Planning for the Knowledge Economy:  
The Nicaraguan Strategy to Engage in the Global Trade of Business Services

by

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Abstract

Global integration is driving a convergence of economies and markets; however, the benefits of integration, in the form of economic growth, are not evenly distributed. Small developing nations face tremendous competitive pressures and do not always possess the infrastructure, policy, and characteristics to engage in trade without risking increases in poverty and inequality. Nicaragua shares many characteristics of other small developing nations, and is currently embarking on a strategy to increase its participation in the large global market for business process outsourcing (BPO) services. The nascent Nicaraguan contact center industry, and its combination of advanced production processes and higher order labor skills, can be viewed as an entry-level strategy for increasing Nicaragua’s participation in the global knowledge economy. An innovative strategy of the Nicaraguan government was to invest in the infrastructure of a world class contact center facility to attract a large multinational corporation. The unintended result was the formation of a joint venture between a Nicaraguan and Danish firm that includes support from the Danish government to establish a training institution which would serve the entire industry. This public-private partnership has the potential to enable the growth of the Nicaraguan contact center industry, which can create backward linkages with domestic suppliers and spillovers that can benefit the development of other knowledge-based industries.
Acknowledgements

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List of Acronyms and Abbreviations

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>BPO</td>
<td>Business Process Outsourcing</td>
</tr>
<tr>
<td>CEPAL</td>
<td>Economic Commission for Latin America and the Caribbean</td>
</tr>
<tr>
<td>CINDE</td>
<td>Costa Rican Coalition of Development Initiatives</td>
</tr>
<tr>
<td>CLACDS</td>
<td>Latin American Center for Competitiveness and Sustainable Development</td>
</tr>
<tr>
<td>CNZF</td>
<td>National Commission of Free Zones (Nicaragua)</td>
</tr>
<tr>
<td>DR-CAFTA</td>
<td>Central America-Dominican Republic Free Trade Agreement</td>
</tr>
<tr>
<td>EPZ</td>
<td>Export Processing Zone</td>
</tr>
<tr>
<td>FDI</td>
<td>Foreign Direct Investment</td>
</tr>
<tr>
<td>FIAS</td>
<td>Foreign Investment Advisory Service</td>
</tr>
<tr>
<td>HIPC</td>
<td>Heavily Indebted Poor Country</td>
</tr>
<tr>
<td>IADB</td>
<td>Inter-American Development Bank</td>
</tr>
<tr>
<td>ICT</td>
<td>Information and Communication Technology</td>
</tr>
<tr>
<td>IDA</td>
<td>Industrial Development Agency</td>
</tr>
<tr>
<td>IFU</td>
<td>The Danish government Development Agency</td>
</tr>
<tr>
<td>INATEC</td>
<td>National Technical Institute (Nicaragua)</td>
</tr>
<tr>
<td>INCAE</td>
<td>The Central American Business School</td>
</tr>
<tr>
<td>INPYME</td>
<td>Nicaraguan Institute for Small and Medium sized Enterprises</td>
</tr>
<tr>
<td>IPA</td>
<td>Investment Promotion Agency</td>
</tr>
<tr>
<td>LAC</td>
<td>Latin America and the Caribbean</td>
</tr>
<tr>
<td>LDC</td>
<td>Less Developed Country</td>
</tr>
<tr>
<td>MIFIC</td>
<td>Ministry of Industry and Commerce (Nicaragua)</td>
</tr>
<tr>
<td>MNE</td>
<td>Multinational Enterprise</td>
</tr>
<tr>
<td>NAFTA</td>
<td>North American Free Trade Agreement</td>
</tr>
<tr>
<td>SME</td>
<td>Small and Medium-Sized Enterprise</td>
</tr>
<tr>
<td>UAM</td>
<td>American University of Managua (Nicaragua)</td>
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<tr>
<td>UCA</td>
<td>Central American University (Nicaragua)</td>
</tr>
<tr>
<td>UNAN</td>
<td>National Autonomous University (Nicaragua)</td>
</tr>
<tr>
<td>UNCTAD</td>
<td>United Nations Conference on Trade and Development</td>
</tr>
<tr>
<td>UNDP</td>
<td>United Nations Development Program</td>
</tr>
<tr>
<td>UNI</td>
<td>National University of Engineering (Nicaragua)</td>
</tr>
<tr>
<td>USAID</td>
<td>United States Agency for International Development</td>
</tr>
<tr>
<td>WTO</td>
<td>World Trade Organization</td>
</tr>
</tbody>
</table>
Map of Nicaragua and its Relative Proximity to North America
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Section 1: Introduction

Global integration, fueled by advances in transport and information and communication technologies (ICT), is driving a convergence of economies, cultures, and markets. More developed nations are realizing benefits of this integration in the form of economic growth and expansion of knowledge-based industries. These benefits, however, are not evenly distributed. While larger nations like Mexico, China, India, and the East Asian “Tigers” have found a successful footing in the global economy, other smaller developing nations face tremendous competitive pressures in global markets. They do not always possess the infrastructure, policies, and necessary characteristics to engage in global trade without risking an increase in poverty and inequality. In these circumstances, export-oriented activities can take the form of economic enclaves with little knowledge diffusion or backward linkages in the local economy.

This paper proposes to use Nicaragua as an illustration of how a nation with medium human development confronts the challenges of global integration, with a specific focus on the potential of the Nicaraguan contact center industry to grow and increase Nicaragua’s participation in the global trade of Business Process Outsourcing (BPO) services. Nicaragua currently has five contact centers delivering basic levels of BPO services. The growth of this industry and the combination of advanced production processes and higher order skills required of the labor force can be viewed as an entry-level strategy for increasing Nicaragua’s participation in the global knowledge economy.

Nicaragua shares many characteristics of other small developing nations, with poor infrastructure and medium-to-low levels of human development. Its per capita Gross Domestic Product (GDP) of $819 is the lowest in Central America, and almost 56 percent of its 5.5 million people are below the national poverty line (CEPAL, 2006). Education attainment is low, with the average citizen attending less than five years of school (USAID, 2006). Also, the national debt burden warranted Nicaragua being named a Heavily Indebted Poor Country (HIPC) by the World Bank. There are large discrepancies between urban and rural economic activity, with poverty being more
extreme in rural areas. Job creation and employment are persistent problems, with unemployment in the formal sector estimated to be 9.3 percent and underemployment, 46.5 percent (CEPAL, 2006 & CIA World Fact Book, 2006).

On the other hand, Nicaragua enjoys favorable proximity to North American markets. In the 1990s, following a decade of revolution and civil war, Nicaragua made moves toward rapid integration and significantly increased exporting activities in apparel, textiles, and simple manufactured goods. The Nicaraguan economy, however, did not grow under expanded trade as it approached the millennium, as per capita GDP decreased (CEPAL, 2006). This trend has reversed since 2000; however, it has been at a lower level that that of other new globalizers. For example, while Nicaragua’s GDP increased by less than five percent, Costa Rica’s increased by over seven percent.

Most of this contemporary growth in Nicaragua has occurred under a regime of export processing zones (EPZs), managed by the Comisión Nacional de Zonas Francas (CNZF). The number of companies operating in EPZs has increased from five in 1992 to almost 100 by mid-2005 (ProNicaragua, 2006). Employment in EPZs has increased from 20,000 jobs in 1999 to over 80,000 in 2006, representing the largest source of employment growth in Nicaragua during a seven-year period (See Appendix 1 for EPZ Employment). While Nicaragua has 33 EPZ industrial parks, it also permits firms to operate as stand-alone EPZs, a flexible policy feature that is the primary vehicle for establishing contact centers.

A diaspora, resulting from the civil war of the 1980s, created a population of over 400,000 Nicaraguans that lived in North America and gained Western education and familiarity with Northern business customs (Proctor, 2006). Local economic development professionals are hoping that the affect of the diaspora on Nicaraguan industrial development will follow the pattern described by AnnaLee Saxenian, where “brain drain” evolves from being a curse into an asset of “brain circulation” (Saxenian, 2000). Since 1990, many of these people have returned to Nicaragua, with a desire to re-establish themselves in their homeland. As a result, there is both an emerging class of
Nicaraguan entrepreneurs and individuals who are employed as representatives of multinational corporations with operations in Nicaragua.

In 2005, Nicaragua ratified the Central American Free Trade Agreement (DR-CAFTA), which will provide an opportunity for Nicaragua to attract increased Foreign Direct Investment (FDI), create jobs, and strengthen economic development. An additional benefit is that intellectual property is protected via the agreement. This can improve the investment climate by reducing the risk of U.S. firms seeking offshore providers for more knowledge-intensive services.

To further assist the attraction of FDI, Nicaragua established an Investment Promotion Agency (IPA), ProNicaragua, in 2002, which was modeled on successful institutions in Ireland (IDA) and Costa Rica (CINDE). CINDE is widely credited for its role in bringing an INTEL chip manufacturing plant to Costa Rica, and assisting the strategy to develop a consumer electronics cluster (Porter and Ketelhöhn, 2002A). ProNicaragua is staffed by professionals with international business experience, and has played a key role in evangelizing the benefits of Nicaragua as a destination for offshore BPO services.

To spur further growth, Nicaragua is trying to capitalize on changes in global production systems and the increase in tradable services, by entering the immense global market for BPO services via the contact center industry. Contact centers provide a collection of resources that serve as an interface between a service provider and its customers (Whitt, 2002). Currently, call centers are some of the most recognized forms of contact centers; however, advancements of ICT have created different mediums for customer contact, and the industry is more nuanced than simple phone-based services. BPO is the practice where firms use specialized employees or third-party providers to provide services that can be disaggregated from core firm operations (Papinniemi et al., 2005). Cost savings are the primary driver for offshoring these services, and some common examples of BPO services include sales, customer service, accounting, information technology (IT) support, payroll, software development, and human resources functions.
Many developing nations are inspired by the success of India, which booked $22 billion in BPO business in 2005, and created 1.3 million jobs over the last ten years (Businessweek, January 30, 2006). Additionally, the McKinsey Global Institute (2005) projects that by 2008, 160 million jobs, or about 11 percent of 1.46 billion global service jobs, could theoretically be performed remotely barring any constraints on supply. Service activities with high potential for offshoring include engineering, finance and accounting, generalist, and support staff. McKinsey’s projection theorizes that as many as 26 million generalist and support staff jobs, the immediate opportunity for countries like Nicaragua, could be candidates for offshoring by 2008.

