International Conference

Strategies for Building Software Industries
in Developing Countries
Honolulu, Hawaii
May 2004

Software Companies Making It

Case Study

Costa Rica/
Grupo TecApro / Infonet:

Presented by:

Alexander Mora[1], MBA

Sponsored by:

International Intellectual Property Institute

[1] President of Costa Rican Chamber of Software (CAPROSOFT- www.caprosoft.com -) and Vice-President of Costa Rican Chamber of Exports (CADEXCO- www.cadexco.biz -) since 2001 up today. Chairman and CEO of Grupo TecApro / Infonet Central America (www.tecapro.com , www.infonet.com).

"...los países que no utilizen a la ciencia y la técnica como guías en sus empresas, se quedarán postergados y estarán supeditados al desarrollo de los demás, porque en las sociedades actuales, aquéllos que utilizen mayor conocimiento y sagacidad, serán los que logren ventajas sobre los otros..."

"...those countries in which science and technology is <u>not</u> applied as a guide to business, will fall behind and will be ever dependent on the development of others, for in today's society, those who use their knowledge and cleverness best, will be those who achieve advantage over others..."

José María Castro Madriz,
First President of Costa Rica,
Speech to Congress,
September 15th, 1844

1. Presentation.

Many developing and transitional economies (DTEs) have become actively interested in increasing their software industry sector and software exports. The software industry is being acknowledged as one of the most important sectors in terms of exports and also R&D expenditures in many countries.

This paper contains two sections. The First Section presents a general description of the efforts that Costa Rica is articulating in order to grow up into a "world class" exporting software industry. The Second Section presents an overview of the business strategies followed by some Costa Rican software firms and the specific experience of one of the pioneer software and service exporting firms in the ICT (Information and Communication Technology) sector in Central America, a Costa Rican based company: **Grupo TecApro.**

Most of general content in this paper is a summary based on three recent studies promoted by ***THE SUPPORT PROGRAMME FOR COSTA RICA SOFTWARE SECTOR'S COMPETITIVENESS (IADB-CAPROSOFT- CENAT-PROCOMER***[2], a major alliance between the Costa Rican Government, the public Universities, the local industry represented by CAPROSOFT and the Inter-American Development Bank. The Study of Costa Rica's Software Industry[3] presents a set of metrics and statistics that dimensions the industry size and composition. The Critical Roll of Software Industry in Economic Growth: Focus Costa Rica[4], gives a perspective of the impact over the domestic economy of the Costa Rican software industry. The Strategic Plan to Develop the Costa Rican Software Industry[5] presents a diagnostic, a set of strategies and tactics to develop the local industry with an export focus.

Stimulating software industry in developing countries requires specific actions and supporting policies and tactics over private, academic and public sectors. Governments have a key role in doing such direct intervention in order to develop the proper ***ICT ecosystem***.

---

[2] IADB-Inter-American Development Bank (www.iadb.org), CAPROSOFT – National Chamber of Software (www.caprosoft.org), CENAT – National Centre of High Technology (www.cenat.co.cr) and PROCOMER – Costa Rican Export Promotion Boreau (www.procomer.com).

[3] Developed in 2003 by Centro Internacional de Política Económica CINPE, Universidad Nacional (www.cimpe.una.ac.cr) . Coordinated by Leiner Vargas Alfaro (lvargas@una.ac.cr).

[4] Developed in 2003 by Sallstrom Consulting and Nathan Assocciates. Sponsored by CompTIA (www.comptia.com) and ALETI (www.aleti.org). Coordinated by Laura Sallstrom (www.laurasallstrom@earthlink.net).

[5] Study in progress under the excecution of Fundación Centro de Gestión Tecnológica CEGESTI (www.cegesti.org) . Main consultants Dr. Brian Nicholson and Dr. Sundeep Sahay. Coordinated by Daira Gómez (dgomez@cegesti.org).

First Section

1. Costa Rica: A general overview.

Being one of the most stable and long-standing democratic countries in the modern world (ruled under democracy without interruptions since 1889), Costa Rica is included among the short list of countries with "High Human Development", according to the Human Development Index[6] of the United Nations. Having abolished the army back in 1949, civil institutions, public education and health, transparent justice, environment protection (including the largest portion of the nation's territory (landscape and ocean) dedicated to national parks and wild protected areas in the world), as well as public infrastructure, have been the priority destination of public budget expenditures and investments.

Over the past two centuries, the country has maintained a competitive drive for foreign trade and a mindset that supports diversified exports as well as a strong government supported strategy of open markets. Currently, the country has free trade agreements in place with Canada, CARICOM (Caribbean Community of States), Chile, Mexico, the rest of Central American countries and the United States of America (just agreed on January 26, 2004[7]). Free trade agreements with Mercosur (which includes Argentina, Brazil, Paraguay and Uruguay) and the European Union will be under negotiations shortly.

The country has a sustaining expansion of its economy, reaching 6,8% of growth in 2003 and is expecting rates of growth over 5% in the upcoming years. Two digit rates of growth in the ICT[8] (Information and Communication Technology) sector are also expected during the upcoming 10 years, according to different sources. Presently, over 65% of the nation's jobs are dedicated to export production. Figure 1 shows the distribution of Costa Rican software production between local market and exports. Figure 2 presents software exports distribution between Central America and Rest of the World and Figure 3 shows the destination Costa Rica's software exports outside the Central America region. Service sector represents almost 60% of the domestic market. Software exports reached the US$70 million in 2002[9] and ICT exports exceed the US$400 million in 2003[10].

