course, this altered design would require participation by EMFs that decided not to enter developed markets as well as EMFs that did.

In terms of empirical results, given the apparently small effect size of organizational learning, either a sample size larger than the 166, or a longer study period, is obviously needed if the dependent variable is economic in nature. A key control variable, firm total assets, demonstrated how an economic predictor can significantly influence an economic dependent variable. Nonetheless, it should be noted that empirically significant sample differences, using two-sample t-tests for equality of means, factor analyses and correlation matrices, identified various forms of learning that were achieved by firms in the treatment group (incubator participant).
LIMITATIONS

This study adopted a one-stage approach to assess the impact of incubator participation, via increases in target market-related absorptive capacity, on EMF developed market product commercialization success. While increases in incubator participant EMF absorptive capacity were noted, there was negligible impact on the dependent variable, U.S. sales growth. Perhaps a more effective research design would be a two-stage model, where (1) incubator participation, leading to absorptive capacity increases, favorably influences firm strategic decision-making such that EMFs decide to enter developed markets, and (2) such enlightened developed market entry leads to developed market sales growth. It is worth noting that historically the length of time required to measure the effectiveness of incubators is about nine years, given that most businesses incubate for an average of three years (NABI, 2008). Hence, studying the effects of absorptive capacity on sales growth would likely yield more meaningful results if a longer field period is adopted. Finally, this study could pursue an alternative statistical model, structural equation modeling (Bolle, 1989; Jöreskog & Sörbom, 1996), that bypasses factor analyses and uses the 14 survey items as reflective indicators of the four absorptive capacity components (first- and second-order latent variables). The challenge, of course, would be to develop two additional reflective indicators of the firm performance dependent variable beside the U.S. sales growth measure used by this study.

IMPLICATIONS FOR FUTURE RESEARCH

This study demonstrated, via sample differences two-sample t-tests for equality of means, factor analyses and correlation matrices, that EMF incubator participation enhances firm absorptive capacity. Future research can either adopt the two-stage approach described above or
lengthen the study period to allow the full effects of organizational learning to bear fruit. Additionally, this dissertation focused on two specific measures of absorptive capacity, market knowledge and technological knowledge, because these are areas where incubators in particular can contribute to participants' learning (Amezcua, 2010). However, a third area of study, financial knowledge, could play an important role in the overall development of absorptive capacity and thus, impact firm performance. While differences or increases in financial knowledge could have captured important and likely significant elements of absorptive capacity, the decision not to include it was based on the attempt to specifically assess market and technology-related factors that impact firm performance without biasing performance in favor of larger or more affluent firms. Moreover, this study did not attempt to incorporate the complementary area of social capital as a means of knowledge acquisition and exploitation (Yli-Renko, Autio & Sapienza, 2001). Thus, an enriching area of further research could explore the implications of emerging firms participating in incubators and how social capital contributes to firm performance through their developed market entry.

CONCLUSION

The purpose of this dissertation was to answer the key question: How does incubator participation make EMF developed market entry more successful? Relying on several findings of prior scholarship, the expectation was that EMF incubator participation would make their developed market entry more successful. In particular, this study posited that if firms can learn more about market conditions and attain additional information of what is required to succeed, they could reduce the uncertainty of market entry (Gulati, 1998; Hsu, 2006). In an effort to further understanding of this phenomenon, this study set out to answer two questions: How does incubator participation increase EMFs absorptive capacity relevant to product
commercialization? and How does the increase in such absorptive capacity (e.g., technological learning, market learning) lead to improved performance of developed market product commercialization success? The author relied on his direct knowledge of, and experience with, several EMFs entering the United States, as well as tested two hypotheses on a sample of firms from Mexico engaged in product commercialization in the United States.

While the hypotheses were not directly supported, the findings in the dissertation identify areas for future research on absorptive capacity and market entry emerging market firms. Thus, while causation was not found, this study did find that the learning going in incubators is associated with successful economic performance. Therefore, it is important to prepare firms seeking to incubate to learn and incorporate best practices into their routines. Already the Mexican government is addressing some of the aforementioned challenges. For instance, there is a program in place to conduct “pre-incubation” training for smaller, less experience firms in Mexico (Medina, 2011). These “boot camps” can help identify firms earlier, who would likely benefit from the increases in absorptive capacity in a more meaningful way versus larger firms who have market entry experience and relationships in place. This study has shown that EMFs that participate in incubators are associated with higher economic performance as a result of developed market entry, and that EMFs that participate in incubators are associated with greater organizational learning. While causation was not demonstrated via significant regression results, other statistical tests support the general premises of both of the hypotheses. Others are encouraged to study the outcomes and practices incubation using longitudinal data and increasing the number of dependent variables measured.

