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## INTEL AND COSTA RICA: A MODEL FOR GLOBAL EXPANSION, ECONOMIC DEVELOPMENT AND SUSTAINABILITY

In this article, the myriad issues influencing Intel's worldwide expansion into the global marketplace are examined. Because this topic is so broad in scope, discussion will focus on the strategic management policies implemented in the company's 1995 decision to construct the Fabrication plant, A6/T6, in Costa Rica. By analyzing the specific process and conditions of this incursion into Costa Rica, we can extrapolate a model that will serve to illuminate the strengths of Intel's organizational structure, processes, and strategies, and how they might apply to other global expansionary efforts. Similarly, we postulate a model for economic development practiced by Costa Rica that sustained positive economic growth and development unique to the region.

This study will present the trade and investment environment, socio-cultural factors, the political setting, and certain corporate competencies that came into play. We assess the value of this approach in Costa Rica as it might provide a basis for future global plans. Lastly we suggest a list of recommendations for maximizing the effectiveness and efficiency of a company on a worldwide basis. One of the major points we underscore relates to the effectiveness of knowledge transfer and integration by a corporate headquarters to subsidiaries and plants as well as from these points of origin back to headquarters. If a corporation is truly versatile and knowledge flows in both directions, then it assumes transnational status, the ultimate in global efficiency.

### INTEL

Intel Corporation, considered the number one maker of computer chips, commands more than 80% of the PC microprocessor market, with

recent semi-annual revenues of \$13.01 billion.<sup>1</sup> The core business of Intel in microprocessors and chipsets for PCs and servers, falls under the industry rubric of semiconductors in the technology sector.<sup>2</sup> Headquarters are housed in Santa Clara, California in the Silicon Valley technology cluster, although the corporation has subsidiaries around the globe. The geographic distribution of their organization is fairly comprehensive with regional scope, spanning the US and Canada,<sup>3</sup> Europe,<sup>4</sup> Pacific Asia,<sup>5</sup> Japan,<sup>6</sup> and South America.<sup>7</sup> The corporate centers within specific countries do not correspond directly to manufacturing plant locations. Nevertheless Intel achieves competitive positioning through the complex logistical coordination of its global activities.

Intel fundamentals, underscored by Standard and Poors, principally pertain to “its manufacturing prowess,” a major competitive advantage over its peers. Furthermore Intel has a demonstrated ability to “penetrate the market for higher-end platforms, and leverage its web-based processes to reduce cost structure.” Hence Intel's core competencies relate to manufacturing and cost control, both of which are essential for competitors in the technology sector. Typically the market life cycle is short,<sup>8</sup> just as research and development costs can be prohibitive in the break-neck pace of computer technology innovation. Costs must be contained in order to maximize profits and retain market position. The recent precipitous drop in chip prices to an all-time low of \$215 has shrunk margins considerably, though they are still higher than top rival AMD's chips that sell for \$90-\$125 a piece. Because products become obsolete quickly and margins are low, manufacturing acumen is essential in new product cycle innovations.

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<sup>1</sup>For the 39 weeks ended 9/29/01, revenues fell 22% to \$19.56 billion. Net income fell 91% to \$787 million.(Yahoo Market Guide Oct. 25, 01). \$33.7 billion revenues in 2000 (Annual Report).

<sup>2</sup>Hoover's describes the electronics and miscellaneous technology industry as one “offering product lines of integrated circuits, microprocessors, logic devices, chipsets and memory chips for a wide variety of users, including telecom, computer, networking, wireless and other instrumentation.”

<sup>3</sup>Controlled under Intel headquarters in Santa Clara.

<sup>4</sup>Intel Corporation UK Ltd., headquarters in UK and other branches in Israel, England, Germany, France, Italy, Netherlands, Sweden and Russia.

<sup>5</sup>Hong Kong base - Intel Semiconductor Ltd.

<sup>6</sup>Ibaraki-ken, Intel Kabushiki Kaisha.

<sup>7</sup>Brazil Intel Semicondutores do Brasil.

<sup>8</sup>Moore's Law - that speculates on the rapid growth and obsolescence in computers.

Spreading costs around the globe is another key competitive advantage of this corporation. The value is two-fold: the company consistently maximizes value by seeking low cost structures abroad for foreign direct investment in offshore sites, and Intel's global network of operations is flexible and responsive to integration of much of that local knowledge. The presence of wafer production plants in Israel and Ireland, an assembly test plant in Malaysia and the Philippines, and an assembly and test plant for surface mount procedures in Costa Rica, facilitate Intel's access to the benefits from offshore locations as well as domestic wafer facilities.<sup>9</sup> The foreign countries where they operate have a similar profile: typically small, emerging economies with relatively high-skilled workers, lower cost factors, friendly tax structures, as well as stable governments.

