

A MODEL FOR THE ESTABLISHMENT OF A MARKET-DRIVEN SOFTWARE INDUSTRY IN A POST SOCIALIST CUBA

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I have been involved in the computer industry in the United States for more than 12 years, ten of which have been as president of a company that has undergone three major metamorphic changes, from hardware distribution to networking and communications support, to software and Internet development. Recently, I began to think about how a viable market-driven software industry may be developed in Cuba after the departure of totalitarian socialism. Following are my very personal observations.

In 1916 my grandfather, Pedro Nolasco Font, a hard working Quaker and a recent accounting graduate, applied for a job with the Royal Bank of Canada, in one of its new branches in Oriente province, Cuba. Unsure of my grandfather's credentials, the branch manager instead offered him a position as "barrendero" or floor sweeper, with the stipulation that if he proved himself to be honest, timely, and good with numbers, he would be considered for the position. Needing to make money and not insulted by the Canadians, my grandfather accepted the job, which paid U.S. \$24.00 dollars per month. After a short period, he proved his skills and went on to a career with the Royal Bank of Canada where in the 1920's he became a manager in the very same place he had started as floor sweeper.

This family story helps to bring perspective to the subject of this paper. First, it focuses attention to the

incredible fact that the wages of a 1916 capitalist Cuban floor sweeper were higher than those of a worker in a state-run enterprise in modern day socialist Cuba. The political, social, and economic implications of this retardation have been widely discussed by objective scholars for quite some time now and you will find some of these in my reference materials. Secondly, it shows that in a competitive environment, an honest and hard working well-educated man, just like a business with good products and a rational business plan, usually succeed regardless of adversity. Finally, it clearly shows that before you can run, you have to take a few clumsy steps. This paper summarizes from the perspective of a businessman and a technologist, not an academician, some of the issues that may be faced if an internationally competitive software industry is to be established in a post socialist Cuba. It accepts that the potential exists for this phenomenon to occur even though the required social, political, and economic conditions needed are currently absent, and may not be in place for a while.¹

COMPUTER SCIENTISTS ALONE ARE NOT ENOUGH

Before I begin to discuss Cuba, I will take you to Asia—India in particular. The experience of India in this context is important because it succeeded in lifting itself from a quasi-socialist technologically backward existence into a technologically advanced capi-

1. Betancourt, Roger R., 1999, "Cuba's Economic 'Reforms': Waiting for Fidel on the Eve of the 21st Century." *Cuba in Transition—Volume 9*. Washington: Association for the Study of the Cuban Economy, 276–281.

talist economy in about fifteen years. And, yes I see a connection to Cuba. Let me elaborate.

During a business trip to India in 1984, I noticed the effects of that country's maladjusted economic practices due to its enamoration with socialism. During this time, India's economy was in a strange socialist/capitalist transition. Those elements of its economy that brought in foreign exchange ran smoothly, based on a capitalist model, while most of its internal economy and domestic services were clearly socialist and stagnant. Bajaj motor scooters sold in the internal market were available to those who ordered them, paid for them, and then waited four years to receive them, since this was the "normal" production backlog that resulted from the government's centrally planned scheme. In the black market, Bajaj motor scooters could be obtained rapidly. The state-owned telephone system was ancient and still used obsolete equipment left over from the time of the British, ending in 1948. The average factory worker earned less than \$60 per month.

Upon arriving at Delhi International Airport, all electronic equipment such as VCR's, Sony Walkmans, or electronic calculators were either taken by corrupt customs officials, or you were hit with "import" fees sometimes exceeding 400% of the value of the product. The most sought after electronic equipment in the major cities were portable electric generators because the power grid was antiquated and power generation insufficient, producing chronic power failures, spikes, and blackouts. This dilemma wreaked havoc with any type of industry that depended on steady electrical power. Indians lived with a maze of monetary laws designed to restrict the flow of capital, and discouraged the "encroachment" of domestic industries by foreign competitors. Respect by a large segment of the business community for foreign copyrights, patents, trademarks, and intellectual property was generally ignored, and most manufacturing concerns operated with great pride in their ability to copy or reverse engineer any product they could get their hands on. In response to these anomalies, the Indian government used to recite its laws, participation in international business forums, and commercial code, all of which, on paper, made India

a very appealing and rational place to do business. For those who wished to ignore reality, socialists or western visitors not responsible for dealing with the bureaucracy, Indian public relations and the romantic appeal of the Taj Mahal generally succeeded in making the place appear as an attractive environment for business. This dislocation with the facts on the ground reminded me of Cuba, where on paper the "socialist paradise" and the "eradication of inequality" gives it the appearance of being the most advanced and well balanced society on earth.

It was in this environment that a group of friends and I had dinner at the U.S. Embassy in New Delhi, with a group of Indian business people, engineers and government officials. The discussions centered on textile industry issues, which were my main focus at the time, and then it moved on to technology and computers, which to my surprise turned out to be their main interest. These far-sighted individuals had a good pulse on their country's movement towards full-fledged capitalism, upcoming trends in the global economy and the eventual bankruptcy of socialism—and believed in these things so strongly that they were about to resign their positions in government to start an entrepreneurial company importing computers from the United States.