As Thomas Alva Edison taught us, this is not a failure, but an opportunity to improve the work product and light a path for others. A particularly satisfying outcome of this study is the
introduction of the product commercialization framework, which can be extended into other areas of managerial theory and practice. For instance, through rigors of research design and testing, social capital can be incorporated into further study of emerging market firms that seek to enter developed markets. Additionally, would-be financiers or venture capitalists with an interest in funding emerging market firms could incorporate the framework into their due diligence and governance practices as way to measure long-term non-economic progress and short-term economic indicators. Perhaps in doing so successfully, there would be a better path forged for scholars and practitioners alike.
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APPENDIX A: IRB PROPOSAL

I. Title

This research proposal is intended as part of the requirements of my PhD dissertation, the title of which is, “The Effect of Incubator Participation in Developed Market Direct Entry by Emerging Market Firms.”

II. Investigators (Co-Investigators)

Given the focus of the research, the principal investigator is the doctoral candidate, Ebetuel Pallares-Venegas. As required by the University, the Graduate School and the College of Business Administration, the principal investigator reports to a dissertation committee comprised of four faculty members:

Committee Chair: Dr. Joseph O’Connor – Assistant Professor of Management
Committee Member: Dr. Santiago Ibarreche – Professor of Management
Committee Member: Dr. Leo Gemoets – Department Chair, Information and Decision Sciences
External Committee Member: Dr. Reid Click – Assistant Professor of International Business and International Affairs, The George Washington University

III. Hypothesis, Research Questions, or Goals of the Project

The goal of the project is to analyze the effect incubator participation has on developed market direct entry success by emerging market firms (EMFs). This research is based on firm level data, as opposed to individual level data. Figure 1 below depicts the theoretical model this research intends to explore.

The research questions I intend to answer are:
1. How does incubator participation make EMF developed market entry (product commercialization) more successful?
2. How does incubator participation increase EMFs absorptive capacity relevant to developed market entry (product commercialization)? and
3. How does the increase in such absorptive capacity (e.g., technological learning, market learning) lead to improved performance of EMF developed market entry (product commercialization) success?

The operational model, depicted by Figure 2 below, expands the theoretical model and covers how the various constructs interact with each other. This research is specifically focused on the presence or lack of incubator participation and its effect on EMF absorptive capacity as it influences EMF developed market entry (product commercialization) success.

The hypotheses the research aims to test are:

1. EMFs that develop additional technological and market knowledge (absorptive capacity) relative to a targeted developed market will tend to achieve greater market entry (product commercialization) success relative to that targeted developed market than EMFs that do not develop such additional knowledge.
2. Effective (high-quality) EMF incubator participation regarding a targeted developed market tends to lead to those EMFs developing additional technological and market knowledge (absorptive capacity) related to that targeted developed market, and therefore tends to help those EMFs achieve greater market entry (product commercialization) success relative to that targeted developed
market than EMFs that either experience low-quality incubator participation or do not participate at all in incubator programs.

IV. Background and Significance:

The motivation for this research stems from the principal investigator’s experience of observing and working with emerging market firms (EMFs), primarily Latin American high-technology firms seeking entry into United States and Europe markets. While the general phenomena of EMFs are well covered in the extant literature (e.g., Brouthers O’Donnell & Hadjimarcou, 2005; Hitt et al., 2000; Lecraw, 1993; Wells, 1983; Wright, Filatotchev, Hoskisson & Peng, 2005), the purpose of this dissertation is to answer one key question: How does incubator participation make EMF developed market entry more successful? Even before these central questions are addressed, we need a deeper understanding of how do they gain sufficient knowledge of those developed markets. To answer these questions I rely on my direct knowledge of and experience with several high technology EMFs entering the United States, as well as testing a series of hypotheses on a sample of firms from Mexico.