#### BACKGROUND INFORMATION

When Intel decided to open a Fabrication plant in Latin America in 1995, the corporation researched the region in order to find the optimal location for its only plant. Several key demographic, political, geographic and socio-cultural determinants coupled with incentive plans presented by the Costa Rican government eventually lead to the projected \$500 million total investment (by 2002) in San Jose.

There were four primary contenders in Latin America for the plant: Costa Rica, Mexico, Chile and Brasil. Harvard Business Professor Debra Spar, while working for a non-profit organization called the Foreign Investment Advisory Service (FIAS), funded jointly by the World Bank and International Finance Corporation, submitted a report outlining the manner in which Costa Rica won over Intel. Her study examines the contenders, yet outside of the Americas, Intel considered Taiwan and Singapore as equally suited. Thus the fact that Costa Rica won the "competition" is all the more revealing concerning the new paradigm countries will have to follow in order to vie for foreign direct investment and the much-needed capital for constructing competitive infrastructures and economies. It seems the Costa Rican success story is a textbook example, and certain circumstances played a decisive role in the outcome.

Important factors influenced Intel's decision to select Costa Rica, chief among which were: 1) the highest GDP per capita in the region, 2) a history of democracy and respect for the rule of law, 3) a relatively well-

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<sup>9</sup>New Mexico, Arizona, Texas and Oregon.

developed infrastructure in communications, transportation, roads, education and other services, 4) a well-educated workforce, 5) a central location for shipping in any direction, with access to coastline on both the eastern and western shores, 6) low cost structure for land, human resources and services, 7) a transparent economy, and 8) a free-trade zone, an industrial park, launched by the government.

#### GEOGRAPHY AND DEMOGRAPHICS

Costa Rica is located in a centralized position vis-à-vis the north-south corridor as well as along the Atlantic and Pacific coasts. This alone, an arbitrary and fortuitous fact, helped to dissuade Intel from Chile. Furthermore, the country has the highest percentage of European blended Mestizo population in Latin America. No other country in the region can even approximate their 94% white European dominance.

Human capital is a major asset for the country, rivaling levels of major industrialized countries. A 94.8% literacy rate couples with a particularly high proportion of skilled workers, unrivalled in Central America (see “Background Notes”). The uniquely educated workforce explains 1995 figures for the distribution of the 1.2 million person workforce: 45% in services, 22% in agriculture, and a rising 17% in industry.

These figures indicate an uncommon trend in Costa Rica in comparison to its northern neighbors, where the economies tend to be excessively dependent on agriculture and an indigenous Amerindian, agro-based labor force. Prior to Intel's arrival in 1995, Costa Rica had already begun the strategic shift toward diversification of its economy into services and industry (“Costa Rica”).

Beginning in the 1980s, while its Central American neighbors were mired in civil wars, the country attracted numerous US retirees who moved to the beautiful, cheap and comfortable coastline. The high percentage of white Europeans as well as English-speakers makes living in Costa Rica almost like being in the states and not quite so “Spanish” or “foreign”. The amenities most US households and corporations take for granted, like running water, cable TV, and continuous electricity flow, are available in this tropical paradise whose standard of living surpasses any other in the region and begins to approximate that of the US. Retirees tend to appreciate the political and economic stability of the country, knowing that the costs are less than in the US, yet the infrastructure guar-

antees near US quality in banking, housing and other aspects of the infrastructure and economy—and at half the cost.

#### TRADE AND INVESTMENT ISSUES

In the latter part of the twentieth century Costa Rica served as a catalyst for economic reform in the Latin American region. Association in several key organizations has augmented this preeminent role as promoter of economic stability. Membership in the UN, the OAS (Organization of American States), and non-political observer status in ALADI (Association of Latin American Integration), as well as its role as a principal player in the MCCA (Common Market of Central America) demonstrate the country's commitment to the economic sector.

In 1999, foreign trade exports of \$6.6 billion included electronic components, bananas, coffee, textiles and apparel, fruits, jewelry and flowers. Major market receptors of these goods were the US (51%), Europe (23%), Central America (11%), and Japan (2%). On the import side, a total of \$6.3 billion came from the US (56%), Europe (10%), Mexico (5%), Central America (5%), Japan (5%) and Venezuela (4%). Imports included electronic components, machinery, vehicles, consumer goods, chemicals, petroleum products, foods and fertilizers (see “Background Notes”). A key challenge for Costa Rica is to reduce its trade dependence on foreign countries for the expensive high-tech imports and create a local industry in these superior value sectors. This can occur only if indigenous industries result from spillover through foreign investment projects, such as Intel.