Their business plan as outlined to us focused on the following: (1) India was at least ten years behind the rest of the world in computer technology. This meant that if they were to import foreign technology that was five years old by Western standards, their company would still be considered "cutting edge" in their domestic market; (2) Since their government had protectionist policies in place to keep out foreign companies, they would incorporate as an Indian company, although most of their operations were to occur in overseas "branches" whose operating costs were to be kept as high as possible in order to legally transfer profits out of the country; (3) Since the government had import duties and a tax system discouraging to their plans and focused on consumer electronics, they planned to disassemble computers in Abu Dhabi (in the Persian Gulf), then import the components to India at a lower tariff to be later reassembled using local labor as needed; (4) Immediately

begin to cultivate local spheres of influence in academia and selected key local governments that would support the development of future educational programs generating the trained technicians needed to support the influx of software and hardware products brought in by their company; (5) Lobby their government for the establishment of liberal foreign investment laws and securities laws that would allow them to raise overseas venture capital to expand their operations in India in the future.

Of all the points discussed, I asked my Indian friends which one they considered to be the most important for the future of technology in their country. Without hesitation, they said it was the liberalization of foreign investment regulations, specifically the ability of Indian companies to attract and compete for foreign capital without fear of government intervention or the imposition of “centrally planned” policies in the technology sector. In other words, they wanted to operate in a classical capitalist open market environment, generate as much wealth as possible regardless of where in the world they had to do it, constantly adjust strategies in order to avoid excessive tariffs or taxation, and seek foreign capital to do it—period. To my surprise, the answer had little to do with computer programming, networking technology, or the acquisition of compilers or microprocessors. They felt technicians and programmers were important issues, but not a central concern because their assessment of India’s private technical schools and English speaking curriculums at the University level led them to conclude that within five years the country would be producing large numbers of highly trained computer scientists who would then react to the market “appropriately.”

There is no need to outline for the reader the indisputable success of today’s India as a world class intellectual and technology power, especially in the field of software. It is also clear that this leap from third world to first world technology only began to exert

itself after India abandoned its socialist pretensions, interestingly done after the fall of the Soviet Union, and after an analysis of globalization found a niche that could be attacked based on its already existing institutions and human capital. Before India became a computer science contender it had to substantially change its socio-political structures to the point where international investors could begin to think of its markets and legal systems as worthy of confidence and a place where returns on investments could be calculated without the perpetual Latin American question of “what will the next government do?” In the end, India’s elites and its government understood the forces of globalization and became active partners in the development of a modern economic infrastructure, giving the technology sector all the prerequisites needed to succeed.²

Early in the transition from socialism to capitalism, Cuba will find itself with the rare opportunity India had in the mid-1980’s. The way Cuba’s elites and government analyze the global marketplace, the way they decide to channel existing intellectual capital, and how they re-structure the commercial, legal and monetary systems will determine whether the country can become a serious contender in the global software industry and technology in general. Like in India, if the right decisions are made, a transformation of the economic landscape can occur in a relatively short time.

The nature of the technology sector demands quick decisions and actions. The technology world is re-invented every seven to 12 months, and the exchange of ideas across national boundaries is instantaneous due to the Internet. The flow of capital towards “worthy” projects is no longer tightly controlled by bankers with political agendas, but by venture capitalists with an eye for first mover positions and maximum returns.³ A successful software development industry needs competition, the unencumbered flow of information, people, ideas, capital, and products—

2. American University, Washington D.C. 2001. Information Technology Landscape in Nations. <http://www.american.edu/academic.depts/ksb/mogit/country.html>

3. Milken, Michael, 2000. “The Democratization of Capital.” *California Lawyer* (July, 2000).

things not associated with socialism or the current government of Cuba. Therefore, trying to analyze the potential for a software industry in Cuba, based only on technology issues, is the wrong approach. The challenge for the future is not so much whether Cuba can create 100,000 software programmers, 50,000 networking engineers, or 25,000 systems analysts.⁴ The challenge for Cuba is what to do with them. How does the society compete internationally for their loyalty? How does it stimulate their creativity, and how can it generate confidence with those international investors and venture capitalists whose money will be needed to fuel the growth of the technology sector?

WHERE IS THE OPPORTUNITY FOR CUBA?

Cuba's opportunity in software lies in these four areas: First, by exploiting the inefficiencies and lack of technology infrastructure endemic in Latin America. Second, by exploiting the demand that is developing for Spanish language software in the U.S. market, created by the growing Hispanic population. Third, as an offshore Spanish and English language software development center for established world-class technology companies. And fourth, by exploiting the existing business connections held by Cuban exiles in the U.S. Cuba's goal should be no less than to become the premier software development center of Latin America.

Such pretentious goals from a small non-English speaking country so far behind the rest of the world in technology can be achieved due to the following reasons:

- the competition from other Latin American countries is poor, inconsistent and disorganized, and not likely to improve in the future. Countries like Argentina, Peru, Chile, and Brazil, have software industries, but aside from Chile, lack consistency and sophistication in their efforts.⁵ I hold this view as a businessman, and I realize a great many people, especially natives of these

countries, will disagree with me. But my interest in writing this paper is not to win a popularity contest;

- Even though Cuba's intellectual and technical cadres are not experienced in market economics, there may already exist enough of an elite to staff a good number of seed companies that will "spawn" self-sustaining viable enterprises;
- The demand for Spanish language software is growing steadily in Latin America as the use of computers in the Hispanic world increases, and this trend is not likely to decrease;
- Just like there is "market segmentation" for television, radio, and mass media in the U.S. market focusing products on the "Hispanic market", segmentation for software, Internet, and other technology products and services will likely occur;
- There exists a sizable Cuban exiled population with experience in "capitalism" in the United States, Latin America, and Europe that can serve as future conduits for capital, ideas, technical expertise, and distribution channels for these new companies;
- It is likely that there will be strong demand in the domestic Cuban market for vertical software solutions after the departure of socialism, opening the door for home grown developers to "practice" or launch many "version 1.0" type products prior to venturing into the international arena;
- It is very likely that software development costs and associated expenses in Cuba will be substantially lower than those of the developed world, including places like India;
- The physical proximity of Cuba to the United States, and the quality of life benefits of the tropics may facilitate the attraction of high quality

4. Valdés, Nelson P. and Rivera, Mario A., 1999. "The Political Economy of the Internet in Cuba." *Cuba in Transition—Volume 9*. Washington: Association for the Study of the Cuban Economy, 141–154 .

