



INFORMATION FOR DEVELOPMENT PROGRAM

Improving Competitiveness and Increasing Economic Diversification in the Caribbean: *The Role of ICT*

April 2005

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FOREWORD

In recent years, developing countries and their partners in the international development community have devoted considerable attention to the role that information and communication technologies (ICT) might play in promoting economic growth, combating poverty, and strengthening their participation and competitiveness in the global economy. Spurred by the example of developing countries, such as India, that seem to be “riding the ICT wave” successfully, many developing countries are looking to emulate these successes and reap the benefits of ICT-led growth for their own economies.

However, in an increasingly open global economy, the ability of developing countries to promote domestic growth, increase the global competitiveness of their firms and economic sectors, and provide new products and services both to their own people and to global markets, depends on a variety of factors, and ICT provide no shortcuts or simple solutions. Nor does the promotion of ICT-enabled businesses suffice to address the fundamental challenges facing developing countries in adapting the structure of their domestic economy to a global market while promoting sustainable, broad-based growth at home, even those that leverage the attractive wage/skill mix of developing countries such as business process outsourcing, call centers and software development.

Developing countries, therefore, need to think about the challenges and opportunities of ICT-enabled growth and poverty reduction within the larger context of reforming the structure, and increasing the flexibility and diversity, of their economy. To this end, *infoDev* is pursuing a multi-country research program which takes a sober look at the role of ICT in improving competitiveness and overcoming the fundamental impediments to innovation, new business creation and sustainable private sector development in developing countries. Our research program starts from the premise that ICT can be an invaluable tool if used strategically and appropriately based on sound, practical applications that leverage a country's comparative advantage within the global economy.

This study on “Improving Competitiveness and Increasing Economic Diversification in the Caribbean: *The Role of ICT*” is our first output of this program. In the coming months, we will undertake similar studies in other countries, beginning with Tanzania, to develop a broader framework for the international development community on how ICT can be a key enabler of economic growth, poverty reduction and global competitiveness.

I would like to commend the OTF Group, particularly Marcela Escobari, Camila Rodriguez and David Rabkin, for preparing this comprehensive report and for enriching our understanding of the role of ICT in improving competitiveness and promoting sustainable economic development.



Mostafa Terrab
infoDev Program Manager

About *infoDev*

infoDev is an international partnership of bilateral and multilateral development agencies and other key partners, facilitated by an expert Secretariat housed at the World Bank. Its mission is to help developing countries and their partners in the international community use information and communication technologies (ICT) effectively and strategically as tools to combat poverty, promote sustainable economic growth, and empower individuals and communities to participate more fully and creatively in their societies and economies. For additional information about this study or more general information on *infoDev*, please visit www.infodev.org or contact Seth Ayers, *infoDev* (email: sayers@worldbank.org or tel: +1.202.473.4868).

About OTF Group

A consulting firm that focuses on country competitiveness projects in emerging economies around the world.

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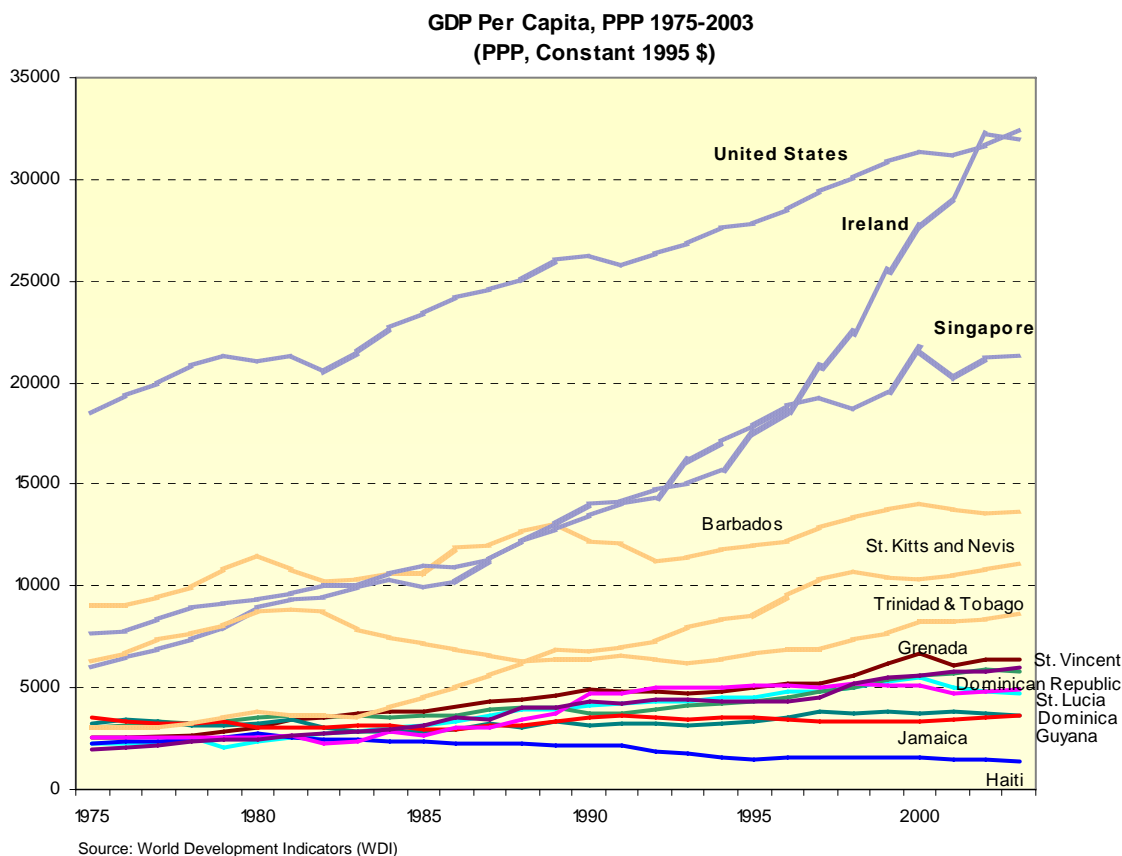
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Executive Summary

The Development Challenges of the Caribbean

The states and microstates of the Caribbean offer a tantalizing glimpse of development achievements that might have been. For 40 years in many cases, and almost 200 in others, these states have held out the promise of favorable locations, excellent climates, convenient languages, rich natural resources and, recently, large Diaspora communities. With relatively small populations, and increasingly large outside forces offering to help, many of these states were expected to grow rapidly through the end of the 20th century. A very few did, while most have stagnated and some have fallen into increasing poverty.

In reality, the Caribbean economies are faced with distinct challenges on their road to development. Once dependent on agricultural and extractive industries, they have seen protective policies disappear, and their products have commoditized. Their small size and high labor costs make these industries unviable when competing with the scale and low labor costs of giants like India and China – or even high labor but low total cost environments such as the US and Canada. Now these countries face modest growth rates (1.17%)¹, high unemployment rates (15% - 20%) and an overly-responsive government sector trying to maintain social cohesion and acting as an unemployment buffer.² Their relative geographical dispersion has also made regional integration and harmonization a slow process.



Small island economies cannot produce in scale quantities, and have additional logistical costs built in. In the case of the Caribbean, telecommunications costs are high and labor productivity (although not necessarily average wages) is low. In all but Trinidad and Tobago, energy costs are high. These structural problems are augmented by the lack of an entrepreneurial class and world class firms.

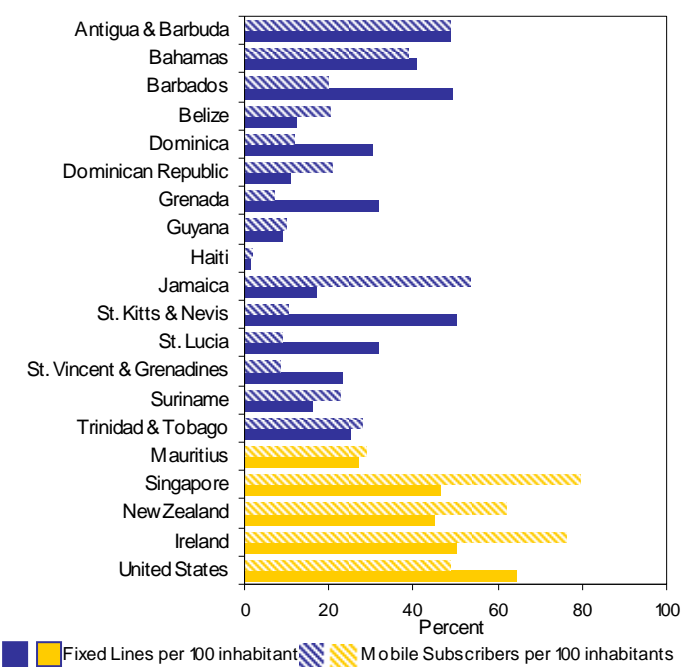
¹ Average growth rate in the region for 2002. World Development Indicators (WDI)

² Government services account for more than 17% of GDP in countries like St. Kitts and Nevis and Barbados, and up to 8% in countries such as the Dominican Republic. On average in all the Caribbean countries in this study, government services as a percentage of GDP average almost 14%.

Companies in much of the Caribbean have succeeded in the past by managing a few relationships and taking advantage of trade preferences. As these disappear, many firms are inadequately prepared to tackle global competition and serve sophisticated consumers abroad. Under these mounting pressures, the current high standard of living in many of the smaller islands is unsustainable, and the low economic achievements of the majority are getting worse.

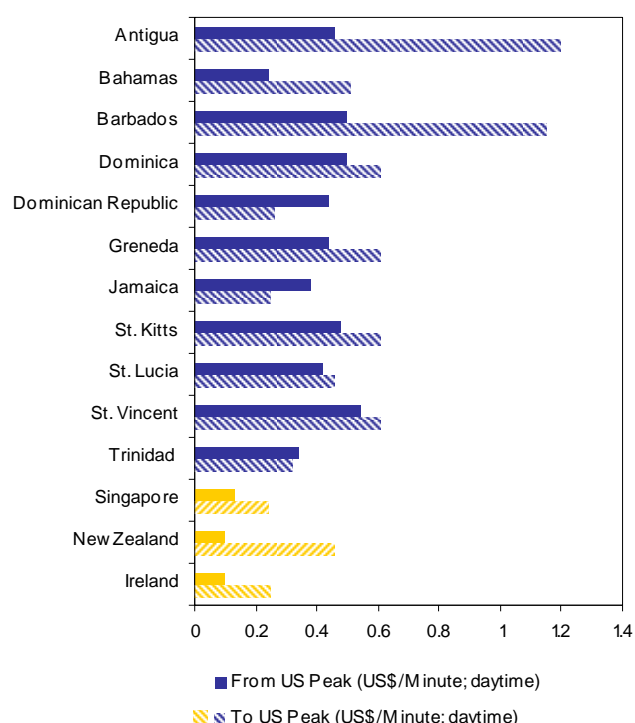
Various analysis of the region come to similar conclusions- access to telecommunications and Internet services is improving through liberalization across the Caribbean, but telecoms monopolies and small markets make for exorbitant prices and adoption is lower and less reliable than one would hope, with obvious variations between countries. Outbound calls are still priced higher than inbound calls³ and Internet services are more costly than in countries with comparable income levels. For instance, the cost of 20 hr dial-up access in St. Lucia is US\$ 22.22 compared to US\$ 8.42 in Malaysia.⁴ High-speed connection is as high as US\$ 400 per month in places like Antigua, Barbados and Jamaica, while it costs US\$ 40-50 in the US.

Teledensity of Fixed vs Mobile Telephony (1997-2002)



Source: ITU 2003

International Inbound and Outbound Phone Rates



Source: BaTelCo, Cable & Wireless, SingTel, TTST and Verizon

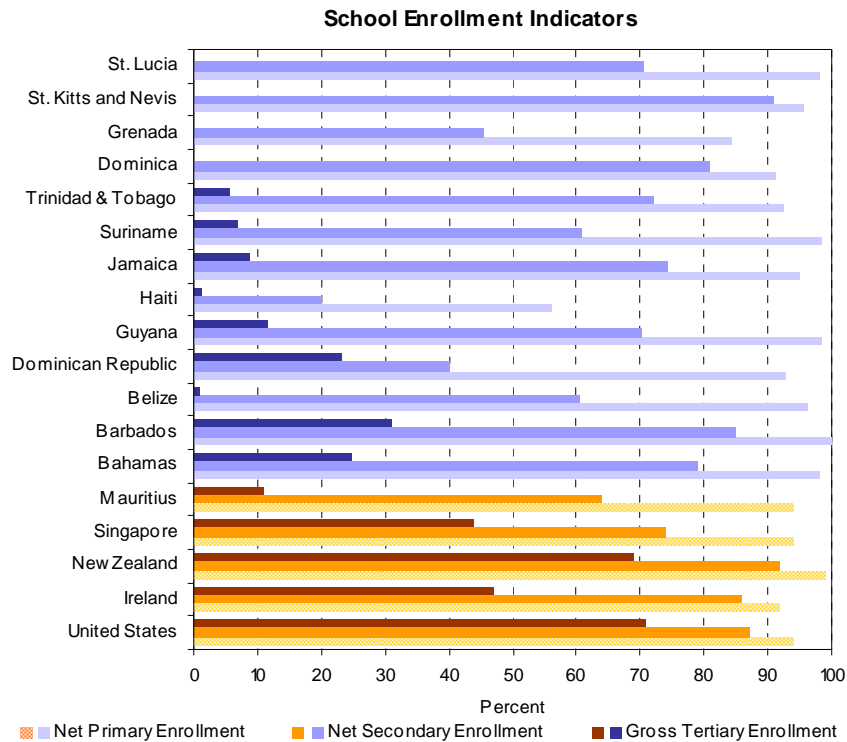
As a result of these high prices, Internet density is particularly low in the Dominican Republic, Haiti, Suriname and St Vincent and the Grenadines, at 3.64, 0.96, 4.16 and 5.98 users per 100 inhabitants. Other countries like Jamaica and St Kitts and Nevis have relatively higher usage rates of more than 20 users per 100 inhabitants. These are all substantially lower than in the US, Singapore and New Zealand.

Educational attainment is also an important challenge in the region. A popular misconception is that the skill level in the Caribbean is relatively high. While primary education is universal, with enrollment rates of over 90% in 2002, and secondary schooling is improving, tertiary levels are one of the region's biggest educational weaknesses. Despite the fact that countries like Barbados, Bahamas and the Dominican Republic have more than 20% of their youth attending university, the Eastern Caribbean

³ International Inbound and Outbound phone rate graph refers to the following: household, off-peak rates from Cable & Wireless, SingTel and Verizon (Dominican Republic).

⁴ ITU (2004)

States (ECS) average a meager 2%.⁵ In the ECS a small group of graduates go abroad to study, which raises tertiary enrolment rates to approximately 12%; yet the majority of the local workforce has barely finished primary school.⁶ This trend has contributed to the continuing dominance of mostly low skilled sectors in the economy, where Information and Communication Technologies (ICT) usage is less common and where long-term economic growth opportunities are limited.



With these many structural disadvantages, Caribbean economies must focus on premium niche segments, even in tourism. Yet they persist in following low cost strategies, despite the fact that their economies are clearly high cost.

There are a few companies that are successfully taking advantage of niche manufacturing. Gale Force, for example, is a regional company based in Antigua that builds high-end, hurricane resistant windows and doors. Their business proposition is building custom made windows to fit architects' creativity, as opposed to the majority of international competitors that prefer to work with standardized sizes and shapes. In a fully digitized environment, they are able to provide on-demand price quotes, and price competitive products. They train their own staff and offer competitive wages for factory workers starting at twice the minimum wage.

Likewise, there are increasingly attractive opportunities in niche service sectors. Leisure marine is one sector with high potential for the Caribbean to provide a competitive and differentiated product, both as a niche market of the tourism industry and for complementary services like pleasure boat building and maintenance operations. Offshore financial services, a long tradition in the Caribbean, also have potential but need upgrading. Islands like the Bahamas are migrating from 'banner like' companies without a physical presence to "Virtual Headquarters" that require trained staff using sophisticated interfaces to communicate with their client base. To attract these businesses, they have implemented stringent regulations to improve monitoring, such as establishing a financial intelligence unit to oversee

⁵ OECS Human Development Report (2002).

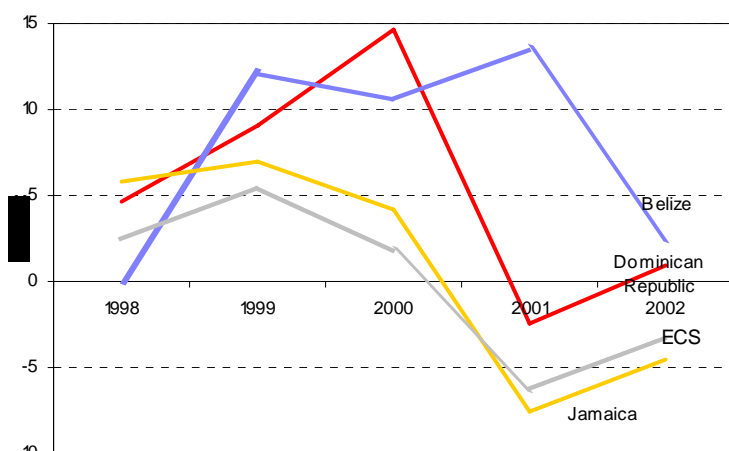
⁶ Overall tertiary enrollment rates correspond to the average enrollment for four ECS countries for which data was available: Grenada (13%), St Kitts & Nevis (12%), St Lucia (14%) and St Vincent & Grenadines (8.3%). In terms of labor force educational attainment, St. Lucia, St. Vincent and Grenada have over 65% of the adult population with only a primary level education.

the offshore sector and banning anonymous accounts and anonymous international business corporations.⁷ These types of services provide positive spillovers because of their demand of supporting staff, specialized software applications, and strategic and legal consulting services, among others.

The Vision for the Future

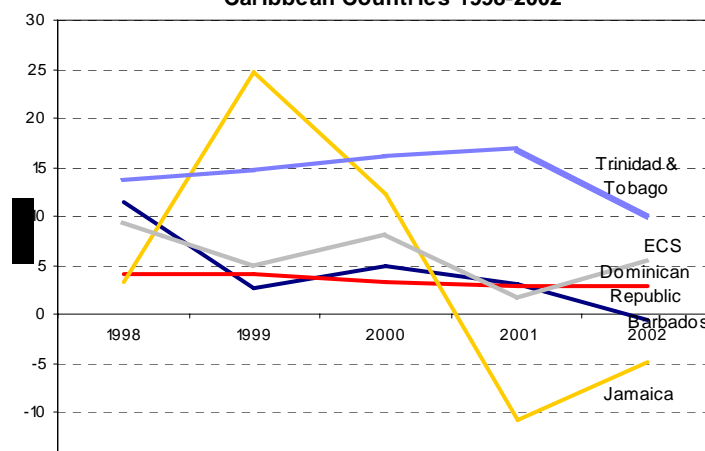
The major opportunity for the future of these island states is in the transition many have started to a service economy, and a push towards niche manufacturing sectors that can supply high paying jobs. While there is a push towards diversification, given the size of these economies, the goal should be towards adding complexity, along with robust business strategies, to promising new and exciting clusters. Instead, the key traditional service industries of tourism and financial services have become commoditized in some Caribbean countries, leading to lower profits for their home economies. As illustrated in the graph below, growth in financial services has deteriorated or stagnated in countries where it represents a sizeable portion of GDP, due to greater scrutiny of their banking practices in the ECS and consolidation in the rest of the Caribbean. Tourism has experienced a similar decline due to September 11, as well as a more commoditized model evolving throughout the Caribbean. Countries like Jamaica and the Dominican Republic have seen spend per day and average length of stay decrease in recent years. Caribbean economies must return to the days when they created new types of tourism and financial services, not the current reality in which they work harder to execute 30-year-old strategies while others all over the globe have innovated beyond them and the best customers have moved on.

Growth of Tourism Sector for Selected Caribbean Countries 1998-2002



Source: Study Calculations and Country Central Banks

Growth of Financial Services Sector for Selected Caribbean Countries 1998-2002



Source: Study Calculations and Country Central Banks

The transition to niche manufacturing and high-end services is not easy for economies without the necessary skill level, such as those in the Caribbean. However, there are other small island countries to learn from that have managed this transition successfully. Ireland had a dramatic transformation from a largely low-cost agricultural and manufacturing economy to a service, pharmaceutical and information technology economy that has achieved a three-fold per capita GDP increase since 1970—accelerating from negative growth to the fastest in Europe. Through coordination between the private and public sectors, Ireland targeted and attracted companies in key sectors, and in turn, the government created the necessary infrastructure and investments in education to supply the skill level required in engineering and computer science sectors. Ireland went from the worst schooling record in the European Union to graduating, proportionally, the highest number of scientists and engineers in the EU. The surprisingly low levels of tertiary enrollment in the Caribbean offer an important area of improvement if they aim for a similar transformation.

⁷ IMF (2002)
Competitiveness and the Role of ICT in the Caribbean

Other countries like Indonesia, Singapore and South Korea point to the importance of creating linkages between local firms and those attracted by Free Trade Zones (FTZ) or Cyber Parks, a growing phenomenon in the Caribbean. The necessary “spillover effect” of such foreign firms depends in great part on the absorption capacity of the host countries, the terms of the arrangement negotiated between the country and the firm (e.g. technical training, percentage of management which is required to be local, reinvestment, etc), and the ability of its local firms to offer the skills and reliable quality inputs required by the FTZ companies. Weak local infrastructure of firms and skills tend to be the limiting factors, which these Asian countries have addressed through financial incentives for joint ventures, institutional protection of intellectual property and an upgrade of human capital, but which the Caribbean, in general, has not.

Many countries in the Caribbean and Latin American have tried to duplicate these countries’ experience by competing to attract the same type of companies that Ireland and Singapore did 20 years ago, and thus have faced limited success. However, the Caribbean can take advantage of its location and climate to pursue other new promising clusters. For example, healthcare tourism presents a profitable option- from wellness centers offering rehabilitation facilities for people undergoing surgical procedures or retiree complexes, to cutting edge stem cell research, like the facility recently launched in Barbados. Proximity to North American and European markets, an elaborate tourism industry and well-trained healthcare practitioners make the Caribbean an appealing destination for this market.⁸

Telemedicine in Action

To support the Wellness Center Industry, Telemedicine offers an attractive solution for the lack of medical specialists in the Caribbean, and as a source of second opinions and specialized diagnosis. Telemedicine is medicine offered at a distance and that entails the use of audio, video or computer technology to investigate, monitor and manage patients who are geographically separated from a medical specialist. Companies like the Caribbean Medical Imaging Center (CMIC), a privately owned radiology center in St Vincent and the Grenadines, are already using this technology effectively. Using digital cameras and a DSL connection, CMIC can send X-rays, CT scans and ultrasound imaging to specialists around the world to provide more reliable diagnosis. Although the cost of wireless Internet access, and the cost of buying and maintaining equipment has kept CMIC from being a profitable company, the increasing availability and affordability of technology infrastructure and the expansion of wellness centers in the Caribbean poses the right conditions to leverage telemedicine in a more cost-effective manner.

Further regional coordination could also provide competitive and differentiated tourism experiences; such as in the yachting business. There is a growing demand in North America for lower-cost pleasure boat building and service facilities, which can be linked to tourism activities. As a US\$ 30 billion industry in the US alone that has doubled in size in the last 10 years, the yachting business offers a good opportunity for the Eastern Caribbean to become the next high-end destination for the leisure marine community. Islands like St. Barts and St. Marteen have been able to exploit this business attracting high-end boats. Of the average expenditure per week of a luxury yacht (US\$ 75,000), over 90% goes to food, accommodations, entertainment, etc, which is an indication of the potential tourism revenue that can accrue to an island. With further integration and collaboration, the Eastern Caribbean could become a destination for the leisure marine community, offering unique and varied tourism experiences as well as expert boat building. To create a one stop shop would require upgraded services, logistical coordination amongst the islands to streamline customs and immigration, and an improved tourism offering targeted to these travelers.

Opportunities also exist in niche manufacturing, such as medical devices and niche final consumption goods. While some firms are exploiting the potential of these industries, most firms are still competing on low cost models and exporting primarily to their neighboring Caribbean markets. As companies seek to transform themselves to become more globally competitive, technology and specifically information technologies (ICT) can provide valuable advantages.

⁸ Brenzel, Logan, LCSPE (2004), This report offers a review on the opportunities in health services in the Caribbean and examples of current ventures. Competitiveness and the Role of ICT in the Caribbean

The Role of ICT in Reaching the Vision

A sober analysis of how Information and Communication Technologies (telephones, mobile devices, the Internet, etc) can help firms become more globally competitive is missing in the development literature. Instead, ICT have been in recent years held up as holding the promise for unprecedented growth in the Caribbean. This is the promise to “turbo-charge” economic growth in the region, and to “leapfrog” stages of development. After all, information is power, and the seamless, cost-less dissemination of information offered by ICT can be a powerful tool for economic growth. From productivity improvements to global panacea, ICT have been hailed as the “next great thing” for the Caribbean. This view, unfortunately, is inadequate.

ICT Clusters

This exaggerated perception of the power of ICT has led to a lot of energy and money devoted primarily to “ICT Clusters”. Places such as Bangalore and Singapore demonstrate that high technology firms can themselves come together in clusters that have a positive developmental effect on an economy. This has been attempted frequently in the Caribbean, with almost universally poor results. Technology clusters in and of themselves have largely been a mirage, leading to the expenditure of much needed resources and eventual *death in the desert*. This need not be the case. But technology clusters in and of themselves have had limited potential for the region. There are some good reasons for this, particularly the choice of low wage-centric clusters such as call centers, and the failure to link foreign investment to local skills.

Outsourced Business Processes began in the Caribbean in the 1980s with multinationals looking for low cost markets near shore. While some businesses were originally successful, such as Caribbean Data Services from American Airlines, eventually firms fled to lower cost centers like India and the Philippines. As the services needed became more complex, the Caribbean was not able to upgrade its technological and communication infrastructure or skill level to compete. Instead almost every Caribbean country has experimented with subsidized telemarketing call centers, which in the end compete on low labor costs and low cost connectivity, neither of which the Caribbean can supply.