In the 1980s high-tech companies informally began to select the Central American country. Motorola, one of the first, set up a components plant for cellular phones and by 1998 employed over 1,200 workers. More than 30 other high-tech production plants are currently operating in Costa Rica. In 1997, 2% of the country's \$4.8 billion in exports derived from these companies. If we contrast foreign firm's exports in 1997 at \$115.3 million to Intel's output in 1998 of \$700 million, we find an increased overall exports to 17% (Balkin) and can understand the magnitude of this influence.

During the rigorous negotiations with Intel in 1995, the government designed attractive and favorable incentives to lure foreign direct investment. It offered to build a water facility specifically for Intel's exclusive use, grant expeditious approval for permits, allow an initial 8-year tax

exemption, subsequent 4-year 50% discount on taxes, and give bulk rates for electric power. In addition, imports of foreign raw materials received a 100% tax exemption to bolster development within the country. These kinds of inducements led to the initial \$300 million investment, a groundbreaking in April 1997,<sup>10</sup> and eventual employment of 950 individuals. The cornerstone necessary for establishing a high-tech hub in the country was set.

The spillover from Intel's investments, combined with the government's aggressive courtship of other companies, is evident in Costa Rica's continued ability to entice technology sector companies to invest in the country. The cluster includes other multinational electronics firms which followed Intel's investment lead, like Taiwanese Acer, and German Veba, AG. Furthermore, companies in other industries are also taking advantage of what Costa Rica offers, since Proctor and Gamble and Abbott Pharmaceuticals have opened up sites there too (Sowinski). A host of companies offering complementary services to Intel have emerged. For example, Photocircuits in 1998 announced plans to build a \$30 million plant employing over 700 people to produce closed circuit cards for Intel and other electronics firms. DEK USA and EMC Technology made similar overtures (Balkin).

The net effects of offering incentive packages may not be determined within the country until the first wave of tax-exemptions expire in 2005, although the GDP thus far is heavily tied to Intel's production output. Recent data links growth in GDP of almost 8% in 1999 to the inception of the Intel plant's production. Moreover an increase in chip exports to a level of \$2 billion induced the first trade surplus since 1986. Projections assume that once the plant reaches full capacity at the end of 2000, the economy's rate of growth will plunge, some predict to 4% (Sowinski).

Correlated with this dismal picture of dependency is the 1999 national income growth measures (as opposed to GDP) that grew by only 2%, because of the outflow of profits (see "Chip shop afire"). According to Sowinski, Intel is responsible for half of the country's GDP growth in the last two years, and 37% of Costa Rica's exports.

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<sup>10</sup>Intel in Costa Rica originally needed to import 90% of supplies from abroad because the country did not have an adequate infrastructure in place. In comparison, their flash memory plant in Shanghai (1996) buys 80% from local suppliers.

Within its borders, the establishment of a free-zone industrial area similar to the Singapore case model has been instrumental in enticing foreign direct investment. Coincidentally, Intel leverages its presence abroad by using local suppliers, and attracting other complementary companies to establish operations nearby. Every Fabrication plant built typically generates 20-25 suppliers. Originally Intel imported 90% of its supplies from abroad because Costa Rica lacked an adequate infrastructure. In comparison, its flash memory plant in Shanghai in 1996 bought 80% of its materials from local suppliers. In Costa Rica near the A6/T6 plant, 25 high tech companies, such as circuit board manufacturers and other complementary suppliers, have emerged. The growth and sustenance of these local indigenous suppliers is an objective Intel and Costa Rica can conjointly develop in the future. To exploit knowledge transfer, Intel could take a proactive role in nurturing local suppliers of complementary product lines.

#### POLITICAL ISSUES

The political environment in Costa Rica has been characterized by stability for the past sixty years in a region plagued by civil wars from the 1970s through the 1990s. Costa Rica eliminated its armed forces in 1948, maintaining only an internal force for domestic security. In 1993, it declared permanent neutrality, and has upheld a strictly democratic tradition with a free-market economy throughout the twentieth century. While its neighbors experienced revolution (Nicaragua 1979), civil war (El Salvador 1970-90), (Guatemala through the 1990s), and Manuel Noriega's narco-regime (Panama through the 1980s), Costa Rica was forging a peace pact in 1987 for the region. The 1993 Nobel Peace Prize marks the epitome of its efforts; Oscar Arias, ex-President, received the prize for brokering the Central American peace plan.

Costa Rica's role, unparalleled in the region, has been to pursue democratic and economic development policies on the isthmus. Participation in the multinational Partnership for Democracy and Development in Central America reflects the economic thrust of its agenda (see "Background Notes"). Indeed this economic focus has shielded the country from assuming a controversial role in the problematic political arena, and to date the most contentious function it performs is as a member of the UN Human Rights Commission. Costa Rica has sought concrete economic cohe-

sion as paramount to its foreign policy initiatives, sidestepping overtures for political integration of the region.