5. World Information Technology and Services Alliance, 2002. Official Website. <http://www.witsa.org>

young foreign talent to Cuba, needed to create the dynamism of the technology sector;

- The post socialist Cuban government may continue to support “incubator” programs matching up promising young entrepreneurs with sales and marketing expertise, and seed capital;
- Foreign venture capital may be attracted by establishing venture capital brokerages in Cuba, the U.S., and other countries devoted to raising capital for the Cuban technology sector; and

The Cuban diplomatic network can be used as an instrument of world commerce, similar to the Japanese model, which gathers market intelligence, product samples, consumer behaviors, and merger and acquisition targets in a rational program to acquire new markets and increase share in newly created ones. Since Cubans have proven to be good political spies, they may also turn out to be good business spies.

Some of these things can be done by the private sector alone; some have to be done by the government, while others will require a private/public partnership. The opportunity for “Cuba, Inc.” is there. It just has to be taken when the right time comes.

WHAT WILL THE CUBAN SOFTWARE INDUSTRY LOOK LIKE IN A CAPITALIST ENVIRONMENT?

Cuban software companies in a post socialist Cuba will hopefully look like their counterparts everywhere else in the world. Software development companies do not require conveyor belts, 300 lbs per square inch floors, loading docks, or chimneys in their facilities. A well-lit pleasant room with a personal computer network, access to the Internet, some technical manuals, and proximity to some pizza and soft drinks are all that is needed. In Cuba, of course, the pizza will be substituted with “tamales” and “croquetas.” Two or three proficient developers can work on a multimillion-dollar project for six to eight months, and, in the end, their only environmental impact is the crunched up paper they leave behind, some floppies, some Styrofoam cups, and a hole in the wall created by the fist of one of the developers when he got frustrated after accidentally deleting two weeks worth of work.

Most software development companies in the United States and the world are classified as small to mid-sized businesses, in terms of the number of people employed. There are of course giants, like Microsoft, Computer Associates, Lotus, Adobe, etc., employing hundreds or thousands of developers, but generally most software companies operate with less than 25 people. In the vertical software area, the trend is towards even smaller companies with six to ten people being the norm. Valuing or trying to understand a software company by the number of employees is spurious. The importance and value of the economic activity undertaken by a software company is completely disproportional to the number of people involved in it. After the product is created, its sales and marketing are further divorced from the development process, often creating great fluctuations in the number of people involved in the cycle. It is often described as an “accordion strategy” in personnel management, where you bring in specific expertise for a defined period of time. When the project is done, certain people leave and others may come. To clarify for those unfamiliar with this process, let me just say that there are no labor unions involved in the software industry and none are likely to appear in the near future. Both employee and employer recognize the need to cross-pollinate, and maintain free agent status in order to increase the value of one’s work, although this has eroded the remnants of the old concept of “corporate allegiance” that existed during our parents’ generation.

The culture of the software industry around the world is very similar, and not likely to develop differently in a post socialist Cuba. It is generally non-political, youth-oriented, challenging of authority, and viciously focused on the pursuit of intellectual problem solving. It is a meritocracy that is used to making a lot of money, doing things that make others a lot of money, and living in a cocoon where most things are judged based on their importance to technology. Twenty-four year old U.S.-based developers earning \$65.00 to \$150.00 per hour with expense accounts, operate with an incredible amount of mobility and make decisions about taking on projects in Los Angeles, London, Toronto, or Sydney, with incredible speed. Respect among your peers is judged by your

proficiency in C++, Visual Basic, Java, Lotus Script, .Net, SQL, BizTalk, HTML, or XML. The culture of software development is refreshingly based on an individual's ability to deliver regardless of his/her social or ethnic origin, with little room for "faking" knowledge. And, its casualness seems to repel individuals with presumptuous personalities. The Cuban male character depicted in popular culture, with his "macho" and "simpatico womanizer" skills, doesn't fit in very well.

After a short period of time, the Cuban software industry will begin to mimic and catch up with the rest of the world. Cuban nerds will look like American nerds, Irish nerds and Indian nerds. A Cuban software company will have six to ten people in a loft building in Havana, or Holguín, near a technical school or college, or in an area of attraction to intellectually inclined youth—and this company will be part of a small hub of other companies that will feed each other with new ideas, fear of competition, and talent. There will be sales and marketing companies who may act as exclusive agents to these software companies in certain vertical markets, advertising companies, graphics companies, and an active venture capital marketplace keeping an eye open for new products and aggressive growth opportunities.

Most software development companies will also be working in the Internet development area since the two areas are about to merge and the differences will soon blur. Many of these companies will simply do contract work for U.S.-based software companies who will act as ladders for local developers who want to enter the U.S. market. There will be many free agents whose skills will allow them to work for several companies at the same time without conflicts. Slowly, a legal and accounting specialty will develop to support the special needs of these active elite. Freelancers may work for \$10 to \$20 dollars an hour, with contract houses subbing out talent to overseas clients at \$15 to \$45 per hour, the current range in places like India, with certain specialties fetching more.