Demystifying the Call Center Fad

Call Centers Antigua Limited (CCAL) was a joint venture between the Government of Antigua and Barbuda and Caribbean Information Technologies (CIT). The government invested EC\$ 3 million for a 40% stake in the call center, with the goal of creating 850 jobs with exposure to IT skills. In the end, the wages offered were not very attractive, at US\$110-150 per week compared to manufacturing jobs that paid close to US\$200, and high tech jobs in Internet gaming of US\$750/ week. At these wage levels and with low upward mobility, the call center became the temporary holding place for those in-between jobs looking for better opportunities. The CCAL call center promised to create more than 800 jobs but only employed close to 200 people, and has since closed.

Jamaica had a similar experience. A fund was created from the proceeds of telecom spectrum sales to encourage the development of international call centers. The funds were lent at highly concessionary rates, and invested with varying results. Most investors experienced frustration with the inadequacy of the skills of the local labor force, local business rules and regulations, and norms of behavior (work ethics, business acumen, etc).

Free trade Zones (FTZ) and Cyber Parks have also been erected throughout the Caribbean in hopes of attracting foreign exchange, providing employment and the desired ‘spillover effects’ in technology innovation. FTZ started focusing primarily in manufacturing such as textiles, where countries competed on cheap labor since financial incentives could be imitated overnight. This ‘maquiladora’ model created thousands of jobs in countries like the Dominican Republic, but offered few positive externalities and most of the foreign companies have since moved on to Asia for lower labor costs. Cyber Parks have also been conceived throughout the Caribbean - some have not gotten off the

ground as in Antigua, while others like the Dominican Republic's experiment cost US\$ 30 million and has failed to live up to expectations due to a lack of political will and mismanagement.

Mature Cyber Parks exist today throughout the developing world in Taiwan, Indonesia, Malaysia and the Philippines. Successful parks have the ambitious goal of developing high-tech industries by integrating technologically modern facilities with technical universities, research centers, business incubators and other support services. These involve a long-term commitment of government to provide the expensive infrastructure, sustained intellectual capital through learning institutions, and skilled management to integrate the many components. The idea of establishing FTZ needs to be a *strategic one*. Caribbean countries need to first establish a clear vision of where they want to gear their economies, and then the infrastructure and the competencies needed to get there. The more they can build on opportunistic openings as Antigua did with the gaming industry, or base it on comparative advantages such as the production of plastic medical devices from the downstream oil industry in Trinidad, the higher the chances of success.

The software industry is another ICT cluster that has not taken off significantly in the Caribbean. The opportunities do exist in programming in Open Source Software (OSS) for local companies, and could expand to industry specific software. For instance, companies like BP in Trinidad, outsource US\$500 million in geological services and software from Houston that they would rather spend in Trinidad if the capability existed. Digisolv, an OSS company, has partnered with its government in St. Lucia and The Open Group⁹, to organize awareness seminars for the private sector on the benefits of OSS.

ICT enabling productive clusters

Despite the mixed results of ICT clusters, ICT are extremely useful, indeed necessary, tools. These tools play an essential role in economic development, as they are invaluable inputs for competitive firms and for the average citizen to participate more actively in the economy. Technology does not, however, change the fundamental burden on Caribbean economies: to create great companies. With notable exceptions, the economies of the Caribbean contain firms that have persisted through artificial protections, commoditized products, or the exploitation of natural resources. This is a strategy that was never sustainable, and is now no longer even profitable. What ICT can do for these firms is help them become more productive by transforming the way they do business and innovative in the way they engage in the global economy.

The appropriate application of specific technologies to industrial clusters can make a tremendous difference to the firms within that cluster. Firms can learn, market and sell online. At the very least, remaining near the forefront of the technological frontier in one's industry is a minimum pre-condition for global competition and, hence, economic growth. This is particularly important in the ever-increasing service clusters that are the necessary growing force in much of the Caribbean. Services, especially tourism, are becoming ever more complex and individualized. Technology is essential in creating these experiential packaged service offerings.

However, many government and business people in the Caribbean do not see the practical link between ICT and the development of their economies.

ICT can prove to be indispensable tools in fostering productivity and innovation which in turn can spur growth and prosperity. At their root, these tools allow for *increased learning* and more *customized service*. Whether regional firms and governments use them to become smarter – or merely cheaper¹⁰ – will determine whether ICT are the key to increasing wealth or simply slowing the decline into poverty. This report highlights and identifies five opportunities brought by ICT that are particularly important for Caribbean economies as they seek to become competitive. Some firms and governments are already taking advantage of these benefits to chart a path for a more prosperous future. The role of

⁹ The Open Group is an international OSS vendor and technology-neutral consortium. www.opengroup.org

¹⁰ ICT can make operations more cost effective through workflow automation, faster and more accurate communications along the value chain and within companies, and reducing transaction costs, such as in e-commerce.

governments and multilateral aid organizations is to support these types of initiatives and eliminate their constraints for progress.

In essence, the effective use of ICT can improve firm level productivity and innovation by allowing for more cost effective and fluid communication with customers, improving logistics, overcoming distance, helping firms understand their competitive positioning and enhancing transparency.

1. Communicate with Customers and Forward Integrate. Properly executed business strategy starts with the customers' needs. Successful firms are able to identify demanding and underserved customers and develop methods to effectively service those customers. Firms compete by embedding unique insights into the products they produce and the channels they sell those products. Those insights can be captured through interactions with, and feedback from, customers. ICT provides a quick and cost effective way to keep that communication active and permanent. This ability is key in sectors such as tourism, which is a cornerstone of every Caribbean country. Instead of falling into low cost models, such as the all-inclusive or enclave tourism taking over islands like Jamaica and the Dominican Republic, countries need to foster 'a total island experience'. Countries that do so strive to make the entire country a destination, and in doing so create a wide range of experiences from which a visitor might choose. *Unique Jamaica*, a cluster of 100 small hoteliers and attractions in Jamaica, has done this through a collaborate initiative of joint marketing and upgrading. Together, this cluster devised a vision to attract the Adventure/Nature tourists, and created several customized tour packages in culture, nature and food themes. ICT allowed them to do a cost effective marketing campaign, to communicate amongst the members, and develop an interactive web-based booking engine. Bermuda Escapes, founded by Axiom Computer is also a good example of how a simple technical solution of cataloging and coordinating tourism experiences through a single back-end database can make an important difference in the tourists' experiences. Concierges are able to arrange complete itineraries for their guests, and the industry in general has reliable data on what visitors value. Small hoteliers that have upgraded their IT systems, like CocolaPalm in Jamaica have seen a 30% increase in return visitors due to the better service. For instance, CocolaPalm used technology to reorganize key business processes, such as inventory, cash control and room allocation to provide more seamless services, and scaled up marketing and promotional efforts to allow booking and vacation planning through the Internet and more responsive customer contact.

The benefits of ICT in communication are as important in manufacturing, especially of high-end products. Chef Pepper, a start-up in the Dominican Republic that supplies hotels, restaurants and households with imported high quality meat products has seen their sales increase 20% per month since they started an e-mail marketing campaign. Their success is due to the significant Internet penetration rates in the high socioeconomic segments of the Dominican Republic population. Country Traders, a Blue Mountain coffee distributor in Jamaica, also recently experimented using the Internet as a sales channel successfully. Previously selling bulk green beans to overseas buyers who then roasted and branded the beans, it captured very little of the value. By selling branded finished product through a simple online ordering service and using a local courier, the company has found an entirely new market, cut numerous intermediaries and improved their profits for themselves, and by extension for Jamaica. Similar small-scale ventures are sprouting up throughout the region in hot sauces, crafts, etc., which are utilizing ICT to expand their markets, customize their products and to more effectively communicate with their customers.

2. Improve Logistics. ICT can improve efficiency when they are incorporated both inside the organization and used to transact along the value chain, allowing for better times to market, improved coordination of supply and demand and excellent customer service. Given the vast inter-Caribbean business and dispersed nature of the Caribbean islands, this coordination is a priority for regional companies. Companies like insurer Sagicor now can reply to claims from all over the Caribbean in 2 days, instead of 2 weeks, the average timeframe when their offices were not digitally connected. Governments also have much to gain from efficiency gains in the provision of services, particularly in customs and immigration which affects tourism, yachting and

trade in general. In agriculture, where most of the players are small and fragmented, there is an important benefit to eliminating information asymmetries. A recent pilot project sending voice messaging to convey market prices to farmers in Jamaica has been very popular given the ubiquitous nature of mobile phones in the island. A locally based consulting firm is exploring how this service can be launched across the island on a for-profit basis. Gale Force Windows, a manufacturer of hurricane resistance windows in Antigua, is able to provide immediate pricing quotes by analyzing the AUTOCAD drawings sent by architects and developers throughout the Caribbean.

- 3. Make Distance Irrelevant.** Given the dispersed nature of these island economies, ICT can create significant value by allowing the free and instant transport of digitized knowledge and products. Caribbean companies are using ICT to expand their market base and overcome geographic distances, although the rate of deployment and usage varies significantly. The service sector is the most progressive, especially consulting and the offshore financial services industry, which in 2000 represented \$10-12 trillion and is foreseen to grow at 15% on average¹¹. As these services have commoditized and are little more than tax havens, the next opportunity for the Caribbean is in further developing the “virtual headquarters” coupled with first-rate client services, which requires utilization and deployment of advanced ICT. Among the technologies most demanded are interactive asset management tools and brokerage services, built around sophisticated technical components, secure applications and aggressive investment strategies.¹² However, today’s firms in the offshore sector either have the IT expertise in house, or outsource most of this work to North America. Another industry that competes without borders through ICT is Gaming, which has had positive spillover effect in places like Antigua, at some point providing US\$ 25million in government revenue and employing and training engineers, web-designers and customer service representatives at competitive salaries. The gaming industry is completely Internet-based, offering both casino and betting options. For this industry to thrive it needs to be well- regulated, to provide safeguards from money laundering, and transparency to be able to lobby credit card companies to allow online betting. Good regulation, a solid banking system and reliable connectivity has attracted firms to Antigua, despite the high connection fees charged by C&W.¹³

ICT Opening Markets for SMEs

Small and medium size companies, like Erica’s Country- Style in St. Vincent, have been able to benefit from the Internet to open their products to whole new markets. With annual sales of US\$ 200,000, Erica’s Country-Style offers pepper sauces and food snacks to the Caribbean and US markets. After the launch of their website, they started receiving orders from the US market, which now account for 10% of revenues. This growth has prompted the use of a US distributor to save on shipping charges.

- 4. Understand and Improve Their Competitive Positioning.** As globalization has eliminated the physical barriers between markets, it has also done the same with competitors. With competition no longer confined to the neighboring plantations, mines and factories, today’s companies need to compete with global firms that can more easily than ever enter existing markets and take away once loyal customers. Previously only the domain of the largest firms with deep pockets, ICT can now help firms of all sizes gather customer and competitor information in real time allowing them to make timely and informed decisions about how and where to compete. Members of the music industry in Jamaica used such access to information and online surveys about international labels to reposition themselves and find customers around the world that would be interested in recording music in Jamaica. A new organization, “Jamaica Signature Beats” is working to remove previous barriers for the development of these services (such as fragmentation, low trust and lack of professionalism in the industry) by doing joint marketing activities and creating certification and

¹¹ This percentage is likely to be downgraded due to increased scrutiny of offshore operations in the future. While a small percentage of this pie would bring important benefits to Caribbean economies, significant OFCs can make an economy susceptible to international banking crisis.

¹² Carana Corporation (2002)

¹³ Please see extended Case Study on Gaming in main report for the trajectory of gaming in Antigua, the spillovers of this industry and government regulation that can both secure and repel this type of investment.

training for professional studios. Similarly in manufacturing, SM Jaleel - a soft drink company in Trinidad and Tobago, was one of the early innovators that realized it was competing in a global market. Through in-depth research of the global market, it identified the untapped segment of 4-10 year olds, and has built a global brand, "Chubby", now sold in major retailers like Wal-Mart and Kroger.

5. Enhance Transparency. Government can and should be avid users of ICT, both to improve the efficiency and transparency of its services and to set the example for the rest of the society. From broadly available information and downloadable forms to transactional capabilities, government services can become increasingly efficient. Particularly for private sector competitiveness and new business creation, ease of access to pertinent information such as business licensing, customs and tax requirements is critical. Given the size of government intervention, this is especially true for the Caribbean. Despite the need, this is probably the hardest sphere to implement these type of reforms, given the adversity to 'redundancies' created by upgrades in technology, and the lack of market incentives. The Antiguan Office of Technology has managed to create a local loop to connect all government buildings, and has already provided every employee with email access. There are vast opportunities in this realm, starting with improving the efficiency and transparency of the customs and port facilities, which currently are behind Central America. The Dominican Republic holds containers on average for 7 days, compared to 4 in Mexico and El Salvador. High connectivity costs and low educational levels are some of the biggest obstacles to further advancements in e-government initiatives in the region.

While other sources of efficiency and innovation exist, the 5 opportunities outlined above are particularly important for firms in emerging economies. They can be put into practice immediately and provide progressive results. The most important challenge for benefits to accrue lie in the necessary mental shift in how technology can improve businesses, and not necessarily in high capital costs. Governments, private sector stakeholders, and civil society must look at the creation or strengthening of firm-level advantages when assessing the impact of a given ICT initiative.

A more competitive approach is required: one that begins from the bottom up as opposed to the top down. Beginning with the business climate and identifying ICT initiatives to improve it will more quickly focus Caribbean players on the highest-yield projects. While wiring every town with broadband connections may yield wide-ranging benefits, it may not deliver the same economic impact as connecting every firm in the tourism industry to a digital marketplace. Ultimately, both are excellent aspirations, but this paper is about prioritization and choice. Fortunately, as the examples above illustrate, when beginning from the ground up, the opportunities are plentiful and, frequently, cost-effective.

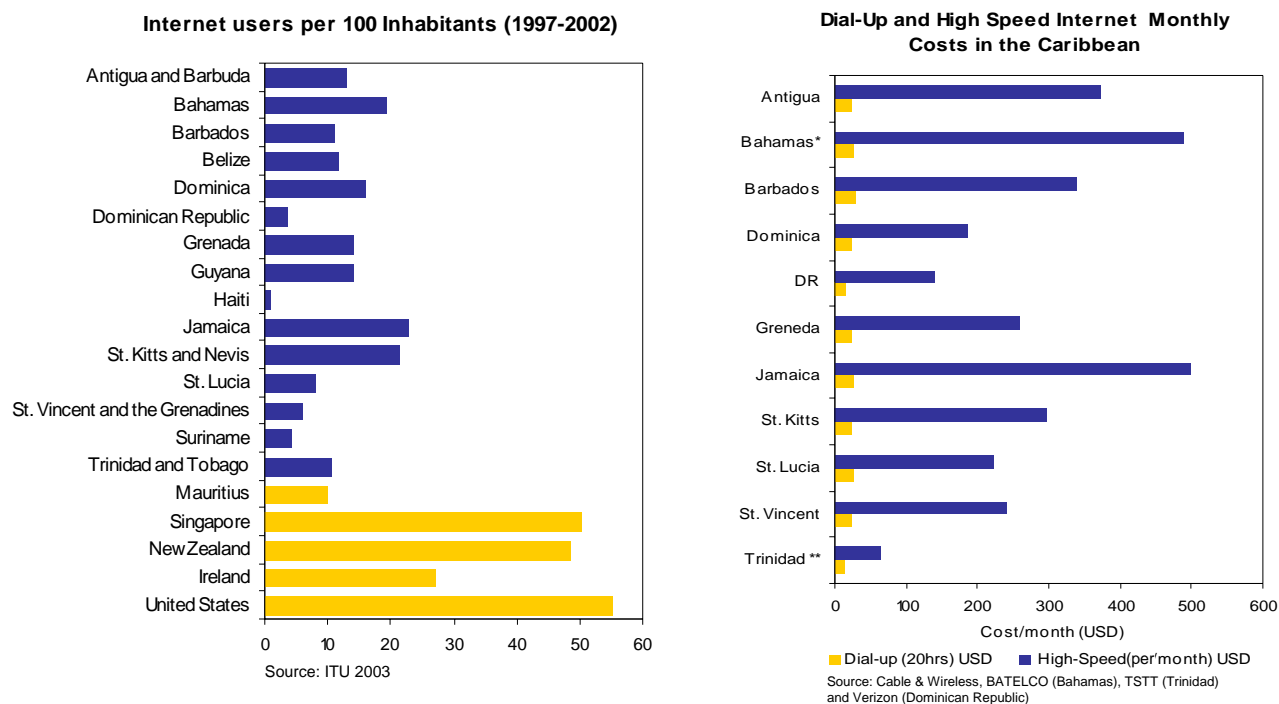
Recommendations

The benefits described above, however, are hard to measure. Until better metrics develop, the growth and sophistication of businesses, the rise of entrepreneurs taking advantage of technology breakthroughs, and firms paying high and rising salaries are good metrics for governments to assess progress. A myriad of digital products and services are now being traded and exchanged through cyberspace. This arena will become an increasingly important one to know how to compete in, especially for countries with historical geographic disadvantages such as the small scale and dispersed nature of the small island states of the Caribbean.

There is much that governments and multilateral donor organizations can do to improve the business environment for healthy and innovative businesses to develop in the region and to utilize ICT as a tool for improving competitiveness and increasing market opportunities.

1. Facilitate Access. Access to technology, as noted earlier, is essential for firms and clusters to compete globally. There has been much written about basic and specialized access, including a variety of metrics to determine how and whether a country has a competitive

technology platform. They all boil down to one thing: can a businessperson get on the Internet and talk on the telephone with reasonable reliability, and at a cost on par with his/her global competitors? In the Caribbean, the situation is suboptimal in this regard, with some of the highest connectivity prices in the region, and in general, uncompetitive telecommunication markets. For instance, outbound calls are more expensive than inbound calls, Internet density is still substantially lower than in the US, Singapore and New Zealand and the cost of high-speed Internet is exorbitant (See graph below).¹⁴



The liberalization of telecom services is taking place in mobile telephony, but the process needs to be sped up particularly for advance services such as broadband and in parallel, new technologies like Wi-Fi or Wi-Max (longer-range wireless technology) need to be encouraged and widely embraced.¹⁵ Most countries continue to grapple with the problems of putting in place effective telecommunications regulations and moving forward with the liberalization process (for example, Trinidad and Tobago, Guyana and Belize among others, are facing these delays). Hence, one of the main imperatives is to set clear deadlines for the completion of liberalization in countries that are still pending, and set up statutory bodies to lead and instill continuity in the process of reform. The creation of a Telecommunications Authority is also in an incipient stage in most of these countries and their technical competencies (i.e. standards, competition law, accounting regulation, etc) are still deficient. Further liberalization will largely hinge on the competence, technical capabilities and independence granted to these authorities so that issues such as interconnectivity, rate-setting and investment incentives in telecoms are set to mimic, as closely as possible, a competitive model.

Providers of international connectivity for data and voice as well as fixed lines are in most of the Caribbean *de facto* monopolies, because there is no alternative submarine cable network. There is also little economic incentive to invest in underground cable as a second comer in the business in small islands like those in the Caribbean. While current high prices might make it

¹⁴ Dial-Up and High Speed Internet graph data refers to the following: Dial-up 56Kbps and 20 hrs access; High Speed: ADSL 1544Kbps, except for Trinidad 128Kbps and unlimited access; household rates, except for Jamaica; installation fee is not included.

¹⁵ Refer to Recommendation 4 – Regional harmonization of Key Policy Areas Related to ICT- for a detailed review of what OECS is doing in this realm through the proposed OECS Telecommunications Reform II Project..

appealing, it is not hard for a regional monopoly like Cable & Wireless to drop local prices and drive competitors out of business. Thus so far, all land line connections from fixed telephones to broadband access required for Internet applications, are bound to use the incumbent's network at their set price.¹⁶

Some Internet Service Providers (ISPs) are already providing Wi-Fi access to the Internet, but the rate of adoption and relatively slow speed offered are still hampering this technology's full potential. As pointed out in a recent study by Eurostrategies, a European-based consulting company, the quality of Wi-Fi service in the Caribbean is still held back by inefficient control of the frequency spectrum and by providers waiting until more competition is in place to increase speed so as to always be just faster than their competitors.¹⁷ Governments can create incentives to encourage the entry of more competitors, particularly in Wi-Fi technologies, and help them drive adoption among the population at large.

Pilot projects initially funded by multilateral organizations and the government should be expanded to provide connectivity at greater speeds to the broader community. For instance, Jamaica with the auspices of USAID, has been studying the possibility of adopting the *Last Mile Initiative*, a global program to expand the access of communications to a wider scale of the population in emerging markets. One of the components of this program is the innovative deployment of low cost technologies such as Wi-Fi and Wi-Max in remote communities and SME firm networks.

These technologies, however, are usually adopted by the larger and more efficient firms first, and then replicated through the economy. Thus, speedy regulation change, incentives for new competitors and technologies and protection from unfair competitor behavior from the incumbent will have the most profound impact.

- 2. Improve Ability.** A key input for improving the region's competitiveness is the *upgrading of knowledge and human capital*. In this sphere, the Caribbean considerably lags in relation to any developed country. This should become an immediate priority for governments since it is well known that any investment in upgrading intangible assets requires both practice and patience over the long-term to fully materialize and translate into improved productive capacity of a country. First, the gap in tertiary education is worrisome. While primary and secondary enrollments are in line or in some instances above other developed countries, enrollment rates at the university level are less than 10% in almost every country (except for Dominican Republic, Barbados and Bahamas that have upwards of 20% enrollment). In response to this, governments have created a series of programs and technical schools and have made program accreditation easier and courses more flexible. These are efforts in the right direction; yet, businesspeople still point to difficulties in getting the right local skill set for their businesses. Some highlight deficiencies in general managerial and marketing skills as stated by the CEO of Gale Force Windows in Antigua: "We don't have a problem recruiting for our factory and providing training, what we need are managers that can open new markets, and interact with our customers to create new opportunities for the business"; others say the skill gap is especially true in more complex direct IT jobs, data processing and software development and maintenance, as noted by the COO of an Internet gaming company: "We are obliged by law to hire locals at a ratio of 3:1, while that is not a challenge given our competitive pay, the real experts in IT and gaming are coming from the UK and Australia."

In this sphere, there is a clear role for government and private sector organizations to provide targeted support. Governments should support private training schemes by providing well-designed training incentives for firms, through fiscal incentives, matching grants or subsidies as appropriate.¹⁸ Furthermore, governments and international donors should support training

¹⁶ Eurostrategies (2004)

¹⁷ Ibid

¹⁸ De Ferranti, et al (2003) and interviews with several company executives included as case studies in this report.

agencies that provide demand-driven programs and prove to have private sector linkages. These linkages can be created through internships and exchanges that bring back relevant market knowledge into the classroom. Private sector organizations and trade associations can also spearhead these efforts by working in conjunction with the government to make training relevant to the labor market and to inform SMEs of the training options available to them. For example, a call center in St. Lucia spent over US\$ 10,000 for a specialist to train its staff. This type of training could be organized by trade associations to encompass more players and spread out the costs.

Local universities need to connect to the needs of the private sector, to understand the demands on future employees and to engage in applied research. Currently, most of the successful businesses are led by Caribbean people that have returned after receiving advanced degrees or having job experiences abroad.¹⁹ More partnerships, like the one spearheaded by the Dominican Republic's government, local universities and NY's Stevens Institute, need to be replicated to improve the quality and applicability of local degrees. Applied science and technology need to be a more relevant part of tertiary education and vocational training. Government institutions and international donors can help mediate these partnerships and sponsor conferences to share and prize advancements in areas of science and technology.

One of the major challenges in the Caribbean is extending training to smaller and medium sized firms which currently are much less likely to use formal training. Small firms are more constrained by resources, lack of knowledge about training and its benefits, and labor turnover than are larger firms.²⁰ There is a rationale for the government to subsidize firms that provide on-the-job training for *general skills*, or to subsidize private training facilities that offer general training. Regional certification boards can also improve and harmonize regional standards in ICT technical degrees to international standards. Companies like Gale Force Windows applied to receive subsidized training from ex-Canadian International Development Agency (CIDA) technical support services in St. Lucia, but were denied for unknown reasons. They wanted to train key personnel on back end IT systems so they could connect their factory to their accounting and sales offices, but could not afford to do so on their own.

Country specific analysis should be performed in order to identify any externalities that may impede effective training (information, financial, labor turnover, etc) to arrive at sound training policy design. However, a general finding of this report is that small and medium sized firms should be the primary targets for incentives to encourage training.

- 3. Support Services for Firms.** The availability of support services and financing for start-ups, particularly in technology-based businesses, is almost non-existent in the region. The failure to deliver funds and technical capabilities to small ventures is the largest impediment for their growth. A conservative banking sector and exorbitant interest rates contribute to the situation. For instance, most SMEs surveyed in this study raise funds through traditional commercial bank loans, where they face upwards of 12% interest rates and in most cases require 100% collateral. This calls for the development of higher-forms of financial intermediation and venture capital to develop: long-term securities, subordinate debt, equity, etc. Although this is a problem faced by the broader developing world, there are some interesting initiatives in the Caribbean worth noting.

Jamaica has begun a business incubator (the Jamaica Technology Innovation Center -TIC) that currently hosts 26 technology businesses, providing marketing and management services and modern communication facilities. Although a business incubator's core competency is

¹⁹ This was true in most of the case studies of new ventures presented in this report. For instance, entrepreneurial spirit such as the one depicted by Digsolv (St Lucia), Erica's Pepper Sauce (St Vincent) and the Caribbean Medical Imaging Center (St Vincent) came from Caribbean people that have returned after receiving advanced degrees or work experience abroad.