This research intends to empirically measure the moderation of incubator participation between increases in organizational knowledge (absorptive capacity) and the subsequent developed market entry (product commercialization) success that high-technology EMFs achieve from participating with an incubator in the United States. I lay out both a theoretical and an empirical model of domestic market product invention and product commercialization in a developed market incorporating the mediating roles of absorptive capacity and complementary assets and the moderating effects of U.S. incubators. This research plan will measure the influence of U.S. incubators on the developed market entry of Mexican EMFs. The study employs a sample of firms from Mexico that entered the United States during the time period from 2009 to 2011. The sample provides a robust set of data from which to test theoretical implications of incubator participation and the impact on organization learning.

V. Research Method, Design, and Proposed Statistical Analysis:

Research Method and Design

The research methodology and design hinge on the analysis of longitudinal (panel data) using hierarchical multiple regressions. The level of analysis is the organization and the unit of analysis is the EMF’s product innovation process, and all data pertains to the EMF, and not individuals. Therefore, survey questions and secondary data will allow me to study repeated observations over some period of time for the same firms.

Two independent data sets comprised of the same respondent firms will be utilized. The first is archival data collected by the Mexican government for purposes unrelated to this research. This data set will be used to provide the dependent variable
measures. The second data set will be derived from an online survey sent out to respondents who will provide answers to the bulk of the control and independent variables.

By using hierarchical multiple regression, I will determine the order that variables are entered into the regression equation. The research design calls for three successive blocks of variables; controls, independent and interaction variables.

My interest is in understanding the effect incubator participation has on EMF absorptive capacity, a measure of organizational knowledge, and in turn whether that leads to improved performance in the form of developed market entry (product commercialization) success, I incorporate incubator participation to the hierarchical regression model as moderation effect (the third block of variables).

Statistical Analysis

The data will be analyzed using standard SPSS software. SPSS shows the statistical results (Model Summary, Coefficients, etc.) as each block of variables is entered into the analysis. In addition, SPSS prints and tests the key statistic used in evaluating the hierarchical hypothesis: change in the coefficient of multiple determination ($R^2$), which is a model fit statistic, for each additional block of variables.

The null hypothesis for the addition of each block of variables to the analysis is that the change in $R^2$ (contribution to the explanation of the variance in the dependent variable) is zero. If the null hypothesis is rejected, then the interpretation will indicate that the variables in block 2 (my predictor set of variables) had a relationship to the dependent variable, after controlling for the relationship of the block 1 variables to the dependent variable. The third block will be the moderating variable, incubator participation, and the same statistical analysis above will be conducted.

VI. Human Subject Interactions

A. Identify the sources of potential participants, derived materials, or data. Describe the characteristics of the subject population such as their anticipated number, age, sex, ethnic background, and state of health.

Potential participants for the study are derived from a database of Mexican emerging market firms that have commercialized their product and services in the United States. A subset of these firms has participated in incubator programs in the United States as part of a Mexican government sponsored program. I anticipate generating a random sample of several hundred possible participants, of which a high number will respond and opt in to participate in the study. This assumption is based on the fact that the Mexican government and the incubators have encouraged survey participation and will facilitate outreach to participants. All potential participants will be adults with ample business experience and information about the specific areas of interest to the researchers. Participants
will be primarily male, age range mostly from 30s to 50s, enjoying good health, and upper-middle to upper class Mexican nationals with a high degree of fluency in English. Nonetheless, the survey will be professionally translated to Spanish and pre-tested for accuracy. Participation in the study will be voluntary, and no coercive recruitment methods will be utilized or allowed. Data will be collected from secondary data records collected by the Mexican government for purposes unrelated to this study, while additional primary data will be collected via an online survey. At any point in the survey process, a participant can choose to opt out. The identity of the respondents will be kept confidential. The online survey is estimated to last no more than 15 minutes, and therefore does not represent an undue hardship on participants. Moreover, the level of involvement anticipated by human subjects is quite limited.

Recruitment will be done via email, wherein invitation recipients will opt in and be directed to the survey site. The field period is anticipated to begin in mid-February 2012 and close within two weeks.

The Mexican government maintains a roster of Mexican firms that have engaged in market entry (product commercialization) abroad, as well as firms that have participated in incubators. Therefore, the Mexican government, through its Secretariat of the Economy, is the best source of the raw contact data.

B. Describe the procedures for the recruitment of the participants.

Participating firms will be recruited via email from a population of firms found in a Mexican government database. The government has agreed to release the contact information for educational purposes as presented by this research proposal. The necessary permission to utilize the data has been obtained from the Mexican government. Participating firms will opt in and log-in to respond to the survey, be presented with a consent form, and a unique ID will be generated to maintain the confidentiality of the respondent. The respondent’s answers are then collated to the unique ID so that their identities are not divulged when the two data sets (archival and survey-based) are merged. Data will only be reported in aggregate so as not to identify any specific respondent.