Nicaragua and this paper are focused upon activities that are located offshore and outsourced to a third party, although some firms may choose to locate captive (producer-owned) units in offshore locations. These activities have a strong link to the relocation of labor from high-wage to low-wage countries, and offer the greatest opportunity for developing countries to enter the global BPO trade.

The rise of this nascent industry in Nicaragua includes an innovative government investment to develop a world-class contact center. Initially intended as a facility to attract a Fortune 100 client firm, the project has evolved into a joint venture with a Nicaraguan and Danish firm called Press2. The unintended outcome of this capital investment has yielded a project that may have significant long-term benefits for the industry in Nicaragua. Rather than leasing the facility to a large multinational enterprise (MNE), which is more likely to tightly manage service provision within its own production chain, Press2 has joined a local firm and a global firm with vast industry experience to create a venture with a higher probability of diffusing its expertise locally. Providing services to multiple foreign firms, and adopting best practices learned elsewhere, can increase the probability of spillovers and knowledge transfer from this joint venture to other local firms and the labor force. Additionally, the Danish government is providing financial and technical support for the development of an independent training center that could serve the entire industry and facilitate the necessary workforce development for high-quality service provision and industry growth.
I argue in this paper that the growth of the contact center industry, and the combination of advanced production processes and higher order of skills required of the labor force, can be viewed as an entry-level strategy for increasing Nicaragua’s participation in the global knowledge economy. Sophisticated contact centers with a technically-skilled labor force can attract additional investment from MNEs that enable further diffusion of knowledge and technologies. With a high percentage of local ownership of contact centers, foreign investment and successful growth of the industry in Nicaragua can foster greater backward linkages (Hirschman, 1950) than have been observed in the country’s existing export activities in apparel and textiles. Such growth can also drive the demand for labor and could create stronger associations between local firms and policy and educational intermediaries to increase the quality and variety of labor skills. Growing skills and developing increasingly sophisticated capabilities in the workplace can also have spillover effects into other technical industries.

The methodology of this study encompasses both primary and secondary sources of information and data. Research of scholarly journals and studies from international development institutions was conducted to explore the theories and impacts of global trade, development policy, and various strategies of other small developing nations. Trade journals, academic research, and business media were consulted for insights into the growth of the global contact center industry and trade in BPO services. Available secondary data was used for descriptive analysis of technological development in Nicaragua and comparable nations. Because the Nicaraguan contact center industry is in its infancy, a series of interviews were conducted with industry leaders, scholars, and economic development professionals from Nicaragua, Costa Rica, and Denmark in late 2006 and early 2007. These interviews helped clarify the current state of development in Nicaragua, and offered insights into the specific local conditions that will influence the growth of the contact center industry.

This paper will present the case of the Nicaraguan contact center industry in the following manner. Section 2 will describe the challenges for small developing nations to
adapt to global integration, by presenting these challenges in the Nicaraguan context. Section 3 specifically addresses the global market for BPO services and the role of contact centers within it. It discusses the opportunities and aspirations for Nicaraguan firms to enter this market, and presents a conceptual framework for understanding the variables that could influence the potential growth of the local contact center industry. Section 4 details the specific case of Press2 as an example of how governments can pursue innovative demand-side strategies for attracting FDI and enabling knowledge-based economic activity.

The remaining sections will address the factors which will most directly influence the growth of the contact industry in Nicaragua. Section 5 addresses the role of policy instruments in facilitating trade in BPO services, attracting high-quality foreign investment, and overcoming market imperfections. Section 6 describes the importance of ProNicaragua as an intermediary for promoting investment, and presents examples of how other nations have used similar intermediaries to attract FDI and create linkages with domestic industries in the global knowledge economy. Section 7 highlights the importance of human capital formation and the cultivation of a technically skilled labor force for the contact center industry. It also describes existing education and training institutions and presents an argument for expanding training capacity in Nicaragua and creating stronger links between industry and training institutions. Section 8 offers recommendations for strengthening the potential for growth of the contact center industry in Nicaragua.

**Section 2: Nicaraguan Challenges in the Age of Global Convergence**

The steady proliferation of free trade is the primary driver of global integration. This results in an increasing interdependence between nations, reinforced by the convergence in production practices, the rapid movement of capital, and human migration. Proponents of globalization advocate that this trend helps reduce poverty in integrated economies via accelerated and diffused growth (World Bank, 2002). World Trade Organization (WTO)
statistics from 2000 to 2005 show that exports from Least-Developed Countries (LDCs) increased 18 percent and imports increased by 15 percent during the period. There is also evidence that a one percent increase in the ratio of exports to GDP is associated with a marginal increase in wages of greater than one percent (Freeman et al., 2001). As low-income countries enter into global manufacturing and services markets, proponents state that increases in labor productivity will help poor people transition from the vulnerability of poverty to better jobs.

A strong critique of globalization, however, is that the costs and benefits of trade have been unevenly distributed across and within countries, perpetuating a pattern of global development that builds prosperity for some while deepening poverty and inequality for others (World Bank, 2002). It is estimated that one-fifth of the global population survives on $2 per day, while another fifth struggles with less than $1 per day (UNDP, 2005). In contrast to some large developing countries, many small developing nations must simultaneously balance resources for combating extreme poverty and increasing their ability to compete in global markets. Nicaragua’s 2006 national budget was approximately $328 million (Ministerio de la Hacienda, 2006), compared to almost $2 billion in Costa Rica (CEPAL) and $256 billion in Brazil (IBGE).

Some of the inequality between trading nations can be attributed to the uneven adaptation of global integration strategies. Widespread integration began around 1980, and larger developing countries like India, China, Brazil, and Mexico greatly increased their participation in the global economy, and lead some 24 developing countries which have doubled their ratio of trade to income over this period (World Bank, 2002). Nicaragua looks up to nations like Ireland, Costa Rica, and South Korea as examples of successful small nations; however, it lacks the infrastructure, education system, and financial resources to equally compete in increasingly complex technology-based industries. Accordingly, countries such as Nicaragua, which are squeezed at the low-end by wage competition from China and at the high-end by larger advanced economies, must carefully design and implement development strategies in order to maximize the use of scarce resources and capitalize on local advantages.
A significant challenge for smaller developing nations is located in external perceptions that include investment climate, market size, and country risk. MNEs have a tendency to concentrate investments in these leading countries despite country risk indicators that suggest activities in some smaller countries will maintain or increase profits (Ul Haque et al., 2000).\(^1\)

BPO services have a higher skill requirement for labor and developing nations are typically less endowed with managerial and organizational talent. In nations where large percentages of the labor force may have been employed in protected industries, the labor force is less-trained and the instinct for quality workmanship is not “second nature” (Hirschman, 1967). Therefore, in industrial tasks where there is wide latitude for poor performance, actual performance will usually be poor. On the other hand, in tasks that require the most discipline, performance has been observed to be nearly equal to that of older industrial nations. By equipping Nicaraguan workers with the skills to manage the complex processes and ICT in contact centers, the industry can have spillover effects on other potential technical industries through a general strengthening of the labor force.

Despite the challenges described above, there is room for effective public interventions. Nations like Ireland, South Korea, Chile, and Costa Rica offer examples of various policies that have led to success in global trade and development. All have invested heavily in education and human capital development, and pursued nuanced strategies for attracting foreign investment and cultivating domestic industries that can engage in global production chains. In pursuing these interventions, governments of developing countries can learn from the experiences of others, but must also pursue strategies that best fit the characteristics of their own nation.

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\(^1\) Nicaragua does not receive much attention from the media in OECD countries and is still combating the images of war and revolution from the 1980s. Additionally, it faces challenges from weaknesses in its institutional system and corruption (Transparency International, 2006). The justice system is inefficient and politicized, and reforms are needed to establish legal and institutional frameworks that promote transparency, the rule of law, and business and investor confidence.
Section 3: Nicaragua and BPO Services

There is a worldwide literature on the changing nature of the global economy and the effect of ICT advances, which are facilitating the transfer of activities from manufacturing to the services sector. This renders the services, particularly business process services, more tradable (UNCTAD, 2006). Nicaragua aspires to capitalize on the growing market for business services by establishing a contact center industry that can provide complex BPO services to foreign producers.

Currently, Nicaragua is home to two small telemarketing centers, a healthcare customer support facility, an employee support center for the Spanish telecom company Telefónica, and the newest entrant, Press2, a Danish-Nicaraguan joint venture. The estimated total employment of the five centers is near 600 people (Proctor, 2006), with average monthly wages for bi-lingual and Spanish speaking customer service representatives being lower than competing firms in other Central American nations (ProNicaragua, 2006). To reach a stated goal of 4,000 employees by 2009 (Businessweek, January 30, 2006), Nicaragua will depend on the ability of these firms, and any subsequent entrants, to capitalize on nearshore outsourcing opportunities with U.S. companies, and increase their service quality and capacity. Another important factor is Nicaragua’s ability to cultivate a skilled and capable labor force (to be discussed further in Section 7).