²⁰Ibid

not in providing access to finance, they can be a potent mechanism for intermediating venture capital and establishing networks of investors. To this end, the TIC is trying to establish an Angel Investment Network to help start-ups gain access to funds. This growth investment fund will typically consist of high net worth individuals that want to provide seed capital to emerging companies. For instance, Jamaican/Canadian billionaire Michael Lee Chin has recently pledged a US\$1 million contribution to be disbursed to the institution over the next five years.²¹ This strategy is worth analyzing, given that the Caribbean Diaspora communities both in North America and Europe, could become a potent force for new venture financing in the region.

Furthermore, incubators can help nurture new enterprises in their most vulnerable phase until they “graduate”—that is, they are financially viable and freestanding to leave the incubator. To do so, however, there are some guidelines that should be followed so that they do not constitute the next IT fad in the region. First, although the most common sponsors of business incubators are academic institutions and government agencies, research suggests that the less an incubator relies on subsidies the more successful and viable it is.²² This calls for a clear strategy of how the incubator will reach financial sustainability both by providing services to in-house start-ups, and training and consulting services to other private and public sector firms. As incubators move towards this path of financial viability, it is typical that their budget moves away from being almost 50% provided by government or multilateral organizations, to almost full reliance on its own revenue-generating activities. Second, incubators should draw a clear line between financial intermediation and providing direct financial assistance to firms. The former is their actual role and they should try to set up networks of potential investors that can help raise start-up capital. Finally, the incubator should have clear and unflinching performance metrics and success criteria for selecting companies, and for them to “graduate.”

Another area for SME support is technical assistance, particularly as it relates to the use of ICT in transforming business processes. Technical assistance is in some cases easier to channel, since financing sometimes lends itself to different pressures and can become concessionary subsidies in some developing countries. Government-funded SME support agencies are rare in the Caribbean and those that exist tend to lack the strategic vision, resources, autonomy and linkages with successful firms to promote private sector development with an ICT edge. For example, Trinidad established three institutions to support the private sector.²³ However, they remain disconnected from the needs of firms and lack the technical capabilities and entrepreneurial expertise that is key to uphold the legitimacy of such institutions. As a case in point, the National Entrepreneurship Development Company Ltd. (NEDCO) is perceived as an instrument of political patronage or as a social development program of income redistribution. On the other hand, organizations like the Centro de Apoyo a la Micro, Pequeña y Mediana Empresa (CAMPE) in the Dominican Republic that provide market information on numerous industries, and legal and financial advice for local businesses are important in fostering entrepreneurship. For best results, these organizations need to have (i) a clear mandate and strategic vision, (ii) the in-house technical capabilities to execute on that mandate, (iii) private sector involvement and personnel with entrepreneurial expertise to bring forth institutional legitimacy and strategic guidance, and (iv) performance metrics to assess an agency’s successful interventions with the private sector.

Regional trade associations could also help, not only in aggregating supply and stimulating demand (collective marketing, training, market research, etc.), but also in providing knowledge resources on how the sector could improve performance and utilize ICT. Although currently most of these organizations are not active and their use of ICT is predominantly through “static” websites with entry forms, some like the Caribbean Tourism Organization (CTO)

²¹ Technology Innovation Center www.jamaicatic.org

²² NBIA www.nbia.org

²³ In Trinidad and Tobago, the institutional map for private sector development is comprised of three organizations: the Tourism and Industrial Development Company (TIDCO), the Business Development Company (BDC) and the National Entrepreneurship Development Company Limited (NEDCO).

are more dynamic in this regard.²⁴ The CTO has a Management Information System for Tourism (MIST) and an Intranet/Extranet that serves as an important catalyst to the advancement of technology platforms within this sector and as powerful market research tools for smaller firms. Cluster-based initiatives funded by donors, governments and the private sector organizations can improve the competitiveness of a sector through collective initiatives that upgrade the clusters' products and services. These initiatives often involve improved technology platforms incorporated by the cluster as a whole, as seen by the Bermuda Escapes project that used a common back-end IT system to track and tailor tourists' experiences.

- 4. Regional harmonization in key policy areas related to ICT:** As more people turn to ICT to do more of their day-to-day operations, it is imperative that legislation is kept attuned to ICT and its use. The more legislation is harmonized in the region and compatible with international standards, the greater the benefit to these economies and their attractiveness to foreign investors.

The legal enforcement of electronic documents, protection of intellectual property and privacy, further liberalization of telecommunication's market, development of a framework to support electronic transactions, and enforcement of electronic documents and contracts are among the priorities in this realm. Laws on intellectual property as it relates to the Internet- in code, data, music or other content has important implications for businesses selling into a multi-jurisdictional world. Keeping abreast of these changes and providing up-to-date, enforceable legislation will affect the region's ability to transact with and attract foreign businesses. Mauritius for example, has been a leader in this realm in Africa and has convinced Microsoft, Hewlett Packard, and IBM to set their regional headquarters in the island.

Ideally, the Caribbean should proceed in these reforms as a regional block. Alternatively, smaller country groups such as the OECS can proceed in tandem if it speeds up the process. To date, the OECS and the Caribbean Single Market and Economy (CSME) have taken important steps in some of these areas. The advantage of this regional alternative is two fold. First, it constitutes an immediate step towards regional harmonization of practices and legislation, which by default, will most likely guarantee international compatibility in e-practices and attempts at replicating best-practices (for instance in telecommunications regulation). Second, it allows individual governments to move more swiftly in the reform process, as each country focuses on facilitation and execution rather than on drafting country-specific legislation. For instance, an OECS Telecommunications Reform II Project is currently being drafted to expand the reach of the first OECS Telecommunications Reform Project and tackle some of the persistent telecom regulatory challenges in the region. Specifically, the new project is expected to build on the reform agenda and set clear guidelines to move forward along two key components:

- Bolstering support for legal and regulatory reforms that are presently underway, such as the establishment of a dispute resolution mechanism for private operators, outlining of policies and procedures for interconnection issues, and capacity building and training to strengthen the Telecommunications Authority and the Spectrum Managing and Monitoring System (SMMS), and;
- Reviewing of the current Universal Access Policy and the establishment of a Universal Access Fund (UAF) to uphold it.

Looking forward, one of the major challenges and, if instituted one of the new project's major accomplishments, would be the design and implementation of regulation for interconnection pricing- physical interconnection and interconnection fees (especially fixed-to-mobile interconnection fees and mobile-to-fixed call termination charges). Interconnection pricing must cope with two problems: the market power of local access carriers in termination

²⁴ Bertin (2004)

charges²⁵ and the incentive of the incumbent not to offer interconnection to entrants (or to provide technically inferior connection between its facilities and the facilities of a competitor).²⁶ Hence, the goal of the new telecom reform project's interconnection pricing scheme is to determine a modern cost methodology and an interconnection regime that diminishes the incumbent's market power, lowering costs and increasing competition.

In the case of the CSME, model legislation is being drafted in the area of Competition Law, Consumer Protection and Anti-Dumping and Countervailing measures.²⁷ But other important issues such as intellectual property and e-enabling legislation (e-commerce regulation, electronic signatures, Internet banking and transactions and Internet crime) have not been tackled on a regional manner. The CSME should extend its reach to these areas, and donors can support these institutions in prompt implementation and regional harmonization in these topics.

As the CSME proceeds as a block, it is also important that regulators be trained in technical aspects and participate in international ICT/Telecommunications workshops to remain informed of the latest trends in international standards, and appropriately customize them to the region's challenges. This is an area where donors can help, connecting networks on the subjects and encouraging the transfer of knowledge in these fast moving topics.

Promoting Knowledge Exchange

Norway has been at the forefront of e-legislation. For instance, the Norwegian government has put in place an initiative to use digital signatures in electronic interaction with and within public administration. Furthermore, Norway is sharing their initial success with developing countries as it relates to e-legislation. The Norwegian Agency for Development (NORAD) in partnership with UNDP has worked in countries like Bosnia to support the development of e-legislation. For example, people from the public and private sector in Bosnia have participated in study trip exchanges to Norway to review best practices in the area of e-legislation and other ICT-related fields.²⁸ Such knowledge exchanges can be easily replicated in the Caribbean and hold important potential.

Tapping into developed nations that have implemented model legislation successfully is the best way to proceed. Organizations like ICANN and ITU can provide guidance on the latest standards. As these changes happen, it is important that consumers and the private sector are kept abreast of what this means for their businesses, particularly as it pertains to their legal rights and responsibilities.

- 5. Technology Clusters must make business sense.** High technology clusters do offer the potential for positive spillover in the Caribbean. This potential is, however, extremely limited and has to date been heavily over-estimated at significant costs. For instance, as call centers became a fad throughout the Caribbean, investments were often not analyzed in a rigorous manner. Despite the use of basic technologies (telephony), many foreign companies demanded generous concessions from government promising more complex technology spillover effects and employment generation. Perhaps most importantly, the sponsors of basic telemarketing call centers misunderstood the upward cycle they were trying to create. Call centers alone are akin to maquila labor in textiles. The primary attraction is cheap rates (both on financing and especially on labor). An industry, disconnected from a legitimate software or service infrastructure, cannot hope to migrate upward.

²⁵ Refers to fees charged by the incumbent for completing connection that make use of the entrant's facilities, or in the mobile-to-fixed case, fees charged by fixed line providers for calling mobile numbers.

²⁶ Engel, E. (2003)

²⁷ CARICOM (October 2004). http://www.caricom.org/archives/csme/csme-matrix-keyelements-30oct_04.pdf

²⁸ UNDP <http://unpan1.un.org/intradoc/groups/public/documents/UNTC/UNPAN018493.pdf>

There are some viable opportunities in the call center business if the Caribbean can re-enter at the high end of customer service for large/well-known US companies, instead of continuing with the low-cost telemarketing model. The advantage of higher-end customer service accounts is three fold. First, customer service accounts guarantee longer-term contracts (2 years plus) because the outsourcing company has to make greater commitment in training and development for the call center employees. Training in this sort of arrangement is more holistic, not only focusing on customer service skills, but also on company specific products, policies and procedures, and involves more sophisticated software programs. Second, in these arrangements the call center employees become part of the outsourcing company, improving motivation and reducing turnover rates. Finally, large companies and their clients tend to have more contact with their customer service operations offshore and many often visit call center premises on a regular basis.

Many Caribbean nations have also experimented with Free Trade Zones (FTZ) and Cyber Parks as the next policy trend to attract FDI and facilitate technology transfer and other positive spillover effects. However, as the case of Antigua FTZ and the Dominican Republic's Cyber Park indicate, very seldom does the promised effects materialize and in many cases the international demand for these services to be offered in such locations did not exist. These failures illustrate that these new investments need to make business sense, be demand-driven and be guided by a carefully assessed strategic intent. For instance, the longer the commitment required by the foreign businesses and the greater the need for their close interaction with the local workforce and businesses (through specialized training, procurement of inputs and raw materials, etc.) the more the spillover effects can be realized. These spillovers range from positive externalities in training and human capital, to the adoption of technology and more efficient business processes.²⁹ Academic studies that have attempted to quantify these externalities have produced mixed results, but all point to the importance of establishing links with the local economy as the key determinant of success. Otherwise, very little is left behind when foreign investors exit the economy.

As Caribbean governments seek to attract new firms and FDI to their islands, they should incorporate private sector firms and encourage joint ventures to improve chances of success. The government and donors can help existing trade and industry associations to do feasibility studies along with interested companies before investments ensue. Investment Promotion Agencies, along with the government and the private sector, need to have a vision of the country's growth strategy and work together to execute it.

- 6. Strengthen new service and niche manufacturing clusters.** Technology can and must be a fundamental enabler of high potential clusters of existing Caribbean businesses, such as tourism. This is an essential and largely under-appreciated imperative.

First and foremost, public and private sector partnerships should be created to attract investment in promising sectors such as wellness and rehabilitation centers, high-end tourism and yachting, stem cell research, virtual financial headquarters, medical devices, niche agribusiness clusters, etc. This requires the articulation of a coherent and coordinated industry-wide strategy for those targeted clusters that have the greatest potential for growth. In doing so, there is a clear role for government and the private sector. The private sector, through industry associations or business development institutions, needs to incorporate those industry goals and facilitate collaborative initiatives that improve access to crucial inputs (training, targeted technical assistance, etc). In doing so, they can also lobby the central government for particular infrastructure and/or institutional improvements and education and training initiatives required to push forth a sector's new vision for the future. Governments can support these organizations by funding feasibility studies³⁰, facilitating the emergence of agencies in

²⁹ Darnani (1998)

³⁰ For instance, governments or donors can support feasibility studies of industries that have the potential to export niche products or provide trade in services. They can provide information on best practices applicable to promising clusters, etc. Governments and donors should restrict their

nascent but promising industries, and implementing the necessary legislation to support their growth. Furthermore, credible private sector institutions or regional trade associations have a crucial role to play in countries where ICT business usage and absorption is minimal. As illustrated in this report's Open Source case study, businesses along with development institutions can make concerted efforts to showcase best practices and educate the private sector in how ICT can improve productivity.

Ireland- Private Sector Institutions in Action

Ireland, through its Industrial Development Authority (IDA), offers an example of how this may be achieved. This agency spearheaded the effort to attract foreign companies to invest in Ireland. It touted to multinationals the relatively-cheap but well-skilled English speaking work force, a low corporate tax rate, and access to the EU. It arranged for company-specific packages of investment support and lobbied the central government for particular infrastructure improvements and education initiatives such as a swift and decisive action in the area of IT. The Irish government was responsive and answered the call. For instance, it pushed forth education reforms that reduced the secondary dropout rate significantly and increased the levels of tertiary education.

Moreover, the IDA created an overseas network of offices to establish close relationships with executives in specific companies and compiled what many considered to be the best database of potential investors around the world. It developed and fostered close relationships with executives in firms that fit the pattern of development sought by the country, and maintained these contacts even when individuals moved to different firms. This information was provided free to interested firms, along with advice on how to proceed with potential deals.

In terms of strengthening new services and niche manufacturing clusters, there also needs to be a cognitive shift away from structural incentives as the catalysts for change. This cognitive shift entails having the private sector take the lead in developing its own future, by proactively seeking market opportunities and asking for government support only as an enabler, not as an architect of the future. In this regard, government policies aimed at rewarding innovation and entrepreneurship are favored, as well as merit-based promotions campaigns for public service servants. The government should help publicize, reward and disseminate successful entrepreneurial activity to give Caribbean people the sense of possibility. The idea is to move away from a state of complacency where government is seen as the caretaker, to one focused on competition as the force that spurs innovation, human initiatives, learning, interpersonal trust and cooperation triumph.³¹

interventions to knowledge gaps that would not normally be provided (or shared) through the private sector because of the investments necessary is unfeasible due to the size and fragmentation of an industry, or the limited private returns to investing in knowledge.

³¹ Fairbanks, M. (2000)

1. Competitiveness and ICT

1.1 Imperatives for Change

As markets have liberalized and information technology advances have changed the nature of communication and competition, the most successful governments have developed strategies and institutions that not only manage the effects of these global trends but leverage them for increased effectiveness. At the same time the most successful businesses, the economic engines of a nation, have been those that have been able to integrate ICT into their operations to create sustainable and defensible strategies to deliver complex products to demanding customers.

Companies in much of the Caribbean have succeeded in the past by managing a few relationships and taking advantage of trade preferences in commodity markets. The rules of competition are changing and, increasingly, sustained advantages are created by managing and understanding one's customers and their needs.

In a globalized world, competitors cannot hide in protected markets. Eventually, all firms will face competitive pressures at home, even if they choose not to sell abroad. In order, therefore, to be prepared to meet and beat the competition, firms must be capable of exporting. For reasons of scale and sophistication, the small economies of the Caribbean demand that leading firms export, and be able to do so without distorting trade preferences and subsidies.

The definition of a competitive firm is one that has the ability to sell a product or service to demanding customers, for a profit, over a long period of time. Companies that succeed in the 21st century do so by embedding unique insights about their customers' needs and preferences into the products that they produce. This does not only mean that companies must produce premium niche products (although that is the best route for most Caribbean companies). It does mean, however, that each company must be differentiated either in its offering, its relationships, or its processes.

Information and Communication Technologies (ICT) can provide existing companies and new entrepreneurs an opportunity to engage in, and manage, the new dynamics of the global marketplace. Most important, ICT offer the opportunity for firms to learn from the best in the world, at a keystroke. ICT, used correctly, can *level the playing field*. "Going high tech", however, does not in and of itself make a firm competitive. ICT are tools that are as effective as the strategies driving their use.

While many studies have been done to determine access and ability to use ICT, the goal of this study is to focus on how the adoption of ICT has or has not created the productivity improvement necessary for sustained growth. We also dissect some of the ICT pilot projects that have been tried throughout the region to better understand the sources of success or failure. *infoDev* plays a unique role in providing research on ICT to inform policy and projects led by members of the multilateral community. Following their mandate, the explicit recommendations coming out of this analysis will be directed towards governments and multilateral organizations seeking to take a progressive role in strengthening the impact of ICT in firm-level competitiveness and improving growth.

Access

Much has been written about access (or the lack thereof) and the digital divide (the growing gap in the ability to leverage technologies by the sophisticated few versus the unsophisticated many – between and within countries). Certainly, ensuring reasonable access and bridging the digital divide are essential.

There are other analyses that study these issues extensively. We have cited many of these, in particular to provide an understanding of where the Caribbean nations fall along these yardsticks. However, much of this work will be found in appendices to this report for two important reasons:

- This topic has been covered elsewhere, by others who have more expertise in this area than we, and;
- Our primary goal is to shift the conversation from one of universal access to one of enabling technologies for high potential clusters.

Universal access is an important and worthy goal. However, this goal has not been achieved in any country, so it is difficult to tie this to specific productivity improvements. We posit that the short and medium litmus test for connectivity ought to be the ability of the average businessperson to access the Internet and speak on the telephone (domestically and internationally) with reasonable reliability and at reasonable cost. The long-term litmus test is the ability of the average citizen to access these same services, but that is outside the scope of our analysis.

Important to note, however, is that the various analyses of the region come to similar conclusions. Access in the Caribbean is improving, but telecoms monopolies and small markets make for exorbitant prices, and adoption is lower and less reliable than one would hope, with obvious variations between countries.

Access can be achieved with fixed phone lines or cell phones, Internet telephony or satellite. Costs can be reduced through open competition, government subsidies, or alternative technologies. Our task in this report is to highlight the relative starting points in the Caribbean, and to provide potential solutions. But this is meant primarily to support the broader economic growth objectives of this report, not as an end in itself.

We will therefore look at access, ability and the business environment in the diagnostic section of this study to understand what firms and institutions require from the enabling environment to reap productivity gains from ICT tools. Our most important recommendations in this realm will be tied to gaps experienced in the productive sector, rather than looking at access and ability indicators in isolation.

Horizontal vs. Vertical ICT Sectors

An important distinction we make in this study is between **ICT vertical sectors** that focus on the development of direct ICT products and Services (Business Processes Outsourcing services, Call Centers, software development, etc.) and **ICT as a platform and enabler** (horizontal) for the larger economy (through infrastructure development, reduced telecom costs, e-commerce, etc.) that lead to firm-level improvements in productivity. Most industrial and service clusters can benefit from the incorporation of ICT and that is an angle that is harder to isolate and measure. These two are commonly conflated when assessing the impact of ICT, and the former is usually the one vastly publicized in the news as progress in the move into “high-tech”, especially when industries are created from scratch. This study will focus on understanding ICT from each of these two perspectives which, together, will allow us to assess the holistic impact of ICT on the Caribbean.

Broadly speaking, we believe that vertical ICT clusters have been over-relied upon and have largely failed to live up to expectations. There are some good reasons for this, particularly the choice of low wage-centric clusters such as call centers, and the failure to link foreign investment to local skills and generate spillovers. Choosing more wisely and implementing in a more locally appropriate fashion can offer potential (such as data modeling for the energy industry in Trinidad and Tobago). But this potential is limited.

We will offer analysis of what has worked (Caribbean and elsewhere) and what has not (Caribbean). Largely, however, our conclusions are that these sectors have been too heavily emphasized, to the detriment of existing clusters that can greatly benefit from increased ICT applications.

1.2 The Cluster as the Appropriate Level of ICT Intervention

The ultimate objective of any ICT initiative in the region should be to grow Caribbean economies through the appropriate use of ICT. Therefore, we must focus our efforts at the organizational level, where economic impact can occur. Organizations – primarily private firms, supported by ministries and/or NGOs – are where economic value is created. Firms and institutions do not operate alone. Firms and institutions work together to produce products and services, and depend on one another to supply their inputs and buy their products and services. Additionally, these organizations depend on services like transportation and packaging. A cluster is a combination of all these organizations that need to coordinate their activities in order to create value to the final consumer.

The cluster is a natural group of organizations that need to communicate with one another, and is an important focus for ICT for two reasons. First, it allows us to focus our interventions on a large number of small organizations at once, multiplying our impact³². Communication throughout the value chain to the final consumer to improve efficiency and create customer loyalty is one of ICT's most easily attained advantages. Thus, understanding the needs of clusters can help find the most productive uses of ICT.

Second, ICT usage can increase information exchange and coordination between actors, particularly by lowering physical transaction costs, but also by lowering barriers of trust (which is so sorely lacking in the region). For example, consider an electronic market for commodity goods. This is a cluster-level intervention that improves the quantity, quality, and speed of access to information. Cooperation is simultaneous and instantly visible to the entire community. This lowers the trust threshold at which companies will transact, and thereby actually builds trusting relationships over time.

ICT can be applied to make a single organization more efficient, but by applying ICT to a cluster of firms that must work together *and communicate* to succeed, we can produce a much greater economic impact.

In analyzing case studies of successful and failed attempts to use ICT effectively, it is important to consider the appropriate use of ICT by each actor in the cluster. While the majority of the examples studied in this report are single institutions and firms, we will often refer to opportunities at the cluster level. Clusters are also a good unit of intervention for governments and NGOs that want to drive adoption of ICT.

Transition from commodity to knowledge-based economies

When analyzing the role of ICT, the question must always go back to the final goal - building competitive advantage - and how to measure whether institutions are making progress toward that goal with the use of ICT. Our premise is that Caribbean economies must move away from commoditized goods and services to high-value added and differentiated products and services. Most companies in the Caribbean are still competing based on comparative advantage which hinges on the endowments of factor inputs available in one country: labor, capital and natural resources. Thus, they compete by undercutting each other in terms of labor costs or by exploiting and creating vulnerable reliance on commodities and natural endowments. The more you sell into commoditized markets, the poorer your country becomes.

In an increasingly global economy, factor inputs have become less and less important as sources of productivity and sustained growth. Countries are no longer constrained by their factor inheritance in creating competitive firms and environments. In this sense, competitive advantage no longer rests on a country's natural endowments but on the ability of a country to create a business environment, along with supporting institutions that allow the nation's inputs to be used and upgraded in the most productive manner.³³

³² Metcalfe's Law tells us that the value of ICT grows when people who need to communicate and share information with one another all use ICT. Metcalfe's Law: The power of a network increases exponentially by the number of people connected to it. Everyone connected to the network both uses it as a resource, while adding resources in a spiral of increasing value and choice. Bob Metcalfe, Inventor of Ethernet, and founder of 3Com.

³³ Porter, Michael (1990)

Diversifying into high value added products and services requires both building superior industry structures and product traits that cater to sophisticated customers (not to be confused with rich customers). Insight, brand and focus are the building blocks of world class strategies.

When are ICT (part of) the Answer?

Most developing countries and development partners now understand that ICT has a critical role to play in enabling this transition to high valued added products and services, and thus accelerating the process of economic development. Phenomenal amounts of funding and effort have been put toward ICT infrastructure and service provision, but success requires more than the provision of services. To realize the promise of ICT requires not simply the adoption of ICT, but the usage of ICT to improve productivity. If funds are invested in ICT to drive adoption without demonstrable returns in productivity and wealth, the countries will fall further behind the world in terms of productivity and efficiency, and the future investments in ICT will be harder to justify in light of a negative track-record.

Even when seeking to apply an ICT to a promising cluster opportunity, three keys to success must be considered:

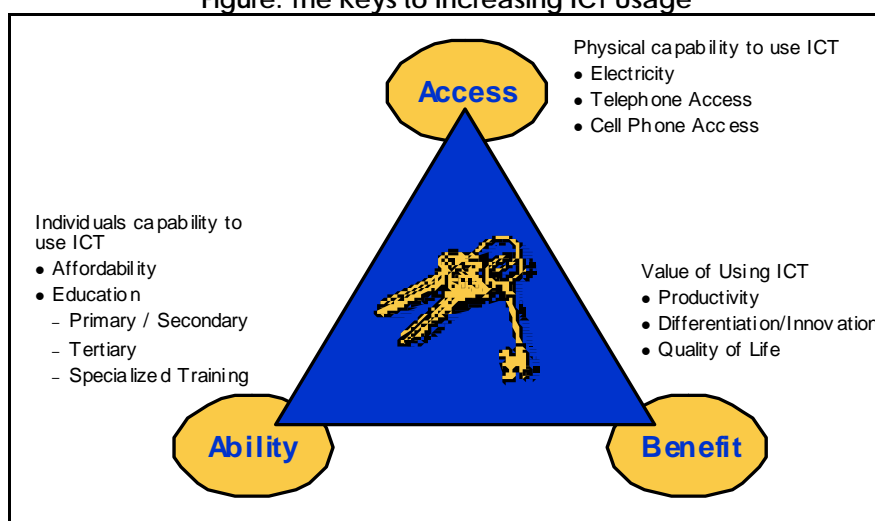
- **Access:** Does the recipient organization have the infrastructure to use the ICT in question. Factors that affect access are availability of services such as electricity, telephone, cellular and satellite. Access factors are still important determinants in the Caribbean because of the high prices on telephony and Internet access demanded by the regional monopoly, and the regulatory restrictions on other competitive options for connectivity. *Note: access is not an end in itself but a means to a specific utility.*
- **Ability:** Does the intended beneficiary(ies) have the appropriate skill set to leverage the technology being applied? Willingness of the organization to pay for ICT services is an ability factor, as is the level of education and technology training of an organization's employees. In the Caribbean, ability is a mixed bag - literacy rates and primary schooling shows promising indices, as well as pilot projects bringing computers to schools. However, there is still a lag in skilled IT labor, and most of the decision makers at the top of organizations (both public and private) do not understand the inherent transformations necessary to benefit from these technologies.
- **Benefit:** Does the project increase competitive advantage, *even after accounting for projects costs?* Measuring the impact of ICT is not easy- in developed countries, ICT investment has been linked to growth in Total Factor Productivity.³⁴ When looking at ICT in developing countries, this methodology is difficult to apply because the information is not readily available, and ICT might not have trickled through the economy sufficiently to track its influence. However, there are indicators that can elucidate how and if ICT is having an important impact on improving competitiveness, at a firm and institutional level. In analyzing the benefit of various initiatives, we use two main parameters:
 1. **Productivity Improvement:** Has the use of ICT increased efficiency and/or reduced costs? ICT can be a fundamental tool in improving productivity by facilitating logistical improvements through faster and more efficient communication along the value chain. It can also make distance irrelevant, particularly on more value added digitized products and services. In a service economy, the ability to provide services faster and in a more customized way, will become norms of competition. Improving transparency through the universal availability of information can also improve the cost of doing business and strengthen institutions.
 2. **Creating Differentiation:** Will the firm/institution use technology to enter new niche markets, innovate and differentiate their products or processes? Have ICT allowed them to provide a differentiated product to new and more profitable global clients? The ability to

³⁴ The World Bank's (2004) "Contribution of Information and Communications Technologies to Growth" by Zhen-Wei Qiang, Pitt A. and Ayers S., analyzed the impact of technology in Total Factor Productivity in developed economies. Total Factor Productivity is defined as the output growth minus the growth rates of capital and labor stocks, weighted by their contributions to output. This study has proven the positive results many Western Economies (especially the US) have accrued from investment in ICT.

communicate with your customers, faster and more intimately with ICT allows companies to customize their offerings to achieve a competitive edge. ICT also makes available information about competitors and clients beyond your borders to understand your competitive positioning and adapt the market forces.

