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The Development and Diffusion of Business Incubation Capabilities in Five Emerging Markets in South America

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Abstract: Business incubation encourages new business formation and offers the potential to improve emerging market economies. Business incubation is a system of routines for creating and improving survival rates and growth of new businesses. Incubation originated in developed economies and is now spreading globally to emerging markets. Incubators are designed to reduce start-up costs and train entrepreneurs in business practices while connecting them to markets and assisting in securing financial backing for the new ventures. For this qualitative study I interviewed managers from business incubators, government agencies, nongovernmental organizations and entrepreneurship educators from Peru, Bolivia, Chile, Argentina, and Brazil. This study integrates incubation practices in these five countries with organizational learning and diffusion of innovation theories to propose a model of stages of development for incubation practices in emerging markets. The model describes how national systems of business incubation develop and differentiate due to unique cultural, political, and economic contexts.

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Introduction

Incubation research has focused on incubation practices in developed economies that often have long experience with incubation, or in rapidly emerging Asian economies such as China and India. These studies often focus on differences in practices and policies of the incubators themselves and how they assist their clients. This study focuses on how incubation activity begins and develops over time, sometimes into complex national networks of incubators. In order to examine incubation in different national contexts, I interviewed incubator managers and others interested in entrepreneurship in five emerging markets in South America: Peru, Bolivia, Chile, Argentina, and Brazil. While all of these countries have some level of incubation activity, they vary in their amount of incubation activity, economic activity, population, innovative capacity, governmental innovation policy, and historical involvement with business incubation and entrepreneurship. In addition, South America is a growing market for trade but has been eclipsed lately by the attention given to the emerging markets of China and India.

In this study, I seek to understand the role of government policies, incubator sponsors, cultural values, and economic forces on the development of business incubation capabilities over time. From my observations and using relevant organizational theories, I propose a model for the development of incubation in emerging markets and illustrate that model using qualitative observations of the similarities and differences among entrepreneurs, incubation practices, and national incubation systems in those emerging markets. The nature of business incubation puts this study at the intersection of macro-level forces such as national innovation policy, economic development policy, and economic activity. National cultural factors related to the propensity to

tolerate risk, consequences of failure, and image of ownership and entrepreneurship in the society also have great effects on the creation and elaboration of business incubation practices in the countries in this study.

Study description:

During July and August of 2006 I conducted 27 interviews in a total of five countries in South America. A summary of the types of organizations participating in the interviews appears in Table 1. In addition, a list of interview sites appears in Appendix 1. Site names are disguised in the appendix to keep interviewee identities confidential. Interviews are cited in parentheses throughout the paper using their country name and identifier.

Table 1

Onsite interviews conducted in 5 countries during July and August 2006

	Incubators	Educators	Agency/ Sponsor
Argentina	2	1	1
Bolivia	1	0	0
Brazil	10	0	2
Chile	5	1	1
Peru	1	2	0
Total	19	4	4

To learn about current incubation practices and the historical development of incubation in each country, I interviewed a number of business incubator managers, university professors active in entrepreneurship education and government officials. The roots of this study began

with a preliminary trip to Chile in October 2005, during which I attended a conference of Latin American business researchers and interviewed managers from two Chilean incubators. Both incubators were pursuing clients in differentiated ways that fit their university sponsors' traditional strengths. Both incubators were early movers in Chile's incubation marketplace.

One incubator was focused on commercializing faculty and private sector technology developed in conjunction with the universities science and engineering schools. The other incubator was founded later by a highly respected private university known for its business education prowess. It was primarily a virtual incubator focused on developing the skills of the entrepreneur and focused on the founding and growth of business ventures. The university had worked in consultation with a leading U.S. incubator and a famous U.S. venture capitalist. The incubator focused on helping the entrepreneur create a top management team and develop the founder's management expertise.

I also attended the formal founding meeting of the incubator managers and government and university sponsors that formed a cooperative incubator network called ChileIncuba. Following that meeting, I interviewed a manager involved in the early formation of Santiago's first incubator who was now in charge of evaluating the performance of government funded incubators throughout the country. The first incubator in Chile was founded by the city of Santiago and was designed to promote economic development, employment, provide low-cost services, and use underutilized assets to encourage new business formation (CORFO, 2005). The manager was now a national government official in CORFO (a Chilean government agency focused on economic development) which provided funding and oversight for the creation of a network of incubators based in universities that served all but three of the 15 administrative

regions in Chile (Chile AN, 2006; Chile UC, 2006). She was in the process of developing performance measures for the networked incubators funded by CORFO.

My preliminary Chilean interviews left me with several questions. First, what are the different ways that incubators are founded and what influences the incubators' strategic choices in terms of target clientele and the services that are offered? Second, why and how do networks of incubators develop over time? Chile has a young but extensive network of loosely affiliated incubators now uniting under the mantle of a network association, but is this a common model that all emerging markets will copy or are there other models? Finally, I want to understand the process of creating a national system of incubation.

This initial fieldwork in Chile formed the basis for the second round of extensive interviews conducted in five countries during June, July, and August of 2006. Peru, Bolivia, Chile, Argentina and Brazil were selected because my initial background research shows that there are important differences in the level of incubation in each country that provide insight into the topics identified in the preliminary research. For example, in Bolivia, there was mention of an incubator established by a U.S. university; however, I could find no indication that the incubator still exists. Peruvian scholars indicate that in Peru there are several incubators but the concept is very new to them and has not been adopted at the national level. Argentina has incubation activity, but it is scattered across a number of incubators in cities and universities and there is no national network. Chile's national incubation network was formed while I was in Santiago in 2005. Brazil has extensive incubation networks at the regional level and institutions that create a very sophisticated system of linkages between universities, quasi-government agencies, and government sponsors.

Social and economic factors affecting entrepreneurship and incubation

Factors affecting the national context include economic capacity, differing degrees of socialism and capitalism, population levels and the relative cost and time to start businesses. These factors provide insight into how incubation practices are adapted to fit national contexts. For example, Chile is admired as the most entrepreneur-friendly environment. It is relatively rich in terms of gross domestic product but is small in population. Following many years of dictatorship, Chile has a relatively young democratic government. Chile's economy is a free market, but it has a highly centralized government and an export-focused economy invested mainly in raw materials extraction, agricultural production and winemaking, with little high-tech manufacturing. Starting a business in Chile takes relatively little time and the government is interested in making it even less demanding in terms of cost and time.

Brazil also is democratic after years of military rule, possessing a strong economy with inflation under control, strong regional governments, advanced private and public scientific and manufacturing organizations, and a large population of underemployed people. It is time consuming to start a business in Brazil. The cost is not much different than other countries in absolute terms, and relative to national income, it is relatively cheap.

Peru has a young democracy emerging from years of guerrilla warfare but plagued by scandal and corruption. The economy is very rural and the population experiencing a growing prosperity but also facing extensive poverty. Bolivia is also a young democracy that has just recently elected a socialist President whose ancestry is indigenous rather than European. There is prosperity from new natural gas industry development and exports but the poverty faced by the people in Bolivia is grinding and Bolivians are suspicious of the potential downside to free markets. Starting a business in Bolivia is relatively difficult, time consuming and very expensive

given the low national income. Table 2 below describes some key indicators that may affect incubation practices.

Table 2: Selected economic and social indicators, 2005, World Bank World Development Indicators					
Indicator	Argentina	Bolivia	Brazil	Chile	Peru
Business entry rate (new registrations as % of total)	12%	7%	na	18%	6%
Ease of doing business index (1=most business-friendly regulations)	93	126	122	24	78
Cost of business start-up procedures (% of GNI per capita)	12%	162%	10%	10%	38%
GDP (constant 2000 US\$) (in billions)	\$ 313.6	\$ 9.7	\$ 738.2	\$ 93.2	\$ 65.4
GDP per capita growth (annual %)	8%	2%	2%	5%	5%
Time required to start a business (days)	31	50	152	27	102
Total businesses registered (number)	450,535	24,649	na	170,636	554,135
Population, total (in millions)	38.7	9.2	186.8	16.3	27.3
Population in urban agglomerations > 1 million (% of total population)	39%	31%	37%	35%	26%

Methodology

The incubators for the second round of interviews were selected where possible to give a variety of types, locations, sizes, and age. To understand the origins of business incubation as well as current practice, I opted to use semi-structured interviews as well as published data. I obtained deep historical insights by interviewing well-established incubators to gain access to the

most experienced incubator managers. To gain insight into current incubation trends, I also interviewed managers and officials from agencies and incubators that were created or changed recently (e.g. the Bolivian incubator was only two months old) (Bolivia, 2006).