The Changing Nature of Service Activities

The potential for the global trade of services is immense. In 2002, a WTO study revealed that services accounted for over 60 percent of global GDP, yet only 20 percent of world trade. The proliferation of ICTs has expanded the range of tradable services and reduced the costs of service provision in distant locations (Papinniemi et al., 2005). Furthermore, technology enables firms to disaggregate their value chains so that high skill activities such as research and development, supply chain management, and marketing remain at the corporate level, while intermediate functions and services can be delegated to outside providers to gain cost advantages (van Marrewijk et al., 1996).
Along with an aggregate increase in offshore activities, the type of activities moving offshore has diversified as well. For firms beginning to engage in offshoring, the initial activities are typically modest knowledge work such as back-office support, customer service, and data entry. As firms have gained confidence in offshore providers, the scope of services has progressed to more sophisticated tasks such as computer coding, insurance underwriting, claims processing, and medical transcription (Reich, 2005). This is significant for Nicaraguan firms, as initial service contracts are likely to come from North American firms that are beginning to consider offshoring, rather than the largest MNEs with long-standing activities in other countries.

**Firm Choice in Offshoring**

Growth of the international trade in business services will depend on three main factors: supply – the capacity and quality of offshore service providers; demand growth – the adoption of offshoring by firms; and industry conduct – the actions taken by industry players (NASSCOM-McKinsey, 2005).

Countries like Nicaragua must focus on supply side issues, on which they have greater control, so that they are viewed as viable locations for firms seeking offshore services. On the demand side there are different drivers of firm decisions, and Nicaraguan providers are primarily focused on meeting the concerns of U.S. firms. Table 1 presents the different factors which affect firm decisions, and demonstrates that conditions in Nicaragua will directly influence the choices of these firms. It is crucial that Nicaraguan BPO service providers, policy makers, and intermediaries are cognizant of these factors and actively working to build confidence with potential investors. One initial advantage is that Nicaraguan contact centers are enabled by the existence of fiber optic backbone networks, which have the capacity to transmit large amounts of data at high speeds, and are protected from failures by redundant design. Nicaragua has access to three submarine fiber optic cable systems (Appendix 2), which can lower the cost of use by firms due to competition (P. Stern, 2006).
### Table 1 – Offshoring Considerations of U.S. Firms

<table>
<thead>
<tr>
<th>Considerations</th>
<th>Comments</th>
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<tbody>
<tr>
<td><strong>Primary Driver</strong></td>
<td></td>
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<tr>
<td>Cost Savings</td>
<td>Costs are important, but product quality must be assured</td>
</tr>
<tr>
<td><strong>Secondary Drivers</strong></td>
<td></td>
</tr>
<tr>
<td>Performance Improvement</td>
<td>Quality offshore services create growth opportunities in parent firms</td>
</tr>
<tr>
<td>Personal Connection</td>
<td>Many offshore relationships are initiated via an employee in the parent firm from a foreign country which breeds comfort with the service provider</td>
</tr>
<tr>
<td>U.S. Presence</td>
<td>Service providers with U.S. representation are more effective at building relationships with lead firms</td>
</tr>
<tr>
<td>Critical mass of skilled technical professionals</td>
<td>Service providers must have an adequate labor force</td>
</tr>
<tr>
<td><strong>Technical and Non-Technical Knowledge</strong></td>
<td></td>
</tr>
<tr>
<td>Project Management Skills and Quality Certification</td>
<td>Providers must demonstrate management and communication skills that minimize obstacles to effective service</td>
</tr>
<tr>
<td>Language and Culture</td>
<td>Providers must be able to effectively communicate with clients and customers alike</td>
</tr>
<tr>
<td>Western Business Savvy</td>
<td>Lead firms are comfortable with providers that follow similar business practices and norms</td>
</tr>
<tr>
<td><strong>Domestic Conditions</strong></td>
<td></td>
</tr>
<tr>
<td>Intellectual Property Protection</td>
<td>In absence of regulation, lead firms must create disincentives for violation of intellectual property rights</td>
</tr>
<tr>
<td>Regulatory Environment</td>
<td>Contracts must be enforced and corruption minimized</td>
</tr>
<tr>
<td>Telecommunications Infrastructure</td>
<td>Robust and high bandwidth connectivity facilitates smoother transactions and engenders confidence in lead firms</td>
</tr>
<tr>
<td>Physical Infrastructure</td>
<td>Many providers have generators to prevent work stoppages from power outages, which is added into the cost of service</td>
</tr>
<tr>
<td><strong>Exogenous Factors</strong></td>
<td></td>
</tr>
<tr>
<td>Time Zone Difference</td>
<td>Extreme time differences limit communications between lead firms and providers, which offers an advantage to LAC providers working with U.S. firms</td>
</tr>
<tr>
<td>Political Stability</td>
<td>Lead firms do not want to risk work stoppages and will often diversify offshoring locations to hedge against political risk</td>
</tr>
<tr>
<td><strong>Summarizing Factor</strong></td>
<td></td>
</tr>
<tr>
<td>Country Image</td>
<td>This is the FUD factor – fear, uncertainty, and doubt – which often stems from stereotypes that lead firms have about a given country</td>
</tr>
</tbody>
</table>

**Source:** adapted by the author from Lewin(2005), Coward(2003), and McKinsey Global Institute(2006)

### Contact Center Operations

A customer *contact center* is a collection of resources providing an interface between a service provider and its customers. The classic contact center is a *call center*, containing a collection of service representatives (reps), or agents, who interact with customers over the telephone. In a call center, the service reps are supported by elaborate ICT equipment, such as a private branch exchange (PBX), an interactive voice response (IVR) unit, an automatic call distributor (ACD), a personal computer (PC) and assorted databases (Whitt, 2002). With proliferation of online transactions, contact between the service provider and its customers if often made via e-mail or the Internet instead of by telephone. Thus, the
general interface between a service provider and its customers is now often called a *contact center*.

For the most part, Nicaraguan contact centers are currently provide services which involves telephone and email services that have implications for the skill requirements of labor. When telephone is the primary form of contact between customers and the providers, there are two types of calls. The first are outbound calls, where agents place calls to potential customers typically with the intention of selling a service to the individual. These calls require rather basic skills, with sales training being of primary importance (Mandelbaum et al., 2001). Currently in Nicaragua, the two telemarketing centers and Press2 (for the near-term) are primarily engaged in these activities.

The second type of calls are inbound calls, which are made by the customer to the call center with the purpose of obtaining information, reporting a product problem, or asking for help. Handling inbound calls is complex because there are often many types of calls which require different service skills such as knowledge of different languages, multiple promotions, different service options, and the ability to analyze problems. Currently, the healthcare and employee support centers in Nicaragua are engaged in these more sophisticated activities.

**Advantages for Nicaraguan Contact Centers**

A significant advantage the Nicaraguan contact centers would like to exploit is their *nearshore* proximity to the U.S. Nearshore outsourcing is the practice of getting services performed by people in neighboring countries rather than in your own country. Geographic proximity means: travel and communications are easier and less expensive, there are likely to be at least some commonalities between the cultures, and people are more likely to speak the same language. While labor costs of nearshore service providers to the U.S. may be higher than those for similar services in India\(^2\), there is an assumption that the proximity advantage can outweigh cost advantages in some cases (Trefler, 2005).

\(^2\) *ProNicaragua* estimates that average contact center wages in Nicaragua are 50 percent higher than those in India, 2006.
Indeed, various researchers have observed that vast time zone differences, while allowing for 24 hour project work, also breed a “friction of distance” that can impede effective collaboration between principals and agents (Rao, 2004).

In Nicaragua, proximity lowers the time and costs of making site visits by clients. For example, there are multiple daily flights from Managua to Miami, Houston, and Atlanta, with average travel times between 2.5 and 3 hours. This can limit transactional costs for U.S. firms compared to those incurred with more distant service providers in India. In terms of cultural similarities, ProNicaragua currently has a database of over 4,000 English-speaking Nicaraguans with interest in working in the contact center industry, of which over 1,000 have previously lived in the U.S.

Not of the least importance is the size of the Spanish-speaking population in the U.S., estimated to be greater than 40 million people with a potential buying power of $454 billion (US Census Bureau, 2002). Accordingly, language and culture commonality are distinct advantages for nearshore providers in LAC, and creates the potential of employing workers that only speak Spanish rather than strictly bi-lingual workers. In fact, the name of the newest firm, Press2, is a nod to the common IVR function that instructs callers to “press #2” to speak with a customer representative that speaks Spanish. A recent market study titled Call Center Outsourcing in Latin America and the Caribbean to 2008 estimates that 60 percent of calls from the U.S. to LAC call centers are in English, with 40 percent in Spanish (Datamonitor, 2004).

There is, however, considerable regional competition for the same U.S. market. The Datamonitor study estimates that Latin America will have 11,900 contact centers by 2008 with a capacity for 730,000 agent positions (APs), with Mexico and Argentina being home to the largest concentration of centers. Within Central America, many countries already have a head start on Nicaragua. According to the Central American Call Center Report of 2007 (Zagada Institute), there are 35 centers in Costa Rica, with an estimated

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3 ProNicaragua has created a website, www.nicasearch.com, where potential contact center employees register themselves and submit voluntary information on work history and language skills.
8,000 APs; 50 centers, with close to 10,000 APs in Panama; and El Salvador and Guatemala already have over 7000 Contact Center employees working in 14 Centers. Though the potential nearshore market with U.S. firms is large, Nicaraguan firms will have to provide a variety of services of consistently improving quality to capture significant share of this market.

**Variety in Service Provision**

There is a value chain in the BPO industry (UNCTAD, 2005) comprised of different tiers of service activities, with the ascending tiers representing increasing levels of activity complexity (Table 2). Higher tier activities require greater process management by service providers and higher-skilled employees within the centers. Currently, three of the five Nicaraguan contact centers are engaged in outbound telemarketing. Almori S.A., the healthcare support center, provides customer relationship management services to healthcare providers in Texas. Both of these activities are located within the first tier of the value chain, which is consistent with the premise that the advent Nicaraguan contact centers are an entry-level strategy for the trade of business services.