The embedded democratic nature of institutions in the country guarantees and imposes strict constitutional checks and balances. The political and judicial systems manifest transparency and a system of clear accountability, which reinforces a dependable regulatory regime. The superiority of this system was apparent in its competition with Mexico, for an Intel site, since the chipmaker, determined that the level of Mexican corruption impeded transparent transactions and made the country too complicated for conducting business.

The legitimacy of the legal and judicial system in Costa Rica attracted Intel from the start. In 1998, the Supreme Court approved the operation of high-voltage wires (230,000-volt lines) near the new plant, overturning a suit brought by local citizens against the company (see “Czech Republic”). As pointed out earlier, one of the incentives the government had offered was for fast-track approval of permits for the MNC. Thus legislative and judicial measures fostered and continue to encourage a favorable climate for foreign investment.

#### CORPORATE ISSUES

It is difficult to ascertain to what degree Intel has created a worldwide corporate infrastructure of distributed yet specialized assets and capabilities. Have they capitalized on knowledge flow and achieved knowledge transfer from the outside back to headquarters? There is no doubt that the company maximizes low cost competitive advantages in off-shore settings. Furthermore, the method it followed in setting up the Costa Rica plant- though not the first of its kind abroad – suggests that they had already worked out a highly effective strategy for implementing global expansion. The deliberate and meticulous selection of Costa Rica as the ideal locale for promoting a technology hub in Latin America made viable the exploitation of future cluster benefits.

On the other hand, research suggests that Intel locates manufacturing factories around the world in the most cost efficient countries, yet protects their core knowledge competencies by housing headquarters and primary research facilities in the centralized Silicon Valley technology cluster. Some research discusses the unique knowledge transfer qualities offered in the Israeli subsidiary, but most of the other offshore plants do

not reinforce the image of a corporation actively integrating processes from abroad.

In general, knowledge transfer occurs through the exploitation of human capital. By promoting individual managers from acquisitions or rotating management physically around the globe, a corporation can achieve profitable knowledge integration. Reinhardt cites only three CEOs from acquisitions who wield positions in the top tiers of Intel management. Furthermore, although retention remains strong, at 96% per year, the greatest attrition occurs with the younger, midlevel managers. That segment tends to be innovative and aggressive, contributing to the flexibility of an organization, consisting of those who historically were key to Intel's initiation and success in the microprocessor market.

The effect of decentralization is that more knowledge flows between each division and the top. Also, the company can broaden the scope of their product portfolios, which in turn makes for a more flexible, culturally diverse organization. The rapid and expensive acquisitions in 1999 of twelve companies for approximately \$6 billion, exceeding expenditures on capital equipment, demonstrates a commitment to invest in start-ups, a fact which should introduce new vigor into Intel. The objective is to instill an entrepreneurial spirit and integrate energy and creativity from these smaller companies.

From the Costa Rican perspective, the incentives proposed by the country to lure Intel seem to have been good choices for the Costa Rican economy. Capital improvements in key areas of infrastructure, essential for Intel, brought derivative benefits to the Costa Rican citizens as well. Infrastructure growth, particularly in the area of roads, services and communications platforms support the foundation for the development of an electronic high-tech hub in Costa Rica.

Nonetheless the broader advantage for Costa Rica in terms of human resources suggests that valuable skills and knowledge will be transferred to the workers, enhancing their attraction to other high-tech firms. The spillover continues into the supply chain, bolstering local suppliers and the local economy, in theory. This in turn helps to cultivate overall cluster benefits, both for the foreign as well as domestic firms. Intel must capitalize on the spillover it fostered as well.

Costa Rica initially lured companies with generous incentive packages. The government is currently working to improve the over-burdened infrastructure by expanding the airport, building roads, and commencing

the privatization of the ICE, the state-owned electricity and telecommunications monopoly (see “Chip Shop Afire”).

From Intel's perspective, as the first mover in a new manufacturing area, it reaped huge profits. Low costs and efficient production cycles are two of the more obvious benefits. However Intel must integrate knowledge from the Costa Rica plant project and improve processes further. Since a cluster is truly evolving, Intel must organize itself in order to have a mechanism for transferring knowledge from this new hub back to the carefully guarded headquarters. This is the greatest challenge for firms utilizing offshore locations, as they have to maximize the knowledge transfer from those globally dispersed plants. By physically transferring managers around the world and promoting from outside its borders, the company can appreciate all of the advantages of this kind of international organization.

Finally, Intel can follow the model for expansion into Africa and Eastern Europe, where costs are low and human resources are ready for training. Bulgaria, or one of the other centrally-located, “less privileged ascending countries” hoping to join the EU by 2005, would serve as an excellent center and source for new plants and knowledge cultivation. With its first mover experience, Intel should act now.

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