Also, as interviews progressed, I was able to pursue several referrals to key government incubation financing agencies (CORFO in Chile, SEBRAE and ANPROTEC in Brazil) and other incubators. This process was a type of “snowball” sampling where subjects from incubators recommended other locations and experts that could address or contrast with the previously scheduled interviews. The 27 site visits in this second round of interviews consisted of 19 incubators, four government agencies or incubator sponsors and four entrepreneurship educators. Some interviews were attended by representatives from multiple organizations such as incubator managers, sponsors, and university personnel affiliated with incubators. In most cases, the incubators were closely associated with universities, often being run by managers who were also university faculty (Peru, 2006; Bolivia 2006; Argentina, 2006; Chile, 2006; Brazil, 2006).

Within countries, incubators gave very consistent responses regarding regional or national policies and their specific incubation practices and the most relevant interviews are used for citation purposes though the information may have been confirmed in a number of other interviews. The interviews were semi-structured using a series of prompts and follow-on questions in an emergent style consistent with qualitative research procedures used to develop theory from case data (Eisenhardt, 1989). Table 3 below lists the major interview topics.

In the analysis that follows, I offer a staged theory of development of business incubation in emerging markets based on the insights gained from interviews, written documentation, as well as related websites and other publications. I synthesize information from the interviews and analyze business incubation practices in each of these five countries and, based on relevant

organizational characteristics and other data, integrate the data with organizational theories to create insights into how national systems of business incubation develop over time.

Table 3: Key interview topics

History of the incubator
Affiliations with universities
Origins, original sponsors
Funding sources for the incubator and incubatees
Role of stakeholders in creating and operating the incubator
Government, Sponsors
Attitudes toward entrepreneurs and the government
Network affiliations of the incubator
Private-sector role in incubator
Manager and experts employed at the incubator
Sources of incubatee firms
Qualifications of entrepreneurs
Programs for developing incubatee firms
Degree of specialization by the incubator
Techniques for assisting incubatees
Services and resources available for incubatees
Sources of revenue for the incubator
Long-term development objectives for the incubator

Overview of Business Incubation

Business incubation is a well-known technology for assisting the creation, survival and growth of new businesses (entrepreneurship). Business incubation originated in the U.S. in the late 1960s in an effort to reuse abandoned or underutilized buildings. Since then, business incubation practices have matured to a standardized set of procedures. Incubation has spread to over 4,000 incubators worldwide (Hackett and Dilts, 2004). There are estimated to be 2 to 5 incubators in Peru (1 interviewed), 1 to 2 in Bolivia (1 interviewed), 21 in Chile (5 interviewed), 10 to 15 in Argentina (2 interviewed) and 299 incubators (11 interviewed) in Brazil, with 100

more Brazilian incubators under development. (Peru, 2006; Bolivia, 2006; Chile, 2006; Argentina Univ., 2006; Brazil ANP, 2006).

Hackett and Dilts in their 2004 review of business incubation research offer the following definition of business incubation: “A business incubator is a shared office space facility that seeks to provide its incubatees with a strategic or value-adding intervention system of monitoring and business assistance” (Hackett and Dilts, 2004, p. 57). Incubators are typically non-profit organizations created to achieve economic revitalization, commercialization of university technology and incubation of high potential new ventures. Specifically, business incubators improve the survival rate, growth potential, and speed to commercial viability of new businesses. They lower the incubatee’s start-up costs by providing low-cost shared secretarial and technical services and low-cost space for operations (iDisc, 2003; Hackett and Dilts, 2004).

The South American incubator managers interviews reveal that the services offered by their incubators are very similar, though with some variation. For example, a key strength of one incubator located in a large city is its below market space rental costs (Brazil CIE, 2006). Several incubators do not offer any space for rent (being located in cities with inexpensive space available for rent), several are too new to have space available, and others operate as virtual incubators only (Bolivia, 2006; Chile HG, 2006; Chile North, 2006; Peru, 2006; Argentina City, 2006; iDisc, 2003).

In discussing incubator operations, Hackett and Dilts (2004, p. 57) state “[T]he incubator is not simply a shared space, it is also a network of individuals including staff (counselors), advisory board, incubatee companies, employees, professionals, universities, angel investors, venture capitalists.” In emerging markets, many customers simply are unwilling to trust a new supplier and there is little that can be done to inspire their confidence short of a strong reputation

based on years of business. The incubators address this problem by providing the startup with access to the incubators' (and the universities') support networks. These networks are more extensive than those in more developed markets and contain not only customers, suppliers, and service providers, but also additional members including governmental employees (usually in economic development agencies), export or technology development officials, government financed investment officers, industry trade associations, and incubator network administrators or officials (Argentina, 2006; Chile HG, 2006).

A number of incubators specifically do not provide access to funding but do provide assistance to the entrepreneur in how to find financing. Other incubators have access to private funding sources through their advisor networks, angel investor networks, and, in Brazil and Chile, government-funded startup and mezzanine financing programs. Several incubators are able to take ownership in their incubatees in exchange for services or are able to receive future royalties from incubatees' future sales (Brazil BIO, 2006; Brazil CIE, 2006; Chile DIC, 2006). Key issues early in this adoption process include: how is business incubation introduced into emerging markets? And, once the incubator is started, what factors will influence whether business incubation will diffuse beyond pioneering sites to become an established and widely used technology and form national networks of incubation?

I. Initial adoption of business incubation

In traditional learning situations, organizations learn from their own experiences and search for solutions to their problems (Cyert and March, 1963). These search efforts are often stimulated by a performance gap where aspiration levels do not meet organizational performance. As governments and economic development officials and educators see the

problems of poverty, lack of employment and obsolete and underperforming industries, there is a desire to find solutions to reinvigorate their economies. In the search for effective solutions, organizations learn by experimenting, adopting successful solutions from other organizations, or institutions and incorporating these practices with existing organizational routines (Levinthal and March, 1981). Decisions to adopt new solutions to organizational or societal problems can be complex, involving several important stages of the innovation-decision process such as knowledge of the innovation and persuasion as to its efficacy (Rogers, 1995, pp. 162-170).

For a practice or technology like incubation to diffuse widely in an emerging market, incubation will have to achieve both legitimacy (acceptance by sponsors and incubatees) and efficacy (efficient use of resources compared to alternatives). Innovations diffuse more readily if they have been shown to provide tangible benefits, especially economic advantage over existing technologies (Griliches, 1957; Rogers, 1995). However, economic advantage is not the only criterion for adoption decisions; Rogers (1995, pp. 127-128) cites Bordenave (1976) regarding the need to consider whether the technology being diffused in Latin America is “appropriate, well proven and adequate for the stage of socioeconomic development of the nation.” In addition, Bordenave (as cited in Rogers, 1995) also recommends consideration of the innovation’s potential impact on profits for elite groups, employment, equitable income distribution, and migration of rural population to cities.

Rogers (1995) implies that caution should be used in diffusion research due to its pro-innovation bias. Bordenave (as cited in Rogers, 1995) cautions diffusion experts to be mindful that the classical diffusion paradigms were conceived of in the more economically and politically stable conditions of Europe and America, and those conditions differed greatly from social and cultural conditions found Latin American societies (Rogers, 1995).

Incubation as a learned solution

In this study, I find that the governments of all five countries are interested in economic development techniques that will help them respond to poor economic performance leading to slow growth, high unemployment, and uncompetitive businesses. Their search for ways to improve that performance led to the development of entrepreneurship education through universities and local governments. As a further step in stimulating national economic performance, national and/or local governments and universities in each of these five countries have also adopted business incubation programs.