**Table 2 – The BPO Services Value Chain**

<table>
<thead>
<tr>
<th>Tier 1: Contact Center Services</th>
<th>Tier 2: Back-Office Services</th>
<th>Tier 3: IT Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Help desk</td>
<td>Claims processing</td>
<td>Software development</td>
</tr>
<tr>
<td>Technical support/advice</td>
<td>Accounts processing</td>
<td>Application testing</td>
</tr>
<tr>
<td>After-sales support</td>
<td>Transaction processing</td>
<td>Content development</td>
</tr>
<tr>
<td>Employee inquiries</td>
<td>Query management processing</td>
<td>Engineering and design</td>
</tr>
<tr>
<td>Claims inquiries</td>
<td>Customer admin. processing</td>
<td>Product optimization</td>
</tr>
<tr>
<td>Customer support and advice</td>
<td>HR and payroll processing</td>
<td>Other high-end services</td>
</tr>
<tr>
<td>Market research</td>
<td>Data processing</td>
<td>Regional headquarters</td>
</tr>
<tr>
<td>Answering services</td>
<td>IT outsourcing</td>
<td>Architectural services</td>
</tr>
<tr>
<td>Prospecting (telemarketing)</td>
<td>Logistics processing</td>
<td>Biotech and pharmaceutical R&amp;D</td>
</tr>
<tr>
<td>Information services</td>
<td>Quality Assurance</td>
<td>Radiology, X-ray</td>
</tr>
<tr>
<td>Customer relationship mgmt (CRM)</td>
<td>Supplier invoices</td>
<td>Distance education</td>
</tr>
</tbody>
</table>

*Source: UNCTAD 2005*

Service providers in many developing nations are trying to capture market share in Tier 1 activities, following similar strategies as that of Nicaragua. Observing the evolution of BPO services in places like India can offer models for industrial development and strategy, as well as examples of how firms can advance up the BPO value chain. In India call center operations have become commoditized and leading offshore service providers seek contracts with more complex service provisions and higher profit margins. Many
firms are actually refusing call center service contracts unless they are linked with services in higher tiers (*Businessweek*, January 30, 2006). Some Indian firms have even offshored their expertise in the call center business by establishing facilities in Ireland, the Philippines, and Honduras.

**Performance Improvement**

Nicaraguan contact centers share the goals of Indian firms to generate greater economic activity by offering more complex BPO services (Luxner, 2006). Whether these goals are realized will depend on the ability of firms to upgrade their processes, skills, functions, and client sectors. In developed countries, this type of upgrading often involves patterns of innovation. In Latin America, upgrading in this context can be viewed as a pattern of learning, where firms adapt and incrementally improve rather than create knowledge and technology (Giuliani, Pietrobelli and Rabello, 2003). Rather than seek entry in markets where they have little experience and proven capacity, Nicaraguan firms should seek consistent and incremental performance improvement. Such an approach can provide internal learning opportunities for the industry and build the confidence of external investors.

MNEs are naturally skeptical of new entrants in service markets and it is crucial for service providers to meet the expectations of these firms. The problem that most MNEs face is that what is being outsourced is a small component of a larger system (Gereffi, 1999). This creates a tension. On the one hand, an MNE would like a service provider to contribute ever-improving component services, as described above. On the other hand, correcting incompatibilities between interdependent components can be a drain on the MNE’s energies. The MNE can conserve its energies by tightly controlling the improvement process, but this may inadvertently stifle the service provider’s incentive to innovate (Trefler, 2005). This is notable because it describes potential limits of Nicaraguan contact centers’ ability to increase the sophistication of their processes and services.

**Implications for Nicaraguan Contact Centers**
It is necessary for the Nicaraguan firms to have strong information and communication links with factors of both demand and supply. On the demand side, Nicaraguan contact centers must communicate effectively with producers and global buyers of services. This can be cultivated at the firm level via global sales representatives and the establishment of remote offices in the U.S. that can work directly with buyers. Such a strategy will help firms better meet buyer expectations and develop relationships that build confidence and trust across borders. Nicaraguan firms can also leverage relationships with market intermediaries like ProNicaragua, which can provide market intelligence and communicate the attributes of individual firms to potential buyers.

On the supply side, firms must seek to train and retain its labor force in order to enable consistent process improvements over the long-term. Contact centers are known for having high employee turnover, and this impacts quality of service. In India, for example, service quality complaints and consumer backlash have led some firms to cease doing business with Indian firms, and GE has sold its Indian operations altogether (Batt, et al, 2005). At this point, Nicaraguan firms can ill-afford a similarly negative experience with large global buyers, as the industry has an exponentially lower capacity to absorb the losses of major clients. Similarly the firms need to work with education and training institutions to insure that the inflow of new labor possesses the skills necessary for increasing the scope and complexity of services. This will involve developing formal institutions for communicating the demands of the market to the education and training sector.

**Framework for Contact Center Industry Growth**

Figure 1 proposes a conceptual framework for the dynamics of the industry growth in Nicaragua, and the relationship between global demand, industry action, and policy response. This framework is designed utilizing causal loops, adapted from dynamic system modeling methods, to illustrate relationships between important variables in the “system” of the Nicaraguan contact center industry. This framework does not propose to explain all the complexities of global integration; rather, the aim of this model is to bring
focus to the most important variables for Nicaraguan stakeholders to consider when pursuing strategies for entry into the global trade of BPO services.

**Figure 1 – Framework for the growth of the contact center industry in Nicaragua**

Figure 1 shows a series of connected causal loops, with Nicaraguan contact centers (Nica Contact Centers) being at the center. The interpretation of this framework is that a series of reinforcing loops (with an R in the center) are the drivers of growth for the industry. There is also one balancing loop, the “Global Competition Loop” (with a B in the center), which could counter the growth effects of the reinforcing loops. In this framework “Global Competition” represents all other nations that are competing for market share in the international trade of BPO services. The simplified equation for successful growth of the contact center industry is that the effects of the reinforcing loops must outweigh those of the balancing loop.

Whether these loops are positive or negative depends on the activities of the variables within them. For example, the “Nica Labor Market Loop” would be interpreted as
follows. Since there are already five contact centers in Nicaragua, their positive short-term growth will increase “Labor Demand.” This is signified by the polarity, or “+” sign on the link between the two variables. An increase in “Labor Demand” will increase the need for “Post-Secondary Training,” while an increase in this training will increase the size of the “Skilled Labor Force.” The more skilled the labor force, the greater the “Complexity of Service Offerings” will be, which will allow the “Nica Contact Centers” to grow further.

While this description highlights the positive relationships, any negative outputs from the variables will have corresponding negative effects on the linked variables, thus making it a negative reinforcing loop. For example, if education and training institutions do not respond to increases in labor demand, Nicaragua will not have a labor force of sufficient size or skill to increase industry competitiveness and the complexity of service offerings.

Global trade is complex and difficult to capture with simple models, but this framework is a useful tool for understanding the dynamics at play in the case of Nicaragua and illustrates the key variables that will drive the growth of the contact center industry. It is important to read between the lines and identify the necessary elements and intermediaries for reinforcing the links of the model. For example, how will communication systems between industry, market intermediaries, and policy institutions be established? The model also does not answer whether educational institutions, firms, and other training intermediaries will be able to augment the supply of skilled labor needed by the industry. It is more appropriate to view this as a map, with the variables serving as guideposts for industrial development.

Section 4: Establishing a Contact Center in Nicaragua - The Case of Press2

With the rapid expansion of the global market for business services and increased competition from other Latin American countries, the government of Nicaragua initiated in 2005 a proactive strategy to create the capacity to provide high-quality business
services within Nicaragua (Businessweek January 30, 2006). In May of 2006, it commenced an investment of $3.8 million toward the development of a contact center facility in the Invercasa, a modern office building in Managua, with the explicit goal of attracting a first-order MNE with experience in global sourcing of services (MIFIC, 2006). The government hoped to build a BPO cluster around this MNE, much as Costa-Rica has tried to do with INTEL and the electronics industry (Porter and Ketelhöhn, 2002A).

The government hired a Nicaraguan national, who had spent 32 years in the U.S. and helped build call centers in Australia, Europe, India, the Philippines, and South America, to lead the planning and help develop a strategy to attract a Fortune 100 company to anchor the cluster (MIFIC, 2006). It wanted to emulate the success of the strategy of others, much like India attracted General Electric and American Express, so that other large firms would follow (Luxner, 2006). While hiring a local expert in contact center design was effective for ensuring a “Class A” facility, it did not deliver a Fortune 100 anchor firm as a client. In the short-term, the inability to secure an investment from a large multinational was seen as a failure as the new facility sat idle. However, failure can sometimes breed unexpected success in development projects.

Albert Hirschman (1967) described the Principle of the Hiding Hand, which addresses the surprising nature of creativity. Underlying the principle is the idea that people typically take on new tasks because of the presumed absence of challenge. In the case of the Invercasa, it was assumed that the booming market for services and experience of the hired agent would lead to investment from a major MNE. According to Hirschman, if the actual costs and difficulties of a project were known beforehand, it is likely that people would not initiate it in the first place. When tasks are found to be more difficult than expected, however, the perseverance of people to engage the challenges can unleash creative forces that sometimes lead to success. The void of MNE investment brought new parties to the project. ProNicaragua facilitated the introduction of a domestic firm to a Danish firm with broad experience operating contact centers in Europe.
The unintended result of the initial project was the formation of the Press2 joint venture between Nicaraguan and Danish firms, and it has the potential to cultivate greater long-term benefit for Nicaragua than if a multinational had used the *Invercasa* as a captive facility. Contact center activities and technologies that are driven by MNE ownership have been observed to operate as enclaves, much like maquila operations in textiles (IADB, 2006). By engaging local firms and workforce development institutions in industry development, the conditions are perhaps better suited for industrial agglomeration and cluster development than if a singular multinational had occupied the *Invercasa* facility and maintained the outward-focus of other foreign exporters in Nicaragua. Whether Press2 is a successful catalyst of this type of growth will depend upon its ability to provide high quality service, and the ability of the local labor force to acquire the skills needed for these activities. Additionally, it will require the recognition of its success by potential investors.