Because of the nature of the industry, the average software company will be more in tune with globalization issues and the needs of the international mar-

ketplace than most other sectors of the Cuban economy, including the government. And because of the industry's mobility and its relative high level of education, its members are likely to exert strong influence over certain segments of the political structure. After the industry is established, any perceptions viewed as detrimental to its technical and merit based subculture and economic stability are not likely to be welcomed. The technology sector in Cuba may become one of the pillars of capitalism and a deterrent against bad government. The speed in which a laptop with code for a \$25 million dollar product can be folded and moved to Miami or Barcelona by its owner should restrain future Cuban policy makers from acting in ways that will disturb Cuba's integration in the global economy. Fold ten laptops and an entire industry is gone. Confiscate the laptops, and there's always the Internet. It is unlikely that there will be many other sectors of the Cuban economy with the potential promised by the software industry. It will also be a bit of a novelty for the average Cuban used to the socialist concept of production and industry to adjust to a group of people whose schedules will be erratic, compensations will be based on non-standard formulas, and their main activity and products disappear when a switch is turned off. Unlike anything Cubans have experienced during the Castro years, the software industry in Cuba will have to function based on open market pressures, and supply and demand.

VERTICAL SOFTWARE OR RETAIL

Vertical software is the most direct way to start the industry in Cuba. The retail market is too costly to crack, it requires a huge investment in time, and worldwide consumer electronics companies that squash small competitors like they were flies dominate it. It is better to get started by not competing against Microsoft. As the industry matures it will inevitably find its way to the world's software retail markets.

Vertical software development and sales is a business-to-business activity where a client/server software application (software developed to run on a computer network) or an Internet service is custom-developed for a particular company or industry with the plan of

reselling it to others with similar need. This type of product usually fulfills a particular niche or high value workflow that cannot be easily resolved by off-the-shelf or retail software. Because of this, most vertical software in the United States is very expensive ranging in price from \$25,000 to \$100,000 per client—and often exceeding \$250,000 for multi-site installations. These expenditures are justifiable in light of the fact that these products' use often releases dozens of employees, who are paid an average of \$40,000 per year, to handle similar workflows manually or using antiquated systems.

The future of vertical software around the world will be highly impacted by the Internet and the Application Service Provider model (ASP), which brings to customers a rental approach to software rather than the current licensed sales model mentioned above. This model promises greater mass distribution due to lower prices and the reach of the Internet. The ASP business model is of benefit to both developer and client and should slowly replace the current model. The ASP model holds great promise in Latin America, especially in light of the fact that currently more than 80% of the software in use there is stolen or pirated. Encrypted ASP software running on a web browser is very difficult to steal.

The process of pricing vertical software products often has little to do with the costs of development. Profits of several hundred percent are normal since price is driven by demand, and the fact that such a product has to be customized signifies that there is likely to be no other like it anywhere else. In Latin America, wages are lower and vertical software sells for less; nevertheless, the profit ratios are similar and the formula for success is the same.

Developing vertical software is easier said than done. It is something that requires a lot of work, an understanding of the markets in question, and a special sales and marketing approach unique to the vertical sales cycle which is often very long. A particular type of intellectual mix needs to exist within the software development company, strong technical support, an ability to establish long-term relationships with clients who expect high quality consistent support, and enough reserved capital to hold the company together

through the long sales cycles. Some of these practices require a mindset contrary to the values instilled in people by the socialist system, which again brings to focus that the challenge in establishing a viable software industry in Cuba is less technical than behavioral and political. Having the programmers and the centrally planned incubators, as is the case now, is not enough.

Successful vertical software companies focus on a major industry, like hospitals for example, and analyze the workflow processes of greatest value determining if these can be automated, if there are competing products addressing these tasks, determining costs and a sustainable price matrix, and finding out if at least one client in their market will be interested in buying their solution at the set price. Having identified a potential client, they then set out to build the solution generously asking for ideas and product improvements from the client, and anybody else who can help. If the developer is established, he/she hires a product specialist and puts together a focus group to regularly critique and fine-tune the product along the way. After a rigorous quality assurance program, whose length of time is often difficult to determine, the product is released. After several years in this process, the company gains reputation and market share becoming the leader in the chosen "niche" as it expands into other related workflows. With one to three products, some companies reach tens of millions of dollars in sales yearly.

In what industries should the nascent free market oriented Cuban vertical software industry concentrate? The market for Spanish language vertical software is practically virgin territory. There are opportunities in almost every industry imaginable. And like the Indians did in the 1990's, they should promote themselves and search for work as offshore "low cost" development alternatives to other more established places. Each offshore project they get will forward their skills allowing them to move up the "complexity ladder." As the population of English speaking Cuban software developers increases, Cuban vertical software companies should set their sights on penetrating niche markets in the USA.

WHICH TECHNOLOGIES SHOULD BE CONSIDERED?

Cuba has a generation of developers trained in Eastern bloc development techniques that are antiquated and clumsy by today's standards. The ones I've met have explained the use of tools that get the job done, sometimes in a creative manner not done by American programmers. At other times, they seemed unaware of components and shortcuts that can save hours or days of programming time. Nevertheless, they are programmers whose brains are accustomed to dealing with problems systematically and logically. Like many Eastern European programmers, they are likely to quickly adjust to Western methods after a year or two of experimentation with new tools. However, practicality should rule when deciding how an individual or a country's policies should be made regarding a decision of this magnitude. Time should not be spent on anything other than technologies that produce the highest return, the most international portability, and the quickest entry point. For vertical software development and Internet applications, currently only Microsoft development tools meet these criteria although other companies will make strong claims to this effect. Energy and resources should not be spent on Unix-based systems and mainframe technologies. Linux, although offering a cheap entry point and having a strong following in academia, should also be disqualified due to its miniscule market and its never changing "experimental" state.