C. Describe the procedure for obtaining informed consent.

Informed consent will be obtained from each responding firm. While this research is based on 1) online survey data collection where every attempt is made to protect the anonymity of the respondents, and 2) additional data gathered comes from pre-existing secondary data sources, the consent form addresses all the disclosure requirements necessary to safeguard that the research protocol does not violate any of the conditions that require consent.

I also intend to use an online survey platform, Survey Monkey (SurveyMonkey, 2011) that is used by many researchers for online data collection. The
organization has established protocols to facilitate survey delivery and data collection that adheres to IRB standards. These guidelines are reposted below:

“How does SurveyMonkey adhere to IRB guidelines?

This help article outlines the potential guidelines for using SurveyMonkey as a tool to survey research participants. These are criteria that most university IRB’s recommend when using an online survey tool to collect data. It is important to engage your Institutional Review Board to approve.

Secure Transmission

It is important to enable the SSL encryption feature. Sensitive data must be protected as it moves along communication pathways between the respondent’s computer and SurveyMonkey servers. This can be achieved using SSL encryption. In addition, the IP addresses should be masked from the survey author. The SurveyMonkey site has a helpful tutorial demonstrating how to turn off the collection of IP addresses.

Informed Consent

Be sure to include a consent form for your online survey. This should be on the first page of your survey. Here is a good example of a survey consent form: https://www.surveymonkey.com/consent

Please be sure to include a data confidentiality statement in your consent form. Don’t make guarantees to confidentiality or anonymity.”

SurveyMonkey records the respondent time stamp. This is important especially for respondents that consented to taking your survey.

The survey should allow for “no response “or “prefer not to respond” as an option for every survey question. A survey where a respondent cannot proceed without answering the question is in violation of the respondent’s right to withhold information.

At the end of the survey, the respondent should be given an option to withdraw from survey.”

D. Research Protocol. What will you ask your participants to do? When and where will they do it? How long will it take them to do it? Describe the type of research information that you will be gathering from your subjects, i.e., the data that you will collect.

The research protocol calls for emailing representatives of the EMFs. The Mexican government will provide their contact information. These representatives will be informed of the following:
- Who furnished their contact information?
- What is this research study all about?
- Who can participate?
- What are their rights to opt in or out?
- What is the nature of the consent form?
- Who will have access to the information, for what purpose and for how long?
- When will the results be available and in what form?
- Whom should they contact for more information?

The participants will first be asked to review the consent form and acknowledge their desire to move forward and participate. They will then be able to print a copy of their consent form. Participants will then be asked to answer a set of questions pertaining to their firm. The entire survey is anticipated to take respondents no more than 15 minutes to complete. They will also be notified that archival data exists which can be used to enhance the analysis and report it in aggregate form. A copy of the survey is attached, as well as a copy of the data form used by the Mexican government to collect the aforementioned archival data. To encourage participation, they will be offered an executive summary of the survey results if they complete the survey.

I have appended a copy of the survey that will be issued to participants via an online survey delivery platform. I have also appended a copy of the email text that will be sent to the population to be surveyed. The archival data will be derived from a data set that the Mexican government has collected for purposes other than this study. The specific data that will be obtained from the third party are found below:

- What were firm sales by country by year for last 3 years (USD)?
- In what year did the firm begin offering its current product or solution?
- What type of company is the firm’s business (industry)?

Survey respondents will provide the remaining data.

E. How will you protect the privacy and confidentiality of participants?

The study will implement multiple layered procedures to enforce confidentiality and privacy of the participants. The primary layer of enforcement consists of three steps. First, all obvious identifiers (name, address) are removed before the dataset is even loaded and analyzed in any software. Second, less obvious unique, or nearly unique, identifiers (e.g. specific product or service) are also removed from the dataset. Third, all datasets are kept strictly within the bounds of the authorized research study and no outside entities or third parties will have access to the dataset. Additionally, any IDs assigned or utilized to collect data will be removed and replaced with randomly generated IDs.
Another layer of protection is the “firewall” between archival performance data and the responses furnished by participants. All dependent variable data (archival) is stored separate from the primary data. The consequence of this separation is that any dependent and independent variables cannot be combined unless done so by the primary investigator on proprietary hardware (research assistants, faculty or sponsoring organizations will not have access to data sets unless the principal investigator is present).