Hirschman also points out that as much as costs can be underestimated, benefits can be overestimated. The *Invercasa* investment represents a significant use of government resources that bear a great opportunity cost, and it is conceivable that the capacity of the facility will never be fully utilized. The Press2 venture, however, is endowed with important factors to enable the success of the firm, and perhaps the industry at large.

In terms of the facility, the government maintains full ownership and leases its use to Press2. This serves to mitigate government costs and minimize the capital risks of Press2. It is equipped with state-of-art ICT infrastructure and the technical security systems necessary for providing services to global financial institutions, some of the most demanding and complex clients. Currently, the firm is primarily engaged in telemarketing services, the first tier of BPO service complexity in Table 2. Yet, it has the capacity and ambition to expand service offerings to the more complex activities in the third tier. Whether the firm can grow to fulfill this potential depends on factors explored in this paper, including the attraction of high-quality FDI and the cultivation of a skilled labor force.
The bi-national ownership also enhances the venture. The domestic principal is a conglomerate with investments in several local industries, an established national distribution network, and strong ties with other business and government leaders. Therefore, local ownership has the potential to facilitate stronger linkages between export-oriented activities and domestic firms. The involvement of the Danish firm and its operational experience in the industry is a positive unintended consequence that could yield great benefits. By partnering with a global firm with a proven track record in securing clients and growing its BPO services business, Press2 may be better suited for commercial success than the original agent who possessed experience primarily in design and infrastructure development.

The presence of the Danish firm in the venture is also bringing additional resources from the Danish government development fund, IFU, to assist with workforce development and training in Nicaragua. IFU has contracted with a Danish business college, Vejle Business College, to provide immediate training to Press2 employees, and to develop a proposal for a permanent training academy in Nicaragua which could serve multiple firms in the Nicaraguan BPO industry (Section 7 will discuss the potential training center in more detail). The goal of the IFU is to share its expertise in workforce development and empower local actors to take ownership of the training academy so that it will be better suited to meet local needs and characteristics. Training is expensive, and such a center will help the small Nicaraguan firms minimize the fixed costs required for in-house training. IFU is committed to multi-year funding for the academy’s development, but long-term success will depend on its ability to cultivate local staff and clients.

In summary, the Press2 partnership may yield greater long-term benefits to Nicaragua than if a multinational had invested first because it has involved parties and institutions that share an interest in long-term industry growth rather than the short-term profit maximization or cost savings of a single firm. Leaders of policy, industry, and intermediaries like ProNicaragua recognize the importance of developing an industry rather than a single firm. The industry needs to grow and generate the labor demand and competitive dynamics exhibited in Figure 1 if Press2 and its peer firms are to be
successful. A large, competitive industry can positively influence the quality of service provision, attract the attention of a larger pool of potential investors, and stimulate demand for labor that can influence the activities and decisions labor market intermediaries like education and training institutions.

**Section 5: The Role of Policy in Cultivating the Industry**

Public policy has an important role in enabling the success of the Nicaraguan contact center industry and increasing the nation’s participation in the knowledge economy. In such an economy, cheap labor and exports of primary commodities are insufficient to enable rising living standards. Ascending the value chain depends on managing the adaptation and diffusion of new technologies (Sachs, 2002). Free markets alone may not give the right signals for investment in new technologies, especially when there are high and unpredictable learning costs (Kim and Lee, 1999). Moreover, firms in developing countries face structural disadvantages such as lack of information, weak capital markets, and inadequate support institutions (UNDP, 2006). Government plays a role by creating macro- and micro-economic conditions conducive to the enabling of knowledge economy activities, and by identifying externality-generating innovations (Stiglitz, 1999). While Nicaragua has already prioritized policies to increase FDI and export activities, the contact center industry has helped emphasize the importance of sound investments in technology, as evidenced by the development of the Invercasa facility.

Increasing the inflow of FDI is frequently discussed as an important driver of growth in developing countries (Borensztein, 1998). There are, however, debates about the impacts of different types of FDI, and these impacts depend upon a combination of a nation’s policies and characteristics (Willem te Velde, 2001). Indeed, FDI has been vital for the economic growth of countries like Ireland, Costa Rica, and the Asian “Tigers.” These leading small developing countries have employed effective long-term strategies for increasing FDI flows to export-oriented industries. In its 1999 *Agenda for Nicaraguan Competitiveness*, INCAE’s Latin American Center for Competitiveness and Sustainable
Development (CLACDS) identified South Korea and Ireland as benchmarks for developing a policy strategy. Both nations share similarities in that their development has been buoyed by long-term strategies for human capital formation, an export-orientation, and consistent policies that transcended political turnovers. For many reasons, the developing nations of Latin America are trailing these leading nations in terms of development (Rios-Morales and O’Donovan, 2006). Nicaragua can look to them for examples of how sound policy and long-term government strategies have served to attract high-quality FDI.

Sound macroeconomic policy is an important foundation for enabling trade activities, as the development of financial markets encourages MNEs to offshore services (Vietor, 2007). A significant accomplishment of the Nicaraguan government was to rein in the hyperinflation that began in 1988, bringing it down to 10 percent by the end of the 1990s and to 5 percent in 2001 (IADB, 2003). In terms of monetary policy, the Nicaraguan Central Bank (BCN) has established a crawling peg for the Nicaraguan Cordoba to the U.S. Dollar, which maintains a five percent nominal rate of depreciation (BCN, 2007). While this policy has slightly undervalued the Cordoba, this has the effect of creating value (exchange income) for U.S. firms that would like to use Nicaragua as an export platform since they are allowed to repatriate profits in dollars (CNZF, 1991). Additionally, by maintaining a close association with the U.S. Dollar, the Nicaraguan economy and the Cordoba are less susceptible to shocks that might occur with other currencies when the Dollar becomes volatile.

**Incentives for Investment**

Nicaragua also offers an example of how small developing countries use incentives to compete for FDI (Barros and Cabral, 2000). There is a downside to competing purely on supply-side incentives alone, as countries with similar characteristics are likely to increase the costs of said incentives. Governments must also tend to the demand-side, and pursue strategies that enhance the local business environment and increase its bargaining power with MNEs (Tendler, 2000). The investment of the Nicaraguan government in the Press2 facility is one example of a demand-side strategy to attract FDI.
By assuming the cost of infrastructure, the Nicaraguan government facilitated additional investment by Press2 and the Danish government.

Supply-side financial incentives, however, are important in terms of continued industry growth. Government must carefully select different policy instruments that assist exporters with credit, risk management, and working capital by offsetting taxes and duties (Agosin and Ffrench-Davis, 1995). Nicaragua does not have an institution solely dedicated to export finance, but there are vehicles that can benefit potential foreign investors in the contact center industry as well as local firms that can serve as suppliers. Exporters can receive some short-term support from the National Investment Finance Company (FNI). Additionally, U.S. firms operating in Nicaragua are eligible for export insurance from the U.S. Overseas Private Investment Corporation (Conroy, 1998). USAID has established a $20 million fund for local SME suppliers of exporters (USAID, 2006). This serves the dual purpose of assisting local firms with working capital and attempting to strengthen backward linkages from the exporters to the local market. Currently, however, there is no indication that these funds are supporting suppliers to contact centers.

**Export Processing Zones**

EPZs are the most widely used export promotion policy in LAC countries (Mello, 2001) and provide a vehicle for Nicaraguan contact centers to receive the designation of stand-alone EPZ. They have proven their effectiveness for increasing exports in a host nation, but are not a singular solution for effective global integration. By their nature, EPZs segment economic activities within a nation, and governments must also have inward-looking policies to complement the outward-looking focus of EPZs (Madani, 1999). It will be important for Nicaraguan contact centers to determine whether EPZ status will limit their ability to operate in domestic markets and with local suppliers.

The Nicaraguan contact center industry can take advantage of the opportunities provided by EPZs for the acquisition of superior technology, upgrading of labor and managerial skills, and greater access to foreign markets (Jenkins, Esquivel, and Larraín, 1998).
While textiles and apparel industries generally involve lower-skilled production processes, trade in BPO services presents an opportunity to simultaneously upgrade the skills of workers and for Nicaraguan firms to ascend the value chain in the global trade of business services. Countries like Ireland, which have focused on high-value added export activities, have proven this potential by leveraging export promotion for the development of domestic industries (Haider, 2005).

Research shows that the establishment of EPZs is more likely to improve the host nation's welfare when two conditions exist: 1) when there are relatively large rates of unemployment; and 2) when EPZ firms form strong backward linkages with intermediate-producing local firms (Jenkins, Esquivel, and Larrain, 1998). With respect to backward linkages, however, the current manufacturing activities in Nicaraguan EPZs have not demonstrated strong linkages to local suppliers and markets (Willman, 2001). South Korea and Taiwan offer examples of effective policy for developing backward linkages, by carefully selecting industries for EPZs which complemented domestic knowledge-based growth strategies and by providing for limited domestic distribution of EPZ goods (Yuan and Eden, 1992).