These two measures of benefit, *productivity and differentiation*, are not mutually exclusive, nor comprehensively exhaustive, but provide a good indication of how firms, the engines of an economy, are transitioning into more competitive positioning with the use of ICT. A good parameter of improvement on these two fronts is salary levels in key industries. As ICT allows for productivity improvements and differentiation, companies need to pay workers more, as they require higher skill levels. High wages reflect a firm's investment in human capital, and its dependence on innovation for improved performance. This measure can be deceiving in the region, given the inflow of aid, the relative scarcity of skilled labor, inflexible labor markets and government subsidies maintaining artificially high salary levels.³⁵ Where applicable, case studies will make comparisons among wages in ICT-enabled businesses compared to others in the economy.

Figure: The Keys to Increasing ICT Usage



Each of these keys is necessary for ICT initiatives to succeed, and they must be considered simultaneously if we are to increase ICT Usage. In many respects, the appropriate technology will differ depending on the industry, the position of the user in the value chain, the type of product and service offered, etc. This framework is useful to remind us the limits of looking at access and ability metrics in the absolute. Comparing literacy rates or number of Internet users will provide negligible inputs on policy prescription, if they are not tied to the benefits being sought. Competition is about success *relative* to the market; ICT initiatives must therefore be evaluated in the same light.

³⁵ IMF (2003); Moore, W, Skeete, R and Kevin Greenidge (2003).

2. Diagnostic: How the Caribbean Competes Today

2.1 Caribbean Competitive Landscape: Opportunities and Challenges

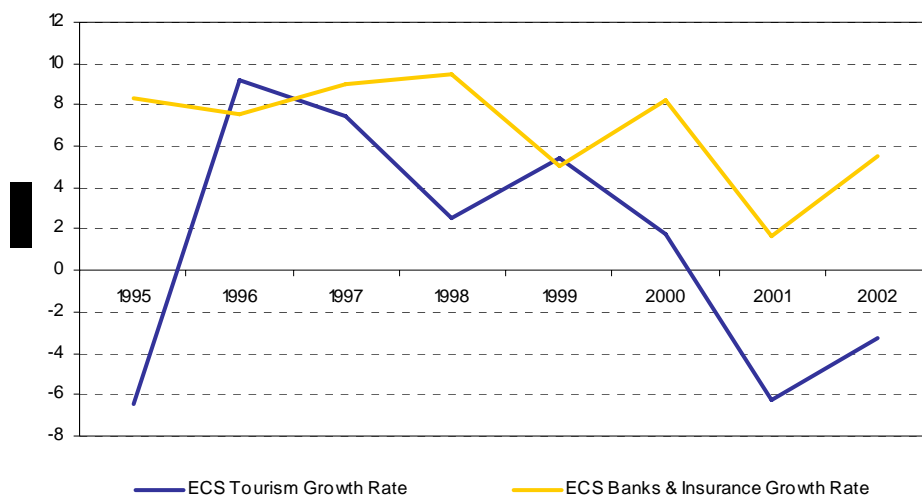
The following section outlines the competitive landscape for Caribbean countries. Since the microstates of the ECS face particular challenges as compared to the broader Caribbean region, they are analyzed independently.

Eastern Caribbean States

The Eastern Caribbean States (ECS) face considerable development challenges due to their small size and their vulnerability to external conditions. Although the 1986-1989 period was characterized by high growth rates averaging over 6% per year, the 1990s were not as fortunate. Real growth rates have dropped down to an average of 2% per year, and some economies like Dominica and more recently Grenada -due to this year's natural disaster- have experienced negative growth (Refer to Appendix 3, Table 3.2 and 3.3).

Most of the favorable conditions that led to the stellar performance of the 1986-1989 period have been reversed. The expansion of agricultural production due to trade preferences and favorable exchange rate movements is now being reversed.³⁶ The boom in tourism, which now accounts for more than half of the Eastern Caribbean States' (ECS) earnings, suffered a considerable decline since 2001 due to adverse global economic conditions, and is only recently recovering. Finally, the offshore financial and business services have recently come under international scrutiny and pressure to strengthen their regulatory infrastructure as well as to reduce their "harmful" tax competition, causing an overall decline in the growth of this sector (See figure below).³⁷

**Growth Rate of the Tourism and Banking Sectors in the ECS
(1995-2002)**



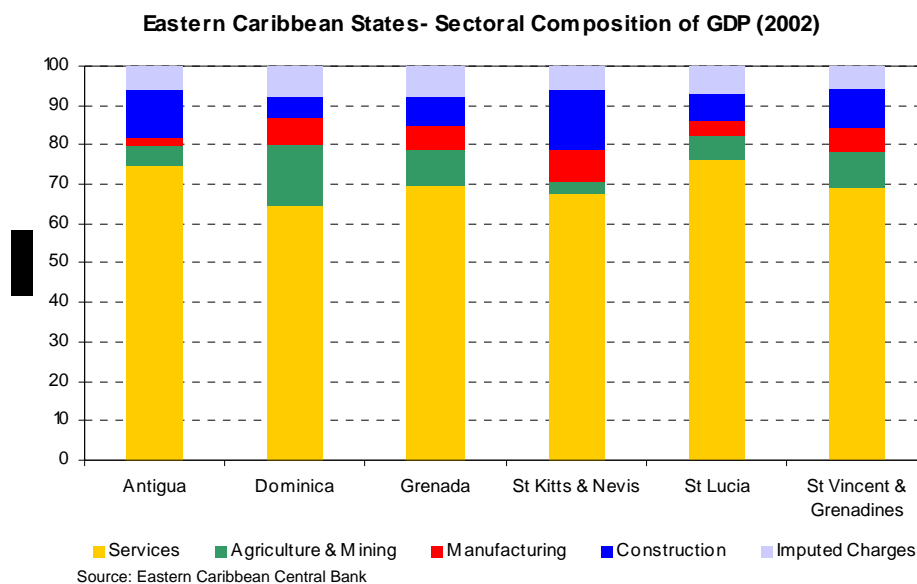
Source: Eastern Caribbean Central Bank

Given this competitive landscape, it is imperative that ECS countries pursue a more aggressive strategy of economic diversification – not necessarily into new industries, but away from the low cost low value models. In essence, there are two broad patterns in the ECS in terms of sectoral composition as depicted by the following figures. One is exemplified by islands such as Dominica, Grenada and St Vincent and the Grenadines with relatively large agricultural, service and government sectors; the other is depicted by Antigua, St Kitts and Nevis and St Lucia that hardly have any agriculture but are also heavily reliant on services and government. In the first group of islands the agricultural sector is still of relative importance and represents anywhere from 8% to 15% of the country's GDP. However, the

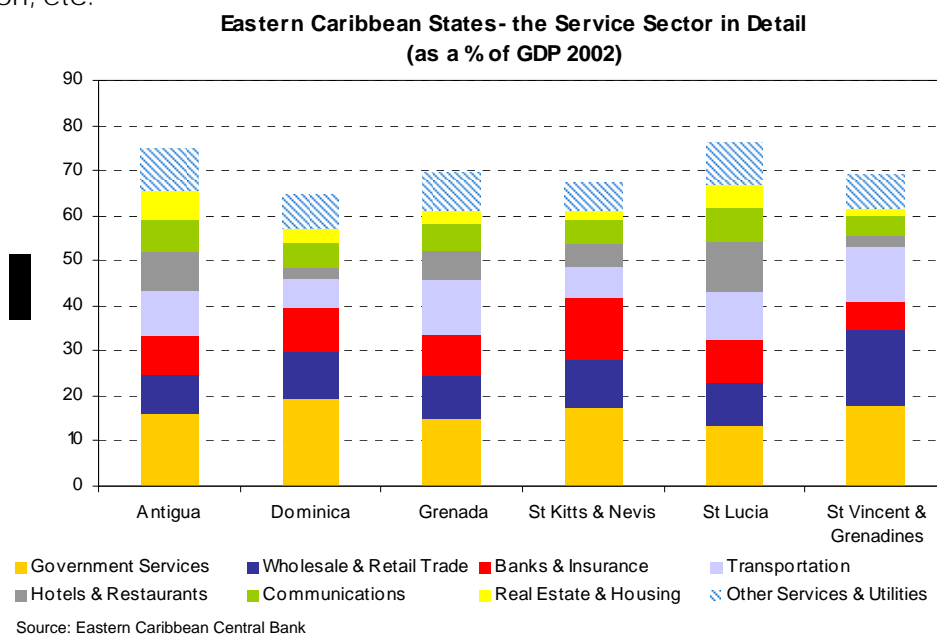
³⁶ OECS Human Development Report (2002)

³⁷ Ibid

future prospects for this sector are extremely challenging due to increased trade liberalization in both banana and sugar production.



The service sector accounts for more than 60% of GDP across all ECS; a closer look at the composition of the service sector sheds light to some interesting patterns across the ECS. As depicted below, the entire region heavily relies on the public sector as a source of growth and employment, as is evidenced by the government's share to GDP that stands at an average of 15% of total output. Most of this growth has been largely due to public sector investment programs in these countries. Wholesale and retail trade, which primarily constitutes the reselling of imported goods such as food, clothing and light manufacturing, is also of relative importance across the ECS given that these islands are net importers of consumption goods. Banks and insurance are also drivers of economic activity in these countries (representing in most countries more than 8% of GDP), but as mentioned previously, some islands have suffered from greater international scrutiny in their banking practices, which has affected the growth of this sector in recent years. The hospitality segment plays a dominant role in countries such as Antigua, St Lucia, Grenada and St Kitts and Nevis, and growth is not only driven by expenditures in hotels and restaurants, but also through complementary investment in real estate, transportation, etc.



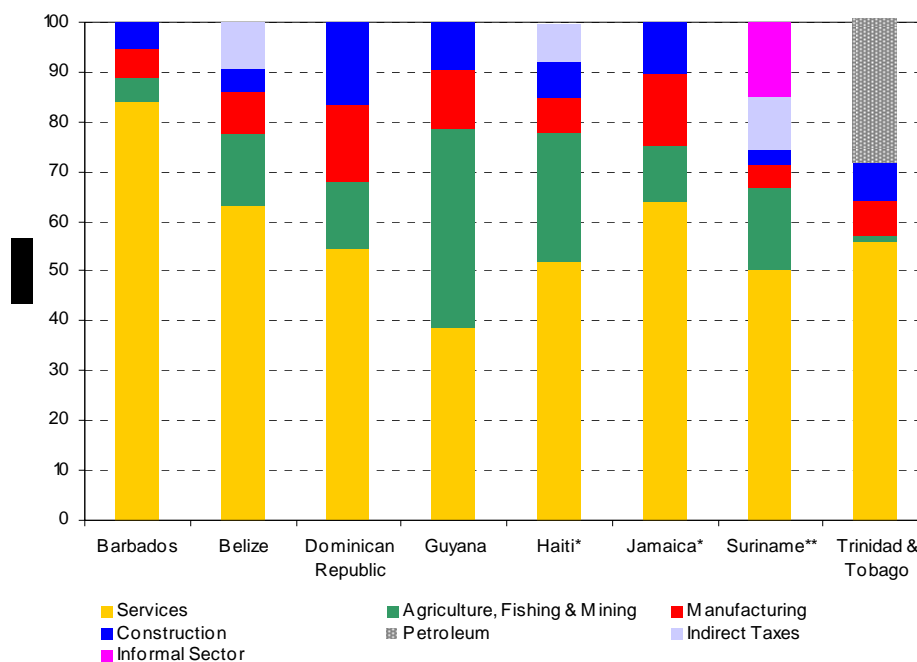
Despite this, some countries have seen a recent deterioration in the economic benefits of this sector as the spend per day from tourists visiting their islands has dropped in recent years (Refer to Section 4.1 for an analysis of tourism latest trends). This could indicate that ECS are following the wrong type of business model, attracting mass tourism and cruise ships, instead of the more sophisticated and high-spending tourists.

Furthermore, the narrow economic base and consequently the export concentration of these countries in agriculture and very basic manufacturing products places them in an extremely vulnerable position (Refer to Section 2.2 for a further analysis of ECS Trade Statistics). These are commoditized products, aimed at customers who are more concerned about getting the lowest price than about paying a premium for value-added.

The Broader Caribbean

The rest of the Caribbean countries covered in this study have had more disparate growth performances and contrasting development challenges than the ECS. For instance, on one side of the spectrum there are countries such as Belize and Trinidad and Tobago that have had sustained growth of 3%-4% of GDP over the last five years; while others like Haiti and Guyana have exhibited negative or stagnant growth in recent years. Yet, there are countries like the Dominican Republic that was growing at the stellar rate of 7% of GDP from 1996 to 2000, but has recently seen growth drastically weakening to -0.4% in 2003. This can be accounted for by the differing composition of their various economies. However, the backdrop of this recent performance is the fact that growth has stagnated in some of these countries' most important economic activities. Further growth spurts through the expansion of tourism and banking is uncertain and the manufacturing sector is still narrowly focused in commoditized products.

Sectoral Composition of GDP (2002)



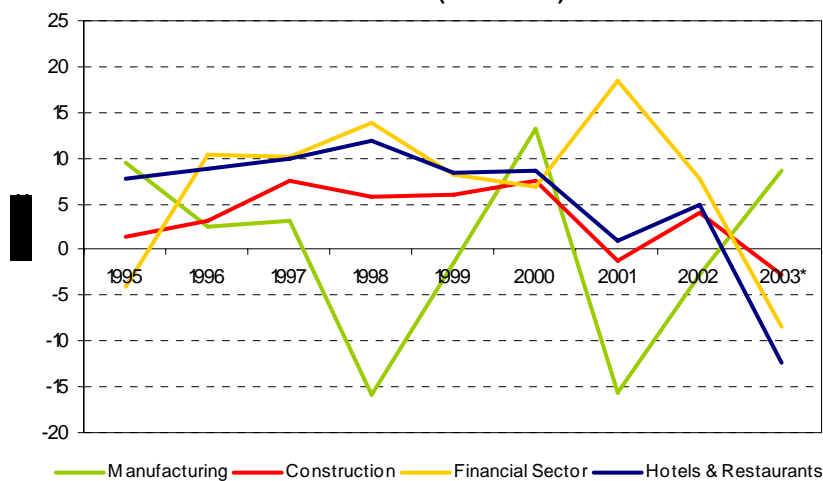
Source: Data for Barbados, Belize, Dominican Republic, Guyana and Trinidad & Tobago corresponds to countries' Central Banks. Data for Haiti, Jamaica is from 2000., compiled from IMF country reports. Data for Suriname .is from the IMF country report.

Although the service sector has taken over manufacturing as the primary sector (agricultural and mining), its relative importance varies across countries (Refer to figure below). In all the mainland countries (Belize, Guyana and Suriname) of this study, agricultural production and mining are significant growth components in GDP and production is still expected to grow. This is primarily due to scale advantages over the smaller islands in the Caribbean that compete in a similar basket of goods.

In Guyana, the agricultural sector accounts for almost 30% of GDP, with another 10% coming from mining (primarily bauxite). This sector has actually grown at an average rate of 3.4% since 1998. Likewise, in Belize agriculture production is expected to expand, with citrus and banana production accounting for most of this growth despite the scaling back in 2005 of EU trade preferences.³⁸ In Suriname, mining and agricultural production have actually more than tripled since 1999; bananas, bauxite and alumina account for most of this growth. Finally, agriculture is also important in Haiti, but the outlook is particularly woeful in terms of productivity increases or growth coming from this sector.

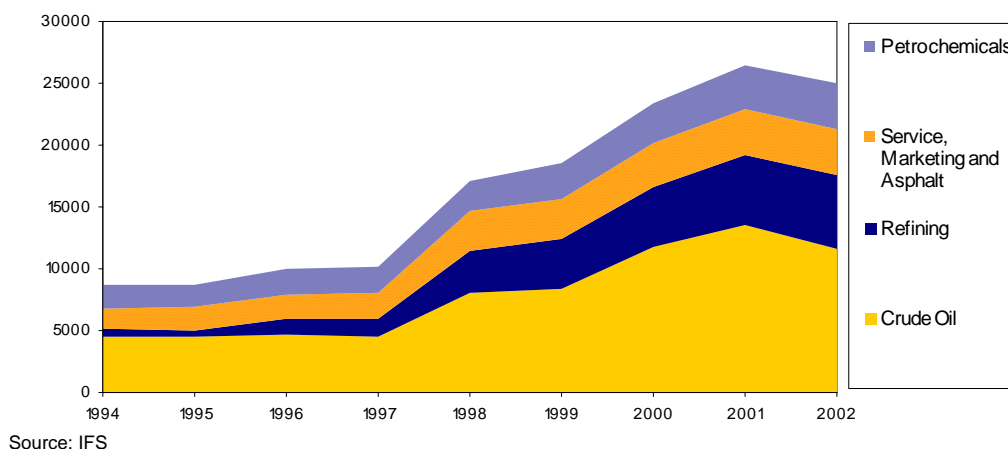
Manufacturing and construction also stand high in countries like Dominican Republic and Jamaica. In the Dominican Republic, the decline in economic activity has particularly affected the construction, manufacturing (Free Trade Zones), tourism and financial sectors of the economy. These sectors have seen sharp decreases in their economic activity during the last 3 to 2 years (refer to Figure below); however, tourism and financial services still represent almost 30% of GDP. Finally, Trinidad and Tobago is a bit of an anomaly among its neighbors. Since the discovery and industrialization of petroleum five decades ago, the importance of the non-service sector has declined in favor of the energy sector. The oil and gas sector petroleum sector now account for more than 30% of GDP (See figure below).

Dominican Republic- Growth Rate of Selected Economic Sectors (1995-2003*)



Source: Dominican Republic Central Bank and Study Calculations

Contribution of the Oil Sector to GDP 1994-2002 - Trinidad and Tobago (Million TTD)

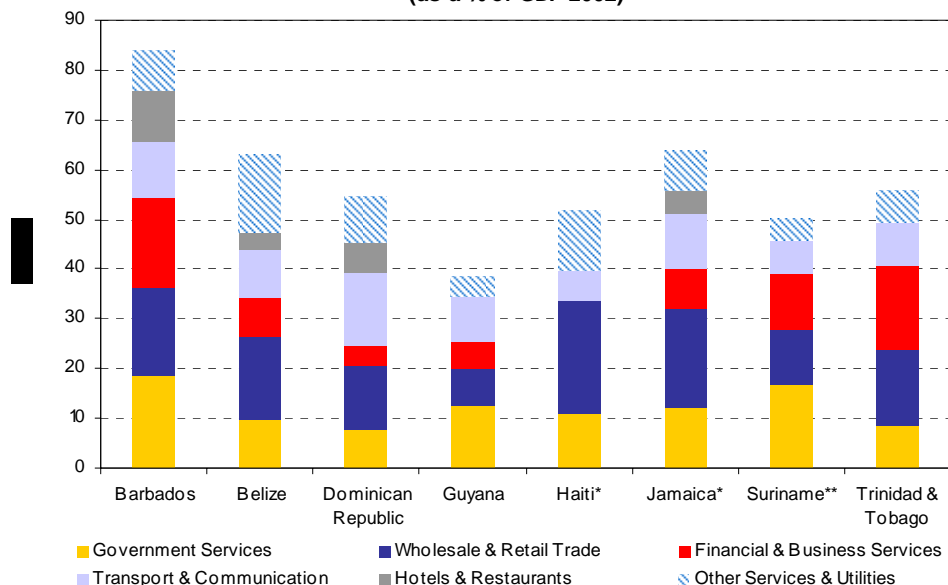


Source: IFS

³⁸ EIU (2004). Belize Country Report
Competitiveness and the Role of ICT in the Caribbean

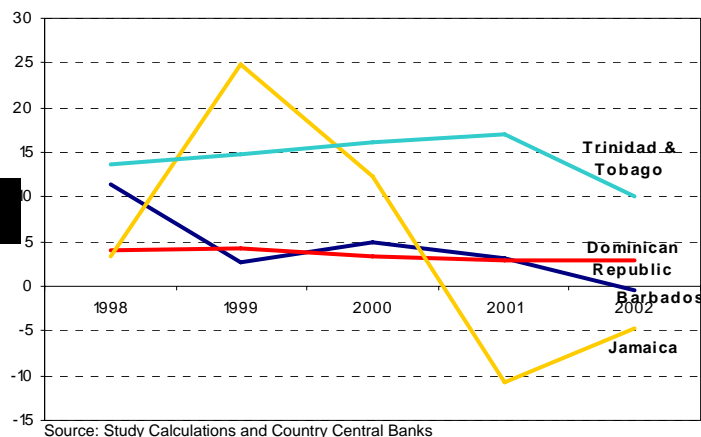
In aggregate, the service sector accounts for more than 50% of GDP across these Caribbean countries (with the exception of Guyana). The figure below provides further insight into its composition. As opposed to the ECS, these countries are not as reliant on public sector goods and services. With the exceptions of Barbados and Suriname, this sector represents less than 10% of overall economic activity. Wholesale and retail trade is relatively important in countries like Barbados, Belize, Haiti and Jamaica. Banks, insurance and the hospitality sector are also the main drivers of economic activity in Barbados, Bahamas, Belize, Dominican Republic and Jamaica, being also represented by complementary investments in transportation, communications, etc.

**The Service Sector in Detail
(as a % of GDP 2002)**

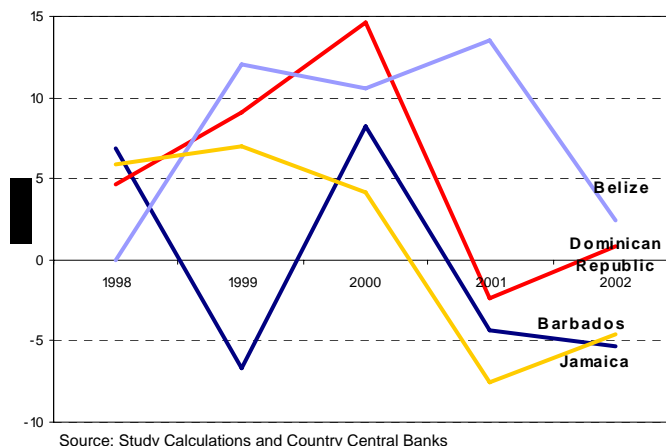


Despite this, some countries have seen a recent deterioration in the economic benefits of these sectors. For instance, as illustrated in the graph below, growth in financial services has actually deteriorated or stagnated in countries where it represents a sizeable portion of GDP. Jamaica has seen the sharpest decrease in year on year growth primarily due to the continued effects of the 1996 financial sector crisis, although the sector seems to be recovering since 2002 due to improved supervision and regulation in this sector.³⁹ Most of the broad downturn however, has been the result of consolidation in this industry as opposed to greater international scrutiny in their banking practices as was the case in the ECS. The pattern that emerges from the tourism sector is similar (overall sharp decline since 2001), although more volatile. As was the case in the ECS, most of this decline has stemmed from the modest global recession and the events of September 11th.

Growth of Financial Services Sector for Selected Caribbean Countries 1998-2002



Growth of Tourism Sector for Selected Caribbean Countries 1998-2002



³⁹ EIU (2003). Jamaica Country Profile.

Not surprisingly, some countries in the Caribbean are in a precarious situation for the future. Growth from tourism and banking, which had provided an alternative to the dying agricultural sector, has stagnated in recent years. Manufacturing and industrial activity are narrowly focused in commoditized products and the public sector continues to play an unsustainable balancing act in the economy.

It is firms that compete, not nations. Only firms can produce differentiated products or services that can be exported to sophisticated consumers and sold for a premium. A government can improve the environment around firms, but cannot itself compete. Thus, the only source of real competitiveness that can bring sustained growth and high and rising salaries to a nation's citizens is a strong private sector. In an economy that has heavy reliance on the government sector for growth and unemployment absorption, entrepreneurial spirit and private sector initiatives may be dwarfed.