Incubation in emerging markets often begins with imported technology and routines copied from *infodev* incubators (the World Bank's incubation initiative) and contacts with other incubators in countries with established networks of incubation. The foreign incubators and incubation-sponsors like *infodev* deliberately transfer their routines to the new country in order to help the nation establish pioneering incubators (iDisc, 2003). These pioneering incubation efforts acted as broadcast sources (Dimaggio and Powell, 1983; Miner and Haunschild, 1995) and templates for additional new incubators and for the transfer of technical knowledge about how to incubate entrepreneurial businesses effectively (iDisc, 2003).

Incubation technology or routines have been imported into the national systems of innovation of emerging market countries since the 1970s. However, each country has its own trajectory of adoption. Brazil was an early adopter, in part seeking to improve indigenous technology development (Brazil SEB, 2006; Brazil CIE, 2006) and also utilize assets that are underutilized. In fact, one of the incubators I visited was located in the building that had been designed to house the former military government's nuclear weapons development program

(Brazil CIE, 2006). Chile's earliest incubators were developed by the city of Santiago to boost entrepreneurial behavior especially in mining and export industries.

The role of legitimacy in adoption of business incubation

Incubation took hold in part because innovative ideas that are endorsed by international development agencies carry with them the legitimacy accorded those same institutions.

International agencies such as the World Bank through its *infodev* incubator program and the related iDisc advisory program seek to influence and persuade governments to create incubators (Chile AN, 2006; iDisc, 2003). French business incubators and U.S. incubators as well as the National Business Incubation Association trade association and its associated annual meetings are other sources of early learning for business incubators (CORFO, 2005; Chile HG, 2006). In fact, a number of South American incubator startup efforts have been assisted by experienced Brazilian incubators (Brazil CIE, 2006).

Importation and customization of foreign incubation routines was commonplace in part due to bandwagon effects (Abrahamson and Rosenkopf, 1993) among economic development officials and the "push" efforts by international agencies such as the World Bank's *infodev* program (iDisc, 2003). Business incubation techniques gained great admiration in Peru and Bolivia because the Brazilians had created such an extensive network and the less developed economies generally looked to more developed economies as thought leaders in new techniques.

Proposition 1a: Early incubators will be founded in conjunction with international development or other international change agents (such as *infodev*). Legitimacy of NGO's and other agencies can overcome resistance to adoption of incubation.

In the business incubation context, the transfer of knowledge from the incubator to the incubatee will be influenced in part by elements of the institutional context in which the

incubator exists and operates. Elements that influence knowledge transfer in a system are: 1) the number of skilled actors available to facilitate knowledge transfer (Cyert and March, 1963) in this case the number of incubators and their capacity to work with incubatees; 2) the amount of collective experience that actors have in operating in the institutional context (Cyert and March, 1963; Dimaggio and Powell, 1983) - in the incubation context this would be the length of time that incubators have been active in the country and the extent to which those incubators have been operating effectively; and 3) the degree that knowledge transfer routines are enacted in national innovation systems (Kogut, 1991; Nelson and Rosenberg, 1993), which in the incubation context would include the elaboration of incubators, their support systems of advisors, networks of incubators, and government agencies that provide incubator and incubatee support.

Over time, these institutions and actors will work together and develop scripts, routines, and standard operating procedures from their experiences with trial and error learning (Cyert and March, 1963), or vicariously from other organizations (Dimaggio and Powell, 1983). Some of these routines make knowledge transfer likely (Suchman, 1994), while others have symbolic value making organizations appear more legitimate (Edelman, 1992). When business incubation is adopted by an emerging market country, its adoption is a learning process that evolves over time. The basic model is imported by copying practices and procedures from foreign incubators. Each incubator customizes its approach over time through some trial and error processes and through interorganizational learning via international development agencies, existing foreign incubators, and change agents (IDB, 2006; Bolivia, 2006; Chile HG, 2006; CORFO, 2005).

Proposition 1b: Business incubation practices will resemble practices advocated by the international sponsors that function as broadcast sources of innovation.

Political concerns in the adoption of incubation

There are several political factors that influence the balance between university, private foundations and government involvement in growing incubation programs. In Bolivia, the government is so focused on dealing with more fundamental issues such as alleviating poverty and hunger that it ignores efforts to begin incubation programs. The election of a populist indigenous President created a backlash against existing private businesses, especially internationally-owned extractive businesses in mining and natural gas production. For this reason, the foundation sponsoring the incubator in La Paz, rather than seeking publicity in its launch of the incubator, keeps a relatively low profile in the city and does not seek additional aid from the government so as to remain under the “radar” during this period of transition to the new government. By deliberately keeping a low profile the incubator is also imitating a common strategy by entrepreneurs in Bolivia of remaining small and unofficial (not registering with tax authorities) to avoid onerous regulation and taxation.

Cultural and historical conditions also shape the emergence of incubators in South America. Institutional sponsorship plays a crucial role in incubator start-up and growth because there are limited resources available to entrepreneurs and a reluctance to take risks in some emerging markets such as Peru and Bolivia or even Chile, because of the cultural view of failure as a very negative and lasting stigma to those who have failed (Peru, 2006; Bolivia, 2006; Chile HG, 2006). There is also a lack of trust on the part of incubatees who fear the failure of their enterprise due to the inexperience of the incubator or copying of their new business idea by government officials, rival entrepreneurs and future competitors.

By using the practices and procedures of legitimate (previously successful, often international) sources, incubators can begin operations quickly and gain the support of local and national sponsors as well as the confidence of entrepreneurs looking for incubation services. The

copying of known incubation routines gives the new incubator legitimacy and improves its chances of success by moving it down the learning curve faster and with less chance of failure than if it had to invent original incubation routines for the very first time.

Incubation managers in the least developed countries, Peru and Bolivia, are experiencing social turmoil due to high levels of poverty. This is the case as well in Brazil, which has a large segment of its population that is traditionally underemployed and living in impoverished areas of the country (Brazil ANP, 2006; Bolivia, 2006; Peru, 2006). Early on in both Bolivia and Peru, incubation technology diffused slowly in terms of establishing incubators as part of a broader emphasis on growing entrepreneurs. In Bolivia, incubation was very new and virtually unknown outside the small community involved with the foundation. In both countries, there is no organized involvement at the government level in developing and diffusing incubators. In Peru, this lack of government involvement occurred because the interested agencies were focused on mass education of “entrepreneurs of necessity” (Peru, 2006; Peru Univ. 2006). In Bolivia, the government is more focused on providing basic services for its citizens and in nationalizing the energy sector than on entrepreneurship (Bolivia, 2006).

Factors limiting incubation diffusion

While being slow to adopt a national system of incubation, the Peruvian government has been very active in developing microfinance alternatives. The government sees political and social advantage in encouraging the startup of very small ventures that essentially create only a single job for the founder. As with incubation, there are non-governmental organizations from the international sector seeking to help establish microfinance programs. Unfortunately for incubation supporters, microbusinesses are poor candidates for incubation practices and rarely grow into the larger, more sophisticated businesses that incubation can create (Peru Univ., 2006).

Incubators, even if very successful, only have a limited impact on economic growth. For example, the most successful incubator interviewed has 45 graduated firms and currently incubates 118 firms. It takes between 2 and 3 years to incubate a successful firm making economic benefits slow to develop. However, this incubator's post-graduation survival rate was 80% after 2 years whereas the underlying survival rate of non-incubated firms was less than half of the incubator's rate. Altogether, the graduated firms have created a total of 550 jobs and \$12 million in sales. While in this case the incubator's success seems impressive, it is not at all typical, as most incubators in Brazil have between 12 and 18 incubatee firms each (Brazil CIE 2006; Brazil CMP, 2006) as do Chilean incubators (CORFO, 2006).