The emergence of the contact center industry in Nicaragua and the presence of local ownership in all existing firms may help to change this dynamic. Whether the Comisión Nacional de Zonas Francas (CNZF) is the most effective policy regime for this industry remains to be seen. The most established contact center in Nicaragua, Almori S.A., has intentionally avoided government subsidies and support, with its principal stating that, “we cannot live off the government.” Almori provides back office services to a pharmacy operation in Texas owned by the same principal and has aligned the scale of its business with that of its U.S. parent (Luxner, 2006). In this sense it is unique compared to the other firms that are seeking to provide customized services for a broad range of clients. By seeking opportunities in a larger number of production chains, the requirements of these firms very well could create opportunities for local firms to partner with them as suppliers and contractors.
Nicaragua may want to explore the possibility of developing an intermediary to focus on linking local firms and suppliers with BPO and other knowledge economy firms. Ireland created *Enterprise Ireland* to provide professional services to local firms in order to improve productivity and meet the quality standards of international markets (Rios-Morales and O’Donovan, 2006). Currently, Nicaragua has a government sponsored agency called the Nicaraguan Institute for the support of SMEs (INPYME). With almost 90 percent of the labor force located in firms with less than 100 employees, it would be a logical institution for facilitating backward linkages. While the goals of INPYME are clearly focused on improving productivity and innovation within SMEs, its strategic plan for 2001-05 does not have any mention of linkages to exporters or accessing international markets (INPYME, 2001). While it is certain that Nicaraguan SMEs are seeking export opportunities on their own, a more formal role for INPYME, or a new intermediary, may enable stronger links with BPO firms.

**Section 6: ProNicaragua as Market Advocate for Contact Centers**

In 2002, the government established *ProNicaragua* as the Nicaraguan Investment Promotion Agency (IPA). It is incorporated as a non-profit, public-private institution, with a mission to generate economic growth and job creation by attracting “high-quality” foreign investment. There are two important functions of an IPA (Wells and Wint 2001). The first consists of its role in communicating and disseminating information to external parties, something that is crucial for overcoming market failures. The second is that an IPA can play a role in coordinating most activities aimed at improving the business environment in the host country.

IPAs provide a variety of services that typically include image building, investment generation, investor services, and policy advocacy (See Appendix 3). Representatives of *ProNicaragua* engage in the services described above and serve a broad range of industry sectors which are listed in Table 3. The agency also engages in the research and
investigation of investment diagnostics in all regions of Nicaragua. In this capacity it serves as something akin to an internal think tank.

While their organizational forms vary between government agencies, public-private partnerships and NGOs, they are viewed as useful instruments for overcoming the information asymmetries that vex many developing countries (Morisset and Andrews-Johnson, 2004). One successful example is Ireland’s *Industrial Development Agency* (IDA), which is credited with bringing “tigerhood” to Ireland (Battel, 2003). Another is the Costa Rican Coalition of Development Initiatives (CINDE), which is credited for attracting INTEL and helping develop an electronics manufacturing cluster (Rodriguez-Clare, 2001). While IPAs have demonstrated success in attracting investment that might not otherwise occur, their effectiveness is limited by the environment of the countries they operate in. Regardless of the polish an IPA may provide, a country with a poor investment climate will have a difficult time attracting investments.

Based on observations of other countries, the Nicaraguan government wanted to ensure the presence of a world-class investment promotion agency over the long term. Accordingly, *ProNicaragua* has been staffed by a specialized professional team with extensive experience in the international private sector, and its organizational structure has the profile of a small and efficient private agency (Bolaños NDP, 2003). *ProNicaragua* also coordinates efforts with other institutions that promote trade and development like CNZF and the Ministry of Industry and Commerce (MFIC). *ProNicaragua* is also designed to focus on value-added export activities, while NICAEXPORT is a government sponsored agency that focuses on more traditional exporting of agricultural commodities and artisan products (NICAEXPORT, 2007).
Table 3 – Sector Focus of ProNicaragua and Number of Employees

<table>
<thead>
<tr>
<th>Function</th>
<th>Number of Staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior Management</td>
<td>3</td>
</tr>
<tr>
<td>MCA Regional Manager</td>
<td>1</td>
</tr>
<tr>
<td>Market Intelligence Research</td>
<td>3</td>
</tr>
<tr>
<td>Public Relations</td>
<td>1</td>
</tr>
<tr>
<td>Legal Counsel</td>
<td>1</td>
</tr>
<tr>
<td>Administrative Support</td>
<td>3</td>
</tr>
</tbody>
</table>

Investment Advisors by Sector

<table>
<thead>
<tr>
<th>Sector</th>
<th>Number of Staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tourism</td>
<td>2</td>
</tr>
<tr>
<td>Contact Centers and BPO</td>
<td>1</td>
</tr>
<tr>
<td>Medical Devices and Electronic Assembly</td>
<td>1</td>
</tr>
<tr>
<td>Textiles and Apparel</td>
<td>2</td>
</tr>
<tr>
<td>Agribusiness (and Food Processing)</td>
<td>1</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>19</strong></td>
</tr>
</tbody>
</table>

Source: www.ProNicaragua.org

In the pursuit of FDI, it is the nature of IPAs to be opportunistic and flexible in order to be able to respond to new opportunities. In addition to the sectors listed in Table 7, ProNicaragua has increased advisory services in the retail and telecommunications sector in response to more recent interest from foreign firms. With a relatively small staff, such a broad sectoral focus could limit down-stream effectiveness by cultivating a broad rather than deep expertise in desirable sectors. The experience of older IPAs has shown the benefits of depth of sectoral expertise and specialization, as well as staff capacity to provide quality service (Moirsset, 2004). IPAs must find an appropriate balance between proactive and reactive investment promotion, and be able to cultivate the expertise and relationships necessary to target specific sectors. The current lean structure of ProNicaragua could inhibit this ability in the long-term as it will not be able to be all things to all parties.

ProNicaragua can learn from the case of CINDE and how it realigned its strategic focus to pursue higher value-added activities and ensure it had the depth of expertise needed for effective industrial targeting. CINDE is a private non-profit founded in 1983. For its first ten years, it worked primarily to attract FDI in agriculture and unskilled manufacturing industries. During the development a new strategic plan in 1993, CINDE realized that Costa Rica was losing competitiveness in these industries as the advent of NAFTA was diverting FDI for these activities to Mexico (Rodriguez-Clare, 2001). CINDE decided to focus on fewer sectors and to redirect its attention toward the
electronic and telecommunications industries. By 1995, CINDE succeeded in helping attract four different electronics manufacturers to Costa Rica, which allowed it to improve its understanding of the needs of firms in the sector. When CINDE learned that INTEL was searching for a location for a new $2 billion Assembly and Testing plant, it formulated an approach. Though Costa Rica was not initially on INTEL’s list of potential locations, CINDE’s proactive marketing and industry knowledge impressed the INTEL search team and enabled the negotiations which brought the INTEL plant to Costa Rica (Porter and Ketelhön, 2002A).

Research and interviews conducted by Debora Spar (1998) for the Foreign Investment Advisory Service (FIAS) revealed four factors that influenced INTEL’s decision: 1) the general country characteristics of Costa Rica; 2) Costa Rica’s growing emphasis and success in attracting high tech FDI; 3) the existence of an effective and knowledgeable IPA like CINDE; and 4) a government that understood the importance of an INTEL investment in the country and motivated its agencies to help Intel as much as they could within the limits of existing laws and regulations. These findings demonstrate how and IPA can build momentum and expertise such that one success can lead to another.

Ireland’s approach to investment promotion serves as an even more mature and comprehensive example for ProNicaragua. Founded in 1969 as an autonomous state-sponsored body, the Industrial Development Agency (IDA) was responsible for all aspects of industrial development with regard to export-oriented enterprise in Ireland. Like CINDE, the IDA evolved over time from establishing Ireland’s modern manufacturing base to targeting high-technology and high-output industries and expanding into internationally traded service sectors (Haider, 2005). IDA targets over time have included manufacturing sectors in the 1970s, then computer, pharmaceutical, and healthcare in the 1980s to early 1990s. More recently, the IDA has targeted international financial and business services industries and Internet services.

Different from CINDE, the IDA has an expansive infrastructure due to its substantial government funding. Beside the headquarters in Dublin, the IDA has 11 regional offices
and 13 global offices which employ 240 specialists, and enable it to work closely with the firms and industries it targets (www.idaireland.com, 2007). This structure, however, is not inexpensive. The average cost per job created from 1996-2002 was €15,897 (Rios-Morales and O’Donovan, 2006). There is a substantial body of literature that debates the costs of economic development programs and job creation, and there is clearly a trade-off Nicaragua must account for when committing public funds to investment promotion activities and incentives for firms.

*Enterprise Ireland*, is the domestic-focused counterpart to IDA, with a mission to create and grow Irish enterprises as suppliers to and partners with foreign-based firms. It promotes business start-ups and expansion based on the need of foreign-based firms for local supply chains and exchanges with Irish-based businesses (Haider, 2005). To aid this strategy, *Enterprise Ireland* facilitates relationships with firms and financing sources like angel investors, venture capital, and banks (www.enterprise-ireland.com, 2007). Like the IDA, *Enterprise Ireland* has a large organizational structure with 13 domestic offices and 33 global offices. At the global level, *Enterprise Ireland* handles business investment marketing functions and helps facilitate joint ventures and distribution and marketing agreements for Irish and foreign firms.

In sum, Nicaragua can learn from the experiences of others, and create specialized intermediaries that coordinate activities in an effective manner to meet national development goals. At this point, however, the Irish model is too large and costly for the current state of affairs in Nicaragua; however, there are some important lessons from the experience of Ireland. While *ProNicaragua* can serve the current needs of Nicaragua it must balance its resources between proactive and reactive opportunities. As *ProNicaragua* grows it should consider the potential of developing a counterpart agency much like *Enterprise Ireland*. Current counterparts like INPYME are inward-focused, but do not have specific strategies for integrating Nicaraguan firms into export-oriented industries. At some point, there will be a need to diversify the functions of researching investment opportunities, attracting FDI, and creating backward linkages with local firms.
Additionally, *ProNicaragua* might consider locating a permanent representative in the U.S. to build closer relationships with potential offshoring clients.