However, in facing these challenges, the Caribbean finds itself in good company. In fact, a paternalistic government is one of the patterns of uncompetitive behavior commonly encountered in the developing world⁴⁰. Governments feel an overriding sense of responsibility for the success of industries but historically have been unable to create an environment supportive of sustainable competitive advantages. In this sense, businesses become under-responsible for their future since they grow accustomed to a lack of real competitive pressure and rely on artificial advantages such as government protection and subsidies. This is a hard cycle to break; to do so, government leaders need to rethink their fundamental assumptions about the nation's people, companies and economy, and begin a "change in the mind of the nation." These changes require time and commitment.

As this report outlines, there are attractive opportunities for Caribbean countries to diversify their economies and leverage ICT to create a world-class service sector in hospitality, high-end outsourcing of services and niche markets for manufacturing. ICT can bring a new thrust to the service sector in the Caribbean and allow it to fend off most of the structural challenges faced for so long in this region.

2.2 Economic Performance and Trade Statistics

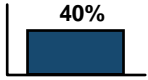

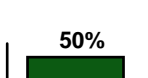
2.2.1 Methodology and Theory

A closer look at the Caribbean's economic performance and export flows provides a deeper understanding of the challenges faced by small island economies in devising a strategy for competitiveness and sustained economic growth. By default, the lack of opportunities in these islands for achieving economies of scale, together with their narrow economic base, reinforces the view that the region ultimately has two options to compete. First, most countries in the Caribbean can only *profitably* compete in the manufacturing or tradable sector by developing and exporting to niche markets where consumers are not price sensitive and products are not based on low labor costs. The second way forward, and one that will become clear after reviewing the region's export flows, is the urgency to further expand into the service sector. To meet the challenge of scalability in the Caribbean, the most valuable asset in these countries is their human capital. In order to do this, some of the rents that are either extracted from agricultural or mining exports, or in other cases provided by the government as a source of income, have to be invested in upgrading the human and knowledge capital of the region. This is a slow process that takes time, patience and a real commitment by policymakers.

To illustrate trade patterns and export flows, trade charts are calculated for each of the 15 countries of this study and for most countries covers the 1992-2002 period (See Appendix 4 for trade charts for all 15 countries). These trade flows are presented in a chart separated by 3 broad clusters bands that reflect consumption patterns in the economy. As illustrated in the figure below, the first broad cluster band is depicted in the top row and shows upstream-sectors characterized by industries whose primary products are inputs to products in other industries. Most of these industries are resource-based, with the exception of semiconductors/computers and competition is mostly based on costs (i.e. gold, timber,

⁴⁰ Fairbanks and Lindsay (1997).

oil, memory chips). Across the middle row are broad end-use sectors involving industrial or supporting functions. These clusters are centers of complex operations and conduits of innovation and upgrading, characterized by competition based on differentiation as much as costs (i.e. power generators, motor vehicles, and scientific instruments). Finally, the bottom row contains end-use sectors mostly associated with final consumption goods and services. In these sectors, competition mostly centers on product differentiation (i.e. breakfast cereals, clothes, furniture).

| "Broad Cluster" | Definition | Examples |
|--|---|--|
|  <p>40% Upstream Industries</p> | <ul style="list-style-type: none"> Primarily used as inputs into other industries Competition primarily based on cost | <ul style="list-style-type: none"> Gold Timber Oil Memory chips |
|  <p>10% Industrial and Supporting Functions</p> | <ul style="list-style-type: none"> Centers of complex operations Conduits of innovation and upgrading Competition on differentiation as much as cost | <ul style="list-style-type: none"> Power generators Motor vehicles PABXs TV tubes |
|  <p>50% Final Consumption</p> | <ul style="list-style-type: none"> Goods destined for final consumption Competition traditionally on differentiated products and services | <ul style="list-style-type: none"> Breakfast Cereals Television Sets Jewelry diamonds Clothes Furniture |

The link between these three horizontal bands and productivity upgrading is straightforward. Economies generally begin the upgrading process from initial positions at the top (upstream industries) or the bottom (final consumption goods and services) bands of the trade chart. Resource-rich countries (such as Trinidad and Tobago, Suriname, Guyana and Jamaica) typically begin at the level of upstream industries, and gradually develop competitive industries in the mid-band (industrial and supporting goods) or the services sector by investing the rents extracted from their resource exports into human and knowledge capital. This process of transformation allows countries to lay the foundations of a complex industrial core or a thriving services sector that relies on human capital.⁴¹ Other resource-poor nations (such as the ECS, Barbados and Bahamas, etc) start from labor-intensive final consumption goods derived from basic agricultural products or simple manufacturing. As these products are commoditized and price competition becomes fierce, countries should start focusing on a number of niche markets and in parallel, invest in human and knowledge capital to develop a competitive service sector. As the following section shows, these countries' current situation helps create the tension and urgency for a clear growth and competitiveness strategy in the region.

2.2.2 Economic Performance and Trade Statistics

The analysis of trade statistics allows us to delineate the broad economic and export patterns that emerge across the region for their existing manufacturing clusters. The analysis also provides insight into the evolution of these economies towards higher levels of productivity and value-added products. Appendix 4 shows the detailed trade statistics for 14 out of the 15 countries of this study (except Antigua who did not report their trade statistics).

In essence, there are two broad exporting patterns emerging in the Caribbean:

1. Countries with high export concentrations in traditional crops that add very limited processing and value-added to their products. Most of these exports are found in the food and beverages *final consumption goods*. Example: St. Lucia.

⁴¹ Porter, Michael (1990).

2. Countries with high export concentration in the resource extraction *upstream industries*. These are usually petroleum or mineral abundant countries, exporting those resources almost directly from the ground with very limited processing or value added.

Barbados represents a third pattern emerging, of a truly diversified economy. So far it is the only country that has made visible progress in adding complexity, and shows the potential for other neighboring countries. The following sub-sections will analyze these broad patterns and their implication for devising an economic strategy for the region in years to come. Country snapshots are also provided to highlight specific patterns on a country by country basis.

Concentration on Final Consumption Goods

Countries in the ECS like Dominica, St. Lucia and St. Vincent and the Grenadines, and others like Haiti and Belize in the broader Caribbean, illustrate the first pattern mentioned above. In these countries most exports are concentrated in the food and beverages *final consumption goods*. These exports rely on very limited processing of agricultural goods. Raw materials like sugar and bananas are exported mostly to Europe through preferential agreements, and low cost final consumption goods are mostly exported to neighboring islands.⁴² This pattern persists over the 1992-2002 period, and in most cases total export share in these sectors has increased or remained constant over the period of analysis. (Refer to Figure 2.2. St Lucia's trade chart which exemplifies the broad trade patterns for these set of countries. Trade flows in these countries suggest that they have mostly responded to demand patterns and customer needs in a very precarious manner. These nations are targeting export markets with very basic manufacturing products (mostly low-cost final consumption primary goods), transforming agricultural inputs into generic processed goods or importing raw materials and selling them to their neighbors protected by trade-preferences. There is almost no presence of an industrial base in more sophisticated products or niche markets. If these countries wish to diversify, not only their exports but also their economic base, they need to move away from the bottom of the value-chain and begin upgrading industries and products that compete through brand recognition, efficient systems and in niche markets. Furthermore, this narrow focus in tradable goods only reinforces the view that their economic diversification has to continue through a vibrant service sector.

Growth in **Dominica** has actually stagnated since 1999; the average rate of growth has been -1.65% over the past five years. Government services account for a vast majority of the country's economy, representing 19.56% of GDP in 2002. Other important sectors were agriculture, wholesale and retail trade and banks/insurance. Dominica is a highly focused economy, where more than 90% of exports are concentrated in the food and beverages industry and housing/household *final consumption goods*. Over the 1994-2002 period, the total export share in this sector has remained relatively constant (Refer to Appendix 4, Table 4.1). However, if we look at the top 5 exports, we see that in recent years the country has decreased its reliance on just a few export goods, which together represented 67.8% of the country's total export value versus 85% for 1994 (Refer to Appendix 5, Figure 5.1). In 2002, this export basket was comprised of (i) soaps, (ii) bananas and plantains, (iii) perfumery and cosmetics, (iv) disinfectants for retail and (v) washing preparations (such as cleaning agents and waxes).

St Lucia has had some episodes of positive growth over the past five years, but on average growth rates have been negative. Services (hospitality, banks/insurance), transportation and wholesale/retail trade account for the largest part of GDP, aside from government service. St Lucia is also an example of a highly focused economy, where 83% of 2000 exports came from food and beverages and another 8% from textile/apparel goods. This amounts to more than 90% of exports being concentrated in *final consumption goods* (Refer to Figure 2.1). The country's top 5 exports (in terms of export value for 2000) were (i) bananas/plantain, (ii) non-alcoholic flavored waters, (iii) outerwear and other clothing accessories, (iv) fixed and variable resistors and (v) beer (Refer to Appendix 5, Figure 5.4). These goods represented over 85% of the country's total export bill and exemplify the country's highly dependent

⁴² OECS Development Report (2002)
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and concentrated economy; more so, looking at export shares over 1992-2000, this pattern seems to have worsened in recent years.

St. Vincent and the Grenadines has grown at an average rate of 2.38% since 1997. Its economy is still highly dependent on agriculture (close to 9% of GDP in 2002) and wholesale/retail trade. The service sector, especially the hospitality industry, has not been developed and only represents slightly more than 2% of GDP. Government services once again account for more than 17% of GDP. In St Vincent and the Grenadines, 86% of the export share is concentrated in food and beverages; another 5% of its exports come from the materials/metals goods in *upstream industries*, and a very small percent from the transportation sector (Refer to Appendix 3, Figure 4.3). In 2002, 72% of its exports bill came from the following top 5 products (i) bananas/plantains, (ii) flour of wheat or meslin, (iii) milled rice, (iv) roots and fresh tubers (vegetables) and (v) non-alcoholic flavored waters (Refer to Appendix 5, Figure 5.5).

Grenada has grown at an average rate of 3.19% over the past five years. Agriculture is still an important sector in the economy, contributing close to 9% of GDP in 2002. Transportation, banks/insurance and wholesale/retail trade also each accounted for close to 10% of GDP. Government services stood at 15% of GDP in 2002. Grenada's export pattern points to a slightly more diversified country relative to the ECS, but the country is still reliant on traditional exports. In 2002, 66% of the country's exports came from the food/beverages cluster and 7% both from housing/household and personal goods, all in the *final consumption horizontal stage*. Another important export bill came from mid-band clusters, such as transportation and power generation and distribution, amounting to 14% of total exports. Notice that in 1998 and 2000, the export share coming from industrial and supporting functions was considerably higher, representing 32% and 58% of total exports, respectively. Zooming in on these two sectors, in 1998 and 2000 Grenada was exporting a substantial amount of electrical insulation equipment and switchgear that corresponded to the values we see in the power generation and distribution cluster. In terms of the mid band "office" cluster, most exports were coming from office equipment such as adaptive machine parts, accounting instruments, etc. It is also worth noting that in 2002, the country's top 5 exports only constitute 63.4% of total export value coming from the following products (i) nutmeg, mace and cardamoms, (ii) flour of wheat (iii) essential oils and resins (iv) fresh fish and (v) toilet paper (Refer to Appendix 5, Figure 5.2).

St. Kitts and Nevis presents an interesting trade pattern over the last few years. In 1994 and 1996, close to 70% of its exports came from food/beverages; however, in 2000 this sector only represented 27% (mostly attributable to sugar cane exports). This decline was complemented by an increase in the power generation and distribution mid band cluster, which in 2000 accounted for 61% of total exports. A closer look at these numbers indicates that switchgear (i.e. switches, relays and breakers) accounted for most of the increase in this export category. Although a snapshot of the country in recent years suggests a more diversified export base, looking at the share of the top exports over the last eight years, indicates a much more focused economy. The years for which data is available (1994; 1996 and 2000) the top 5 exports accounted for more than 80% of St Kitts' export value. In 2000, these were (i) switchgear, (ii) sugar cane, (iii) electrical condensers, (iv) non-alcoholic flavored waters, and (v) rotating electric part for power plants (Refer to Appendix 5, Figure 5.4).

The **Dominican Republic**, had been growing at more than 7% per year, for five years since 1996; since 2001 growth has steadfastly declined and now stands at -0.4% of GDP (2003). Agriculture, manufacturing, wholesale and retail trade and construction contribute respectively, more than 10% of GDP and as a whole account to more than 50% of economic activity. Service sector is also representative but not as important as in other Caribbean countries, accounting for less than 50% of GDP. The decline in economic activity has particularly affected the construction, wholesale and retail trade, Free Trade Zones and financial sectors of the economy, which have seen sharp decreases in their economic activity during the last 3 to 2 years. Two broad clusters represent the majority of the country's export value: food/beverages and metals/materials. Textiles and apparel used to represent more than 30% of country's export during the early 1990s, but have recently seen a sharp decrease.

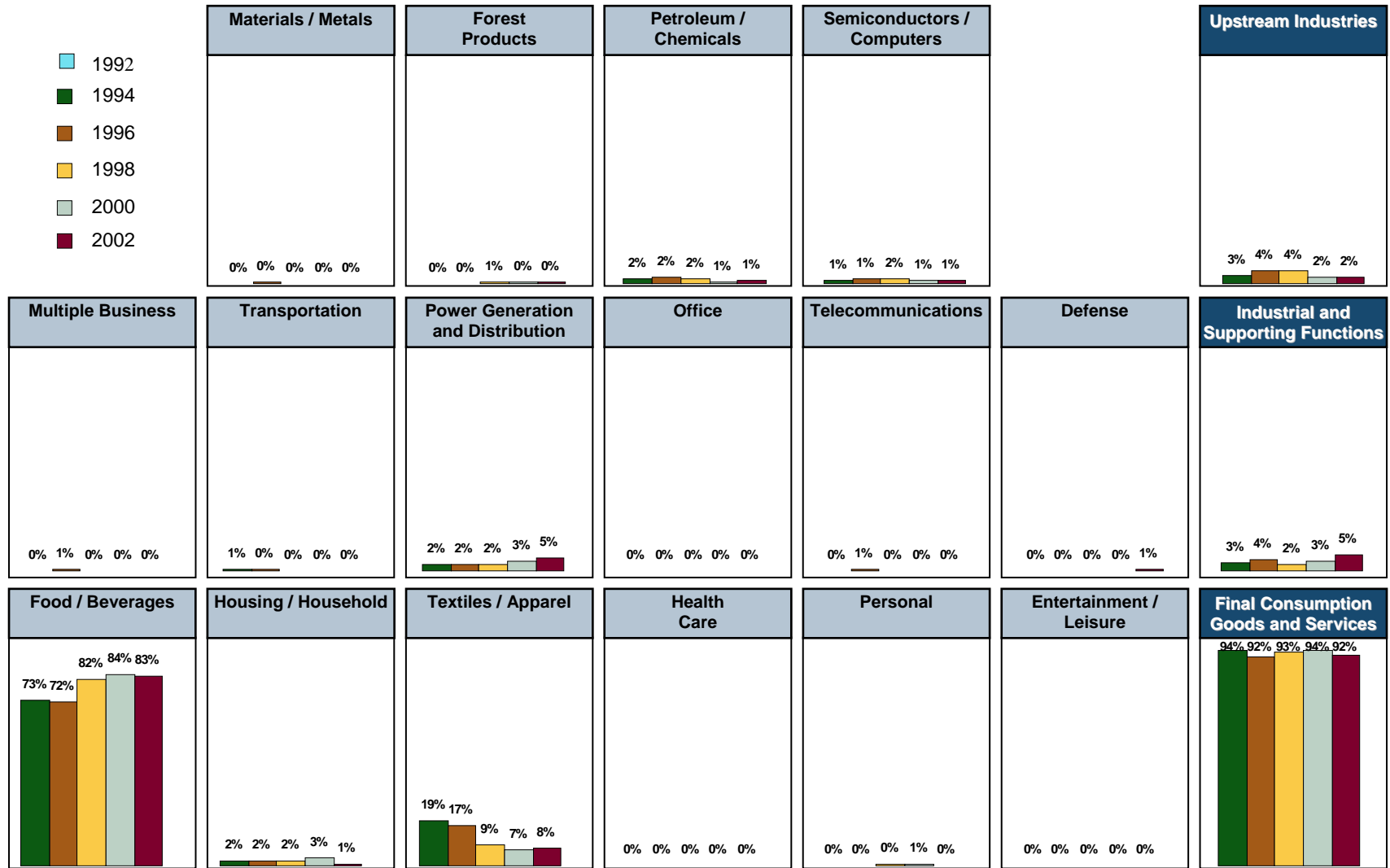
Belize's economy has grown at a commendable rate of more than 4% over the past 4 years, mostly as a result of recent investment in agricultural exports and tourism. The average growth rate since 1998 has been at 6.1%, and at the beginning of 2000, the country exhibited growth rates as high as 12% (2000). The economy is largely focused on agriculture and forestry, wholesale and retail trade, tourism and government services, with each accounting more than 10% to GDP. Over the years, agriculture has had a large but relatively declining role in overall economic activity. Agricultural production has centered on sugar cane, banana, oranges/grapefruit, rice and corn production. Wholesale and retail trade have consistently contributed to over 16% of GDP throughout the last five years. And government services are still important but declining share of GDP, from close to 12% in 1998 to less than 10% in 2002. Lastly, financial intermediation services are increasing share of GDP, from 5% GDP in 1998 to 7.4% in 2002. Belize's exports also reflect the agricultural dependence of this economy. Since 1992, exports in the food and beverages final consumption cluster account for more than 80% of total exports, and this pattern increases over the 1992-2002 period. Also, there seemed to be an emerging cluster in textiles/apparel, but its relative importance has been steadily decreasing over this period. The following exports represent the top 5 exports by total export value: sugar cane, banana, fish, orange juice and vegetables. For instance, sugar cane exports are 46% and banana 25%.

Following years of economic contraction, **Haiti's** current political and social frictions still predict a looming future for this country. Major infrastructure programs, being financed by international donors and lenders, are meant to provide new employment opportunities and help lift national income. Haiti's export flows are primarily centered in the final consumption goods and services broad cluster. Over the 1992-1996 period, textiles and apparel were the major export contributors, with 59% of total exports in 1996. Food and beverages cluster is also important, contributing close to 20% of the export share over this period. Housing/household products and entertainment/leisure were also of relative importance but have been consistently decreasing over the years. The only other product outside of these broad clusters, is transportation, which accounted for 4% of exports in 1996. Most of the products in the textile/apparel sector corresponded to maquila type of manufacturing of the following garments: women's blouses (19.72% total exports); women's undergarments (7.04%) and men's trousers (6.96%) and non-elastic knit gloves (5.48%). The other export with greatest export value was coffee (13.05%).

Bahamas recorded an average growth rate of just 1.3% over the past two years and a contraction of 2% in 2000/01. The main drivers of economic activity have been tourism and financial services sectors.⁴³ that account to Export data for Bahamas was only available for 2000 and 2001. Data for these two years suggest export flows are predominantly emerging from two broad clusters: petroleum/chemical upstream industries (42% total exports) and food/beverages consumption products (33% total exports). There are some emerging clusters in transportation, which represented 8% of total exports in 2001, and in the personal and housing/household final consumption goods, representing 4% and 2% of total exports respectively. The top 5 export products in Bahamas derive from the petrochemical and food beverages cluster: polystyrene fabricated plastics accounting for 19.10% of total exports, fish represents another 19.09%, gas oils (18.32%), alcoholic beverages (10.23%) and salts (3.60%). Overall these exports account for 70.3% of total exports in 2001.

⁴³ EIU (2004) Bahamas Country Report
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Figure 2.1 St Lucia Trade Statistics



Note: Totals may not add up to 100% due to rounding
 Source: OTF Group; COMTRADE / UN Trade Statistics (Rev. 2)

Concentration on Natural Resource Extraction

The second pattern that emerges is of resource abundant countries heavily reliant on upstream industries for export revenue. Trinidad and Suriname are the premier examples with more than 80% of exports deriving from the material/metals or petroleum/chemical *upstream industries*. To a lesser extent Guyana and Jamaica have also moved in this direction in recent years by increasing their presence in these export markets. Since most exports are natural resource related, the level of processing of those goods is minimal. More sophisticated manufacturing in terms of products and processes has not flourished; not even in the oil and gas sector of Trinidad and Tobago, which is rightly positioned for diversification into more value added up and downstream industries and services, such as geological modeling, plastic medical devices and drilling equipment. In turn, the best strategy for these countries is to invest some of the rents extracted in the exploitation of their subsoil assets, and invest in human skills and capabilities and knowledge capital to develop a more sophisticated manufacturing and service sector.

Over the past decade, **Trinidad and Tobago** has had a sound overall economic performance, with real GDP growth averaging slightly over 3%. After the downturn in economic activity at the beginning of the 1990s, growth picked up since 1994, peaking at 7.1% in 1998 as new reserves of oil and natural gas were discovered.⁴⁴ Since the discovery and industrialization of petroleum five decades ago, the importance of agriculture has declined in favor of the energy cluster (the extractive industry and its related upstream and downstream dependents) while the service sector has become a driver of growth in the rest of the economy. The petroleum sector now accounts for more than 30% of GDP, while non-energy manufacturers contribute less than 7% of total economic activity. Also of relative importance are distribution and financial/insurance services, representing 14.3% and 16.1% of GDP (Refer to Appendix 3). Not surprisingly, in Trinidad and Tobago most of the exports are concentrated in petroleum and chemical upstream-*sectors* and in the food and beverages *final consumption goods*. This pattern persists over the 1992-2000 period. In 1992, production of petroleum/ inputs accounted for 76% of total exports and by 2000 this share had increased to 81%. An emerging cluster in upstream industries, is the material/metals sector, which represents, on average, 8% of the country's export share. With respect to the food/beverages cluster, in 1992 this sector represented 10% of the total export share, increasing over the next 6 years to 15% of exports. However, by 2000 this cluster substantially decreased to 8% of exports.

Suriname has also one of the most concentrated export baskets. The overall tendency during the 1992-2000 period is an increased concentration in the materials/metals upstream clusters, at 80% of exports while the remainder share originates in food/beverages final consumption goods. The top 5 exports in terms of total export value, represent an astonishing 92.5% of total exports, a pattern that persists over the period of analysis. All together, alumina exports account for more than 66% of the country's export value. Gold, which represents the second source of export revenues for Suriname, stands at a distant 12% of export value.

Guyana's growth rate over the last 5 years has been very modest, averaging 1% of GDP. The period has been characterized by slight spurts of growths followed by negative growth performances. The service sector is the largest contributor to GDP, with over 40% of economic activity deriving from it. Agriculture, forestry and fishing are also of considerable importance, accounting to almost 30% of GDP. Finally mining, manufacturing and construction each represent the remaining 30% of GDP. The importance of the services and agricultural sector has remained relatively unchanged over the past decade. In turn the service sector is comprised solely of the government's activities, which consistently represent between 12-15% of GDP. Export data for **Guyana** was only available for 2000 and 2001. As the trade chart in Appendix 4 illustrates, the country's exports come from two broad clusters: material/metals and food/beverages. In 2001, gold and sugarcane accounted for 24% and 20% of total exports, respectively.

⁴⁴ IMF (2003)

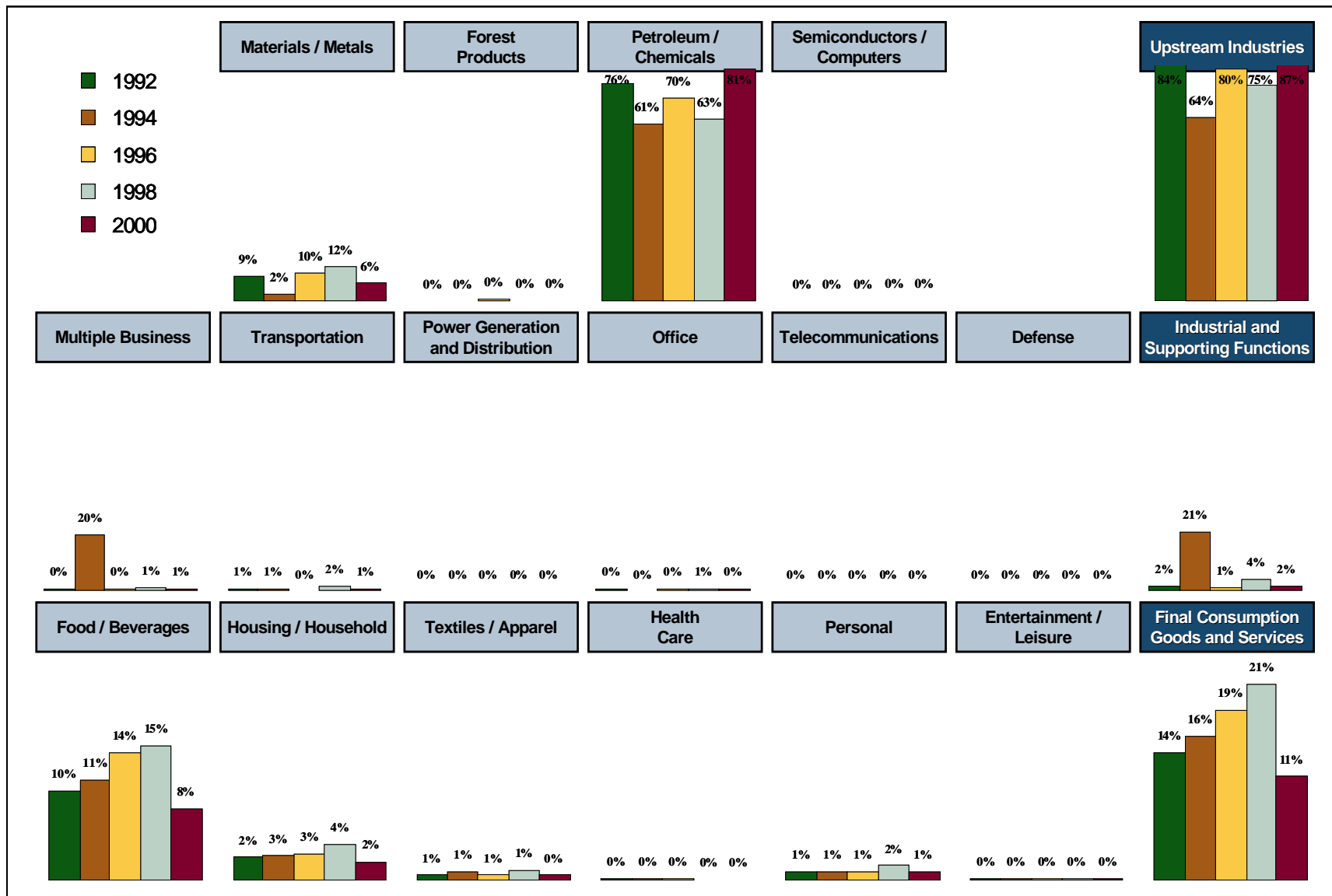
During the past few years **Jamaica** has been characterized by negative or very low rates of economic growth; over the past 5 years growth has averaged less than 1% of GDP. Services currently represent more than 70% of the country's economy, with communications, finance and insurance, tourism and government services accounting for most of it. Manufacturing, agriculture and mining are also important economic activities, although their relative contribution to GDP has decreased in recent years. In terms of trade patterns, Jamaica is fairly focused in 3 broad export clusters: food and beverages, textiles and metal (Refer to Appendix 4). However, increasingly the materials/metal cluster has taken over other export sectors of the economy. For instance, in 1998 this sector accounted for 54% of total exports and in 2002 it was 67%. Textile exports, mostly garment manufacturing in maquila type production, have had a precipitous decrease from 21% of exports in 1998, to 2% in 2002. Looking closely at Jamaica's top export products, alumina and aluminium ore account for an astonishing 65% of the total exports.