Not all efforts to establish incubators are successful (Brazil Network, 2006), nor does incubation spread passively from one country to another. Within South America, frequent visits by incubator managers to learn new practices are common both within national incubation systems and between established incubators and new startup incubators (Brazil CIE, 2006; Brazil Network, 2006). Political and historical factors affect the extent of diffusion of incubation and collaboration between incubators. For example, the Bolivian incubator was interested in learning from the Columbian incubators and the Brazilians but not as much from the Chileans. The Peruvian incubators are also reluctant to engage with the Chilean incubators or to be seen as "copying" the Chilean approach to creating a network of incubators. Resistance to Chilean influence was rooted in the current political climate and ultimately stems from a war (and the resulting territorial dispute) between Chile on one side and Bolivia and Peru on the other during the late 1800s (Bolivia, 2006; Peru Univ., 2006; Peru, 2006; Brazil CMP, 2006).

Proposition 1c: Experimentation by forming incubators will develop sporadically and slowly due to resource scarcity. Social and political factors will affect the role of national

government involvement in incubation until the incubation movement demonstrates its efficacy in creating businesses that benefit the nation.

II: Societal factors affecting incubation practices

A key question that arose during the interview process is how the development of incubation capabilities varies across different countries. For example, it is clear that Brazil had made decades of effort to develop its incubation networks and was still creating new incubators at a fast pace, with over 100 more incubators proposed as of 2006 (Brazil ANP, 2006). Chile also has an extensive network relative to its size (roughly equivalent to Brazil, at a ratio of about one incubator for every 600,000 people). Unlike Brazil and Chile, incubation efforts in Argentina are developing without national coordination. Peru and Bolivia are really just beginning to chart their course with experimental programs. To understand the similarities and differences in the various national incubation situations, I examined several contextual aspects of each country.

The role of national context in shaping incubation

The cultural concept of entrepreneurship is not a universal concept and its definition and cultural relevance varies by country. Busenitz, Gomez, and Spencer (2000) developed measures for rating institutional profiles and cultural values and recognized the need for multifaceted views of entrepreneurial concepts. My interviews revealed multifaceted views of entrepreneurship concepts in my discussions with incubator managers in Peru and Bolivia.

In Peru, there are a large number of entrepreneurs (GEM, 2006; see Table 2 for population data) but those high numbers do not translate into high demand for incubation services, as most are subsistence entrepreneurs and are not interested in growing their businesses (Peru Univ., 2006). The climate of innovation in Peru is also limited by a lack of market size,

which depresses the growth of domestic ventures and creates a lack of vision by potential entrepreneurs as to reaching and competing successfully in international markets (Peru Univ, 2006). The Bolivians face similar problems with small markets and limited willingness to consider entering competitive international markets (Bolivia, 2006).

A Peruvian incubator manager and several faculty members who lead programs in entrepreneurship are quick to point out that Peruvians admire small business entrepreneurs but mistrust entrepreneurs whose organizations have become very large and successful. Bolivian foundation managers also point to a similar admiration and mistrust if the entrepreneur is too successful. The philosophy is that if an entrepreneur is that successful, the entrepreneur must be abusing the society which has so many poor people (Peru Univ., 2006; Peru, 2006).

Although there are few incubators in Peru, there is also a lack of appropriate business plans for incubation. Entrepreneurs tend to be interested in creating jobs for themselves rather than creating a company that can grow to provide many jobs. This inhibits expansion of incubators because, rather than creating new, high growth potential ventures, the entrepreneurship promoters must train large groups of “entrepreneurs of necessity”, which yields less result as these enterprises generally employ just one person, or a few people. The prevailing logic is that consultants and trainers will get more return from working with more ambitious entrepreneurs (Peru, 2006; Peru Univ., 2006). These necessity entrepreneurs do not innovate; instead they primarily replicate other existing businesses (e.g., small retail snack vendors). This reduces the level of innovation in an economy as many entrepreneurs develop “jobs” rather than innovative firms creating many jobs. Several incubators invested significant effort in selecting incubatees with high growth potential (Chile HG, 2006; Brazil CIE, 2006; Brazil Soft1, 2006; GEM, 2006).

The entrepreneur of necessity phenomenon is also present in Bolivia, which has begun some entrepreneurship training activities and business plan competitions. Entrepreneurial thinking is very common among Bolivian people because they have had to work hard and be clever to survive harsh economic conditions and big swings in economic activity levels (Bolivia, 2006). However, they think in survival terms, not in terms of building large organizations. The idea of developing an enterprise that can grow and expand runs contrary to their experience or stereotype which is to mistrust large organizations (Peru Univ, 2006; Bolivia, 2006).

Proposition 2a: Entrepreneurs for a variety of reasons think “small.” This makes it difficult for incubators to build high growth firms that contribute to job growth and capability development in the economy.

In 2002, a report on entrepreneurship in emerging economies urged that “red tape” leading to high startup costs and delays that create barriers to developing new companies should be reduced if Latin American entrepreneurs are to succeed. These barriers are higher than in East Asian economies (Kantis, Ishida, and Komori, 2003). Table 2 shows some comparative statistics on the length of time it takes to start a business in each of the five countries and the relative ease of startup. Entrepreneurs in emerging markets are often reluctant to work with incubators because it will make it necessary for the entrepreneur to register with the government tax authorities. There is a high cost of registering businesses in Bolivia and Peru given their low levels of income. Also, if the business is “unofficial,” it will escape taxation (Bolivia, 2006; Peru, 2006; Peru Univ. 2006). My interviews revealed that incubator managers and others still find a harsh startup environment in South America. The harshness results from high fees to register companies with the government of more than U.S. \$1500 in Argentina and Bolivia; long and complicated registration procedures; and inefficient tax collections regimes that allow many

businesses to enjoy the advantage of unofficial (and consequently untaxed) status (Bolivia, 2006; Peru Univ., 2006). These taxation conditions limit incentives to found businesses that will grow to become visible to government authorities.

In contrast, Chilean companies can be registered in ten days (see Table 2) and for about U.S. \$1000 and the Chilean incubator managers feel that even that is too slow when compared to the U.S. (Chile HG, 2006). As a result of the friendlier startup conditions in Chile, businesses register earlier in the venture creation process and begin to acquire legitimacy in the Chilean system early in their lifecycle (Chile AN, 2006; CORFO, 2006).

Incubators attempt to build the number of entrepreneurs through a variety of means. A common method is to offer classes in business planning as well as sponsoring business plan contests at the university level. Entrepreneurship education over the past two years has created the beginnings of an incubation-ready entrepreneurial climate (Peru Univ. 2006). However, the extent of entrepreneurial spirit is limited by several factors. First, in spite of the fact that much entrepreneurship training and many business plan contests are sponsored by universities and local government, there is still a deep distrust of mayors and other officials (Peru Univ 2006). Ironically this mistrust is based in the fact that most government workers also have private companies, often unofficial or unregistered with authorities in order to avoid taxation (Peru Univ., 2006). This leads to lower levels of participation in seminars, training sessions sponsored by the municipalities, and reluctance to join the few incubators that exist (Peru, 2006).

There is a significant social and economic penalty for failure in these five countries. While there are provisions for bankruptcy in each market, the legal process is difficult and has significant social costs. Incubator and education officials in each market express admiration for the relative ease of bankruptcy processes in the U.S. and the lack of social stigma that appears to

be attached to it for entrepreneurs. In contrast, bankruptcy in Chile stigmatizes an entrepreneur, and rehabilitation requires full restitution to creditors. After a bankruptcy, there would be little chance of operating with trade credit and a bankrupt entrepreneur would likely have difficulty returning to corporate employment (Chile, AN 2006; Chile HG, 2006). The implication is that launching a new venture is personally risky for the entrepreneur, more so than in the US, and this serves as a high hurdle for incubators to overcome. In addition, those seen as sponsoring or vouching for the entrepreneur are tainted by any bankruptcy or unethical behavior by the entrepreneur. This raises the stakes in terms of the incubator's reputation, making incubators very cautious about who they select for incubation. This risk aversion further cascades to the funding agencies that support the incubators. If the incubator performs poorly in terms of failed incubatees, this in turn hurts the reputation of the funding agencies, which has political consequences leading ultimately to potential funding cuts or de-authorization or forced change in management of the incubator.