The final layer of protection is the special permissions required to receive any of the data. All investigators must obtain permission to perform their research from their IRB and sign a data distribution agreement. To avoid any unique identification of survey participants, no “Exempt” status is allowed. Any project desiring access to the data must obtain full or expedited IRB review. The data distribution agreement imposes on all investigators the responsibility to enforce the UTEP informed consent document. The investigator’s institution must agree to this document. It makes it clear that the external investigator and his institution are not indemnified against violations of confidentiality or privacy.

F. Discuss the procedures that will be used to maintain the confidentiality of the research data.

Once data is collected via a server with secure socket layer (SSL) and encrypted, it will be analyzed on a single computer belonging to the principal investigator. This data will not be sent to any third party. When the research field period ends, two weeks after launch, all data will be wiped off the external server. Once analysis is completed on the proprietary computer, the data will be backed up onto an external drive and encrypted. The random IDs will remain the link to the data, but all obvious identifiers will not be included in the encrypted file. The encrypted file will be kept for a period of three months. No third party will have access to the aforementioned data file. All printouts of data or printed survey forms will be destroyed immediately following their use, and only the encrypted electronic file will remain securely stored.

G. Please describe your research resources.

The principal investigator has designated ample time for data collection and analysis. The staff needs are not a factor, since the principal investigator is responsible for data collection, analysis and reporting. The PI will also provide all equipment and space necessary to carry out the research. There is no need for any special facilities.

VII. Describe any potential risks (physical, psychological, social, legal, or other) and assess their likelihood and seriousness. Describe alternative and potentially less risky methods, if any, that were considered as possible methods and why they were not used. If the research methods impose risks on the subjects, include evidence that may
justify their use (such as previous experience with the procedures). Most studies pose some degree of risk, even though the risk may be minimal.

The overall potential of this research for psychological, social, and/or physical harm is minimal. The strong barriers to identifying individual participants of the study minimize the potential violations of privacy and confidentiality. All personal identifiers are removed from a dataset prior to analysis and any reporting is done in aggregate. Furthermore, outside of the principal investigator, no other parties will have access to any personal identifiers. The principal investigator will use randomly generated IDs for all data to safeguard the integrity of the data. The Study will institute a “firewall” between the archival data and the participant provided data (survey data). All archival data will be kept separate from the survey data. The consequence of this separation is that access to the combined data set will only be available to the principal investigator, and only with random IDs in the statistical software package, SPSS.

The potential for adverse effects on insurability, employability or social status is minimized by two approaches. First, the study aims to obtain consent from each participant and only for the purposes of this study. Second, providing data to any third party will only be done in statistical aggregate, as in the reporting that will be done in the dissertation. The informed consent gives the participant total control over whether who accesses the data and for what purpose.

The potential for harm from disclosure of participant demographics is minimized by the study’s privacy and confidentiality measures mentioned above. In addition, the principal investigator removes all individual identifiers such as name and address from the dataset prior to analysis and reporting. This should prevent even a legitimate investigator from detecting the identity of any record. Furthermore, in the unlikely event that any participant identifier escapes the internal checks, the data distribution agreement, which all investigators must sign, forbids any public disclosure and requires the investigator to report the non-paternity to the Study.

Given that the unit of analysis is at the firm level, the potential for any damage to business continuity or reputation is close to non-existent given that the data is longitudinal and historic, with independent variable data from 2008 - 2010 and dependent variable data from 2009 – 2011. Furthermore, the analysis will be conducted on the perceived increase in absorptive capacity of the firm as reported by the respondent, and will have no bearing on the financial viability of the business reporting. This study does not involve any form of deception, and therefore requires no form of debriefing the participants on this matter.

VIII. Describe and assess the potential benefits to be gained by participants (if any) and the benefits that may accrue to society in general as a result of the planned work. Discuss the risks in relation to the anticipated benefits to the participants and to society.
This enjoyment and the sense of good feeling they get from helping the research enterprise makes surveys possible. While the pleasure is probably temporary; no systematic evidence of long-term benefits from survey participation has been collected, though such benefits are possible.

What is tangibly a benefit to respondents is receiving an executive summary of the aggregate results of the study. This can be a useful tool for their firms.