Barbados- An Optimistic Anomaly

In the Caribbean, **Barbados** stands out as an outlier in terms of the patterns coming out of its trade statistics. The country has a small foothold on the industrial and supporting functions middle cluster band, and does not have excessive concentration either in natural resources or the food and beverages final consumption sectors. Sectors such as power generation and distribution, office and transportation have been relative important exports over the 1992-2002 period.

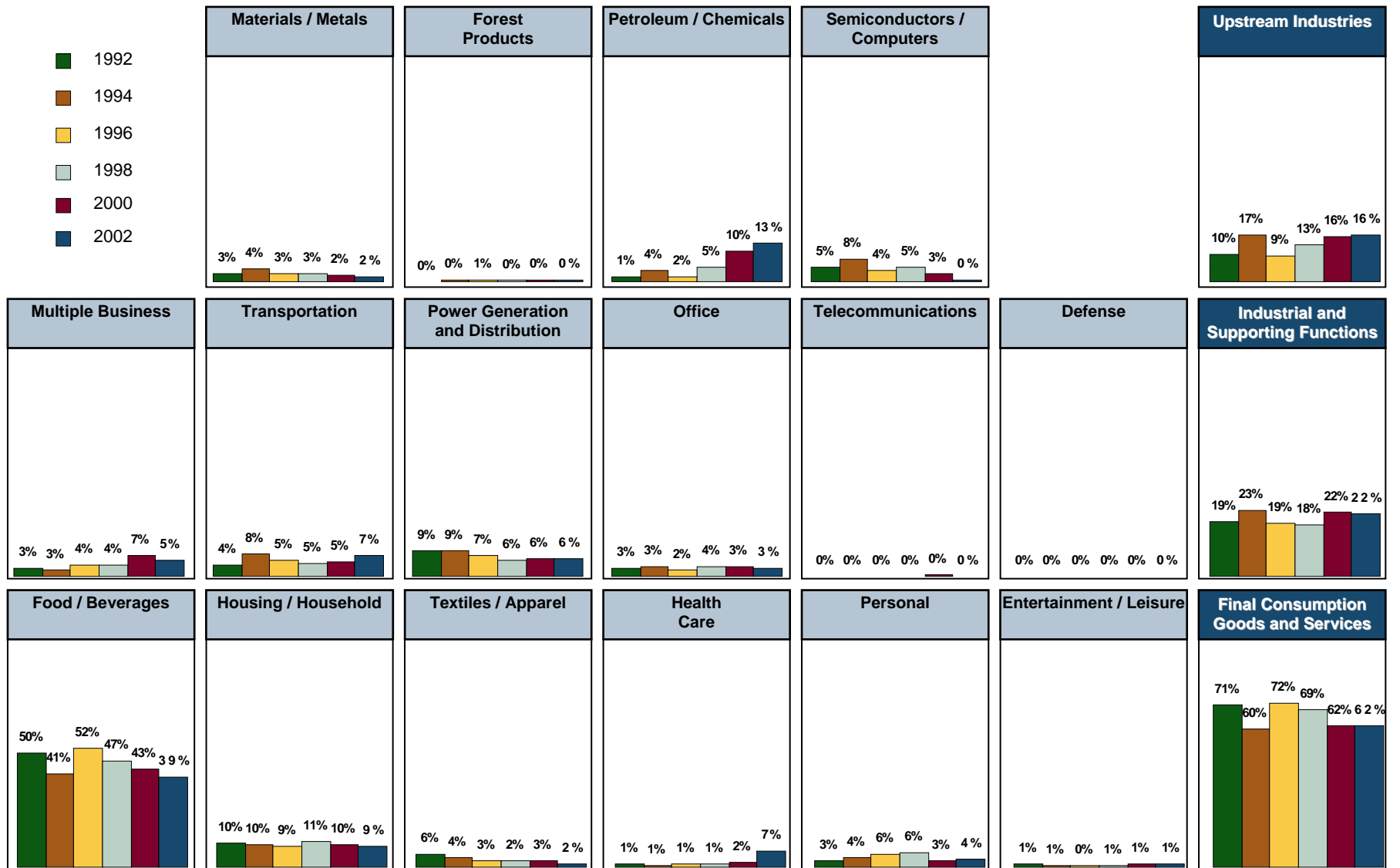
Barbados grew at more than 3.5% per year at the end of the 1990s; however, in more recent years growth has stalled. In 2001 and 2002, the country had negative growth rates of 2.8% and 2.1%, respectively and only improved slightly in 2003 with a positive rate of 1.3%. The services sector is the largest contributor to GDP, with Finance & Banking, Wholesale and Retail Trade and Government Services accounting to more than 15% of GDP (Appendix 3). Also worth noting is the contribution of tourism to GDP, which represents more than 10% of the economy, but has steadily declined in importance since 1997. Barbados shows a healthy degree of export diversification, both across broad cluster levels and in terms of export goods. Since 1992, exports shares have remained relatively constant and reflected the following pattern: first, slightly over 60% of exports are concentrated in final consumption goods and services (with close to 40% coming from food and beverages). Second, more than 20% of exports correspond to the industrial and supporting functions cluster, primarily transportation and power generation and distribution, but also increasing from multiple business sectors. Finally, less than 20% coming from upstream industries. In the later category it is important to highlight how the decline in exports of semiconductor/computer products has been compensated by an increase in petroleum/chemicals. This pattern may posit some concerns as to the development of an industry that can decapitalize the island (corresponds mostly to Kerosene Jet fuel and other fuel oils). In comparison to other Caribbean countries, Barbados exhibits less reliance on just a few export products. For instance, in 2002 the top 5 exports only represented 38% of total exports in comparison to other Caribbean countries that have as high as 90% of export concentration in their top 5 products.

Figure 2.2 Trinidad & Tobago Trade Statistics



Source: OTF Group; COMTRADE / UN Trade Statistics (Rev. 2)

Figure 2.3 Barbados Trade Statistics

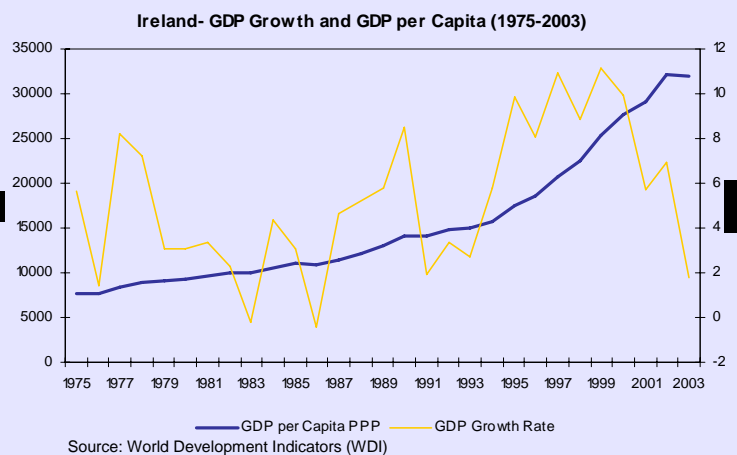


Source: OTF Group; COMTRADE / UN Trade Statistics (Rev. 2)

As shown by the trade statistics, most Caribbean countries concentrate their exports on low end consumer goods and raw materials. As previously mentioned, niche manufacturing and the service sector are probably the most important sources of future growth for these economies if the correct strategies are in place to nurture a knowledge and human capital as their most valuable asset. Although some countries are expanding these sectors more successfully than others, the Caribbean can learn from places like Ireland, on how ICT can be leveraged to pave the way for a knowledge economy.

Ireland- The Development of a Knowledge Economy

Ireland's dramatic transformation from a largely agricultural and manufacturing based economy to a service, pharmaceutical and information technology economy has resulted in sustained increases in per capita income. At the time of the 1922 partition, Ireland enjoyed thriving industries in such sectors as linen manufacture and shipbuilding. Over the years, however, protectionist policies and a decline in competitiveness and growth prompted the need for a clear strategy targeting specific sectors through planned coordination by both the state and private sector.⁴⁵



By the early 1960s, the Irish government centered on a policy of "industrialization by invitation". The Industrial Development Authority (IDA), an independent state-sponsored agency, spearheaded the effort to attract foreign companies to invest in Ireland. It touted to multinationals the relatively-cheap skill level of Irish, English-speaking workers, a low corporate tax rate, and access to the EU. It arranged for company-specific packages of investment supports and lobbied the central government for particular infrastructure improvements and education initiatives such as a swift and decisive action in the area of Information Technology. The Irish government answered the call. A 1963 report by the OECD highlighted the poor condition of educational facilities in Ireland. Fewer than half of all national schools had piped water and more than half of all children did not complete secondary schooling. A couple decades of reforms reduced the dropout rate significantly while simultaneously increasing levels of tertiary education. Furthermore, acknowledging that an influx of foreign-owned firms will require substantial amounts of skilled workers, tertiary level institutions emphasized engineering, computer science and other technical degrees in the 1980s.⁴⁶ By the late 1990s, Ireland graduated, proportionally, the highest number of scientists and engineers in the OECD.

Moreover, the IDA created an overseas network of offices to establish close relationships with executives in specific companies. In the 1980s the IDA became more focused on targeting companies in specific industries offering high export potential, attractive employment opportunities for skilled workers, and supply opportunities for indigenous firms. To this end, the electronics, software, pharmaceutical and international financial services industries were targeted as priority sectors. Hence, while computer hardware dominated

⁴⁵ Case study is drawn from Harvard Business School Case Study " 1-800 Buy Ireland" (1999); Harvard Business School Case Study " IBM Ireland: Reinventing Education Across the Atlantic" and Tallon and Kraemer (1999).

⁴⁶ Tallon and Kraemer (1999)

the first phase of FDI during the 1970s, and second phase in software and services emerged during the 1980s.⁴⁷

In 1994, the IDA was split into IDA Ireland and Enterprise Ireland to allow for the development of strategies tailored more closely to the specific needs of both foreign and indigenous investors. By 1998, foreign-owned firms generated approximately 30% of Ireland's GDP and 40% of its exports. Among the companies setting up major operations in Ireland were IBM, Microsoft, Dell, HP, Apple, and Intel.

Countries like Jamaica have actually tried to strengthen their ties with Ireland in search of ways to replicate their success story. For instance, Digicel (an Irish-owned mobile telephone operator that has gained leading market share in several Caribbean markets, including Jamaica) hosted a week in Jamaica in mid-2003 during which several of the key actors in Ireland's social partnership shared their experiences of over a decade. The government, labor unions, and civil society were all present. Through workshops, press conferences, and meetings with officials from the private sector, government, and labor unions, they generously provided details of how they came together to make the difficult sacrifices and subsequently amazing progress that is now commonly referred to as the "Irish Miracle".

This interchange led to the creation of a Partnership for Progress (P for P) between Jamaica's analogous organizations (the Private Sector Organization, Chamber of Commerce, Government, and Federation of Trade Unions). This partnership has worked to put together joint positions on issues ranging from fiscal policy to education. The effort was further strengthened in 2004 when the Irish government invited a delegation of Jamaican leaders involved with the P for P to Ireland to further explore the process undertaken in Ireland. The P for P continues and hopes to sign a major multi-lateral agreement in the near future.

2.3 Enabling Environment for Access and Ability: Where Do We Stand?

Access

On the dimension of access, several public and private initiatives have met with recent success. Telecommunications liberalization across the Caribbean has led to increased telephone coverage in the region. The widespread use of mobiles and their relative affordability has compensated a little for the slow growth in fixed-line telephony. For instance, over the 1997-2002 period, fixed telephone line penetration considerably stagnated in the Caribbean, growing at a compounded annual rate of less than 5%. On the contrary, the annual growth rate of cellular subscribers surpassed the 50% mark in all the Caribbean, which exceeds the US and other high income small island economies (such as Ireland and Singapore). Some countries like Antigua and Barbuda, Bahamas, Barbados, Dominican Republic and Jamaica now have more than 80% of the population owning a cellular phone.⁴⁸ Likewise, affordability of mobile telephony makes for a more attractive choice than fixed lines. In most Caribbean countries, prepaid mobile services are a cheaper and more flexible option, without the commitments that a fixed line requires (i.e. fixed monthly payment whether the consumer uses the line or not, credit qualifications, connection charges, etc).

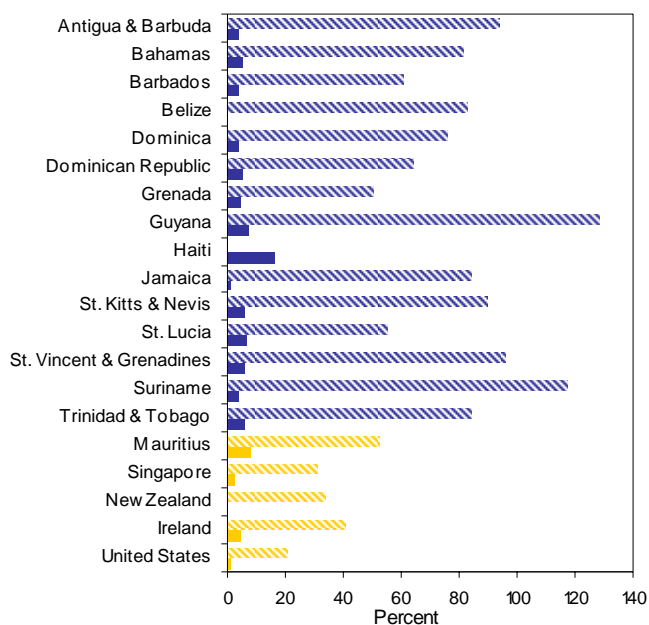
In addition, much of this demand has come from people for whom a mobile is their first telephone. As cited by a recent study from the World Bank, the economic impact of increased mobile coverage has been substantial, for instance by allowing casual workers and trades people to increase their productivity through greatly improved communication with their employers. This is the case in places like Jamaica or the Dominican Republic, where teledensity of mobiles surpasses that of fixed line telephones (See Figure below). For instance, Jamaica has the highest penetration in the region with over 50 subscribers per 100 inhabitants (this figure is well above the average for upper middle income countries like the US, but still slightly lower than in Singapore, New Zealand or Ireland). However, Jamaica's case is more of an exception than the norm; while progress has been made in allowing the

⁴⁷ Tallon and Kraemer (1999)

⁴⁸ ITU (2003)

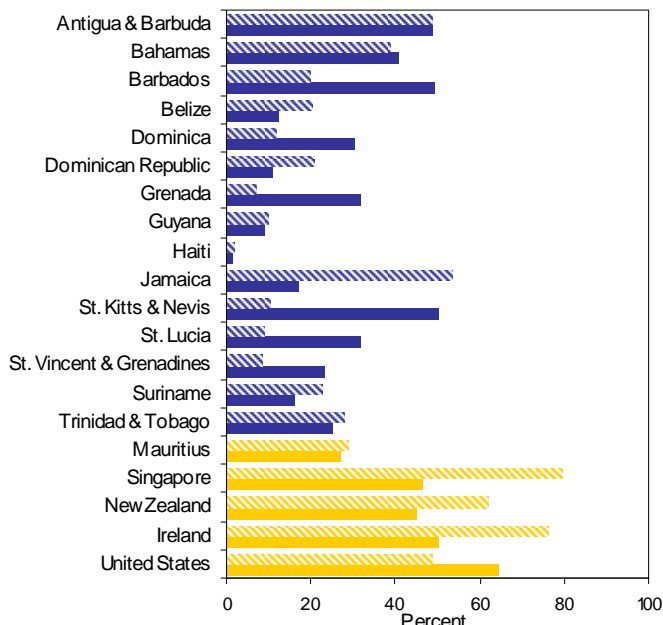
average citizen to connect through phones, teledensity both in terms of fixed lines and mobiles remains low in places like Belize, Dominica, Dominican Republic, Guyana, Haiti, Suriname and Trinidad and Tobago.

Compounded Annual Growth Rate of Fixed vs Mobile Telephony (1997-2002)



Source: ITU 2003

Teledensity of Fixed vs Mobile Telephony (1997-2002)



Source: ITU 2003

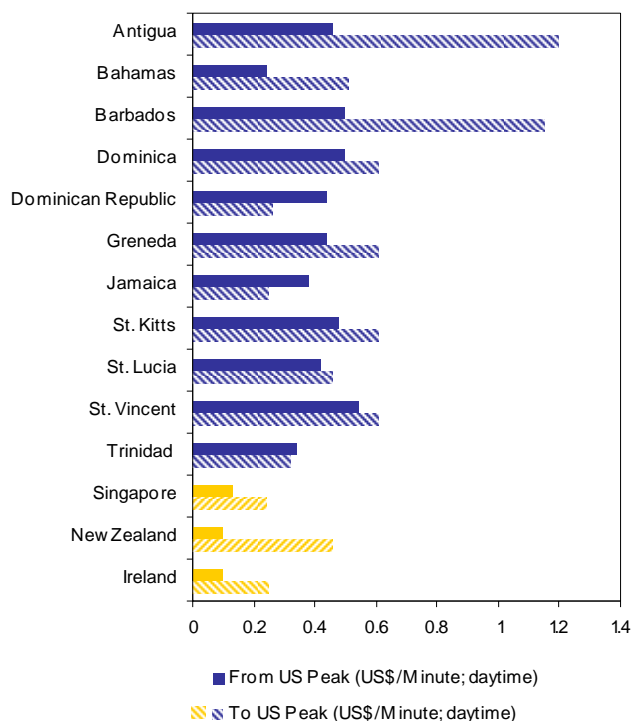
In addition, business people, public officials and residential customers alike still rightfully complain about high telecommunications prices and overall network reliability (refer to figures below). Although there is partial competition in almost all Caribbean countries both in the long distance market and for Internet service providers, outbound calls are still higher than inbound calls⁴⁹, and Internet services are more costly than in countries with comparable income levels. For instance, the cost of 20 hours of dial-up access in St Lucia is US\$22.22 compared to US\$8.42 in Malaysia⁵⁰, while the most affordable broadband ADSL subscription in the country starts at US\$67 per month or 14,6% of per capita income.⁵¹ Like wise, the cost of high speed Internet is as high as US\$ 400 per month in places like Antigua, Barbados and Jamaica, while it cost US\$ 40-50 In the US.

⁴⁹ International Inbound and Outbound phone rate graph refers to the following: household, off-peak rates from Cable & Wireless, SingTel and Verizon (Dominican Republic). Dial-Up and High Speed Internet graph data refers to the following: **Dial-up 56Kbps and 20 hrs access; High Speed: ADSL 1544Kbps, except for Trinidad 128Kbps and unlimited access; household rates, except for Jamaica; installation fee is not included.**

⁵⁰ ITU (2004)

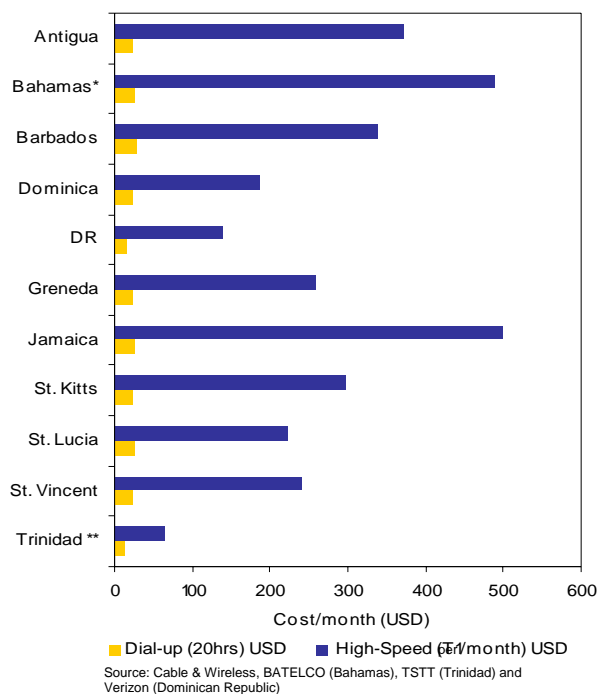
⁵¹ Ibid

International Inbound and Outbound Phone Rates



Source: BaTelCo, Cable & Wireless, SingTel, TTST and Verizon

Dial-Up and High Speed Internet Monthly Costs in the Caribbean



Source: Cable & Wireless, BATELCO (Bahamas), TSTT (Trinidad) and Verizon (Dominican Republic)

In terms of Internet hosts and computers, usage is disparate across the Caribbean but still considerably below the average for similar income countries. Internet density is particularly low in the Dominican Republic, Haiti, Suriname and St Vincent and the Grenadines, at 3.64, 0.96, 4.16 and 5.98 users per 100 inhabitants. Other countries like Jamaica and St Kitts and Nevis have relatively higher usage rates of more than 20 users per 100 inhabitants. These are all substantially lower than in the US, Singapore and New Zealand.

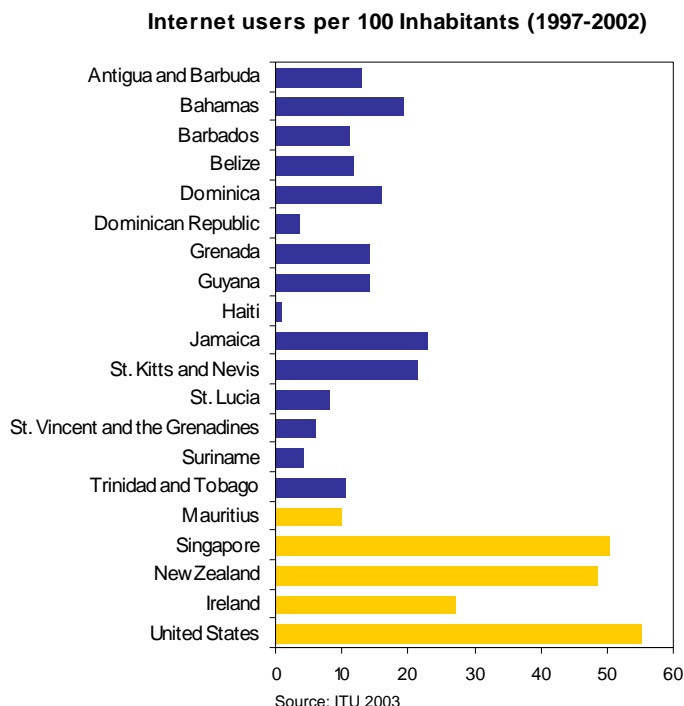
If we foresee a Caribbean knowledge and service economy that is at the forefront of ICT usage across all sectors of the economy, telecommunications and Internet costs should be priced competitively at US levels and broadband access needs to be available on a wider scale. Private sector organizations—such as hoteliers, manufacturing companies and those that attract FDI—should exert further pressure in this arena.

Finally, although some countries in the region have been progressive in addressing telecommunications liberalization, most have been slow in executing reforms. For instance in the ECTEL member states, although licenses have been given to further competition in fixed, mobile and Internet services, the pace in which new operators have entered the market is quite disparate. While mobile operators have entered the region in an active manner, the pace of new entrants in fixed-line and ISPs has been poor.⁵² Furthermore, although ECTEL recommended the issuance of a cable landing license in each of the five countries, to date Cable and Wireless is the only operator of submarine cable that links the region to the outside world.⁵³ Others, like Trinidad and Tobago, have included liberalization of this sector in the policy agenda for more than a decade, but have yet to pursue concrete steps to materialize the effort. In the Dominican Republic, Verizon is the dominant fixed line player, although in the last years a new local provider TRICOM entered the market and invested heavily in duplicating Verizon’s fiber optic network. While they put up a good fight and have a growing customer base, they

⁵² Carana Corporation (2004)

⁵³ Ibid

are currently facing financial problems due to the heavy investment. This example depicts a common paradox in this problem: while it is easy to blame the government for dragging its feet in deregulation, there is also little economic incentive to invest in underground cable as a second comer in the business in small islands like those in the Caribbean. While current high prices might make it appealing, it is not hard for a regional monopoly like Cable & Wireless to drop local prices and drive competitors out of business.