Incubation and entrepreneurship community experts also point to the difficulty and risk associated with being an officially registered company in a country where the majority of the economy operates "off the books" in order to avoid taxation. Would-be entrepreneurs ask incubator officials and advisors if they can stay "unofficial," but this in turn puts the incubator at odds with government enforcement. It is seen as too risky to be associated with an incubator that may receive support from public and prestigious private institutions. This leads to an incubation paradox in that there is significant momentum to create businesses but the mindset of the owners is not one of innovation but one of replication.

Incubators, in order to justify their support from governments and sponsors, encourage more innovative entrepreneurs rather than risk their resources on these low value-added jobs

created by entrepreneurs of necessity. These emerging market conditions have restricted the growth of incubation in Peru and led to much of the efforts at growing an entrepreneurial society being focused on mass-market “how to” business planning (business plan contests, workshops, short courses in running your own business) rather than developing a climate of innovation that could lead to founding growth-oriented businesses that compete on a global scale. All of these conditions serve to depress the number of growth oriented, innovation-based businesses that incubator managers hope to attract as incubatees (Peru Univ. 2006, Bolivia 2006; Peru 2006).

Proposition 2b: Emerging markets view entrepreneurship as a mixed blessing. These cultural attitudes affect entrepreneurs’ willingness to incubate and the image of entrepreneurs in society. In early incubation efforts in emerging markets, the ambition-level of incubatees is an important factor in developing viable incubation clients rather than subsistence businesses. Significant efforts by incubators will be devoted to helping entrepreneurs expand their aspiration levels beyond subsistence businesses.

Proposition 2c: Entrepreneurs will be reluctant to work with incubators due to structural problems that raise costs and require them to become “official” registered businesses. High costs and complicated procedures discourage official registration of businesses, posing problems for incubators to be able to work with unregistered businesses.

Interorganizational knowledge transfer leads to founding of new incubators

Countries that adopt business incubation as a national policy, and institutions such as universities that create incubators, model their incubation practices on incubators existing in other countries. Often the new incubators are patterned after model incubators promoted by international development agencies or that have become famous in the incubation community of practice (Peru, 2006; Chile AN, 2006). These existing models of incubation contain knowledge

in the form of routines, technology, and processes (Nelson and Winter, 1982; Teece, 1986). Transfer of this knowledge can occur through indirect observation of spillovers (Cohen and Levinthal, 1990), the movement of employees (Ryan, 1998; Robinson and Miner, 1996), or imitation of practices of other organizations (Dimaggio and Powell, 1983). Often organizations such as incubators work together or send advisors to help develop new programs (Brazil Network, 2006). In addition, some rules in the Brazilian incubation program require incubator managers to stay only a limited term of three years before they must move on to another job. This rule helps keep the system from becoming dominated by career bureaucrats and as a side-effect transfers practices across incubators (Brazil Network, 2006). Both visits and transfers by managers promote deliberate knowledge exchange and often lead to joint learning efforts (Miner and Anderson, 1999). Institutional theory and organization and population level learning theories all claim that there is knowledge transfer through imitation of routines and structures by organizations (Dimaggio and Powell, 1983; Fligstein, 1985; Miner and Haunschild, 1995). International sponsors of incubation activity such as *infodev* actively encourage this imitation by promoting seminars and publications (iDisc, 2003).

Understanding how organizations learn new competencies has gained importance in recent years as competition among firms has been characterized as being increasingly based on unique capabilities or core competencies (Wernerfelt, 1984; Barney 1991; Prahalad and Hamel, 1990). Experience points out actions that are inconsistent with the operation of a system, making the system easier to understand and more predictable to use (Zucker, 1987; Nelson and Winter, 1982; Winter, 1987). Institutional and learning scholars observe that, over time, populations of organizations develop routines or scripts that can be used by many different actors (Dimaggio and Powell, 1983; Zucker, 1987; Suchman, 1994; Miner and Haunschild, 1995).

The existence of standard scripts ease interorganizational knowledge transfer because the process does not have to be reinvented each time it occurs; it becomes standardized. For examples, consultants rapidly spread a standardized form of ‘poison pill’ takeover defenses during the 1980s and lawyers spread a standardized legal structure for high technology ventures in Silicon Valley (Davis, 1991; Suchman, 1994). Similarly, I observe the almost identical development of the use of business plan contests and pre-incubation routines to select candidates to become incubated businesses across a wide variety of incubators (Chile North, 2006; Peru, 2006; Bolivia, 2006). Selection was much less formalized in one Argentinean incubator funded by the city government due to its mission as an outreach for the city. Administrators wanted to promote the incubator as much as possible into the community (Argentina City, 2006).

Business incubators use established methods for providing business advice and services to their incubatee clients. Incubators use scripts and routines in a complex way by making certain practices, such as advising, a customized experience for the incubatee and using generally accepted techniques such as business plan contests to attract potential incubatees. The use of standard recipes and scripts to provide business incubation was evident in all five countries. Even in the least developed incubation system in Bolivia, the pre-incubation practices and future plans for full incubation services were familiar: providing access to experts to develop the business plan, access to industry contacts to perfect the product, and access to inexpensive services and space (Bolivia, 2006; Chile HG, 2006).

Proposition 2d: Advanced incubation systems will use standardized practices because there are common needs for helping businesses get started across all countries. Experienced incubator managers will rotate to different incubators and act as consultants to spread these common scripts and routines. Experienced incubator managers will be able to make

effective decisions about the needs for local adaptation to maximize incubator performance in light of national performance measures tied to funding.

III: Development of national incubation systems

The effects of national policies on incubation contribute to how innovative and by implication how competitive an economy can become. As part of this study, I investigate how incubators move from their chaotic beginnings as individual incubators to national systems of incubation and how the incubation systems develop and evolve unique capabilities over time.

Government funding of incubators

Incubator managers, in discussing the extensive incubation system in Brazil and the developing system in Chile, indicated that government sponsorship is the key to diffusion of new incubators across any emerging nation. Brazil's incubation system continues to grow rapidly due to continued government funding of incubator proposals (Brazil, ANP 2006; Brazil CMP, 2006; Chile AN, 2005; Chile AN, 2006). Funding for incubation, including funds going directly to incubatees, come primarily from sales and income taxes in Brazil (Brazil ANP, 2006). In Chile, funding is processed through a development agency that is funded directly by taxes derived from international trade as well as other sources (CORFO, 2006). Government funding is also provided indirectly through universities that provide facilities and employees without charge to the incubator on their campuses (Brazil CDT, 2006; Brazil CIE, 2006; Chile North, 2006).

In creating new incubators, both in Chile and in Brazil, the government uses a granting process. Interested sponsors, usually universities, submit grant proposals to the corresponding agency. Sponsors agreed to contribute in kind resources such as office space, services, faculty as consultants and space for operations in some cases (CORFO, 2006; Brazil SEB, 2006).

Although ideally incubators would earn sufficient fees from their clients to be self-supporting,

they rarely are able to accomplish it (Hackett and Dilts, 2004; Chile OCT, 2006). In line with this, incubators are experimenting with funding alternatives. Most incubators recovered some of their costs by charging limited fees for services at below market rates. A large incubator in Brazil charged a commission of two percent of future sales each year for every year that the firm was incubated. The incubator had over 100 clients but had only had its first graduate firm in 2002 so revenue was very low but beginning to climb, as over 45 firms had graduated by 2006.

Government funding must be maintained indefinitely in part due to the fact that incubators are simply unable to sustain themselves because their revenues from operations rarely rise to the level of covering their costs. (Chile HG, 2006). One Brazilian incubator manager observed that there may be too much investment in incubators and that a rationalization (downsizing) effort may be made by the government or its related NGOs. Out of 40 or more incubators in the region, only 2 or 3 were seen by him as viable in the near term. Viable in his terms does not even mean self-supporting, it simply means that these few incubators were able to attract clients and graduate effective new businesses in sufficient quantity to justify the government's continued funding (Brazil Network, 2006). SEBRAE used to cover 100% of an incubator's costs but had reduced that to 50% in an attempt to promote self-sustaining incubation. However it does not appear likely that support would be withdrawn entirely. Incubators are making strong efforts to show that they are contributing to society. For example, a large incubator's graduated firms generated 6.5 times in taxes paid than the amount the government invested in funding the incubator's efforts. While large incubators may be able to justify their value, the small, generalist incubators sponsored by municipal governments will need to rely on their political connections to keep funding intact.