[6] Human Development Index, 2003.
[7] CAFTA will be sent to Congress within the up coming months.
[8] Under this paper, ICT sector in Costa Rica does not include Intel Corporation's exporting numbers.
[9] Source: CINPE: Study of Costa Rica's Software Industry, 2003.
[10] Source: Procomer Draft Estimation of Service Exports, 2003. Not including Intel Corporation.

Figure 1: Destination of Costa Rica Software Production:
Local Market vrs. Exports (2002)

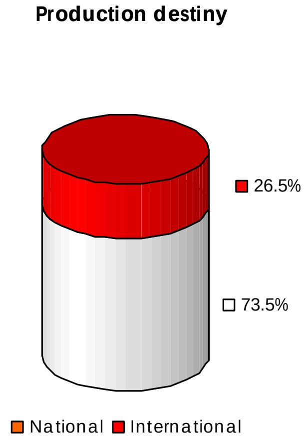


Figure 2: Destination of Costa Rica Software Exports:
Central America vrs. Rest of the World (2002)

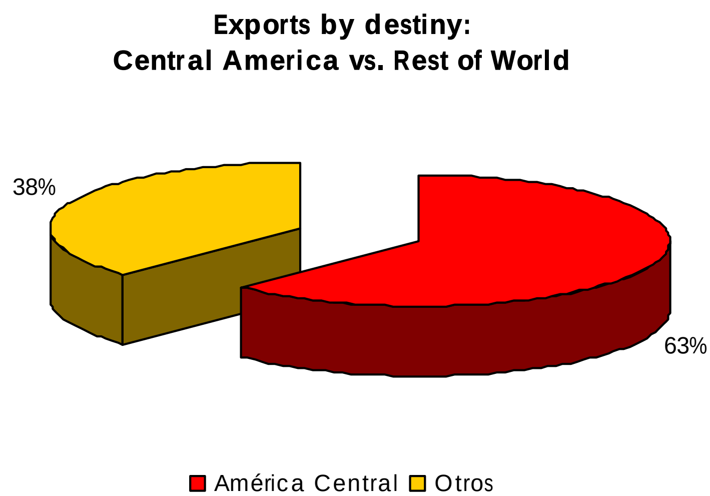
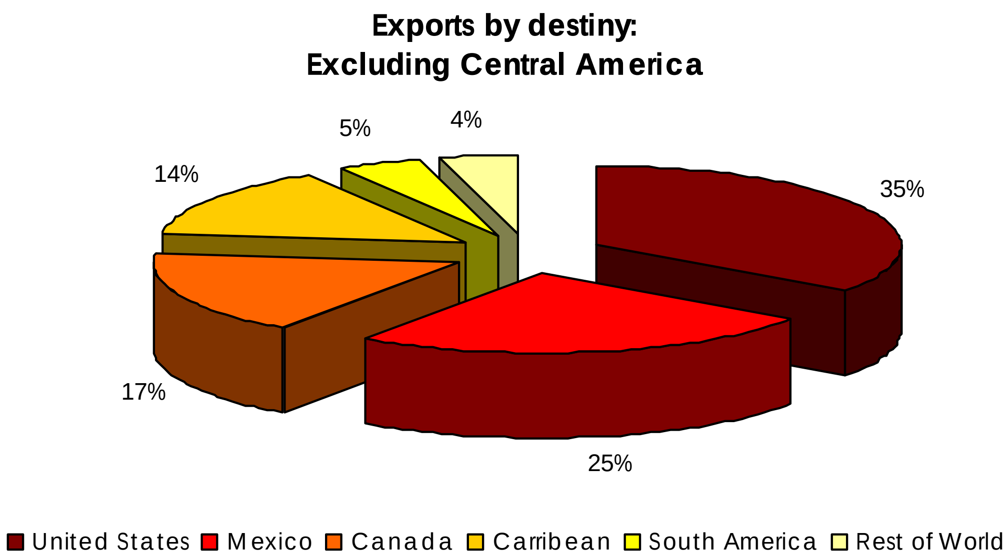


Figure 3: Destination of Costa Rica Software Exports:
Rest of the World (2002)



Starting a decade ago, a new breed of nontraditional and industrial exports has taken the lead. Strategic investments by Intel Corporation have turned Costa Rica into the exporter of computer chips and now, 100% of server's chips produced by Intel Corporation and sold worldwide, are manufactured in Costa Rica by a staff composed by 98% Costa Rican professionals. It is also important to mention that Intel Corporation has recently open a software division based in Costa Rica, in charge of providing internal software R&D. With a population of only 4 million inhabitants and a pool of over 60 private and public universities. The World Economic Forum ranks Costa Rica as the country in Latin America with the highest "Quality of IT Training & Education Program" among the "Human Capital Indicators Index"[11]. Computers have been declared free of import taxes since 1985, helping Costa Rica to have the highest per capita number of PCs in the Latin America region. Internet access rates are reaching 40% of the population[12].

Costa Rica boasts a significant interplay between the private sector, the government, the academic sector and several foreign players, including private multinational companies, the financial community and several multilateral organizations like the IADB and the World Bank. The local software industry is seen as a strategic partner in increasing exports, based on the highly escalated capacity of software products and services. A main goal for local actors is to develop the human capital needed to produce a prime intellectual content in the form of software products. It is important to mention that most Costa Rican software firms are small or medium enterprises (SMEs) and its capital is mostly local. Figure 4 presents the distribution of software firms according to its size (per number of employees) and Figure 5 shows the proportion of local versus external capital in Costa Rican software firms. ICT is, since 2001, the first

[11] www.weforum.org. 2003-2004 Network Readiness Index.

[12] According to RACSA (Radiográfica Costarricense S.A.) recent Newpaper publication –Periódico La República-, April 30th., 2004.

choice of young men and women reaching the university system, with over 15% of new admissions demanding ICT in the entire university system.