**Section 7: Human Capital Formation**

For the Nicaraguan contact center industry, the supply of a skilled and capable labor force is crucial. Contact centers must be able to draw from a pool of workers with sufficient breadth and depth of skills if they want to increase the scope and complexity of services provided. Nicaragua has great potential in the realm of human capital. Its population is very young; the 2000 census reporting that over 78 percent of the population is younger than 35 years (CEPAL, 2005). The national university system contains 44 schools with a combined enrollment greater than 95,000 (*ProNicaragua*, 2006). Managua is also the location of INCAE, the Central American Business School, which was founded under the technical supervision of Harvard Business School (HBS). There is also a concentration of bilingual education centers in Managua, with one English language university, three English language university degree programs, and five bi-lingual high schools. These conditions suggest that Nicaragua has a base upon which it can support the development of the contact center industry and other knowledge-based industries.

Developing human capital involves two distinct processes: (1) skill development through formal education, and (2) training and capability formation through specific technology-based experience (Lall, 1999). The former can be provided by intermediaries like the basic and post-secondary education system. The latter process may be facilitated by third party technical schools and certificate programs, or by BPO service firms themselves in what is known as enterprise training. Migration is another factor that influences the composition of the Nicaraguan BPO labor force, and the potential benefit of the Sandinista era diaspora to provide a near-term foundation of skilled bi-lingual workers.
The introduction of BPO services to the Nicaraguan economy represents the potential for significant technological change in the local economy. Inflows of FDI increase the probability of having a technological change, which can offer higher returns to human capital investment. The use of information technology is pervasive in new work methods that accompany FDI such as process control, total quality management, and just-in-time inventory systems. All of these necessitate higher skill levels and training efforts, with the intensity of skill upgrading rising with the complexity and sophistication of the technologies involved. In addition, the increased importance of networking between firms and other institutions requires specific ‘communicative’ skills (Tomlinson, 1999). Knowledge-intensive sectors are the most dynamic in industry with respect to their learning potential, so that employees who can enter them benefit from a virtuous cycle of skill creation and upgrading.

Additionally, increasing BPO service activities with MNEs can have an impact on knowledge diffusion within Nicaraguan institutions. In small developing nations, MNEs can function like educational institutions by transferring knowledge (e.g., technical expertise, management techniques, job skills, production methods) to local institutions (e.g., domestic industry, universities, public schools, R&D centers) that can move a country up the learning and development curves (IADB, 2006). However, the local acquisition of knowledge is not automatic. MNEs transfer the technologies suited to existing capabilities in local economies. Where skills, supplier capabilities, and technical knowledge are low, they import simple labor-intensive technologies and create the capabilities to use these efficiently. They do not invest in creating more advanced capabilities that need more sophisticated skills, or transfer advanced functions that are efficiently centralized elsewhere. Only the government can upgrade the skill creation system or boost supplier capabilities (Lall, 1999). Nicaraguan development policy in the context of human capital formation, therefore, must seek to cultivate knowledge and transfer skills to industry to avoid the marginalization of the labor force.
The Importance of Basic Education

Nicaragua is a country with a relatively small population, and the average education attainment of less than 5 years cannot help but weigh heavily against the potential future growth of the BPO services industry. New forms of work organization require greater responsibility and greater skills from the workforce, and low literacy rates in developing countries impede growth in new industries. Though considerable progress can be made with a poorly educated labor force, particularly in early stages of integration, firms which have educated labor are likely in the long run to make more progress in their training schemes (ILO: World Employment Report, 1999). This is because the requirements of a skilled workforce, and worker participation in continuous improvement, call for an understanding of the underlying technical processes.

Though basic education is not the focus of this paper, or a significant factor for the near-term success of workers in the contact center industry, it has important long-term implications for Nicaragua’s ability to engage in knowledge economy activities. The need to develop a population with basic skills and literacy is indeed something that has implications for the entire economy, and increasing the flow of students into secondary and post-secondary education institutions is vital for ensuring the existence of a labor force with the capability to meet global production standards.

Post Secondary Education and Training Institutions

Fluid relationships between academia and industry are commonly described as being critical for transferring knowledge and technical gains, particularly in the realm of innovation. These same relationships are also vital for the development of human capital in medium-tech industries like BPO services (IADB, 2006). Despite challenges at the basic levels of education, Nicaragua does have a relatively large supply of students enrolled in post-secondary (or tertiary) education institutions. The national university system in Nicaragua contains 44 schools with a combined enrollment greater than 95,000 (ProNicaragua, 2007). This represents 1.73 percent of the population, a significant increase from the 0.86 percent reported in 1997 (UNESCO – See Appendix 4). This
speaks to both the youth of the population and improvements in Nicaraguan school enrollments since 1990.

Within Managua, the location of all the current contact centers, there are four major institutions that could supply human capital to the BPO services and other knowledge economy industries. Two of the universities are public, one receives partial public funding, and the other is private.

The public universities tend to offer a broad range of academic disciplines and technical degrees. The National University of Engineering (UNI) provides both undergraduate and master degrees in a variety of disciplines including: human resources, marketing, finance, project development and evaluation, management systems, and quantitative management methods (UNI, 2007). The National Autonomous University (UNAN) is primarily a technical institution with departments of computer science, mathematics and statistics, physics, chemistry, and biology (UNAN, 2007).

The Central American University (UCA) receives partial public funding. It offers degrees in systems engineering, information technology, financial management, operations and logistics, as well as a program for teaching English as a second language (UCA, 2007). UCA is also home to one of Nicaragua’s few biotechnology laboratories. Although Nicaraguan institutions do not grant doctorate degrees in science, UCA offers master programs in scientific research directed by some professors who have received scientific doctorates in the U.S. and Europe.

The American University of Managua (UAM) is a private institution that was founded to develop professionals with the capability to meet the challenges of globalization and social and economic development needs of Nicaragua. Its services may be more immediately applicable to the contact center industry, with course offerings in business administration, marketing, and systems and industrial engineering. In addition, it offers several competencies (certificate programs) in the use of different information technologies, including training in Oracle, Microsoft and Novell network and database
management (UAM, 2007). The former director of the Nicaraguan Advisory on Science and Technology (CONYCIT) is also an instructor at UAM and stated that the school is very responsive to market demand. If an industry demonstrates a need for a particular technical skill, UAM is interested in developing a competency to meet that need.

Beyond the four institutions above, Managua is also the location of INCAE, the Central American Business School. INCAE now has a sister campus in Costa Rica, and is the largest source for advanced management education in Central America, with about 14 percent of its students being from Nicaragua (INCAE, 2007). INCAE also host the CLACDS project on regional competitiveness and engages in various collaborations with local industry to promote business and economic development.

Currently, however, there is no formal linkage between the Nicaraguan BPO firms and local universities. Informal links exist, such as the movement of the former Director of CONYCIT to UAM, but more intentional links have proven successful in other countries (IADB, 2006). A starting point might be the formation of an industry association for BPO providers. There are informal social relationships between many of the local investors, but there is no formal association for identifying industry needs and communicating them to government and education institutions. An agency like ProNicaragua could also help facilitate more direct communication between industry and education so that appropriate training and skills can be incorporated into degree and certificate programs.

**Enterprise and Third-Party Training**

Training provided to workers after formal schooling is one of the most important sources of skill formation (Lall, 1999). This training can take place in vocational institutions, within firms themselves, a practice known as enterprise training. In the case of the BPO industry, the Danish IFU is developing the concept for training center to serve the specific needs of the industry.
Nicaragua has a government sponsored training center called INATEC. An examination of its course catalog reveals that it primarily provides training for low-skilled jobs in EPZ industries, as well as administrative functions in different businesses. The highest level of training it offers is equivalent to a high school diploma. While INATEC is not likely to be a primary provider of labor for the contact centers in the near-term, it does offer training courses for bi-lingual executive secretaries (INATEC Course Catalog, 2007). Such courses create the possibility of training people for BPO functions such as telemarketing, which may be a viable option if firms are able to pursue more complex activities and need to promote higher-skilled workers to new functions and recruit entry-level workers to take their place.

Enterprise training can be an effective and economical way to develop the skills of the workforce. Employers tend to be knowledgeable about skill needs, though they may not be aware of training methods. Some, however, have the expertise to train people in traditional and emerging skills. Enterprise training can also be cost-effective if executed well. On one hand, there are costs in materials, time, foregone production, and the risk of employees leaving after training. On the other hand, such training is also specific to employer needs and minimizes the risks of providing unnecessary or inappropriate skills (Tan and Batra, 1996). To insure that benefits outweigh costs, firms must have the capacity to provide proper training.

The most important determinants of worker training are (Lall, 1999):

- The educational attainment of the workforce (educated workers are better learners and benefit more from training).
- Firm size, as large firms can spread the fixed costs of training across a large pool of workers. SMEs can be limited by poor information and inability to exploit scale economies in training.
- The training and management capabilities of employers, which tend to be weaker in small firms.
- The presence of external training institutions able to deliver relevant training at a low cost.
Currently, there is no a third-party training option for BPO services in Nicaragua. Press2 is leveraging its relationship with its Danish partner to mitigate the risks to small firms described above, with the Danish government development fund (IFU) funding a Danish business college, Vejle Business College, to provide the initial training to its employees. This serves to transfer knowledge gained in contact center operations in Europe to Nicaraguan managers, and also enables the college to use Press2 as a test for exploring the potential of a more comprehensive training academy.

Contact center operations tend to be very specific, particularly for the less complex functions like telemarketing. The current training regime at Press2 involves general agent training in company operations, sales theory and techniques, teamwork theory and techniques, and customer care. There are also specialized training modules for supervisors with a focus on managing and monitoring agents (Christiansen and Beyer-Pedersen, 2007). The goal of this initial round of training is to endow Press2 with the ability to effectively conduct introductory training for new agents. Currently, the business college and IFU are exploring the possibility of establishing an independent training center that can serve all firms in the industry with both basic and more complex training curricula.