Funding for incubatees

These imported incubation routines, however, are not simply copies of what exists in the operations guidelines of the *infodev* incubation model or other NGOs. They are changed and shaped by the national and local context, especially in areas such as the financing of the incubator itself or in the financing of incubatee development. For example, Chile adapted its funding of new ventures by studying systems in Scotland and England (Chile HG, 2006). This has resulted in funding at the business plan development stage, the commercialization stage and on into the growth stage. While it is not unusual to have funding in the first two phases, the Chilean system uses a blend of private and public funding in an innovative investor fund that matches private investment 3-for-1 with public money to drive growth financing in a risk averse market (CORFO, 2006). The Chileans have a gap in investment that results from the availability of safer and better understood investments such as stocks and bonds and mutual funds, making funding for risky new ventures difficult to obtain. By matching private funds aggressively with public money, the private sector's risk is brought down to more acceptable levels. (CORFO, 2006; Chile HG, 2006).

Network elaboration: From sporadic efforts to early network formation

Argentina is a good example of the transition stage in incubation from individual unconnected incubators to the beginnings of a network of incubators. At the national level, there is a great deal of fragmentation in incubation policies due to the way the government is organized. Buenos Aires is a city equivalent to Washington, D.C. and New York City in terms of political and economic impact in Argentina. The city government sponsors two incubators, one a general incubator focusing on most types of businesses, the other an incubator focused on businesses that incorporate an emphasis on design. However, at the time of my interviews, a change in political parties in charge of the city government had put future incubator funding in

limbo. At the national level, there are entrepreneurship initiatives from several departments including economic development and science and technology. Also, there is no official governmental coordinating body or agency that develops incubation policy or coordinates activity across incubators (Argentina City, 2006; Argentina DEV, 2006; Argentina Univ., 2006).

The fragmentation of the incubation system has led to an interesting phenomenon, the formation of a grassroots entrepreneurship and business incubation association in Buenos Aires. The association is unofficial at this point but is starting to develop some coordinating mechanisms for its meetings. The group consists of incubator professionals, entrepreneurship educators and those interested in innovation and economic development. They meet monthly to discuss the issues they face and to learn what each other is doing to promote entrepreneurship. This informal group of university, government, and incubator began meeting in 2006 and is emerging as an informal trade association that helps coordinate entrepreneurship and incubation efforts in the fragmented Argentinean incubation community. From this group's efforts, an informal incubator network may emerge and it would also be a source of lobbying effort to encourage the government to fund a formal network (Argentina Univ., 2006).

In Chile, there is a nascent incubator network that unites 15 of the 21 incubators existing nationwide in 2006 into a trade group that works closely with funding agencies, the government and other incubators to develop incubation practices and government incubation policy (Chile North, 2006). The group was formed in 2005 and has recently held an election of a new board of executives to energize the lobbying efforts of the network. (Chile North, 2006) The leadership of this organization is working with CORFO to develop funding alternatives for incubatees and other entrepreneurial organizations with significant growth potential (CORFO, 2006; Chile AN, 2006). The combined public/private sector composition of this funding is the result of interest by

incubator managers in promoting high growth potential incubatees (as compared to general incubatees with more average growth prospects) (CORFO, 2006; Chile HG, 2006). These incubators are a loosely coordinated system of incubation with shared practices and routines and administrative structures. These practices are imposed in part through the government's funding initiatives (CORFO, 2006) on which the incubators and incubatees rely for funding.

Proposition 3a: Incubation systems develop in distinct stages that are influenced both by grassroots efforts where policy is lacking and by official government policy initiatives.

Early efforts will involve coordination and learning encouraged by financial incentives.

An important result of the rapid growth in incubation in Brazil is a very diverse collection of incubators focused in part on providing justification to their funding agencies that they are returning value added for Brazil. In order to understand the level of success from its diverse groups of incubators, ANPROTEC began developing a set of key indicators for incubator performance. Several of the most respected incubators have developed performance measures which have been published and disseminated through regional networks of incubators as well as national incubator meetings. Performance measures that are of primary importance in most incubators are also important for ANPROTEC's effectiveness evaluations and include the gross sales receipts of incubatee businesses as well as the tax revenue generated by those sales and the number of jobs created in those incubatee organizations (Brazil CIE, 2006).

Some important measures such as the amount of time in the incubator before graduation and the graduation rate are dependent in part on the nature of the technology underlying the business. Some technologies take a long time to develop and the technology based incubator managers are concerned about the comparison of their statistics to other incubators. This concern is growing as the national incubation program matures and the government considers changes in

how incubators are going to be funded (Brazil CMP, 2006; Brazil CIE, 2006). A potential consolidation or reduction for “poor” performers seems inevitable to the incubator network managers and common measures are a step in the maturation process for the control function of the incubator movement (Brazil SOC, 2006; Brazil Network, 2006).

CORFO is also working to standardize measures for the Chilean network. With only about 3 years of experience and new incubators still being added to the network, there has been less movement to develop standardized performance measures than in Brazil’s more mature system. However, CORFO is very serious about effective use of its funding and therefore collects statistics on how many plans are presented for funding by each incubator and how many of those plans presented are approved. These serve as productivity and quality measures. Interestingly, Chile’s key issue appears to be a shortage of founding quality businesses. This lack of foundings limits the deal flow through to potential investors, which is holding back the growth of an angel investor network and to funding agencies tasked with encouraging technical and business development (Chile AN 2006; CORFO, 2006).

Proposition 3b: Later-stage coordinating efforts will involve development of incubator networks that coordinate government policy toward incubation, encourage and evaluate incubator performance and create new sources of private funding.

While early incubation efforts tend to be very specific in supporting technology-based ventures or very general incubators supporting a variety of small business initiatives, over time, the incubators develop specialties or dominate niches in the incubation market, thus attracting entrepreneurs away from other venues to be incubated in an experienced technology incubator (Brazil ANP, 2006; Chile HG, 2006; Chile North, 2006). As the network of incubators increases in number, there is diffusion of new incubators into different regions to foster economic

development objectives. In addition, some incubators develop special programs that provide service to the entire community, for example, an angel investment network in Chile or a high growth, high innovation incubator sponsored by a leading private university. Brazil represents a highly developed system of business incubation. While many incubators are locally or regionally sponsored, there is significant funding from national sources as well (Brazil ANPROTEC, 2006; Brazil CDT, 2006).

Advanced systems of incubation can develop in emerging markets, but they will require significant support from the national government, especially in smaller economies where incubatees will have trouble generating revenues to pay fees or profit-sharing. The emergence of national and regional networks of incubators has led to cooperation between incubators in supporting new ventures and economic development. In these collaborative networks, specific incubators develop specialized knowledge but often do not have enough incubatees to justify maintaining the capability for their incubator alone. This specialization and a desire for efficiency has led incubator managers to collaborate in intellectual property law (patenting and licensing), scientific testing and analysis, engineering services, and access to incubator networks (Brazil BIO, 2006; Brazil CMP, 2006; CORFO, 2006; Chile HG, 2006). Without these capabilities somewhere in the network, the scope of incubation activities performed with incubatees will be limited, due to fear of loss of intellectual property (the firms will stay secretive instead) or incubatees will be unable to solve their technical problems due to lack of access to university experts (Brazil CMP, 2006; Brazil CIE, 2006; Argentina Univ., 2006).

Networks as coordinating mechanisms for incubation systems

In order to spread effective incubation practices and improve the influence of national policies on incubation practices, governments have encouraged the formation of incubator

networks. These networks also carry with them the potential to become effective lobbying groups able to influence national and regional incubation policies. For example, the new Chilean incubation system has a national coordinating mechanism through the government agency CORFO that links incubator performance to additional funding for incubator operations. The Chilean incubators also formed a national trade association that has as explicit goals serving as a technical source of help in spreading best incubation practices across incubators.