Figure 4: Costa Rican software firms size (by number of employees) (2002)

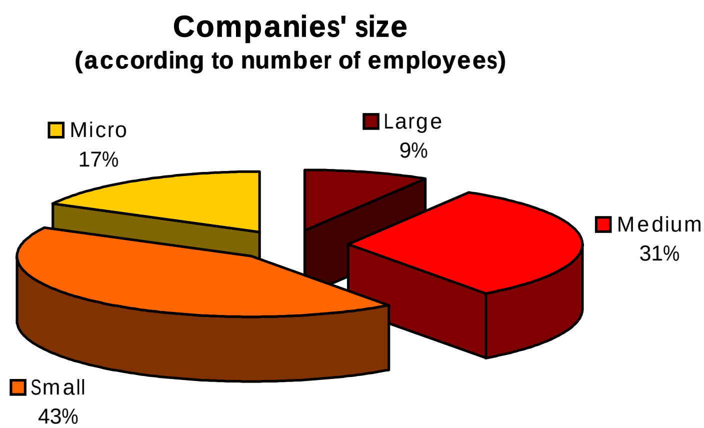
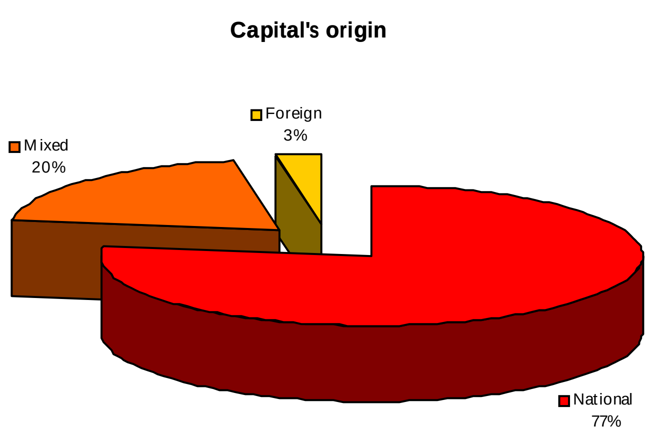


Figure 5: Costa Rican software firms capital origin (2002)



Since year 2000, under the leadership of CAPROSOFT, a convergence of initiatives between main players has been in progress under ***THE SUPPORT PROGRAMME FOR THE COSTA RICA SOFTWARE SECTOR'S COMPETITIVENESS (IADB-CAPROSOFT- CENAT-PROCOMER –PROSOFTWARE-***, a creative initiative that has been able to align the country's effort and recourses. The following sections present the main initiatives sponsored by Prosoftware Programme, currently in execution in the country.

2. The value of a strategy in a DTE.

In the developing world, India is held up as the exemplar of spectacular growth that many other DTEs seek to emulate. Predictions are of a $ 57 billion industry by 2008 and the software industry has already achieved an impressive 3% contribution to India's GDP, and is expected to grow significantly in coming years[13]. In India, the software industry has been boosted by a strong indigenous component. With a different approach but with high results, in Ireland, multinationals have played a key role in bringing in foreign capital and know how. In the case of both India and Ireland, there has been a tremendous boost in entrepreneurship activities that represents a significant departure from their lack of technology focus in the past.

Many planners in new entrant DTEs aspire to India's growth strategy, and it is important to examine why a strategy is necessary for new entrants. Some commentators have argued that Indian growth occurred as a result of "benign neglect," implying that government and policy played a marginal role in the spectacular growth of India's software industry. However, government intervention in the shape of policy clearly did have an impact in providing investment in "public goods". Examples such as telecommunications and education, legal reforms, tax incentives and policy bodies have all contributed in different ways to stimulating growth. In all the major software exporting nations, macroeconomic stability has contributed to the industry growth.

Lessons may be learned from the policies and growth of these countries but it is important to note that *initial conditions* for India and Ireland's software industry development were characterised by high international demand. The same demand profile, however, does not exist today. During the 1990s, both of these countries could supply skills at the right time with low opportunity costs of human capital for software engineers, managers and entrepreneurs. While some commentators perceive this situation as a "lucky episode," others describe it as the effect of concerted strategy. In either case, however, it opened a window of opportunity for companies in these countries to develop, and paved the path for other countries to try and emulate.

Thus, the context facing new entrants such as Costa Rica is very different to that faced by India and Ireland nearly two decades ago. This revised situation provides both new challenges and opportunities. The challenge comes from sophisticated and well-established mature competitors located in the leading clusters that now provide serious entry barriers to new entrants. The opportunity that arises for innovative firms is to identify and establish themselves in new niches. Another challenge arises from the fact that demand is lower in 2004 and has a different profile. The problem is not insurmountable and new strong international opportunities exist, but new entrants like Costa Rica require concerted and coordinated action by a multiplicity of actors, both in the domestic and international network, to develop and sustain the export potential.

One clear opportunity that arises today as compared to the past is that the practice of global outsourcing is relatively normalized and accepted by firms in the West. As a

[13] Nasscom.