Nicaraguan stakeholders should not let the efforts of IFU exist in isolation, and involvement in design and development should extend to other parties outside of Press2. As contact centers advance up the BPO value chain, the need for enterprise training could intensify, as it is an essential complement to new investment in technology and new organizational methods (Lall, 1999). Studies in mature industrial economies have shown that a shortage of appropriate worker skills is a major constraint on the adoption of new technologies (Bartel and Licthenberg, 1987); whereas well-trained workers accelerate this adoption. This agrees with the value of the depth of human capital introduced at the beginning of this section.

Enterprise training could also represent valuable organizational development for the firms in terms of testing one’s ability to adopt new ideas and upgrade skills and processes
internally. This capacity will be necessary for advancing up the value chain, since the indigenous firms cannot count on a MNE for investment and knowledge diffusion. Ireland started its economic growth with call centers, and Irish policymakers recognized that they had to ascend the technology ladder within five years before they would start to lose their relative advantage due to entry from firms in other countries with low labor costs. Consequently, they learned how to build the call center infrastructure equipment, and then transformed those skills into designing the software that runs the call center (IADB, 2006).

Section 8: Conclusion

Contemporary global integration since 1980 has spurred a wave of free trade and export oriented policies in developing nations. While an elite group of developing nations has realized the benefits of trade, many small nations lag behind and face tremendous pressures from international competition and domestic poverty. The large demand for offshore service provision is creating opportunities for small developing nations to increase participation in trade and knowledge economy activities, and Nicaragua’s nascent contact center industry serves as an example of how the selective use of resources and policy can yield benefits, even if they do not meet original expectations.

The opportunity for Nicaragua to enter the global trade in BPO services is clear, and it has the potential to build relationships with multinational firms operating in the lucrative U.S. market. By investing in the development of part of the Invercasa facility (a modern Managua office building) as a contact center, the government initiated a process which is leading toward unexpected positive results in the form of the Press2 venture and an extended relationship with the Danish government for training and workforce development. The ultimate success of this investment may be the growth of a thriving domestic industry with a high ratio of local participation, rather than an enclave for multinational production chains.
Firms in the Nicaraguan contact center industry must strive to ensure quality service provision, and seek consistent improvement to advance to the upper levels of the BPO value chain. The current group of five firms seems to be focused on cultivating the capabilities of workers and management, without exceeding their existing capacity to provide complex services. However, the growth of this industry will depend upon the creation of a competitive environment which enables quality improvement, skill upgrading, and knowledge spillovers amongst firms. If successful, the growth of the contact center industry can lead to the generation of other technology-based industries and create high-quality employment opportunities for Nicaragua’s young population.

Beyond the firms, there are other institutions and intermediaries that play an important role in the development of this industry. Government policy is crucial for ensuring a healthy climate for FDI and properly aligning programs and incentives to encourage export activities and backward linkages with local firms. Market intermediaries like ProNicaragua add value by helping the Nicaraguan firms overcome information asymmetries and strategically target industry sectors. Investment in human capital formation is required to ensure a sizeable and skilled labor force for contact centers and other knowledge based industries. More specific recommendations are listed below.

With regard to government policy, Nicaragua must continue working to maintain macroeconomic stability. During this time of political transition, it is important to maintain the confidence of both foreign and domestic investors. In terms of trade policy, the government needs to seek interventions that encourage more backward linkages with local firms. The current EPZ system isolates a majority of export activity from the domestic economy, and locally-owned contact centers offer an opportunity for the diffusion of economic benefits to more local firms. The spillover effects can also aid the development of other knowledge-based industries.

ProNicaragua should continue to build its sectoral expertise in BPO services and help facilitate communication between Nicaraguan firms, global buyers, and domestic institutions that can aid in workforce development. Currently, it must serve a broad range
of industries in Nicaragua and be opportunistic in pursuing FDI. In the long-term, it can learn from the examples of Costa Rica and Ireland and sharpen its strategic focus on high-value added industries. A counterpart agency, similar to Enterprise Ireland, should be considered. It would focus on assisting local firms develop the capacity to participate in knowledge-economy trade activities and serve as suppliers to MNEs using Nicaragua as an export platform.

Most importantly, the contact center industry must have access to a skilled and capable labor force. There is a continued need for top-to-bottom improvement in the public education system and technical education should be emphasized at early stages in the curriculum to increase the downstream supply of technically skilled citizens. At the tertiary level, there is a need for formal networks that improve communication and feedback between industry and academia. This will enable Nicaraguan universities to better prepare students for competing in a global economy and assist firms as they strive for consistent performance improvement. It can also improve the diffusion of organizational learning and technology across sectors.

Firms also play a role in training. The potential IFU-sponsored training center could bring great benefits to the contact center industry by reducing the costs of training and agglomerating best practices across firms. It is important for existing firms to participate in efforts to develop and utilize such a facility, for if it is to be useful, it must meet the needs and expectations of the current firms. Along with learning from the expertise of the Danish trainers, firms must learn from their own experiences so they may continuously improve processes and skills of their workforce. While a third party training center can help cultivate advanced skills, firms must ultimately deliver specialized training to meet their specific needs.

Despite significant and persistent challenges to national economic development, the Nicaraguan contact center industry has the potential to increase knowledge-based economic activity within Nicaragua, and thus increase Nicaragua’s participation in the global trade in business services.
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Appendix

Appendix 1 – 2005 distribution of EPZ production, and number of firms operating in EPZs by country

Source: ProNicaragua Country Information, 2007
Appendix 2 – Redundant Fiber Optic Networks linked with Nicaragua

Redundant Telecommunications Links

Source: ProNicaragua Country Information, 2006

Appendix 3 – Typical IPA Services

<table>
<thead>
<tr>
<th>Image Building</th>
<th>Investor Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Advertising in general financial media</td>
<td>• Providing investment counseling services</td>
</tr>
<tr>
<td>• Advertising in industry- or sector-specific media</td>
<td>• Expediting the processing of applications and permits</td>
</tr>
<tr>
<td>• Conducting general investment missions from source country to host country</td>
<td>• Providing postinvestment services</td>
</tr>
<tr>
<td>• Conducting general information seminars on investment opportunities</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Investment Generation</th>
<th>Policy Advocacy</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Engaging in direct mail or telemarketing campaigns</td>
<td>• Participating in policy task forces</td>
</tr>
<tr>
<td>• Conducting industry- or sector-specific investment missions from source country to host country or vice versa</td>
<td>• Developing lobbying activities</td>
</tr>
<tr>
<td>• Conducting industry- or sector-specific information seminars</td>
<td>• Drafting laws or policy recommendations</td>
</tr>
<tr>
<td>• Engaging in firm-specific research followed by sales presentations</td>
<td>• Reporting investors' perceptions</td>
</tr>
</tbody>
</table>

Source: Wells and Wint, 2001
Appendix 4 – Comparison of Enrollment Statistics Among Specific Developing Nations

<table>
<thead>
<tr>
<th>Country</th>
<th>Technical Enrollments at Tertiary Level</th>
<th>Natural Science</th>
<th>Math &amp; Computing</th>
<th>Engineering</th>
<th>Total Tech Subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>numbers</td>
<td>%</td>
<td>numbers</td>
<td>%</td>
<td>numbers</td>
</tr>
<tr>
<td>China</td>
<td>167,700</td>
<td>0.014%</td>
<td>99,400</td>
<td>0.008%</td>
<td>971,000</td>
</tr>
<tr>
<td>S. Korea</td>
<td>163,700</td>
<td>0.365%</td>
<td>0</td>
<td>0.000%</td>
<td>577,400</td>
</tr>
<tr>
<td>India</td>
<td>869,100</td>
<td>0.009%</td>
<td>0</td>
<td>0.000%</td>
<td>216,800</td>
</tr>
<tr>
<td>Philippines</td>
<td>27,200</td>
<td>0.040%</td>
<td>121,000</td>
<td>0.178%</td>
<td>225,700</td>
</tr>
<tr>
<td>Ireland</td>
<td>15,728</td>
<td>0.465%</td>
<td>3,450</td>
<td>0.102%</td>
<td>11,433</td>
</tr>
<tr>
<td>Mexico</td>
<td>39,700</td>
<td>0.044%</td>
<td>64,200</td>
<td>0.070%</td>
<td>296,200</td>
</tr>
<tr>
<td>Chile</td>
<td>8,800</td>
<td>0.062%</td>
<td>0</td>
<td>0.000%</td>
<td>94,300</td>
</tr>
<tr>
<td>Brazil</td>
<td>46,300</td>
<td>0.029%</td>
<td>92,700</td>
<td>0.058%</td>
<td>149,700</td>
</tr>
<tr>
<td>Costa Rica</td>
<td>1,100</td>
<td>0.032%</td>
<td>3,400</td>
<td>0.099%</td>
<td>7,300</td>
</tr>
<tr>
<td>El Salvador</td>
<td>200</td>
<td>0.004%</td>
<td>2,100</td>
<td>0.037%</td>
<td>12,700</td>
</tr>
<tr>
<td>Honduras</td>
<td>200</td>
<td>0.004%</td>
<td>2,700</td>
<td>0.048%</td>
<td>8,400</td>
</tr>
<tr>
<td>Nicaragua</td>
<td>900</td>
<td>0.022%</td>
<td>2,300</td>
<td>0.056%</td>
<td>5,800</td>
</tr>
<tr>
<td>Panama</td>
<td>1,900</td>
<td>0.072%</td>
<td>1,600</td>
<td>0.061%</td>
<td>12,100</td>
</tr>
</tbody>
</table>

Source: UNESCO 1997