In Brazil, there is a quasi-governmental agency that functions as a trade group for incubators and sponsors educational conferences and maintains relationships with key governmental agencies. In addition, national agencies help administer funds, usually in partnership with universities or companies, to fund incubatee innovation efforts. At the regional level within Brazil there are a number of networks of incubators. These networks are funded through government grants from the national level through a policy initiative of the national incubation coordinating agencies. National incubation policy has the most direct effect on the development of the incubation services available in Chile and Brazil.

Advanced stages of incubation in emerging markets

In a similar effort, many government-sponsored Chilean incubators have affiliated into a national incubator network. The first year of the network did not produce significant tangible outcomes. However, a new election is being looked to as a means to secure a significant voice to deal as a group with the key governmental funding agencies such as CORFO. There is evidence that key policy changes by CORFO may help to develop additional seed capital and growth financing funds using mixed private and public funds. These policy changes may also encourage entrepreneurs to create high potential, high growth businesses, as opposed to creating standard new businesses that may result in limited growth. Many of these standard businesses are only

imitators of existing businesses and may not bring strong innovation or competitive advantage. A number of incubators have signaled that there is a need to focus financial support on businesses that have explosive growth potential due to their more innovative business models; CORFO is acting to fulfill those needs with encouragement from the incubator network association.

The Brazilian system is the most extensive of the five countries I studied. The Brazilian incubation movement started with a few pioneering incubators affiliated with strong universities and focused primarily on technology development. By 1988, there were only two incubators. In 1994, there were seven incubators (Brazil BRS Network, 2006). The boom in incubation began in the late 1990s as Brazilian governmental agencies made money available for new incubator formation. The number of incubators had gone from 74 in 1998 to 183 in 2003 and to 297 as of 2005. During my interviews in July 2006, the 299th incubator was created and there are over 100 more in the planning stages (Panorama, 2005; Brazil ANP, 2006).

In Brazil, all incubators need a sponsor, usually a university or a local government. Because the incubation system is so extensive and incubator proposals are funded by government agencies interested in promoting technology and other forms of innovation, many incubators specialize in a particular industry. For example, software requires very different resources for development and sales than manufacturing. In one Brazilian software incubator, 80% of its incubatees come directly from the sponsoring university (Brazil Soft1, 2006). The incubatees locate at the university deliberately in order to obtain university talent. Most incubatees are reluctant to take on managers or investors, fearing loss of their trade secrets. The incubator must understand the issues that software startups face in a very uncertain market and provide them with needed counseling to keep them from missing their opportunities due to weak management

skills. The incubator runs on a very low budget, as the government sponsors do not understand software funding needs. In order to survive financially, the incubator provides value-added services and a facility for a national software export trade group, a software training and education unit.

A shift in incubation goals occurred during Brazil's push for incubation. After a number of years of emphasis on industry-based and technology-focused incubators, the incubator movement in Brazil shifted to a broader focus on economic development and social justice (Brazil AN, 2006). Smaller incubators, especially those associated with municipalities, worked on general business formation and there is a separate class of incubators that focuses on incubating cooperatives to employ poor or underprivileged populations (Brazil CMP SOC, 2006; Brazil BRS SOC, 2006).

Proposition 3c: In advanced incubation systems, specialization will coexist with more generalized incubators. There will be a likely move to develop concrete performance measures for incubators as the incubation system matures and the sponsoring agencies look at incubation results. Leading incubators will help shape those measures used to evaluate incubation performance. These measures will then likely be used by sponsoring agencies to determine future funding of incubation activities.

IV. Development of incubator and incubate financing initiatives

A universal complaint by the incubator managers and entrepreneurship educators I interviewed is that there is a lack of companies qualified to enter the incubators. A number of factors contribute to low numbers of incubatees, including shortages of investment capital and a lack of entrepreneurial venture formation in emerging economies. One important factor is the low level of economic activity (relative to the U.S.) and the concentration of wealth in existing

businesses and families. Closed supply chains tend to depress the ability of new entrants to gain sales as they start up their operations. In addition, the social, legal, and economic risks of failure and bankruptcy deter many would-be entrepreneurs because of the long-lasting stigma that follows the risk takers. An emerging role for governments and their incubators has been assisting in the formation of investment capital to assist in the planning, development and market entry of incubatee firms.

Funding and legitimacy

The Chilean government is strongly oriented toward free markets but is also interventionist in using government funds to promote private industry. For example, there are government agencies that promote development of export markets for Chilean fruit, wine and wood products. Incubatees can access funding if their ventures are focused on export markets, but they are not usually available for early stage financing (Chile DTC, 2006; Chile UC, 2006) .

Chile also provides financing to both the incubatee in the form of professional services and equipment; and to the incubator (to help cover the incubator's overhead expenses) for the development of a comprehensive business plan. In order to begin pre-incubation, the firm must have financial backing from private sources. Funding for prototypes and market studies are available through different agencies such as FONTEC (fund for development and innovation) that sponsor industry-related technical and market development (Chile North, 2006).

The incubator helps the incubatee prepare an executive summary (business plan) and if CORFO funds its initial development for up to U.S. \$10,000 then the incubator receives \$2000 toward its expenses. There is second stage funding for development of products for commercial sale for up to U.S. \$68,000. If the incubatee qualifies, the incubator also receives up to U.S. \$12,000 for its operations (Chile UC, 2006; CORFO, 2006). In order to address a lack of risk

financing in the Chilean market, CORFO also funds the startup of angel investor networks (often sponsored by incubators and universities) and provides funding to establish investor risk capital funds, using three public dollars to match each private investment dollar. The businesses are allowed to pay back the funds with very low interest rates and over many years. This type of funding is otherwise nonexistent in emerging markets, as the startups are seen as too risky. A key feature of this program is linking incentives (additional funding) for the incubators (as sponsors) to outcomes that are seen as desirable for the nation (such as funding of successful startups). In contrast, the Bolivian and Peruvian incubator officials have no help in financing incubatees and see little opportunity for change in the near future (Bolivia, 2006; Peru, 2006).

In emerging markets, the conditions described above make giving grants or long-term loans to new businesses a risky choice. If the businesses do not perform, or the perception of the electorate is that this is financial aid to the already privileged, the government can face a skeptical population (Bolivia, 2006; Peru, 2006; Peru Univ., 2006; Brazil Co-op, 2006). This is understandable in emerging markets, where a significant segment of the population is unemployed, underemployed, or simply focused on just surviving. The Chilean financing program requires that the funds go to firms that have strong business prospects, a good management team, and are associated with good sponsors (usually business incubators) (CORFO, 2006). Chilean officials want the reputation and legitimacy of the incubator tied to the business proposals they advance for funding.

In the more developed incubation systems such as Brazil and Chile, the pre-incubation process is important in helping incubators to improve their success rate. The rate of successful applications (that are approved by sponsoring agencies) is used by those sponsoring agencies in both countries to judge the strength of the incubators. Over time, incubators that submit strong

proposals and develop successful businesses earn the “benefit of the doubt” when future funding proposals are considered (CORFO, 2006; Brazil SEB, 2006).

In a financing program in Brazil, funding for advanced stage startups is offered by quasi-government agencies. For example, FINEP, a Brazilian government agency that finances technology ventures, is used by the government to provide seed money for companies using intellectual property from universities. The university provides the intellectual property, the incubator finds the management team talent and advises the venture, and the government provides early financing. More financing is provided by selling 20 percent of the shares of the new venture to the public, with the balance held by the university, FINEP and FAPESP (a Sao Paulo research foundation) (Brazil CMP, 2006).

This scheme is necessary in Brazil because private investors would rather put their funds into safer investment like banks, leaving little risk capital in the marketplace. The venture capital market is small and focused on proven ventures with established track records of earnings. Programs like that described above are part of the government’s attempt to stimulate the creation of early stage venture capitalists by co-investing alongside the private market. Incubators and their regional networks are beginning to form angel investor networks.

Proposition 4a: Programs for funding of incubatees are introduced after incubation is established within the national innovation system, because governments are unwilling to provide direct funding to incubatee firms unless the firms are very likely to succeed. The incubator’s early successful business launches provide evidence that incubation works and that funding new ventures is a good investment.

Proposition 4b: Funding gaps are caused by the lack of available capital for high risk investments and few angel investors to cover the prototype to commercialization stage.