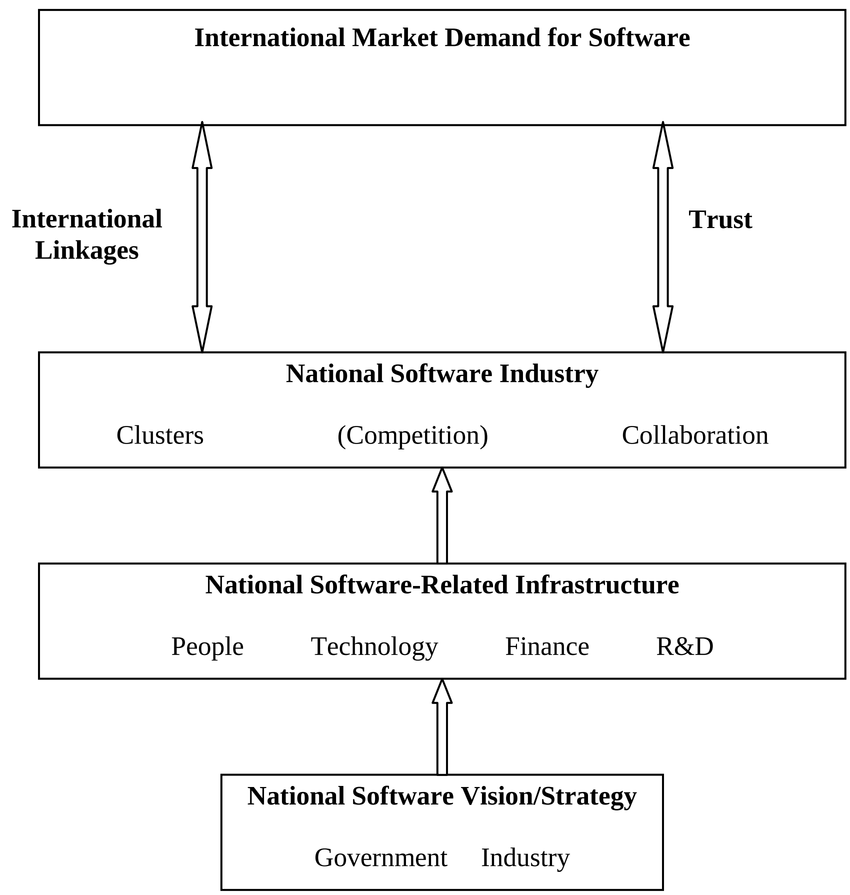
result, the efforts which Indian or Irish firms needed to make to convince potential customers of the benefits from outsourcing need not be repeated by the new entrants. In general, the lessons gained from the experiences of other countries are that policy and strategy can help in certain key areas, such as creating a conducive and enabling environment, the provision of infrastructure, particularly telecommunications and clusters; selective protection especially to SMEs in the shape of subsidies and preferential finance; strengthening education and training; and promoting and marketing the country globally. We strongly believe that strategy building and implementation is not a “one off” event but is evolving, cyclical and interactive. As a result, another key implication for the government is thus in supporting the ongoing process of strategy making and coordinating the various actors in the network to achieve concerted action in the complex network of interdependence between areas of policy and action over time in the face of changes in the domestic and international environment. It is within this spirit, that the Costa Rican software sector is working.

3. Theoretical support of Costa Rica’s software industry strategy.

The Software Export Success Model (SESM)[14] proposed by Heeks and Nicholson (2000) is the basic theoretical support for Costa Rica’s software industry’s strategic approach. The authors reflected on their respective empirical experiences and associated academic and practitioner literature on the "first-tier" software exporters, the Indian, Irish and Israeli software industries or "3Is" as they are popularly known. This process enabled common factors to be derived which were grouped into categories considered central to the development of success of these three countries. The model is made up of five basic categories: demand for software, national software vision and strategy, international linkages and trust, national software industry characteristics, and national software-related infrastructure. Figure 6 (below) provides a schematic of the SESM, and this is followed by a brief description of each category.

[14] Available at http://idpm.man.ac.uk/publications/wp/di/index.shtml

Figure 6: The Software Export Success Model



In order to make strategic planning easier, each level of the strategy must properly understood, according to the following orientation:

- **International demand for software** is important for successful software exports. The role of domestic demand is less clear but by stimulating software capabilities it is expected that it may facilitate exports (Schware 1992). International demand needs to be analyzed both with respect to various technological and market segments.

- **National vision** is another key consideration for software exports. First-tier software exporters all had a vision "shared by a relatively small but committed group of government officials and private entrepreneurs". In India it was led by NASSCOM (National Association Of Software And Service Provider Companies), in Ireland by the IDA, and in Israel by an agency of the Ministry of Industry and Trade.

- **International linkages** – making and sustaining linkages with markets and customers overseas – have been critical to the development of the 3Is. The diaspora from all three countries (especially to the US) was critical in forging such ties. Linkages were also built through marketing operations set up by industry associations. Another linkage issue is trust which was facilitated by the diasporan links and by the reputation of famous companies such as Microsoft or Intel, who set up subsidiaries in the 3I nations. Externally-accredited standards such as ISO9000 and the Capability Maturity Model (CMM) present an image of Western standards and "proven" output. Furthermore, anti-piracy measures and a legislature that can be relied upon to adjudicate fairly also help to foster trust.

- In the 3Is, **clusters forged competition and collaboration between firms** using world-class telecommunications. Knowledge transfer and other synergies provided by clustering were also key success factors. The existence of clusters provides both the physical conditions for synergies to be created, and the symbolic image of a “high-tech” centre.

- **Infrastructure conditions** relating to the pool of human resources, availability and access to finance are other important conditions to foster software exports. These include the availability of technical and managerial skills and the cost at which they are available. Often it is found that only the technical skills are emphasized, while management skills are given secondary importance. The need for strong English language skills is another important factor to operate in the global marketplace. Financial infrastructure such as cheap working capital and loans have fostered growth as has investment in research and development, particularly in the case of Israel.