The source for talent, tools, and business inspiration in the technology field is the United States. Although other countries have strong software industries, they are all clearly second rate players who acknowledge the central role of the United States when pressed. It makes little sense for Cuba, or Cuban computer scientists, to seek expertise anywhere else but at the source. Studying computer technology in Mexico, Poland, Spain, Canada, India, Argentina, or Taiwan will be short-sighted and is a strategy guaranteed to produce second-rate results. The integration of future private and public technical schools in Cuba into a system that closely resembles the technical curriculum of their peers in the United States is of critical importance for Cuba's success in the software

field. Every effort for cross-pollination with U.S.-based businesses should be made to allow Cuban developers to shed their Eastern European shadows and gain the lingo and habits of their North American counterparts. The rest will take care of itself. Market forces and individual pride will force Cubans to choose the appropriate tools to succeed, and this evaluation will automatically occur every seven to 12 months.

A successful Cuban software development company will be able to create Internet products with the same ease as it develops client/server products. Those development companies that do not transition into the Internet space will go out of business. The ability to create ASP products, integrate wireless systems, exploit the promise of XML, develop secure encrypted communications, and bring products quickly to market will determine who flourishes and who doesn't.

SEEDING A FEW ENTREPRENEURIAL SOFTWARE COMPANIES

Starting a software development company from scratch takes courage and patience, and at a certain stage it takes substantial money. Most companies composed of highly technical people tend to have high failure rates. Companies controlled by sales people do not attract the best technical talent, and companies controlled by finance people rarely develop trend-setting products and become farms where new developers gain experience before moving on to the big time. Government-sponsored companies have the attractiveness of the plague and are usually avoided by most experienced programmers from developed countries.

Achieving a balance where the right personalities come together is something not taught in business schools and an art approaching black magic. This mix is critical to success and something experienced venture capitalists look for as a prerequisite to funding. From my experience, the ideal mix for a successful software company is the following:

- One individual whose high intellect and addiction to technology is so severe that he/she constantly forgets to wear socks because he/she is too

consumed with ideas for improving his/her code or adding a new component to a new product;

- One individual who is a great talker, an idealist whose understanding of technology comes from popular magazines and has sold his mothers' underwear to the Salvation Army, and is capable of surviving a five minute conversation with Mr. Nerd in order to understand why Mr. Nerd does not sleep at night, and the flashing little box on the screen has the potential to generate \$15 million dollars within two years. (This individual is called the pain-in-the-neck salesman and his value is important but never as much as he would like);
- One individual who is a normal person has enough patience to put up with Mr. Nerd, and the salesman, has some artistic flair, and/or book keeping skills and shows up consistently every morning. This person handles the general administration of the business, and makes sure clients and business partners don't get too upset at the antics of either Mr. Nerd or the pain in the neck salesman;
- A general-purpose technical support person who knows enough about the products to install them, train clients, and provide technical support to the salesman if needed;
- A sales support person to help the salesman find prospects via telemarketing, mass mailers, cold calls, the Internet, advertising and product presentations; and
- A software development consultant (freelancer) with complimentary skills to Mr. Nerd who can be called on short notice to assist Mr. Nerd in the event of work overflows or emergencies.

This type of organization tends to build up over a period of time with Mr. Nerd and the salesman as the core drivers. They enslave themselves as they develop the key products, working at below market compen-

sation and borrowing from family and friends to keep things going until the first few sales come in. Rarely does this type of enterprise start with a finished product and at full speed with all five or six employees. After several sales, the founders usually look for expansion capital to hire the rest of the team and expand sales to new territories. This is a crucial time, since most teams at this stage are still inexperienced and lack the financial expertise or a well-devised business plan of the caliber that appeals to venture capitalist or investment bankers. Rarely do traditional banks provide financing at this level. Many companies that survive to this stage do not obtain the required capital needed to move on to the next stage because of this problem and they wither away due to the pressures of under capitalization.

No matter how great a product, vertical software reaches a point where it needs an infusion of capital greater than what their developing companies have been able to accumulate. Without it, they can not break out into the major leagues. For the future software industry in Cuba, finding these types of companies and helping them jump over this hurdle is going to be crucial. Having a mechanism to provide the critical \$250,000 to \$500,000 in first stage financing is exactly the type of thing the Indian businessmen I met in New Delhi were talking about in 1984. How many of these types of companies will reach this stage each year in Cuba? No one can tell at this point. With a yearly capital investment of only \$5 million dollars, it may be possible to seed as many as 20 such companies whose potential return by the third or fourth years can be in the hundreds of millions of dollars. Cuba has little experience with venture capital markets, investment banking, securities and stock transactions, or private placements, and raising local capital even a miserly \$5 million per year will not be easy. This dearth of capital formation infrastructure will open the door to entrepreneurs with the ability, contacts, and experience to formally, legally, and consistently broker investors with worthy needy enterprises.⁶

6. Sanginetty, Jorge A., 1999. "Macroeconomic Policy Issues for a Free Market Cuba." *Cuba in Transition—Volume 9*. Washington: Association for the Study of the Cuban Economy, 204–216.

It is my belief, based on personal conversations with recently-arrived Cuban software developers and Cuba's future ability to create large numbers of technically proficient young people, that such small companies may be easily created, and that there are many individuals who currently have many of the required skills for these enterprises— but the socio-economic, and political environment of the country does not allow it. In many ways, Cuba is well positioned to start this process soon after the departure of socialism.