Networks of incubators can negotiate with the government to shape the funding programs and/or create funding opportunities through venture capital and angel investing funds.

Incubators often administer the funds or aid in the preparation of funding applications in order to ensure the quality of the underlying business. Governmental interest in funding new ventures will depend in part on the government's attitude toward capitalism, business development and entrepreneurship.

Incubator funding schemes in advanced incubation systems

In principle, the goal for business incubators is to eventually become self-funding through fees for services. The incubators I interviewed all have difficulty sustaining operations from fees for services due to the inherent contradiction of charging below market rates for value-added services. Even the most developed and successful incubator I visited was not completely self-sustaining with over 100 clients, free infrastructure and support from the university, and a clever routine that reduced fees for services provided by the incubator in exchange for graduated shares of future sales revenue from numerous graduated firms (Brazil CIE, 2006). Incubators in Argentina are heavily dependent on government financing making them politically dependent on uncertain sources of revenue (Hackett and Dilts, 2004). This dependency has given national governments and sponsors (universities) important roles in the incubation process.

Interestingly, disagreements between incubation proponents and government policies in Brazil have led to a small group of privately funded incubators. Even without explicit governmental support, incubation efforts can be successful. One of the strongest incubators in Brazil in the biotechnology sector and a newly created incubator in Bolivia are run by foundations and are considered nonprofits and are not affiliated with universities. Distinguishing features of independent incubators are few but significant. The biotech incubator in Brazil is able

to invest private funds and take an ownership position in the stock of incubatee firms with the understanding that future returns would be reinvested into the incubator. This led to the development of significant post-incubation ties as the incubator continued to advise the firm and play an active role as directors for these firms (Brazil BIO, 2006). While independent incubators are rare, they provide an important niche for incubation efforts that are either unsupported by the government, serve incubatees unable to work within government affiliated financing or incubation rules, or are developing technology that is difficult for governments to publicly support (some medical and technology innovations).

The key advantages of private funding from an incubator's perspective are the ability to take an ownership position through investment and provision of incubation services to the incubatee firm. Appreciation of that investment and shares of profits from future revenues may be able to eventually lead to independence from sponsors for the incubator. In addition, there appears to be movement in the Chilean system to increasingly blend governmental development funding with private investment funds to help make early investment in incubatees more palatable to private investors. This may make it possible for incubators to share in the ventures' future profits as co-investors, as the government continues to lower restrictions on investment and encourage more nongovernmental financing (CORFO, 2006; Chile HG, 2006).

Proposition 4c: Innovation in incubator approaches to financing and ownership of new ventures will depend in part on the availability of other forms of financing in the environment. Incubators will avoid complex government regulations if possible, will learn to use government programs that are helpful, and will experiment with other forms of financing. As incubators gain more experience, the larger incubators (with more graduated clients) may achieve financial sustainability through profit sharing agreements

limiting their dependence on government funding. Most small, generalist or social incubators will not be able to survive without government funding.

Conclusion

Business incubation practices vary in the extent of their diffusion as well as the variety of incubators that are operating in each country. In this study, I describe selected aspects of the business incubation environment in five countries. The study offers theory-based explanations for the stages of development and diffusion of incubation practices and illustrates these stages using a series of examples from the five countries.

The propositions that describe differing aspects of incubation contain specific implications for emerging markets that may consider using business incubation in the future, as well as implications for incubator managers and government officials as they develop new business incubators in other markets. This study provides insight into aspects of national innovation systems focused on macroeconomic outcomes (Nelson, 1993) and the techniques and policies used to improve micro-level outcomes such as the founding of new businesses.

The results of this study indicate that there is a pattern for the development of incubation practices in emerging markets. Governments and other incubator sponsoring organizations first become aware of incubation as a possible solution to nagging economic development conditions like unemployment and lack of innovation. Incubation starts small with a single operation usually sponsored and developed in collaboration with an international agency from more developed countries.

Experimentation with formation of incubators can then lead to the development of national networks of incubators sponsored heavily by government investment but also reaping the rewards, eventually, of greater employment, a more innovative and entrepreneurial business

climate, and additional tax revenues (Brazil ANP, 2006; CORFO, 2006). Early specialization by certain incubators will help shape the networks as well as which incubators become more central to the operation of incubation. Efficiency in these specialized networks is in part dependent on an attitude of collaboration that is the norm in incubator practice in many places but may change if governments seek greater accountability for their investments and incubators are forced to compete to survive.

In the end, an extensive incubation system that is differentiated into national and regional networks and with specialized incubators focused on industries or specific populations can emerge, as in Brazil; or incubation efforts can remain fragmented and undirected, as in Argentina. While Argentina lags in developing a system of incubation at the national level, it has very innovative incubators and an exciting “grassroots” entrepreneurship effort that may succeed in developing a coordinated system of incubation and entrepreneurship in the future.

I end the paper with this optimistic note and remind the readers to consider Rogers (1995) caution about pro-innovation bias in diffusion efforts by some individuals and organizations. Incubator managers are optimists and seek to encourage entrepreneurs to launch their new businesses. However, the incubator managers must also be realists in just how effective their incubators really can be in any given market. Incubation is not a quick fix because systems to support it and the businesses that are founded in incubators take time to impact the nation.

Ironically, for policymakers in emerging markets, a key strength of business incubation as a potential aid to their nations is that it takes time to develop. Time allows incubation to be adapted into a custom solution fitted to a particular national system of innovation. At first, as an experiment, countries can start incubation with a standardized approach, keeping costs down by working through universities as sponsors. Countries can then invest incrementally in creating

incubators as the level of interest in entrepreneurship also increases. Finally, because incubation is a widespread practice with a collaborative philosophy, emerging market countries can develop their incubation systems by visiting and observing the effectiveness of incubation in neighboring countries. The incubation experiences of others will help decision-makers to determine whether incubation is an appropriate solution to their innovation and development needs.

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Appendix 1

Confidential Interviews Conducted June through August 2006

Argentina, Univ., University Entrepreneurship Educator(s) Interview. July, 2006.

Argentina City, Incubator Manager(s) Interview July, 2006.

Argentina DES, Incubator Manager(s) Interview July, 2006.

Argentina END, Private Venture Capital Foundation Interview July, 2006.

Bolivia, Incubator Manager(s) and private foundation Interview. June, 2006.

Brazil ANP, Incubator Trade Association Official(s) Interview. July/August, 2006.

Brazil CDT, Incubator Manager(s) Interview. July/August, 2006.

Brazil CIE, Incubator Manager(s) Interview. July/August, 2006.

Brazil Network, Incubator Network Manager(s) Interview. July/August, 2006.

Brazil MG, Incubator Managers, Interview. July/August, 2006.

Brazil SEB, Brazilian Economic Development Official(s) Interview. July/August, 2006.

Brazil CMP, University Incubator, Official(s) Interview. July/August, 2006.

Brazil CMP SOC, Social Incubator Manager(s), Official(s) Interview. July/August, 2006.

Brazil Soft1, Software Incubator Manager(s), Interview, July/August, 2006.

Brazil BRS SOC, Social Incubator Manager(s) (public university affiliation), Interview.

July/August, 2006.

Brazil BRS SOC, Social Incubator Manager (with religious affiliation), Interview. July/August, 2006.

Brazil BRS Network, Official(s) Interview. June, 2006.

Chile UC, University incubator, Official(s) Interview. June, 2006.

Chile DCT, University Incubator (engineering oriented), Official(s) Interview. June, 2006.

Chile AI, University Entrepreneurship Professor, Official(s) Interview. June, 2006.

Chile HG, Incubator Manager(s) Interview. June, 2006.

Chile AN, Incubator Manager(s) Interview. October 2005 and June, 2006.

Chile North, Incubator Manager(s) Interview. June, 2006.

CORFO, Economic Development Official(s) Interview. October, 2005.

CORFO, Economic Development Official(s) Interview. June, 2006.

Peru, Incubator Manager(s) Interview. June, 2006.

Peru Univ., Entrepreneurship Educator(s) Interview. June, 2006.

Peru PRV, University Entrepreneurship Educators (private university) interview. June, 2006.