4. Costa Rica: strategic drivers.

Each country is different. The specifics of Costa Rica’s unique position strongly supported by a centenary investment on public education and health, a strong vocation of open international trade, the small scale of the local market and the country itself, as well as the significant participation of a worldwide leader like Intel Corporation in the country, constitute a relevant platform and foundation for the national strategy of developing a world class software industry: ***Costa Rica: Green and Smart...***

This software development strategy has been thought in a holistic manner as a network comprising of various elements that need to be strengthened. How to best develop linkages that can strengthen this overall network is the focus of this approach. With this in mind, I am providing some key areas around which concerted and coordinated action needs to be taken. These areas, which form the basis for the formulation of Caprosoft's task group structure, are:

a. Development of a vision

    i. Overall goals
    ii. International linkages

b. Development of national software related infrastructure

i. Policy and regulatory
ii. Institutions
iii. Education and R&D
iv. Telecommunications
v. Capital and financing

c. Development of software industry

i. Collaborations
ii. IT parks
iii. Standards and accreditation

Under the programme "***Costa Rica: Green and Smart...***", an alliance of ICT actors are placing a set of programs, actions and initiatives to accomplish this strategy. Such an expansion has the goal of increasing ICT export from around US$400 million up to US$1.2 billion by 2010, about 1.2% of total exports. The following section highlights the main actions of such a strategy:

a. Promoting development of human capital to produce prime ***intellectual property*** content in the form of software products.
b. Promoting and aligning ***near shore co-outsourcing services*** rather than flat turn of requirements and specifications into computer code.
c. Communicate the country's ICT capacities of adding smart value by developing a branding based perception, focussing on the concept of ***Costa Rica: Green and Smart...***
d. Deploying a strong entrepreneurial knowledge-based ICT sector by improving the country's "ICT habitat".
e. Nurturing the cooperation and common focus among the local ICT sector and establish strategic alliances and partnerships with suitable global players.
f. Exploit synergies with the Hispanic market in North America, which has a high growth expectation.
g. Strenghthen the country's ICT and legal infrastructure, public and private training and education programs, increasing the number of ICT professionals.
h. Increasing the R&D links between the academic and the ICT sector by increasing the networking between key players at both sides.
i. Continuing the metric and quality sort of studies in order to keep periodical track of ICT sector development and its economic impact across the local economy and exports.
j. Increasing the networking efforts with the local and international financial community.
k. Pushing the increase of ICT capital investments on public and private economic sectors in order to expand the local marketplace.

Second Section

1. Driving strategies for software firms.

Most successful market products have developed either through a ***technology insight strategy***[15] or a ***customer insight driven* strategy**. There are various technology driven, product oriented and rapidly growing firms that are close to the USA Silicon Valley model. The Israeli software industry drew on the technology insight strategy built upon its military talent, broad backing from government via incubators and other financial incentives. Israel is a special case because its software industry has benefited from various spill overs from the defense industry including research programmes in real time applications, avionics, communication systems and command and control applications. This was combined with venture capital that converted ideas into products such as in security areas for Checkpoint and Trend Micro. There are other similar examples of technology-insight driven strategies of Russian companies who have utilised ex-nuclear space programme scientists to build scientific products[16].

In Ireland there are many university spin-offs that focus on niche products e.g. development tools and system software, computer-based training, telecommunications business applications. These are usually service-intensive products that require different types of related services such as installation, training and integration, support and maintenance. Table 1 (below) gives two examples of companies in Ireland and India adopting the technology driven approach to product development.

Table 1: Cases of different approaches to technology development

Baltimore technologies is a leading developer of information security products and services for electronic commerce and Internet. It was founded in 1976 as a consulting, custom software development firm by a mathematics academic from Trinity College Dublin. It entered into the product market in 1996 and draws 60% of revenues from product sales (royalties) and 40% from services. 98% of its revenues come from exports. It has multinational development and support offices but cryptographic (security) development remains in Dublin. http://www.baltimore.com/index.asp *Silicon Automation Systems* (now Sasken) based in Bangalore and set up by academics from the Indian Institute of Technology develops proprietary software for communication and networks. The company has focussed on a range of speech compression products and design tools for semiconductor design. http://www.sasken.com/index.htm

2. Customer and technology driven products in Costa Rica.

The customer driven product strategy requires deep insight into changing needs in developed markets to which Costa Rica has proximity. Most of Costa Rican software

[15] Nasscom 2002
[16] see http://www.fort-ross.ru for examples

firms were born following customer needs, specially around ERP needs. Most of the pioneer firms like Exactus Corporation[17], Codisa Software[18] and Grupo TecApro[19] / Infonet, have developed custom enterprise resource planning solutions for some particular customers that were developed into products offered to a wider market back in the late 1980's.

Back in the 80's and early 90's, these Costa Rican software houses aligned their technological capabilities following their customers' needs, developing several ERP products that were sold across Central America, Mexico, the Caribbean and South America (mainly across the Andean Pact countries), positioning themselves as a leader in the ERP arena in the region. Six of each ten ERP commercial systems in operation in the Central America region by 2002 were developed by one of these firms.

Examples of technology driven products are also available in Costa Rica. Some of the most well known examples are ArtinSoft[20], Predisoft[21] and Grupo TecApro[22] / Infonet.

3. Multinational companies and its roll in Costa Rica.

Costa Rica has a growing exposition to multinationals IT companies. Since Intel Corporation established itself in the country back in 1997[23], another possibility for Costa

[17] www.exactus.com. Exactus Corporation was the first CMM-3 certified software firm in the region. Its main commercial product is called Impulso, a solid ERP application with hundreds of customers in over 12 countries in the region.

[18] www.codisa.com. Codisa Software Corporation was the first company that developed an ERP product using Oracle technology in Latin America. Its main product, Codisa NAF, is a solid product with several hundreds of installations in various countries. After 2000, the company developed software for the financial vertical market. Codisa's Business Inteligence (BI) and Data Warehouse applications, recently launched to the market, are part of an all new strategy developed by the firm in order to reach more value segments in the corporate marketplace.