CHOOSING BETWEEN PLANTING PAPAYAS AND DEVELOPING SOFTWARE

The wage of a typical Cuban worker today is about \$10 U.S. dollars per month; this may double or quadruple in a post socialist Cuba to about U.S. \$40 dollars per month. While, a Cuban software developer during this time may earn \$10 to \$20 per hour; we need to acknowledge that the software industry will create an elite group and an anomaly similar to what exists today between people who work in the tourism sector (the dollar economy) and the rest of Cuban society. The situation will be exacerbated because software is not labor intensive and requires substantial capital in relation to other endeavors. For example, \$5 million dollars may seed 20 software companies per year employing 120 people, with trickle down effects that may employ an additional several hundred people, while the same \$5 million could employ more than 10,400 papaya planters per year at a wage of \$40 per month each. The 120 people may generate several hundred million dollars within five years creating hundreds of future high paying jobs whose impact on the general economy will be great. But during that time, what do the 10,400 papaya planters do to survive if the resources don't exist to fund both endeavors? ⁷

Should the venture capitalists and private investment bankers focus on raising investment dollars for improving sugar production, expanding rum distilleries, building tobacco factories, building new music re-

ording studios or more cabarets for tourism? Should government investments for power plants, cellular communications, transportation, biotechnology, the film industry, and the restoration of old historic buildings take precedence over computer software and computer technology? Certainly all are important, and private and public investments will flow to all these sectors, but decisions on priorities cannot be avoided. The current socialist government clearly understands the importance of diversifying the economy and focusing precious resources, and within the scope of its Marxist model, is attempting to create a software industry. They have decided that Cuban software is not a fantasy dream, and have created incubators attached to several universities with the goal of attracting partners from Canada and Europe. It appears that socialist policy makers have looked at the future of sugar and other traditional Cuban industries and they do not like what they see. Morality and ethics aside, the socialists seem to have decided to place bets on software and technology and are lessening their bets on papayas.⁸

In a free market system, these important resource allocation and political questions are outside the scope of the average private entrepreneur. Hopefully, these issues will hopefully be debated and decisions will be based on the best interests of the citizens of Cuban public opinion and the social contract that evolves in the country after the departure of socialism. Entrepreneurs will interpret the laws, the competition, and the opportunities to make a profit, deciding to act based on what they perceive as the action that will expose them to the fewest risks and the highest profits. The social, moral, ethical, and religious questions of the society in a post socialist Cuba will be the responsibility of politicians, priests, academicians, sociologist, philosophers, lobbyist, labor unions, and political parties who will hopefully exercise their democratic responsibilities to argue and disagree. The technology sector will have its own professional

7. Smith, Benjamin, 1999. "The Self Employed in Cuba: A Street Level View." *Cuba in Transition—Volume 9*. Washington: Association for the Study of the Cuban Economy, 49–59.

8. Echevarría, Oscar, 1995. "Cuba and the International Sugar Market." *Cuba in Transition—Volume 5*. Washington: Association for the Study of the Cuban Economy, 363–373.

associations (its lobbyist) and will try to compete for public and private resources just like everyone else agreeing and disagreeing in the process.

RISKS AND CHALLENGES

The 2001 dot.com collapse in the U.S. taught everyone that the new tech economy is not based on thin air principles and that breakeven points still matter. The thing that makes software development an attractive economic activity is the very thing that makes it un-attractive. It lacks substance in the old-fashioned sense. It is difficult to collateralize software. Valuations of software companies and products are notoriously difficult and volatile. Often the most valuable asset of a software company is the brain of its founder or main developer, who recklessly enjoys parachute jumping. Since technological innovations rapidly change and client expectations are affected by variables out of anyone's direct control, market dominance can be and is usually challenged every 24 months. Products need to be regularly upgraded and major marketing/advertising campaigns have to be re-conceptualized. For the majority of Cubans, these conditions are unfamiliar and a likely cause for abstinence from participating significantly as investors in these new software ventures. For the software industry, this is likely to create and maintain an environment where foreign capital will be the driving force and eventually the major equity partners in most successful enterprises. Furthermore, it is not likely that in a resource poor post socialist Cuba with strong socialist ideological leftovers, risky venture capital will be raised for anything but the most simple and traditional of industries even though most of these will have limited potential or little long-term impact. When re-established in Cuba, little can be expected from the traditional banking sector and its risk adverse culture.

In addition to a deficit of capital, the Cuban software industry will have to face the question of competition with the U.S. software industry. The question that some American software companies will ask themselves when they notice the emergence of Cuba as a

competitor will be, do we partner up, do we buy them out, or should we put them out of business? But in reality, the capture by Cuban software companies of several hundred million dollars worth of business each year from the type of activity described in this paper is not likely to cause industry-wide concern in the U.S. because of the enormity of the one trillion dollar per year U.S. information technology industry.⁹

Because of factors outside the scope of this paper, the U.S. software industry has not focused on the Spanish speaking market, and this is not likely to change. By default, this gives the Cubans a relatively large market to exploit. Many U.S. companies will find synergies with Cuban vertical software companies and will form partnerships, invest in them, and may buy them outright. Given the expected shortage of capital in which the Cuban software industry will operate, this will not be too bad. The major competition factor and human dynamic with the U.S., though, will not be in mergers and acquisitions, but in the "brain drain" of talent to U.S. companies with the ability to pay higher compensations. After a few years of experience, Cuban developers will reach a proficiency level that will make them competitive on a worldwide level. This challenge is faced by every developing country in the world and it cannot be avoided.