The most obvious benefits of surveys are those to the researcher and to society. The survey is the only method capable of providing generalizable information on a variety of aspects of organizational learning as perceived by business managers and owners. Survey data are essential to advancing our understanding of changes or improvements of organization learning for EMFs that engage in market entry (product commercialization) in the United States. Research involving the EMFs is critical in helping society understand the following:

- Whether incubator participation ought to favorably increase the absorptive capacity of an EMF relevant to product commercialization.
- What is the relationship between the absorptive capacity of the EMF and its market entry (product commercialization) success in the United States.
- How to measure incubator performance and contribution to EMF market entry (product commercialization success) in the United States.

Even where the benefits of surveys are not immediately apparent, the potential benefits clearly outweigh the minimal risk of harm to respondents in the majority of surveys. In the case of this survey, which presents no physical risk to participants, and a very low level of psychological or business risk, the benefits to participants and to society far outweigh the possibility of the risks described above.

IX. Indicate the specific sites or agencies involved in the research project besides The University of Texas at El Paso. Demonstrate that PI has the resources and facilities necessary to conduct proposed research.

N/A

X. Review by another IRB.

N/A
APPENDIX B: ONLINE SURVEY

Ph.D. in International Business Dissertation Survey

The purpose of this survey is to ask business executives about their perceptions of organizational learning across several dimensions. You’ll be presented with a few questions about how your company utilizes information over a period of time. The first set of questions will ask you to answer questions as they pertain to the year before your firm’s initial commercialization activity in the United States, while the second set of questions pertains to the year after your firm began its commercialization activity in the United States. No single firm data will be identified in any way; only aggregate data produced by this survey will be incorporated into a dissertation for the degree of Doctor of Philosophy in International Business. An executive summary of the aggregate results will be provided to firms that complete this survey, as well as to the Mexican Government and participating incubators. Only the principal investigator will have access to individual firm survey responses and those responses will not be disclosed to anyone else.

Please answer the questions using the scale presented for each set of questions as it pertains to the year before you started doing business in the United States.

A. On a scale of 1 to 7, with 1 being very low degree and 7 being very high degree, please specify to what extent your company uses external resources to obtain information (e.g., personal networks, consultants, seminars, internet, database, professional journals, academic publications, market research, regulations, and laws concerning environment/technique/health/security):
   1. The search for relevant information concerning our industry is every-day business in our company.
   2. Our management motivates the employees to use information sources within our industry.
   3. Our management expects that the employees obtain information beyond our industry.

B. On a scale of 1 to 7, with 1 being very low degree and 7 being very high degree, please rate to what extent the following statements fit the communication structure in your company:
   4. In our company ideas and concepts are communicated cross-departmental.
   5. Our management emphasizes cross-departmental support to solve problems.
   6. In our company there is a quick information flow, e.g., if a business unit obtains important information it communicates this information promptly to all other business units or departments.
   7. Our management demands periodical cross-departmental meetings to interchange new developments, problems, and achievements.
C. On a scale of 1 to 7, with 1 being very low degree and 7 being very high degree, please specify to what extent the following statements fit the knowledge processing in your company:
8. Our employees have the ability to structure and to use collected knowledge.
9. Our employees are used to absorbing new knowledge as well as to prepare it for further purposes and to make it available.
10. Our employees successfully link existing knowledge with new insights.
11. Our employees are able to apply new knowledge in their practical work.

D. On a scale of 1 to 7, with 1 being very low degree and 7 being very high degree, please specify to what extent the following statements fit the commercial exploitation of new knowledge in your company (Note: Please think about all company divisions such as R&D, production, marketing, and accounting):
12. Our management supports the development of prototypes.
13. Our company regularly reconsiders technologies and adapts them according to new knowledge.
14. Our company has the ability to work more effectively by adopting new technologies.

Please answer the questions using the scale presented for each set of questions as it pertains to the year after you’ve been doing business in the United States.

E. On a scale of 1 to 7, with 1 being very low degree and 7 being very high degree, please specify to what extent your company uses external resources to obtain information (e.g., personal networks, consultants, seminars, internet, database, professional journals, academic publications, market research, regulations, and laws concerning environment/technique/health/security):
15. The search for relevant information concerning our industry is every-day business in our company.
16. Our management motivates the employees to use information sources within our industry.
17. Our management expects that the employees obtain information beyond our industry.