[19] www.tecapro.com. Grupo TecApro / Infonet was the first software package-oriented firm in Central America, founded back in the middle 80's. The company was the first in launching an ERP application package (SAI) with multi-currency features and LAN operation capabilities (Novell and Microsoft platforms) in Latin America back in the late 80's, capable of operating in over 18 countries without changes at software code. The company also developed the very first call accounting software package in Latin America (SACET).

[20] www.artinsoft.com. ArtinSoft is a university spin off company founded in the early 1990's, specialist in automated software migration. With headquarters in San José, Costa Rica, the company has a very high reputation as an expert in software migration projects worldwide.

[21] www.predisoft.com. PrediSoft is a young company that applies advanced mathematic models and designs, to support decision making. PrediSoft has developed a complex set of statistic and mathematic models and software based tools, well recognized as one the the most complex and sophisticated data mining models available in the market. With very successful projects in the financial and commercial areas, PrediSoft technology is now in beta testing projects to be applied on the Oil and Chemical industries.

[22] www.tecapro.com . Grupo TecApro / Infonet has developed several personal utility software packages that were the first set of massive oriented software products packages (TeQuita, Spanglish, TecaCom) ever developed in Latin America. By 1992, the company desided to shut down all kind of anti-copy protection on those products. As a result of this strategy, over 5 million copies of these products were in use by 1998 across most of the Spanish speaking countries.

[23] Intel Corporation, the leader company in the world in silicon manufacturing, has concentrated 100% of its chips for computer servers in Costa Rica. Since 2002, software design and software testing teams are also part of the Company's activities in Costa Rica.

Rica was opened. Attracting multinationals into the country to build products and provide services - a growth trajectory adopted by the Irish development policy - is also viable for the country. Although Costa Rica cannot compete with India, for example, on cost or scale, by focussing on developing higher end talent and the advantages of near shore, a Costa Rican team may be able to assist in developing and maintaining products and building upgrades for international product vendors in related sectors[24].

4. Strategy of service (& outsourcing) driven.

Services have relatively lower risk than products but tend to be difficult to scale up since the revenue is dependant on the number of people. A services strategy has presented good business over the last 10 years for countries with low capital cost and a large number of people. In India and Ireland, these include both small firms oriented to the domestic market and larger export firms. Much of the software work in Ireland and especially India has been described as non-innovative and involves activities such as offshore development and testing, localisation and online technical support.

Common activities in Ireland include Internet services, multimedia services and localisation activities. However, it is important to emphasize that many Indian firms (for example, Mastek) evolved to their current position by first offering low value added coding operations and body shopping services to US firms. In order to move up the value chain companies such as TCS, Wipro and Infosys have moved into areas requiring domain expertise in providing “solutions“ to business problems rather than simple coding. These firms have also begun to supply semi pre-packaged business applications requiring brand name building and have been recruiting foreign professionals that can deal with their international customers.

Costa Rican firms are currently not yet ideally placed to exploit these opportunities. Some Costa Rican firms are developing their local and international visibility on the outsourcing arena, like Avantica[25], Lidersoft[26], Exactus Corporation[27], Aura Interactiva[28], Proyectica[29], Internexo[30], Masterlex[31] and Grupo TecApro / Infonet[32].

---

[24] Grupo TecApro and Infonet Services Corporation are a good example of this kind of relationships and the deep benefits that software companies from developing countries can get from alliances following this model.

[25] www.avantica.net. Avantica was the very first firm in Central America in creating a significant experince in the outsourcing business. With a sales and coordination office based in Palo Verde, California (in the Silicon Valley) the company has created a good reputation and has a growing number of successful projects in a portfolio for reference. Avantica is the best example of the competitive advantages that Costa Rica has as a “near shore” service provider for North America.

[26] www.lidersoft-isthmus.com. Lidersoft has developed during the last few years a good reputation on high value outsourcing projects mostly on the financial sector. The company reached the CMM-3 level recently and is now working on the ISO 9K certification as well .

[27] www.exactus.com. Exactus Corporation has a branch dedicated to outsourcing projects for multinationals. With its CMM-3 certification and about to reach ISO-9K certification, the company provides outsourcing services to Procter & Gamble Company’s operations for Latin America.

[28] www.aurainteractiva.com. Aura Interactiva has developed a sophisticated software technology for e-learning and e-training activites and provides services to multinationals across the Latin American region. With headquarters in San José, Costa Rica, its largest market is Mexico.

Per the examples provided above, two important “hotspot” areas of demand are worthy of consideration by Costa Rican firms: custom software and systems integration.

- Demand for custom software will remain buoyant in the USA because it is the only way businesses can differentiate themselves with unique business models and rules.
- Systems integration represents another major area of international growth. For instance, a US company called Lattice has retained India’s Wipro for a full end-to-end US$ 70 million systems integration project and 30 – 40 % of the effort is expected to be carried out offshore. Costa Rica can present a near shore location and the presence of at least one strong company in this market (for example, Artinsoft).

Another route to growth of software services exports is through multinational companies. Many US multinationals have established software development centres in India. Oracle, Texas Instruments, Cadence and Motorola all conduct sophisticated operations in India. This includes some higher value chain activity for instance Oracle’s Network Computer operating system was developed in India, Sun Microsystems opened an Internet development centre and Motorola a cellular phone development centre. Similarly, a major part of Sun’s Java program has been developed in St. Petersburg, Russia.