The brain drain however, will have a positive side effect, in the sense that highly paid young Cuban developers employed overseas will have economic ties to family and friends back in Cuba, sending them valuable remittances. They will also serve as bridges between Cuba and the worldwide technology sector, allowing those same Cuban technicians and developers to become a future source of capital, industry stimulus, and talent for new enterprises in Cuba. At one point, policy decisions will have to be made regarding whether Cuban schools should train high numbers of youth in the technology sector in order to create a large pool of computer talent in highly paid and high demand areas overseas, simply to ex-

9. Information Technology Association of America (ITAA), 2001. Official Website. <http://www.itaa.org>

port them. India has adopted this policy with great success, and H-1B visas (professional workers) for software programmers in the U.S. will be easily obtained. Serious efforts will have to be made to assure that once a computer scientist leaves Cuba for overseas work, his cultural, family, and economic links to Cuba remain strong so he/she can provide benefits to the national economy, although in seemingly indirect ways. As large numbers of these “high tech” workers establish themselves in advanced wealthy markets, they will establish businesses in those markets whose benefits to Cuba will be significant, but difficult to measure.

Professor AnnaLee Saxenian of Harvard University has studied these types of activities and technology transfers. Her lectures on “Brain Drain or Brain Circulation? The Silicon Valley-Asia Connection” help shed light on the multi-dimensional aspects that will likely play themselves out in a post socialist Cuba.¹⁰ If Professor Saxenian is correct, the “Brain Circulation” that will occur during and after the transition away from socialism in Cuba will provide great economic benefits. This is not difficult to see in a country that has been kept isolated and under a totalitarian regime for more than 43 years. Since globalization has eroded national frontiers, there is no reason why Cuban software companies cannot operate anywhere in the world where economic conditions make most sense. In a post socialist environment, travel restrictions will not be an issue.¹¹ California, for example, is now spotted with Taiwanese, Indian, Korean and Chinese high tech companies.

Another unavoidable problem facing the Cuban software industry is the so-called “Miami” problem. Over the years, Cuban exiles in Miami have succeeded in creating a vibrant “Cuban” economy whose diversity goes well beyond the sale of guayaberas and hot tamales in Little Havana.

There exist in Miami a sufficient number of software programmers, trained in Cuba and the U.S., capable of quickly exploiting the conditions outlined in this paper. Their only impediment to executing this type of strategy is that they already have access to the most lucrative software market in the world and they view a diversion of time and money towards the Spanish speaking market as an effort that will yield relatively small returns. Some recent arrivals have the desire but lack the capital to jump past the first stage hurdle, and most are discouraged by the high piracy rate and disrespect for intellectual property in Latin America. These exiled programmers from Miami and other parts of the U.S. may become the primary recruiters for Cuban programmers and the catalysts for the brain drain described. It is likely that such U.S.-based Cuban exile-owned technology companies will greatly benefit by the opening of the software industry in Cuba. It is also likely that many of these firms will expand their services in the U.S. market by becoming agents to Cuban firms, setting up limited partnerships, and in many cases providing the sales and marketing expertise needed by the Cubans to jump start their industry.

The risk in this, from a purely nationalistic Cuban perspective, is that Miami may end up becoming the center of the Cuban software industry. In many ways, from a strictly software centered perspective; Miami has greater potential than Havana in achieving this. It already has the communications and energy infrastructure, the laws, the economic stability, the academic institutions, the international links, and a mass of Cuban capitalists whose focus can be easily turned to this task. Using the Indian model, Cuban exiles may be able to use the deficiencies of a post socialist Cuba to take advantage of the disparities that will exist between the two economies and their ability to attract capital to the task. Whether you view this possibility as a risk and a challenge, of course, depends on whether you live in Cuba or Miami.

10. Saxenian, AnnaLee, 2002. “Local and Global Networks of Immigrant Professionals in Silicon Valley.” Public Policy Institute of California.

11. Travieso-Díaz, Matías F., 1998. “Cuban Immigration: Challenges and Opportunities.” *Cuba in Transition—Volume 8*. Washington: Association for the Study of the Cuban Economy, 65–84.

One of the major decisions that post socialist Cuba will have to make pertaining to laying out the groundwork for the development of a viable market driven software industry will be how to best leverage the value of Miami, and whether the best return on investment will come from investing one dollar in Miami or one dollar in Havana. This Cuba/Miami dynamic holds great promise if properly coordinated by the politicians at both ends. Although large differences have evolved between the Miami Cubans and the “New Cubans” of Castro’s “Socialist Paradise,” both parties have more to gain by bridging these differences than by amplifying them. A transitional Cuba will need all the help it can get from anyone willing to help it. Its most immediate natural ally is Miami. If market forces favor establishing Miami as the center of the Cuban technology sector, no amount of government intervention by the Cubans will stop it. Instead, it should ride the wave and learn what the Indians and most Asians learned a while ago—study the market and profit by it!

So, it may come to pass that after seeding a good number of software companies, bringing them beyond the critical first stage of growth, and seeing many of them reach the \$15 to \$50 million dollar a year sales mark, they will begin to feel a brain drain, become targets of mergers and acquisitions by foreigners, and some may decide to setup “branches” in Guatemala or Peru because developers there are cheaper. It may also come to pass that most corporate offices will be in Miami, and programmers will work in Santiago from Monday through Wednesday, and then in Miami on Thursday and Friday. When Cuba finds itself with this type of problem, it should interpret it as a sign that it has succeeded in becoming a contender in the international software industry and this problem will make a lot of Cubans (private individuals and private companies, not state owned or controlled enterprises) happy and rich. It will also indicate that the country has finally transitioned out of the restrictive grip of totalitarian socialism.

SMALL CLUMSY STEPS

Like my grandfather, we all have to take a few clumsy steps before we can run. And, there must be a clear starting point with specifics.