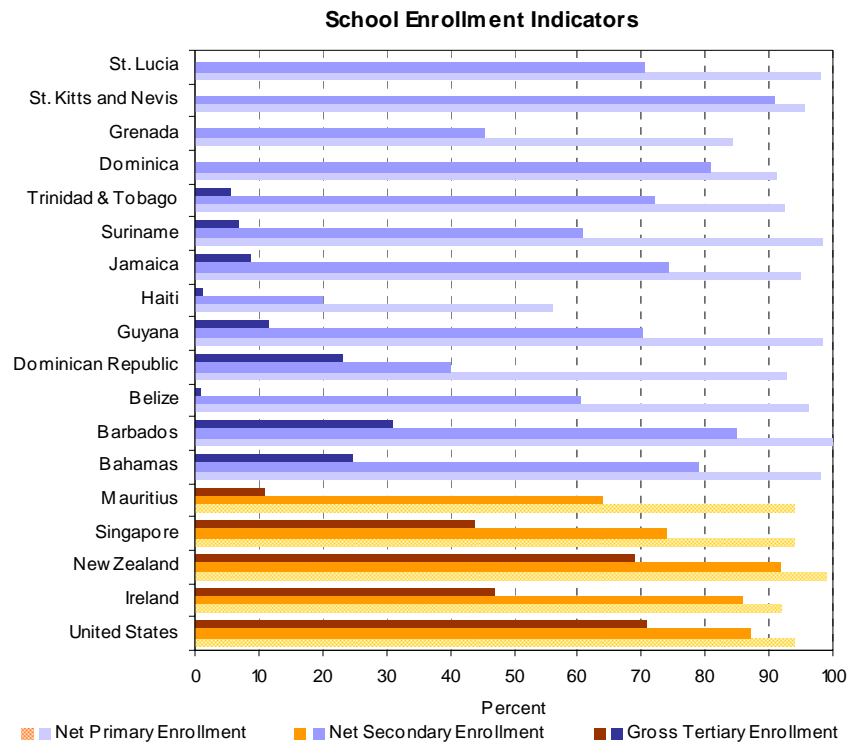
Another problem that hurts price competitiveness is the willingness and propensity of governments to tax this sector heavily. In the Dominican Republic again, taxes on telephone bills add up to 26%. When the recently elected government of President Fernandez found itself in a serious fiscal deficit, it raised taxes on telecommunications and exports. Although these two sectors are key to growth and competitiveness, they also have the disadvantage of being easy and immediate sources of tax revenues.

Ability

Ability refers to the willingness – and preparedness - of individuals in an organization to use ICT. This is directly related to their level of education and technology training. The general situation in the Caribbean is that while primary education is universal with enrollment rates of over 90%, secondary school enrollments are much lower and tertiary education is at best a luxury only for those in the upper end of the socio-economic scale. This is particularly true for the ECS and in Haiti, Belize and Trinidad and Tobago, where less than 6% of the population currently attends university (See Table and Figure below).

In recent years, governments across the Caribbean have pledged to achieve provision of universal primary education and in large part have been able to do so. Apart from Haiti and to a lesser extent Grenada, all countries have primary enrollment rates upwards of 90% in 2002 (refer figure below). Secondary enrollment rates have also improved; in some places such as Barbados, the Bahamas, Dominica and St Kitts and Nevis, current rates are on par with the ones observed in high income countries like Ireland and Singapore. Other countries such as Haiti, Grenada and the Dominican Republic still have some way to go in secondary school attainment, having enrollment rates of less than 50%. However, tertiary level enrollment is still the greatest educational weakness in the region.

Across the ECS, it averages a meager 2%.⁵⁴ A small group of graduates go abroad to study, which raises tertiary ECS enrolment rates to approximately 12%; yet the majority of the local workforce has barely finished primary school.⁵⁵ Barbados and to some extent Bahamas and the Dominican Republic, have made some progress in this respect having more than 20% of its youth attending university. Notwithstanding, the picture looks bleaker when compared to other island nations that have tapped into ICT for growth like Singapore, Ireland or New Zealand, where tertiary enrollment rates stand at more than 40%.



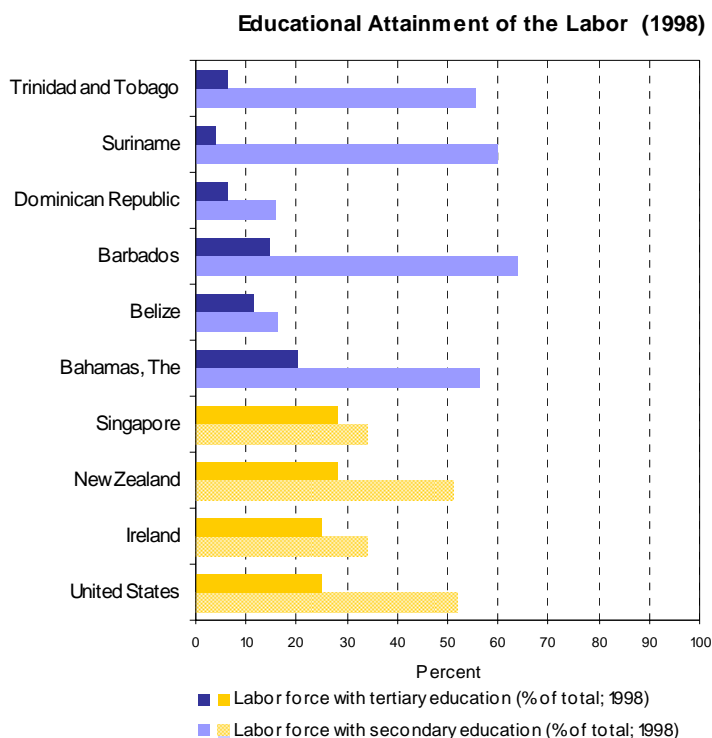
The following table also shows the low level of educational attainment of the current workforce in the Caribbean. Although the share of workers with secondary school is in some cases even greater than in higher income countries, there is a troublesome tertiary level gap across the region. The ECS are in a particularly precarious situation; for instance in St Lucia, St Vincent and Grenada, over 65% of the adult population has only a primary level education (refer to Table below). The levels of training and certification also demonstrate this low level of human capital, which has contributed to the continuing dominance of the mostly low-skilled sectors in the economy where ICT usage and upgrading is less common (this is further explored in the Trade Statistics section). Although these indicators do not attest to the *quality* of education, which is what ultimately matters, at such low levels the Caribbean should be worried about expanding those levels while at the same time making tertiary education relevant to the work place.

This tertiary education gap stems from supply-side constraints as much as from the historical structural transformation of these economies. From the 1960s to the 1980s, most Caribbean countries were largely agricultural-based economies. The demand for university education was minimal in terms of the skills required to succeed in the labor market. Although the structure of economic activity has changed only fairly recently, efforts to diversify the economy are starting to exert demands on skill upgrade and technological transformation as the service sector gains momentum and other industries

⁵⁴OECS Human Development Report (2002)

⁵⁵ Overall tertiary enrollment rates correspond to the average enrollment for four ECS countries for which data was available: Grenada (13%), St Kitts & Nevis (12%), St Lucia (14%) and St Vincent & Grenadines (8.3%). In terms of labor force educational attainment, St. Lucia, St. Vincent and Grenada have over 65% of the adult population with only a primary level education.

develop. Given these countries' historical context, few tertiary education institutions have been operating and able to absorb this higher demand. This was evidenced by the rising number of Caribbean students seeking university education abroad. For instance, during the 1980s approximately 22,000 US and 13,000 Canadian student visas were issued to the English-speaking Caribbean⁵⁶; and in 1998 alone there were almost 17,000 people from the Caribbean studying in the OECD.⁵⁷ This is strong evidence that Caribbean university education was and at present is not ready to take the lead in transforming these countries out of its traditional sectors and into a knowledge based economy.



Source: World Development Indicators (WDI). Data for the US is from the US Bureau of Labor Statistics.

**Percentage Distribution of Highest level of Education of Persons 18 years and older for selected
OECS Countries**

| Country | Primary | Secondary | Post | | | Other/ NA |
|---------------------|---------|-----------|-----------|------------|---------|-----------|
| | | | Secondary | University | Nursery | |
| Grenada | 65.1 | 21.7 | 4.1 | 1.5 | 0.2 | 7.4 |
| St. Kitts and Nevis | 18.1 | 51.1 | 7.1 | 4.7 | 0.1 | 19 |
| St. Lucia | 68.5 | 20.6 | 5.0 | 3.1 | 0.5 | 2.3 |
| St. Vincent | 71.0 | 23.6 | 3.2 | 0.9 | 0 | 1.2 |

Source: OECS Human Development Report 2002

Still, what is most important for the ability of individuals to use ICT in creative and efficient ways is not school coverage but the quality of education. The essential precondition for success is the presence of the skills and capabilities that promote the use of technology in specific clusters. In this area, the Caribbean is lagging, especially in areas such as English, Math, and Science which are close predictors of the ability of countries to innovate and develop a thriving knowledge economy.⁵⁸ Also,

⁵⁶ Inter-American Development Bank (2002)

⁵⁷ Ibid

⁵⁸ The data shown in Appendix 2, Table 2.1 pertains to the results of the Caribbean Secondary Examination Certificate (CSEC) in English and Math for 2000. The table shows the percentage of students taking the examination that received grades acceptable for matriculation and further advancement in the formal education system. In terms of the ECS performance in English, all countries except Grenada, have at least 50% of the Competitiveness and the Role of ICT in the Caribbean

the general perception among business and academic circles across the region is the lack of skilled labor as it pertains to complex deployment and utilization of ICT. As stated by the Director of a private Training and Certification Institute in St Lucia, secondary school students are not graduating with the right ICT skills and what is more worrisome, this skill gap seems to be widening in relation to other countries that are direct competitors in ICT sectors (India, Ireland, China, the Philippines, etc). Private sector leaders also reinforce this view, as stated by the CEO of GaleForce Windows in Antigua, "we don't have a problem recruiting for our factory and providing training, what we need are managers that can open new markets, and interact with our customers to create new opportunities for the business". As is further analyzed in section 3, the lack of skilled labor represents a major obstacle for firms wanting to set up more complex ICT operations in the regions (for instance in more sophisticated ICT operations, such as software development and other type of business outsourcing). The offshore industries are important consumers of IT talent, but as the COO of a gaming company noted, " We are obliged by law to hire locals at a ratio of 3:1, while that is not a challenge given our competitive pay, the real experts in IT and gaming are coming from the UK and Australia." With the size of the industry in the Caribbean, these are skills that the Caribbean could be exporting elsewhere.

Although some commendable efforts have been made to incorporate IT in the education system (especially at the primary level), wider ICT literacy will only become a reality when both individuals and organizations use them in their day-to-day lives and when the appropriate advanced training becomes available to those about to enter (and already in) the workforce. (While reliable data on the availability and usage of computers and the Internet in Caribbean schools is not available, the general perception is that efforts have been made to incorporate IT in the education system, such as the Cicerone School in St Lucia but that there is still a long way to go in this direction).

There are, however, countries in the region (such as Barbados and the Dominican Republic) that have embarked on more visionary attempts to incorporate IT in the education system. For instance, the merit of EDUTECH in Barbados relied on intrinsically transforming the society, whereby all children were raised with ICT. Although the project has had operational difficulties in the process of upgrading the entire school infrastructure, there is a critical mass of educational institutions that have fully embraced this transformation. Some of the students of this program are 12 year olds that can now fix and program computers. These children are likely to be prepared for high technology, and high technology-enabled careers.

The challenge then is to ensure that secondary and post-secondary education becomes relevant to the development needs of the Caribbean, and to the specific cluster opportunities within. The first steps have been taken by new IT schools opening up throughout the region, the Technology for the Americas in Santo Domingo and a new institute through a partnership of the Dominican Republic's PCUMM and New York's Stevens Institute, the Antigua & Barbuda International Institute of Technology opened in 2002 and the Institute of Self-Improvement Systems in St. Lucia, among others. However, these still have a limited reach, and require a radical transformation in the targeting of these initiatives so that the training is tied to specific local industries. A virtuous cycle needs to be initiated – in which these institutions, partnering with international state of the art facilities can provide cutting edge research to the local private sector and guide them in the incorporation of ICT in the business world. At the same time the inclusion of the private sector in guiding and participating in these tertiary offerings is important in establishing a profitable demand side for those students' opportunity costs to be met. For this to happen, ICT centers need to incorporate business principles into the curriculum so that the graduates are not only technically able but entrepreneurial and competent enough to lead institutions in adoption and upgrade.

students taking the examination passing in this subject. Also, this proportion is higher than the overall Caribbean average, where less than half of all candidates passed the test.⁵⁸With regard to Math, four out of the six ECS countries in our study had less than 50% of students passing this subject. The only countries where more than half of the candidates obtained passing grades were Dominica (51.2%) and St Lucia (51.1%) (Refer to Appendix 2, Table 2.1). Although these proportions may be slightly higher than the regional average (39%), they are still indicative of the prevalence of relatively low or modest performance in both English and Math.

3. ICT Clusters: What Has Worked and What Has Not

The primary focus of this report is on the use of ICT to enable business clusters that are not themselves *technology* clusters. While this focus has become relatively well accepted within the donor community, to date the majority of ICT investment has been largely focused on investment in ICT clusters themselves – particularly clusters that were not previously in existence. We will focus at greater length on ICT as enablers, but it is important to begin by debunking the mythology behind so many of the existing initiatives. Therefore, we begin by exploring the many failures, and few successes, in Caribbean high technology initiatives.

3.1 Outsourced Business Processes Services: Call Centers and Offshore Business Processes

The story of outsourcing business processes (OBP) in the Caribbean is by no means a recent one. Although current market conditions and improved ICT systems may have increased the trend, business outsourcing has been an attractive industry in the region since the early 1980s, when US companies started looking closer to home to outsource projects in lower cost markets. Near shore operations were attractive because communication and information transfers were still an impediment for more distanced locations. Hence, the Caribbean became the hub for a near shore data processing industry coming out of the US.

For instance, in 1981 American Airlines assessed different locations to place a wholly owned subsidiary devoted to data processing services (payroll reports and checks, frequent flier database management, customer queries and upgrades, etc.). It decided to invest in Barbados for the readiness of the workforce for training, the work ethic, the stable environment and the proximity to headquarters. At the peak of the business, the company, known as Caribbean Data Services, employed 1,500 local workers for an average salary of US\$1,000 per month (1998). The company became so successful that it started servicing other big US companies like AT&T and BlueCross/Blue Shield and opening subsidiaries across the region (Dominican Republic and Jamaica). By end of the 1990s the company employed more than 3,500 people in the Caribbean.

However, Caribbean Data Services was not able to survive the technological transformation of the industry or to take its services to the next level of complexity. As data processing began to rely more on the use of the Internet and online transactions, telecommunications costs became prohibitive to doing this type of business in the region. At the same time, companies were also facing increased pressure to reduce costs, and as countries such as India, China and the Philippines made a full-fledged entrance into the game, the Caribbean could no longer compete on the basis of wages.

This first wave of ICT OBP was a real missed opportunity in the Caribbean. Barbados failed to make a proactive strategic shift to more value added services and did not grasp how intrinsically technology changed the way they were doing business. Countries in the Caribbean did not take ownership of this technological transformation to take it to the next level, so that they could have waved off competitors from lower cost sites. High telecom costs were one of the main barriers to the technology innovations needed in this industry, such as online transactions. Yet Barbados could have developed a very specific industry expertise, such as in airlines, healthcare, tourism customer service and created spin-offs of PRT. The lack of proactiveness in the business sector to push for a more forceful liberalization of the telecoms sector, and a poor technology platform did not allow for the necessary spillovers.

The second ICT wave involved call center operations for US and European companies looking for low cost customer service and telemarketing services. In 2001, the worldwide customer care industry was estimated to represent a US\$34.9 billion market; experts project the market will exceed US\$90 billion by 2006.⁵⁹

⁵⁹ Zagada Markets Inc (2002)

This time around, Caribbean governments and companies showed a renewed – and more pronounced - interest in this industry as an option to create jobs, diversify the economy and wean themselves from a shrinking agricultural sector and an uncertain hospitality sector. In most cases, regional governments have been more than willing to fund training and provide fiscal incentives to local and foreign operators.⁶⁰ For instance, in the ECS where unemployment rates stand at 15%-20%, call centers have been embraced as unemployment buffers. It has not been rare to hear the number of jobs created by a given new call center as the centerpiece of its publicity efforts.

Unfortunately, wide-scale unemployment absorption has not been achieved. Employment promises have been overstated and the results have been largely disappointing.

Call Centers Antigua Ltd. (CCAL) Case Study

Call Centers Antigua Limited (CCAL) was a joint venture between the Government of Antigua and Barbuda and Caribbean Information Technologies (CIT). It was established as a way to provide employment for Antigua nationals, coupled with some exposure to IT skills. The government put in EC\$ 3 million for a 40% stake. The government paid for the initial investment in computers and training. The center held approximately 400 stations equipped with networked computers. At full capacity, the center was projected to hold 850 agents.

CCAT started operation on February 21, 2002. The hope was that skilled labor could be sourced from the large pool of unemployed workers. Compared to wages in the rest of the economy, the call center at US\$110-150 per week was not such an attractive option (manufacturing jobs paid close to US\$200, and high tech jobs in gaming were US\$750/ week). Furthermore, these wages were contingent on sales closed, as is the case with most telemarketing centers. The closing rates were much lower than those in other regions of the world, such as India and the Philippines.

At these wage levels, employees regarded this work as transient employment and the call center became the temporary holding place for those in-between jobs looking for better opportunities. There was low employee morale and high turnover. There was a strong inclination, particularly from the young people to pursue a higher level of computer literacy. Hence, as people became more computer literate, they sought employment in other fields of work since within call centers there was not much opportunity for upward mobility. Within that environment, the most ambitious and entrepreneurial young people had the incentive to move on to more satisfying jobs and positions.

The CCAL call center reached close to 200 jobs, but has since closed.

There are various reasons why most call center operations in the Caribbean have not reached their potential, and it mostly relates to a lack of understanding of the Caribbean's relative competitive positioning in this business. There are two major types of call centers: Telemarketing, which involves outbound calling to sell products and services, and Customer Service, mostly inbound calls answering concerns and solving customer problems. The telemarketing centers receive commissions on sales closed. Typically a call center will purchase call lists, and are paid, for instance, by a credit card company based on how many credit cards are sold.

Particularly in telemarketing, and in low- level customer service, the ability to compete is based on low costs. Some of the reasons the Caribbean could not compete in this business include:

- **Employee Profile.** The type of candidates attracted to the call center business saw it as temporary employment, where they can have some "hands-on-experience" in using a computer and other IT tools and systems. Therefore, the call center may actually be hiring potential candidates, such as college students that are not ultimately part of the unemployed

⁶⁰Zagada Markets Inc (2002)

pool, and apply as a source of short-term cash. Due to this profile, the commission based system and transient customer relationships, telemarketing call centers have experienced higher turnover rates which results in higher training costs and thus, high costs to close sales. Most of the islands have small populations, with under-educated workforces that have a poor service culture.

- **Low Labor Productivity.** Call centers from the US will only outsource operations to the Caribbean if they are able to make at least 40% savings margins.⁶¹ The Caribbean workforce has not been able to come close to achieving those rates, due to high wages and lower productivity. For instance, the average price per agent hour in Jamaica stood at USD15.50, whereas the same metric was US\$10 in India.⁶²
- **Accents.** Although it may sound trivial, a major obstacle faced by the telemarketing type of call center has been the lack of trust from US customers in giving out credit card information when telemarketers have foreign accents. There is a lot of hesitation and reluctance to give out credit card numbers over the phone to foreigners.
- **High Connectivity Costs:** Particularly for outbound calling, the Caribbean still presents very high connectivity costs, and voice over IP has not been deregulated in most islands.

Most importantly, as call centers became a fad throughout the Caribbean, investments were often not analyzed in a rigorous manner. Despite the use of basic technologies (telephony), many foreign companies demanded generous concessions from government promising spillover effects. Governments supported call centers in Jamaica, Antigua and the Dominican Republic, while in Barbados and St Lucia, the experiments did not receive preferential government support. Some private companies co-invested in some of these initiatives, for example Neal and Massey, a regional conglomerate, invested in a Barbados call center but in 2004 sold its stake in the company because it did not fulfill its expectations.

There are a few cases where private sector investment and commitment has led to successful call center Operations. Vimenca S.A, the largest conglomerate in the Dominican Republic is one such example. It successfully runs a small, 50 person call center for Western Union, for which it owns and operates the local franchise. The call center provides support services for Western Union in country as well as in the United States. The success of Vimenca's call center can also be attributed to the extent to which it has been able to mitigate the weaknesses outlined above. Vimenca used employees from its successful local call center as a base to expand services to the US- thus working on a business it understood well, and with a core of trained employees. Understanding in advance that candidates often see employment at call centers as temporary jobs, Vimenca decided to promote the jobs to local university students within their office's vicinity. Not only do the needs of the students match the nature of the employment (most students are seeking part-time income for periods of less than 4 years), but Vimenca was able to accurately predict and plan for in- house training. This university student profile was also quick to learn the technology, and had no expectation to rise up the ladder. In addition, Vimenca is able to pay their callers an average of US\$550 a month, which is regionally competitive (similar call centers in Costa Rica offer up to US\$1,000 monthly) which lowers concerns about worker productivity. The abundance of university students in the vicinity provides Vimenca with an ample employment pool of individuals with level 4 English ability (individuals who can speak with fluently with no accent detection). However, the Western Union manager was clear that she would not venture on a Call Center of over 100 callers, because the employee base did not exist in the Dominican Republic. This venture had been profitable because of the synergies of their main business and a realistic view of its employee base. Finally, through deregulation of the telecommunications industry, the Dominican Republic offers competitive regional connectivity prices. The monthly cost of a T1 Internet connection in the Dominican Republic is roughly US\$140, significantly cheaper than an equivalent connection in Jamaica (US\$500) and Barbados (\$340) (See Section 2.3).

⁶¹ Interview with CEO of Helen IT System in St Lucia. October 12th, 2004.

⁶² Zagada Markets Inc (2002)

The Vimenca examples illustrates that call centers can be successful if the conditions are right. Some of these conditions, such as low connectivity cost and appropriate human resources are not in the control of the operators. However, Vimenca's ability to understand the strengths and weaknesses of the DR helped it to understand the appropriate scope and nature of its enterprise. It also demonstrates how heavily the success of call centers and the extent to which they serve as large sources of employment depend on the availability of the appropriate level workforce.

Jamaican Call Centers

Several years ago the Jamaican government sold the rights to its local wireless telephone spectrum. Initially selling two licenses, a significant amount of money was raised (US\$100million). Jamaica had long operated under a Cable & Wireless monopoly and, as a result, had among the highest telecom rates in the world. The new wireless licenses paved the way for the entry of Irish company Digicel, one of the most successful technology providers in the Caribbean. In the ensuing competition, Digicel has quickly reached and sustained almost a 2/3 share of the local wireless market. Cable & Wireless, the incumbent, has fought back not only with wireless rates but also with reduced fixed line pricing. The competition has clearly been good for everyone (with the possible exception of Cable & Wireless itself).

As this battle raged, The Ministry responsible for the spectrum sale (Industry, Commerce & Technology – now Commerce, Science & Technology) asked, and was granted, the use of a significant portion of the proceeds of the two sales. The Ministry used these monies to establish a fund to encourage the development of international call centers in Jamaica. The funds were to be lent, at highly concessionary rates, to investors willing to establish call centers fitting certain parameters.

Much of the fund was lent, with varying results. Several of the companies continue to operate, one company we interviewed reports being delighted with its success in Jamaica. They had surpassed both volume and profit expectations and loved the advantageous financing terms. The majority of those we have met, however, report frustration with the local labor force, the inadequacy of local business rules, regulations and, most important, norms of behavior. One potential investor reported after a brief visit that her company was simply unconvinced that the local environment could support a large enough operation to make the overall investment of her effort worthwhile relative to her current operations in the Philippines. Indeed, several companies reported disappointing financial results and there have even been bankruptcies, including one that created something of a scandal.

(The scandal was a noteworthy and highly publicized case of one Call Center operator that defaulted on their loan. This, amid allegations of fraud on the part of the investor and incompetence on the part of the Ministry. While the case is quite interesting, it is our opinion that whatever the particulars, this is not a reflection of the fundamental soundness – or lack thereof – of the business of call centers.)

While the results for investors have been mixed, the results for Jamaica have been clear. The call center movement itself has failed to produce outside dividends and it is extremely difficult to identify the positive spillover effects associated with the creation (or strengthening) of an indigenous technology cluster. This highlights the critical issue in technology application to the Caribbean: new technology must be applied to fill a "fillable" gap in order to have a chance of creating outsized returns. Planting Call Centers in Jamaica has been a bit like planting trees in the desert: even if you can get the trees to grow, you can hardly expect them to spawn an orchard.

What went wrong? The Ministry's analysis quite correctly pointed out the potential utility of a local technology industry, and accurately identified benefits of similar programs in Ireland and parts of India. The analysis did not, however, include local company stakeholders or local human resource specialists. Had they done so, they would have realized that there are a number of Jamaican ICT firms, but they are primarily involved in developing software solutions for other local industries such as health care or tourism. The lower margin call center business is unappealing to them. At the same time, once call centers began to locate in Jamaica with the help of much concessionary funding, they discovered that the available labor pool was woefully inadequate in size and skill to staff a viable industry.

Perhaps most important, the Jamaican government misunderstood the upward cycle they were trying to create. Call centers alone are akin to maquila labor in textiles. The primary attraction is cheap rates (both on financing and, especially on labor). An industry, disconnected from a legitimate software or service infrastructure, cannot hope to migrate upward.

In this case, these results might have been predicted with a more insightful analysis. Labor productivity statistics alone, or combined with functional literacy and numeracy reports (which are readily available) could have told investors from abroad that Jamaica was only well suited for the lowest value sort of call centers. A brief visit to an average restaurant or hotel tells even the most casual observer that the service culture and lack of standardized English skills are insufficient for even most low end clients. What certainly would have predicted this outcome is working closely with the productive sector. This could also have yielded more appropriate alternatives. This is not to say that the Jamaican government's analysis would not have been useful to generate hypotheses. But without testing these hypotheses with firms and labor leaders, it is difficult to consistently develop powerful initiatives.

In the case of Jamaican Call Centers, we have a grand missed opportunity. The same resources used to subsidize international call center operators firms might have been used to develop industry-appropriate technologies or even a software training center. With government investment capital so scarce, the call center investment has been disappointing to say the least.