The ensuing free trade negotiations with USA present both opportunities and threats for Costa Rican firms. On the one hand, CAFTA will present greater opportunities for Costa Rican firms to trade in the USA, relatively free from existing obstacles. It will also mean that USA companies may be keen to examine the potential for operations in Costa Rica. However, this may lead to them exploiting niche domestic markets (such as biodiversity informatics, materials sciences, agriculture or tourism) at the expense of opportunities for local firms.

---

[29] www.proyectica.com. Proyectica has specialized in outsourcing of government projects. The complexity of this market has pushed the company to develop strong metholodogies and it knowhow in doing business with different governments across most of Central American countries is well recognized.

[30] www.internexo.co.cr. Internexto is a young company which specializes in providing outsourcing services on Internet related areas. The company recently achieved the ISO-9000 certification.

[31] www.masterlex.com. Masterlex is a unique services firm which specializes in legal information systems. With the largest legal data libery in Central America, the company recently won a large Request for Proposal called by the US Government, in order to create and manage a complete legal data information for Central America, as a supporting tool for decision making and implementation actions of Central America Free Trade Agreement (CAFTA).

[32] www.tecapr.com. Through its subsidiaries, Grupo TecApro / Infonet has addressed the services market in several areas. Outsourcing IT systems to multionationals like Xerox and Starbucks Coffee Co., transactional and e-mail services to Costa Rican Government and providing regional and global managed networking services in alliance with Infonet Services Corporation (www.infonet.com), the company is gradually expanding its activities and becoming more a “hands-on” system integrator than a software house.

5. IT enabled services.

The IT enabled services area presents a strong opportunity for Costa Rican firms. The table below shows the installed base of IT enabled services in Costa Rica, which should soon include Hewlett Packard, who will joint venture with Proctor and Gamble. There have been some “near misses” with GE and Dell where CINDE[33] took Costa Rica to late stages in negotiations. 9 firms are operating in this area, employing about 2500 people, nearly half the population of the about 150 or so software firms.

Table 2: IT enabled services in Costa Rica, 2003

Company	Services	Employees	Commenced
Sykes	Technical and customer support	750	1999
Procter and Gamble	Employee support (human resource)	100	2000
Access RX	Pharmaceutical prescriptions	35	2000
Supra Telecom	Customer support	850	2002
PC Call Centre	Technical and customer support, sales and marketing	120	2002
Language Line	Interpretation	220	2002
Amadeus	Technical support (travel agencies)	15	2000
ITS (local)	Technical support and telemarketing	250	1997
Optima (local)	Telemarketing	56	1998
Align Technologies	3D Computing Graphics	250	2001
Dakota Imaging	Data capture and forms processing	80	2004
HP	Employee support	400	2003
IBM	Employee support	900	2003

Some key drivers for Costa Rican IT enabled services include:

- several companies are already established,
- the “comfort factor” of low risk near source,
- stable electricity supply and incentives in technology parks,
- low staff turnover and well educated people.
- clients are increasingly looking for “follow the sun” capability, possibly of interest to Spanish companies.

[33] Costa Rica Investment Boureau – www.cinde.org -.

6. Grupo TecApro / Infonet.

TecApro (TECnología APROpiada –Appropriated Technology-) was founded in Costa Rica in 1985. During its early stages, the company was well recognized as a software house, developing the first software packages for businesses in the Central American region and being the first software package exporter in the region. The very first product developed by TecApro was an ERP software system with multi-currency, multi-user and multi-country[34] features. TecApro's first software exports were registered in 1987, less than two years after its creation by a young team of professionals graduated from the University of Costa Rica. By 2003, 65% of Grupo TecApro / Infonet revenue comes from software and services exports mainly to Central America, US, Mexico and the Andean Pact countries (Colombia, Ecuador, Peru and Venezuela). The company business focuses on a mixed portfolio of software products and related services, as well as outsourcing of IT and corporate communications managed services. The value proposition proposed by the company to the marketplace is its well developed capacities as a "hands on ICT integrator".

a. Product strategies.

Starting with a customer driven product strategy, the company has evolved and has also included technology driven product strategies, as well as outsourcing and foreign direct investment partnerships.

The best known business oriented products developed by TecApro, its ERP (SAI) and its Call Accounting[35] (SACET) software systems, are based on a **customer driven product strategy[36].** Both products were created after the company developed custom made systems to customers in need of solving ERP and call accounting requirements. After intense efforts of standardization, these products were launched as software packages, including full color printed boxes, user manuals, all needed marketing

[34] Due to the lack of standards on those initial days, this ERP software package (commercialized under the name of SAI) was developed over TecApro's homemade data base and programming tools technologies, in order to reach compatibility with most of PC based LANs, its natural target marketplace. All calculations related to local legislations across Latin American countries, were based on a "calculation generator" (including loca tax calculation, payroll deduction, etc) and all reports were done using TecApro's "report genetaror" capabilities. This technology was so flexible, that the same programming code and software engines were used across all Latin American countries.

[35] SACET is the commercial name of TecApro's call accounting software package. Call accounting is a very specific requirement on most companies whose telephone system is based on a private PBX. All EPR customers were prospects for TecApro's call accounting technology, but a very large number of PBX vendors made this a complex nich. In order to solve such a problem, the company was forced to partner with most of PBX vendors, including Nortel, Siemens, Alcatel, Panasonic, Ericsson, ATT, Sansung, Hitachi, Hyundai, etc, and recently, with most of the IP-PBX vendors, including Cisco, Avaya, Tricom and others. Again, this software product was created and still runs over TecApro's home made software tools and data base technologies, which includes deep security standards and data base administrators.

[36] Apertura Comercial y Ajuste en las Empresas, Academia de Centroamérica-Centro Internacional para el Desarrollo Económico- Ohio State University; Camacho Mejía, Edna; González Vega,Claudio; San José, Costa Rica, 1992.

elements and the proper related services, such as installation, configuration, final user support, training and maintenance. Over 10.000 companies in 14 countries compose TecApro's software package products customer base today.