F. On a scale of 1 to 7, with 1 being very low degree and 7 being very high degree, please rate to what extent the following statements fit the communication structure in your company:
18. In our company ideas and concepts are communicated cross-departmental.
19. Our management emphasizes cross-departmental support to solve problems.
20. In our company there is a quick information flow, e.g., if a business unit obtains important information it communicates this information promptly to all other business units or departments.
21. Our management demands periodical cross-departmental meetings to interchange new developments, problems, and achievements.

G. On a scale of 1 to 7, with 1 being very low degree and 7 being very high degree, please specify to what extent the following statements fit the knowledge processing in your company:
22. Our employees have the ability to structure and to use collected knowledge.
23. Our employees are used to absorbing new knowledge as well as to prepare it for further purposes and to make it available.
24. Our employees successfully link existing knowledge with new insights.
25. Our employees are able to apply new knowledge in their practical work.

H. On a scale of 1 to 7, with 1 being very low degree and 7 being very high degree, please specify to what extent the following statements fit the commercial exploitation of new knowledge in your company (Note: Please think about all company divisions such as R&D, production, marketing, and accounting):

26. Our management supports the development of prototypes.
27. Our company regularly reconsiders technologies and adapts them according to new knowledge.
28. Our company has the ability to work more effectively by adopting new technologies.

**Previous Experience**

I. Do you currently have any partnerships with U.S.-based firms that facilitate your product commercialization in the United States?
1. Yes
2. No

J. If yes, in what year was the first of these partnerships established?

K. Do you currently have access to advice from specialized consulting firms that facilitate your product commercialization in the United States?
1. Yes
2. No

L. If yes, in what year was the first consulting relationship established?

**Incubator Participation**

M. At any point in the past 3 years have you participated in the TechBA program sponsored by FUMEC and Mexico’s Secretaria de Economia?
1. Yes
2. No

N. If Yes, what was the nature of your participation?
1. I only attended workshops held in Mexico, but did not attend any workshops in the United States.
2. I attended workshops in the United States.
3. I was accepted as an incubation client but did not attend.
4. I was accepted as an incubation client and I did participate in the incubation program.

O. If you participated in the incubation program in the United States please provide the following information:
1. Year(s) of participation
2. Location where your company was incubated
3. Participated with full-time attendance (20+ hours per week)
4. Participated with part-time attendance (less than 20 hours per week)

P. On a scale of 1 to 10, with 1 being a very low degree and 10 being a very high degree, please specify how you would rank the overall quality of the incubator that you participated in, considering the services, facilities and specialized assistance that were provided to your firm.

Demographic Data
Note: The information provided in this survey, including the data requested below, will be given special protection so as to minimize unauthorized use or disclosure. All identifying information will be removed from the dataset prior to analysis and all reporting will be done on an aggregate basis only. Several additional security measures, including firewalls, will be used to ensure that no one beyond the principal investigator can identify any respondent firm with the dataset.

1. Name
2. Title
3. Company Name
4. Year your company first started doing business in Mexico
5. Year your company first started doing business in the United States
6. Number of employees for most recent year of operation
7. Estimated total assets (in US dollars) for most recent year of operation
8. Email Address

Thank you for your participation. The results will be available after July 1, 2012. You can contact me at Ebetuel@gmail.com to obtain an executive summary of the results.
CURRICULUM VITA

Ebetuel Pallares-Venegas was born in Ciudad Juarez, Chihuahua, Mexico. The sixth son of Carlos Pallares Jasso and Hermila Venegas Pallares, he graduated from Riverside High School, El Paso, Texas, in the spring of 1991 and entered Brandeis University in the fall. He received a bachelor’s of arts degree from Brandeis University in 1995. His professional experience spans working for top-tier strategy consulting firms, co-founding start-ups, international business development, nonprofit management and military service. In the summer of 2009, he co-founded Cottonwood Capital Partners, the general partner of Cottonwood Technology Fund, a seed and early-stage venture fund with headquarters in El Paso, TX. He serves on several corporate and nonprofit boards. He is also an advisor to the UT Horizon Fund, the venture capital investment fund of the University of Texas System, and on the limited partnership advisory committee of several venture funds. In the spring of 2005, Mr. Pallares received his MBA from The University of Texas at El Paso. As a student scholar, Mr. Pallares served as the both the secretary and as president of the PhD Project, a non-for-profit national organization spun out of The KPMG Foundation whose mission is to increase the diversity of corporate America by increasing the diversity of business school faculty. Mr. Pallares is married, and enjoys fatherhood. When not watching his kids while his wife, a professional photographer, is on assignment, Beto engages in reading, writing and community service.

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