Socialist Cuba has already taken the steps to create the technology culture (computer scientists) required for the eventual creation of a capitalist software industry. During the last seven to eight years, it has laid out a rudimentary legal framework that may, if the other reforms mentioned here take place, support the structures needed to kick-start the software industry when the political transition occurs.¹² In the surreal environment of Cuban politics, this means after the death of Fidel Castro. At that point, it will not be difficult to retrain a sufficient number of highly educated technologists and computer programmers in modern software development techniques to form the core of a competitive market driven industry. Currently, these programmers’ best contribution to this transition is to continue improving their skills, learn about the international software market and the weaknesses of Latin America (the vertical software industry in particular), and by becoming proficient in Internet technologies.

If the Cuban exiled community in the United States is to play a role in this challenging transition, it has to take action in two very important areas. The first one is the establishment of a small network of private investment intermediaries whose focus will be to raise venture capital to fuel the kind of activity outlined in this paper. These intermediaries should be registered with the U.S. Securities and Exchange Commission. When the political climate allows, appropriate similar Cuban government agencies should be established to offer investors the protection of the law and exclude unscrupulous and criminal activity. Such intermediaries will be responsible for brokering private placement memorandums, limited partnerships, stocks, and other legal investment tools needed for the accumulation and transfer of capital to Cuba.

12. Asociación Nacional de Economistas Independientes de Cuba. 2001. Sumario de Leyes de Comercio Internacional de Cuba. Official Website: <http://www.geo.unipr.it/~davide/cuba/economy/>

There are currently some Cuban-American investment brokers and American investment organizations that may fit this role. They may be able to dominate the market because large American brokerages and venture capitalists will find the overall size of the Cuban market too small for their involvement. With 1.2 million people, the exiled community, which currently sends remittances to Cuba in excess of \$700 million per year and whose GDP is greater than that of the Republic of Cuba, may be able to finance the entire effort as outlined in this paper.¹³ Secondly, Cuban-American computer technologists should form a U.S.-based professional association capable of participating in and taking advantage of the transition discussed here.

There are sufficient numbers of exiled computer businesses to warrant this activity and the numbers are growing steadily. Working closely together with the venture capitalists, this professional association will be able to make significant contributions to the future. It should lay the foundation by first organizing and strengthening the exiled computer technology sector, building an awareness of the importance of this endeavor, and creating important alliances for the future. Its focus should be on the here and now, bringing tangible organizational and economic benefits to its members and making it a valuable asset for growing the industry here in the United States. Its appeal should be from a purely business perspective, not focused on political issues that lay outside of its control, such as the overthrow of the Castro regime. By becoming successful, this Cuban-American Information Technology “Council” or “Association” will indirectly add strength to the exile community and will serve as a stimulus to young exiles as they enter the technology sector. If the Cuban exiled community does not aggressively take these opportunities soon, it may be too late later when the political changes actually occur in Cuba, and by then others may be better positioned to control the future of the

technology sector in Cuba, Latin America, and indirectly in Miami.¹⁴

CONCLUSIONS

In the software industry and many sectors of technology, India leapfrogged from the status of a Third World country to a first world powerhouse in 15 years. A post socialist Cuba will have the potential to do the same. The pre-requisites for such a change, however, have more to do with political, social, and finance sector reforms, than in the creation of a technical culture or the acquisition of software and hardware tools. Once these structural issues are solved, the biggest challenge will be in obtaining and consistently channeling foreign venture capital to competitive young firms. Cuba’s greatest market potential lies in the exploitation of the Latin American market and the development of vertical software and ASP offerings for niche markets in both the Spanish and English speaking world, and as an offshore development center for U.S. based companies.

Cuba is likely to face little competition in the Spanish-speaking marketplace, and its gradual success is likely to attract U.S.-based partners and much needed capital for future projects. Because of the existence of a large Cuban exile community in Miami, its superior infrastructure, and access to capital and markets, Miami may become the de-facto center for the “Cuban” software industry. If venture capital averaging only \$5 million dollars per year can be raised, as many as 20 software companies can be seeded annually. This model lends itself to other “new economy” industries and should be considered alongside other more traditional methods of redevelopment.

However, after discussing this proposal with many Cubans and exchanging correspondence with countless others in the Cuban-American business community, there appears to be little indication that the exiled community has a strong interest in pursuing this type of coordinated effort. The simple fact that all

13. Díaz-Briquets, Sergio, 1999. “Emigrant Remittances in the Cuban Economy: Their Significance During and After the Castro Regime.” *Cuba in Transition—Volume 9*. Washington: Association for the Study of the Cuban Economy.

14. LatinTrade.Com Internet Newsletter, 2002. “Trade Information for Cuba. General Investment and Trade Policies.” <http://www.latintrade.com>

the ingredients needed to set the elements in motion are present does not mean that the challenge will be taken. After 43 years of false starts and dashed hopes for a change in Cuba, exhaustion and apathy towards schemes to “rebuild Cuba” are not uncommon. It may be that this undertaking will not find mass appeal until the day after Fidel Castro dies. As previously indicated, this sort of timing may be off.

Those that are not apathetic and are from the technology sector, investment banking, academia, and business should consider organizing the infrastruc-

ture mentioned here. The upside rewards are much greater than the rewards of inactivity. Rarely does a country go through the convulsions that Cuba will go through during the expected transition away from totalitarian socialism, creating opportunities for well-organized groups to fashion entire industries and major sectors of a new economy. Hopefully, this will happen with less pain, less criminality, and less waste than in the former Soviet Union. As crazy as it may sound to some, the future of Cuba will no longer be in sugar, papayas, or rum, but in technology.