TecApro also has approached the market with a **technology driven product strategy**. Back in the late 80's, the company made significant investments in developing personal utility software. This product line consisted of a set of software tools oriented to increase personal working productivity. Several low cost software packages were launched to the market under this strategy. The 'flagship' product under this strategy is called TeQuita, the best Spanish language spell checker still available in the market, due to its sophisticated phonetical and compression technologies[37]. Other products like Spanglish, TecaCom, KeyHolder, D-Find, Mi Tutor (typing tutorial) are individual examples of commercial applications of TecApro's research and development.

In the early 90's, TecApro made the decision of stop protecting these low price software packages from piracy. Software protection and hardware protecting devices were not used any more by the company in its low end product line. Due to the lack of intellectual property culture and education in the Latin American countries, these products were massively copied and the company didn't materialize any revenue from its commercial usage. Estimations made by APPI[38] in 1998 concluded that only 1% of users of this product line had legal products. Other than branding positioning, non significant direct revenue has been received by the company from these efforts. The damage caused by the lack of intellectual property right protection across the Latin American continent for TecApro has been huge.

b. Company's organizational model.

In 1991, TecApro joined Infonet Services Corporation –ISC- (www.infonet.com, IN:NYSE) as its Central American affiliate partner. A new company was founded 100% dedicated to represent the Infonet product and services portfolio across Central America[39]. This alliance created Grupo TecApro / Infonet and caused deep changes in the organization. Pattering with a highly standardized global company changed the internal culture and brought to the company large multinationals with higher standards of services than the local customers. ISC being an ISO 9000 registered company since

---

[37] TecApro made significant investments in developing high standard technologies for compression and phonetical recognition, mostly under the assumption that data bases and customer information needed to be well protected from hackers and non authorized users. Such a technology was included in ERP and call accounting software packages. As academic interests, some staff members in TecApro tested additional usage for those technologies and created these low cost , massive oriented products.

[38] Asociación Costarricense para la Protección de la Propiedad Informática (Costa Rican Intelectual Property Protection Association) in 1998 concluded that over 5 million illegal users of these TecApro's products were in the Spanish speaking countries. The company registered sales for over 50.000 legal copies of these products, 1% of the total number of users.

[39] ISC provides knowhow, all telecommunication fixed assets as well as the international infrastructure for the Central American piece of Infonet Global Network. TecApro provides all local marketing, sales and services activities under ISC's world class standards.

the early 90's pushed TecApro to increase its quality standards, especially at the service level.

After the company's alliance with Infonet, services started to be a significant part of TecApro's business orientation. Before year 2000, the company made a significant organizational change, turning into a group of companies. This new model made it easier to manage the diversification of the company. Since diversification and specialization seem to be contradictory at a certain level, this new organization simplified the internal operation. The company decided to split into six different companies, controlled by a holding company with a dedicated professional team.

c. Exporting model.

Until the middle 90's, Grupo TecApro / Infonet based its exporting model on the expansion of its direct infrastructure. Its footprint with direct operations covered Mexico, Guatemala, Honduras, Panama, Colombia, Venezuela and Florida. In all those countries, with the exception of the US, the company made huge efforts to penetrate the marketplace with its own business human infrastructure. The US has always been based on sales channels. With the hit of the last crisis in Mexico[40], the company changed its exporting model, turning it into a channels model. Direct operations were closed except in Central America and the US. Today, over 64 sales and services channels compose Grupo TecApro / Infonet's distribution infrastructure in the region. This mix of direct and indirect operations provide a balance and the diversification of the markets as well as the products and services portfolio, supports the company's development.

6. Final comments.

Developing a strategy to develop software industries in DTEs has significant strategic value to those countries and to the globalized economy. The approach Costa Rica is following is guided by two underlying assumptions:

One, the development of software exports and capabilities of the software industry can potentially have significant benefits to the national economy through employment generation, enhancing foreign direct investment, social benefits of an improved education system, and greater global visibility which can have horizontal linkages to, for example, tourism and the agro-industrial sectors. Improving the capabilities of the software industry can also help to reduce dependence on traditional markets. A strong, vibrant software industry can also help develop the capability for Costa Rica to leverage other aspects of the domestic milieu, such as bio-sciences and materials research, and contribute overall to the development of an advanced "knowledge economy". For example, internal capability in e-government would allow projects to be undertaken by domestic firms without recourse to international outsourcing.

[40] The "Tequila Crisis" in 1995.

Two, the focus on developing ownership and commitment through task groups reflects the strong belief that strategies and plans are relatively useless if there is no one responsible to implement the recommendations that emanate from them. These task groups are comprised of inter-institutional teams who have particular stakes in different issues to take the charge in implementing suggested action. This approach also sees strategy making as not a one-time effort but an ongoing and iteractive process that needs to be constantly revised and corrected based on practical experiences of field implementation.

As a company with a mix of operations in several developing countries in Latin America and also in the US, Grupo TecApro / Infonet has developed significant experience in different markets. Developing countries have non-structured software and related services markets, so software companies need to grow vertically, covering several different areas like research and development, sales, marketing, related services, etc, in order to have a viable business model. Software and service companies, like Grupo TecApro / Infonet, have to diversify its operations and spread their focus in order to survive and grow, due to structural market conditions.

Grupo TecApro / Infonet experience is a good example of turning such diversification fact into an advantage. The mix of ICT products and services, an organizational model designed to support such a diversification and the alliance with a major international player like Infonet Services Corporation, makes the company a very particular case study in the Latin American region.