Despite recent examples, there are viable opportunities in the call center business, if the Caribbean can re-enter at the high end of customer service for large/well-known US companies, instead of continuing with the low-cost telemarketing model. The advantage of higher-end customer service accounts is three-fold. First, customer service accounts guarantee longer-term contracts (2 years plus) because the outsourcing company has to make greater commitment in training and development for the call center employees. Training in this sort of arrangement is more holistic, not only focusing on customer service skills, but also on company specific products, policies and procedures and involve more sophisticated software programs. Second, in these arrangements the call center employees become part of the outsourcing company, improving motivation and reducing turn over rates. Finally, large companies and their clients tend to have more contact with their customer service operations offshore and many often visit call center premises on a regular basis. Therefore, outsourcing in the Caribbean becomes more attractive as operations are near shore and there is more affinity to what happens in the US.

Companies in the US are realizing that customer service is a chief differentiator. Most companies profess to have great customer service; however many fail to create incentives for the workforce to deliver this service. In the case of low-end call centers, performance metrics are often based on number of calls, yields and rates instead of customer satisfaction. As major US companies are prioritizing service more highly, they are bringing their operations closer to home to have more control over them. For the Caribbean, there is a choice: it can continue to take on the low-paying telemarketing businesses that it gladly outsources from the US or become prepared to absorb the true customer service side of the business, at a higher bar, by investing in a higher skill level.

The latter option will be a challenge, since the service culture in the Caribbean is sub-standard. This is particularly exacerbated in some countries, such as Jamaica, where "service" and "servitude" are often unproductively linked. However, a dedicated effort to change this cultural phenomenon and provide specialized training (on providing pleasant, accommodating and solution-oriented service, listening to customers, etc.) would not only improve the chances to attract these businesses, but have spillover effects on the prominent hospitality industry that is suffering from the same problem of low quality service. These would be important spillovers, rather than the exaggerated influence of call centers on technology industries.

3.2 Cyber Parks and Free Trade Zones

Free Trade Zones (FTZ) are geographical areas, often located near major ports, which offer companies an array of financial incentives from the local government to invest and operate from these areas. The most common incentives include duty free imports of vital business inputs and tax exemption on corporate profits. The zones also create the indirect benefit of spillover effects caused by the geographical proximity of similar firms. For local governments, FTZ are tools to attract Foreign Direct Investors that can generate foreign exchange and serve as sources of employment for the country's economy.

Countries across the developing world from Mexico to the Philippines have experimented with different versions of the FTZ models. These can be grouped into three major categories:

1. FTZs that focus on manufacturing which often entails the assembly of imported inputs, such as textiles, garments and light manufacturing.
2. FTZ that are IT oriented, attracting businesses in high-tech industries and providing relatively higher paying jobs to local workers
3. Highly integrated Cyber Parks, or techno parks as they are commonly called, that aim to provide the necessary components for business development and technological innovation. These compounds usually include everything from residential neighborhoods to technical academic institutions as business innovators.

As you move along the spectrum from 1-3, the spillover benefits from increased integration of direct and supporting local businesses and human capital should increase. As the scope of the FTZ increases in terms of incorporating supporting businesses and activities, both management and implementation of these projects becomes more challenging.⁶³ Regardless of type, the success rate of FTZ will be closely linked to the degree in which a project was driven by significant international demand.

Many Caribbean nations have experimented with FTZ and Cyber Parks as the next policy trend to attract FDI. Barbados has gone for a demand-driven approach, where private entrepreneurs have invested in high-tech conference centers and industrial parks at the request of international interests in Barbados. Trinidad is currently building a cyber park, and St. Lucia's government conceived the idea but, never executed it because of a lack of interest from foreign investors.

When FTZ first became popular in the developing world, in the mid-1980s or early 1990s, the majority of the projects fell within the first category as explained above. They focused primarily on the manufacturing sectors such as textiles and garments. Countries that applied this model competed largely on the basis of cheap labor since financial incentives from governments could be imitated overnight through policy decisions. The most famous example of these are the *maquiladoras* found throughout Latin America. Through this model countries have proven to gain little from any spillover effects or positive externalities, and are under constant pressure from other developing countries to offer lower wages to remain competitive.⁶⁴ For instance, maquila industries that grew prominently in the 1990s in the Dominican Republic are now looking to China for lower cost options.

Spillover and Positive Externalities in Free Trade Zones (FTZ)

Two types of positive externalities that are expected in theory to arise from the existence of FTZ are increased economic linkages between foreign and local industries and spillovers of knowledge and technological capabilities. However, in both cases, the achievement of these externalities in low-cost manufacturing FTZ has varied. For the most part, the failure to create substantial economic linkages is

⁶³ "Technology Parks- Characteristic and Role" <http://www.techpark.ir/Parks/English/Articles/Lalkaka2.htm>

⁶⁴ Darnani, M. (1998). Overall, the literature agrees that the goal of Export Processing Zones in fostering backward linkages and technological transfers has not lived up to its promise. Some countries like Indonesia have succeeded in establishing backward linkages with the zones firms. Others, like Mexico, have not achieved this goal. Throughout the years both the national content in the gross value of production in Mexican maquilas has declined, as well as the salaries and benefits.

explained by the absorption capacity hypothesis.⁶⁵ This hypothesis states that the extent of the linkage built between local firms and firms within the zone depends mainly upon the former's ability to supply reliable, high-quality raw material and means of production. Weak local business infrastructure and unreliable local supply of raw materials are two main limiting factors. Hence, the most successful examples of long term linkage creation, such as the garment industry in Indonesia, have occurred where there is a minimal technological gap between firms in the FTZ and local firms and where there is a reliable supply of local raw material.

Unfortunately, the low technological gap in production that allows local firms to participate is often the same factor that limits technological and knowledge spillovers. For instance, there has been little to no innovation in the garment industry over many years so any form of knowledge transfer is at best nominal. In cases in which there are real opportunities for knowledge transfer the wide gap in the level of human resources often influences foreign companies to keep their research and technology projects in their homelands.

Technology Spillovers- The Case of China, Singapore and South Korea

However, some countries have been successful in creating backward linkages and technological spillovers mainly through concerted policies and national strategies. For instance, to ensure backward linkages, export oriented ready made garment factories in Bangladesh that include indigenous raw materials instead of imported ones, are given additional facilities and benefits at prescribed rates. Similar incentives are extended to the suppliers of raw materials to export oriented industries.⁶⁶ It should be noted that these incentives are only effective in so far as they stimulate the use of inputs that meet the appropriate standards of the FTZ firms. This supports the view that benefits of FTZ to host countries, particularly in terms of backward linkages, are directly related to location specific advantages.⁶⁷

In terms of technological spillover caused by FTZ, studies have shown that knowledge transfer is inversely related to the degree of insularity of the zones from the local economy.⁶⁸ Hence, several countries have structured incentives to increase the number of joint ventures in FTZ. For instance, the Chinese government gave preferential access to its domestic market to FTZ companies in its successful Shenzhen location that entered into local joint ventures.⁶⁹ From 1992-1999 roughly 80% of high-technology firms in the Shenzhen FTZ operated as joint ventures. Though smaller island economies cannot use access to domestic markets to nearly the same extent, they can structure other incentives to foster this exchange.

Again it should be noted, that despite incentives, the achievement of knowledge spillover depends on the absorption capacity of local human capital. Technological transfer can only occur when host countries surpass a minimum threshold stock of human capital.⁷⁰ Hence, countries where these spillovers have been attained, such as Singapore and South Korea, engaged in early national development strategies that were geared toward upgrading human capital specifically with technical skills. In 1970 Hewlett Packard began the extremely labor intensive process of stringing of computer core memories in Singapore. By the 1980's HP was able to not only assemble but redesign more complex products in Singapore due to the technological absorption of local engineers.⁷¹ It should also be noted that large amounts of knowledge spillover can also create disincentives for local research and development. Hence, government incentives to encourage local R&D should occur simultaneously with educational upgrades and incentives to create joint ventures.

Hence, countries attempting to upgrade their FTZ from those dominated by labor-intensive low tech firms must understand that knowledge transfer occurs when the FTZ industries match local human capital skill level. Processing and assembly industries can foster spillovers in countries with low skill levels

⁶⁵ Amlrahmadi, H. and W. Wu (1995)

⁶⁶ Asian Trade Hub <http://www.asiatradehub.com/bangladesh/finvest.asp>

⁶⁷ McIntyre, J., Narula, R. and Trevino, L. (1996)

⁶⁸ Ibid

⁶⁹ Amlrahmadi, H. and W. Wu (1995)

⁷⁰ Borensztein, E. and DeGregorio, J. (1998)

⁷¹ Harvard Business School (1994) "Hewlett-Packard: Singapore (A)" Case Study
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and, if spillovers are to be maintained, the strategy to migrate to high tech industries should occur simultaneously with national strategies to upgrade the labor force.

More recently, developing countries in Asia and now the Caribbean have attempted to move along the spectrum of FTZ models to those that focus on IT oriented industries, such as call centers and outsourced business processing operations that offer better paying jobs and greater infusion of foreign ICT technology. For instance, the average assembly type garment maquila in Mexico or the Dominican Republic pays about US\$8-10 a day, while the telemarketing type of call center pays more than US\$18 a day (compare this to the US\$2 a day salaries observed in Chinese manufacturing facilities to understand why these companies are migrating east). As the case of Antigua demonstrates (see case study below), within this model there are varying degrees to which spillover in the economy are realized. The longer the commitment required by the foreign businesses and the greater the need for their close interaction with the local workforce and businesses (through specialized training, procurement of inputs and raw materials, etc.) the more the spillover effects can be realized. These spillover effects range from positive externalities in training and human capital, to the adoption of technology and more efficient business processes.⁷² Academic studies that have attempted to quantify these externalities have produced mixed results, but all point to the importance of establishing links with the local economy as the key determinant of success. Otherwise, very little is left behind when foreign investors exit the economy.

Antigua Free Trade Zones

Impetus for the FTZ

Antigua has had a history of government-led initiatives to attract foreign investment in order to diversify the island's economy. From as early as the 1960's, when Antigua was highly dependent on agriculture, the local labor party provided subsidies to businesses abroad in an effort to attract investment, particularly in manufacturing sectors such as garments, tiles, and furniture. Foreign companies would benefit also by the abundance of cheap Antiguan labor. Businesses took advantage of the government give-a-ways, but were unable to grow out of the dependency it created, finding loopholes through constant change of ownership to continue getting concessions.

Based on this historical legacy, it seemed fitting when in 1994 the government drove the creation of a Free Trade Zone (FTZ) in Antigua. The FTZ had the objective of attracting manufacturing and high-tech enterprises in order to diversify an economy no longer overly dependent on agriculture, but on tourism. The FTZ aimed to provide jobs and create a sustainable source of much needed foreign exchange. The government secured 100 acres of land near the V.C. Bird International Airport, and the FTZ provided the most generous fiscal exemptions: no import duties throughout the life of the organization (after paying the license), exemption of income and export taxes, and free repatriation of profits.

Unfortunately, similar to the island's earlier attempt to attract foreign investment through financial incentives, the FTZ failed to reap its proposed benefits. Ten years later, the only company operating in the Free Trade Zone is a Chinese Generics Pharmaceutical Packaging company built to supply the local market, which has recently stopped production because the company is not WHO compliant. The experience proved that providing the necessary infrastructure was insufficient- a successful free-zone necessitates a large sum of available funds to be pumped into its development and a significant demand from interested international investors.

However, with much already invested in Antigua's FTZ initiative, the failed attempt forced the government to seek other industries that would benefit from the FTZ model. The existing government decided to approach the local gaming industry, which had successfully functioned illegally since 1996, to legalize their status under the Free Trade Zone's new laws, and agree to regulate and license the industry. Most operators accepted the offer, and the industry mushroomed from a handful of players contributing no

⁷² Darnani (1998). Academic studies that have attempted to quantify these externalities have produced mixed results, but all point to the importance of establishing links with the local economy as the key determinant of success.

direct revenue to the government to over 100 legal operators that generated US\$ 25mm for the Government of Antigua in 2000. The industry also provided an array of skilled jobs and introduced a group of savvy business people to the island (see case study on Gaming, pg. 45 for more detail). In addition, the money from the gaming industry funded an IT training school, which in 2002 turned into a 1 and 2-yr business and IT degree program: the Antigua & Barbuda International Institute of Technology. This was a good investment as it catered to the needs of trained labor by the gaming industry and local and off shore financial industries.

However, due to short-sightedness and a lack of strategic vision, the Government of Antigua attempted to impose overly stringent regulations on the industry (including levying a tax of 3% on revenue and attempting to force the companies to operate within the FTZ). Although eighteen months later the government decided to rescind on these measures it was already too late, as only a handful of companies were left.

Lessons Learned

Antigua's experience in conceptualizing and implementing Free Trade Zones illustrates both good practices and important lessons learned. Antigua has been good at jumping on upcoming opportunities and reacting fast and in a relatively pointed way in the past (as witnessed in gaming). The Antigua & Barbuda International Institute for Technology was successful in catering to the needs of the industry by training workers to meet its needs. However, the Antiguan case also demonstrates how a lack of strategic vision can lead to irreversible lost opportunities.

Antigua has not fulfilled its initial goal of creating a fully connected, enabled high-tech industrial park catering to foreign companies for several reasons. First, the government never invested the necessary funds for the initial infrastructure. The creation of a technological hub such as the one initially proposed would require close to US\$18 million. Second, the international demand for such services to be offered by Antigua as a location did not exist. This is partly due to artificially high telecommunication rates, expensive labor, and low unemployment. Most importantly however, Antigua has yet to formulate a compelling vision of what it intends to compete in. Regardless of considerations to privatize its telecom industry, which in itself poses complications, funding an \$18mm high-tech park without such vision would be a serious miscalculation.

Towards the right of the spectrum of FTZ models, Cyber Parks tackle the more ambitious goal of developing technological industries that foster business development and technological innovation through collaborative competition. Successful Cyber Parks achieve full integration, creating self-sufficient towns of technology that encompass residential neighborhoods, shopping centers, technical universities, research centers, business incubators and of course technologically modern business facilities. At its extreme, Cyber Parks aim to replicate what Stanford graduates Hewlett and Packard achieved in Silicon Valley in the early 1990s. Mature Cyber Parks exist today throughout the developing world in Taiwan, Indonesia, Malaysia and the Philippines. Similar projects have begun in Latin American and the Caribbean, in Costa Rica and the Dominican Republic.

Though all FTZ models use financial incentives to attract investment, Cyber Parks, with their many intertwined components, necessitate not only larger sources of funding, but a longer and more devout commitment by government as well as skilled management to properly integrate its many vital components. Cyber Parks rely heavily on the sustained creation of significant intellectual capital through universities, research centers, and business incubators all of which are costly and cannot be developed over night. In many cases throughout the world, such as Brazil, Indonesia and Mexico, the challenges of implementing these projects has required centralized management to oversee the integration of its various components.⁷³

Due to the complexity of design and implementation, successful techno parks require patience and a deep unwavering commitment from the country's leadership. As can be seen from the experience of prospering Cyber Parks throughout Asia (Indonesia park started as early as 1976), it can take upwards of 15 years for the model to fully mature to a stage where all of its components are pushing towards a

⁷³ "Technology Parks- Characteristic and Role" <http://www.techpark.ir/Parks/English/Articles/Lalkaka2.htm>

common objective- to enable innovation and increase competitiveness through cooperation.⁷⁴ Hence, many Cyber Parks are developed in stages, over long periods of time. In earlier stages complimentary institutions may not be an immediate necessity to attract initial investment, but as these supportive components develop, so do the types of businesses within the park and the human capital it employs.

Cyber Park projects also require massive investments in infrastructure. The Taiwanese government invested roughly US\$483 million in developing the infrastructure of its 1,000 acre *Hsinchu Science Based Industrial Park* over a 15 year period, including two major universities and the Industrial Technological Research Institute. Four national research laboratories are located in the Hsinchu area. The Technology Park Malaysia (TPM), inaugurated in 1996, covers 120 acres (50 hectares) and involves a state investment of US\$ 80 million and is surrounded by five universities.⁷⁵

Dominican Republic CyberPark

In 2000 the Cyber Park of Santo Domingo (PCSD) was founded as a joint venture between the Government of the Dominican Republic and the private sector with the aim of attracting foreign investment that would serve as the foundation for a thriving high-tech sector. The US\$30 million, 200,000 square meter Cyber Park, equipped with the latest in telecommunications infrastructure, would not only generate revenue for the economy, but would serve as a source of employment to thousands of high-skilled, well-paid Dominican workers. Investors would benefit from financial incentives such as a 100% exemption on corporate taxes, non-interrupted government-subsidized electricity, duty free importation of equipment, as well as the spillover effects of clustering with other technological firms. Like many high-tech industrial centers across the globe, the Cyber Park was constructed in parallel with a technical academic institution- The Technological Institute of the Americas (ITLA). The institute, which cost the government US\$12 million to build, has the objective of providing customized courses and training to park tenants as well as access to research facilities.⁷⁶ With everything in place, in the months leading to the opening of the Cyber Park officials boasted about attracting dozens of foreign investors including world-class prospects such as Microsoft, Oracle, and Terra Networks.

However, despite a multi-faceted approach to attract investors, offering everything from financial incentives to an institute to supply an appropriately skilled labor force, the Cyber Park of Santo Domingo has failed to live up to its expectations. At its peak in 2002, the 3 companies located within the park employed 32 workers, over 84% of whom were employed to non-technical jobs such as manual labor and administration. The technical jobs, which the Cyber Park was intended to create, offered an average monthly wage of DR\$2936, over 3.5 times the average monthly wage of manual laborer across the country's Free Trade Zones.⁷⁷ Presently, the Cyber Park has no companies operating on its compound.

ITLA however has continued to exist independently of the Cyber Park. Currently, there are 700 students enrolled in a variety of 3, 6, and 12 month technical certification programs which include multimedia, information technology and mechanics.

Broken Promises

The failure of the PCSD to grow at projected levels can be explained by the lack of government attention given to the development of the park during its first few years of operation. The promise by the government to provide an all encompassing "live, learn and work" environment was not delivered. Businesses operating within its compound or considering investment were deterred by the lack of basic business inputs. These include a lack transportation to the park from the capital (a 35 minute drive) and reliable electricity. A technology infrastructure firm, who has presently closed operations within the park, reported that on the average day the PCSD received merely four hours of electricity, often during non-business hours.⁷⁸ The high demand for electricity caused by the rapid economic growth of 7.9% per annum in the late nineties has not been matched by investment in electricity infrastructure. This has resulted in frequent blackouts across the

⁷⁴ "Technology Parks- Characteristic and Role" <http://www.techpark.ir/Parks/English/Articles/Lalkaka2.htm>

⁷⁵ Ibid

⁷⁶ IADB Business Environment Report: The Dominican Republic April 2003

⁷⁷ The Free Trade Zone Council of the Dominican Republic www.cnzfe.gov.do

⁷⁸ Interview with Omar Severino, CEO of Interdom Inc.- a current PCSD tenant.

island, which has forced private enterprises to invest in expensive power generators. The failure to deliver these inputs has caused firms located within the park to spend extra resources on expenses for which they had not previously budgeted, driving many to close their operations and scaring away potential investors.

External Factors

The case of the PCSD demonstrates that follow through of policy implementation is vital. Earlier this year, the Inter-American Development Bank reported unpredictability of government policy as one of the main issues adversely affecting investor perceptions of the Dominican Republic.⁷⁹ As a brainchild of the first administration of President Leonel Fernandez, the Mejía administration put little energy into completing the parks development, managing the compound and seeking the needed investors.

However, the PCDS has also had the formidable challenge of growing during a difficult period for both the global and national economy. The PCSD came to fruition during the last year of the Fernandez administration and was given little attention by the subsequent Mejía government. During Fernandez's administration, the Dominican Republic achieved a sustained annual average growth rate of 7.9%, one of the highest in Latin America. In stark contrast to the Fernandez years, the economy of the Dominican Republic has since come to a screeching halt, slowing to a negative 0.4% in 2003.⁸⁰ The Dominican Republic was thrown into a financial crisis in that year by a banking scandal in which the operators of Baninter, a major commercial bank were jailed for fraudulent practices. At the end of 2000 FDI in the FTZ equaled US\$1.2bl, but due to economic instability, blows to investor confidence and the economic recession, total FDI slumped to US\$309m in 2003.⁸¹ In parallel, there has been a 12.5% decrease in the employment base of FTZ in the DR, from 195,262 in 2000 to 170, 833 in 2003.

A Renewed Focus

Since Fernandez's re-election earlier this year, the President has made the continued development of the Cyber Park an issue of high priority for his current administration. Fernandez has endorsed the creation of a new technical university to be located within the Cyber Park which he believes will aid the acceleration of the island's technological innovation and business development. The institute, the result of collaboration between the Steven's Institute of Technology, the Pontifica Católica Universidad Madre y Maestra and the Global Foundation for Democracy and Development, will offer diplomas in a variety of technical disciplines and is set to be opened in 2005. Throughout the developing world, when confronted with poor results, leaders have the propensity to do the same things harder- that is, with redoubled effort.⁸² Hence, the effectiveness of the new institute will depend heavily on the extent to which it can improve on the shortcomings of the pre-existing ITLA and complement, not simply duplicate, its services.

In conclusion, it may be premature to judge the failure of the Cyber Park from the experience thus far. Similar techno parks across the globe have taken almost a decade to fully develop even when supported by an economic atmosphere of growth. Indeed, the future development of the Cyber Park will depend heavily on commitment to its success from the highest levels of government, the ability of Fernandez to lead the economy to a recovery, and the re-establishment of a healthy climate for investors. This will be no easy task. Similar to 2000, the Park's operators are again boasting an array of interested investors. However, the Dominican Republic needs to not only convince investors that it can provide inputs such as high-skilled workforce and reliable electricity, but ensure that these promises are actually delivered. President Fernandez may already have begun to succeed in these efforts as the Cyber Park signed a deal this summer with Fantasy World Theme Parks of Hollywood California, to build an interactive theme park whose end product is to stimulate the development and use of technology in the local Dominican film industry.⁸³

Regardless of the type of business you aim to attract and the level at which it is supported by complementary institutions and activities, all FTZ models are the most successful when their creation is immediately driven by the demand of international investors. Unfortunately, many governments have seen Free Trade Zones and Cyber Parks as development projects on their own, with the mentality of "if we build it, they will come".

⁷⁹ IADB Business Environment Report: The Dominican Republic (2003)

⁸⁰ World Bank Indicators www.worldbank.org

⁸¹ Economic Intelligence Unit Dominican Republic Country Profile (2004)

⁸² Fairbanks, M. and Lindsay (1997)

⁸³ The Economist (2003)

The idea of establishing a FTZ is a strategic one. As Caribbean countries seek to transition into a knowledge economy, they need to first establish a clear vision of where they want to gear their economies, and the infrastructure and competencies needed to get there. The more they can build on pre-existing comparative advantages or opportunistic openings the better. Once this direction is established, countries can aim to close the gaps in terms of skill, knowledge, capital and technology. Attracting FDI is a strategic decision that should make sense for long term sustainability, realizing spillovers into the rest of the economy and upgrading jobs.

3.3 Computer Software Industry

The computer software industry is a fairly new and fragmented sector in the Caribbean. Some of the first firms sprang up during the mid-1990s as a natural extension of back office business data processing. The majority were foreign owned companies, outsourcing part of their software engineering process to the Caribbean because of the incentives provided by local governments. Most operated under the offshore jurisdiction, receiving favorable tax treatments and other enticements for setting up shop on an island. The two countries that have most heavily publicized their computer software industry are Barbados (in areas such as coding, abstraction, etc) and Jamaica.⁸⁴

However, Caribbean governments have failed to follow a proactive strategy to attract these computer software businesses. Furthermore, they were unsuccessful in articulating the FDI synergies and the development of local computer software industries. As pointed out by the Director of the Chamber of Commerce for the International Business sector in Barbados, this was very much a “scatter shot” approach used to lure investors. In most instances, foreign investors came to governments trying to sell the idea in exchange for financial incentives.

PRT Ltd was one of the first software development companies in the Caribbean. This US company set up operations in Barbados in 1996 and employed close to 300 Indian programmers to develop software for companies such as JP Morgan and Prudential Insurance. PRT was classified as an offshore company enjoying tax benefits and rent-free facilities. In turn, the company employed and trained locals and pressured the government to procure high performance communications. By 2000, however, the company left the island and closed operations. Adverse economic conditions in the US (Internet bubble burst) forced on the company to lower costs. Furthermore, the fact that it could not replace Indians with Barbadians made it hard for them to compete. However, its four year presence on the island created spillover in term of IT skills and career advancement in the local IT economy. This was mostly due to the emphasis placed on training, both in the area of customer service as well as in back office IT training to handle the customized US software produced.

Recently, there has been a new wave of interest in a computer software industry in the Caribbean following the advent of Open Source Software (OSS). OSS has been advocated as an attractive option for developing countries on the grounds of flexibility, local adaptability and costs. By definition, OSS lends itself to creating an ICT environment of highly customized applications that cater to the needs of developing countries. With OSS the programming code used to create software is available for inspection, modification, re-use, and distribution by others;⁸⁵ hence software applications can readily be adapted to address local needs. In turn, the software developing process and upgrading can also help cultivate domestic talent that flows into a local computer software industry servicing both the private and public. Furthermore, local participation may also lead to reduced external expenditures on ICT.

The OSS industry in the Caribbean is still quite fragmented. Data on the number of firms operating in this sector does not exist, and information pertaining to the ICT sector overestimates the number of companies in the sector since it includes a wide range of operations from telemarketing to IT training to more sophisticated business segments. Currently, there are a lot of individual efforts and small scale business, but no one really knows what the other players are doing in the region. Most of these companies are sole proprietorships, targeting both the private and public sector. Trinidad and Tobago, Barbados and to a lesser extent Jamaica, are the most highly developed markets for OSS.

However, a few of these players are trying to foster collaboration throughout the industry to create a forum to share innovative ways in which OSS has been used, and to reduce the amount of duplication and replication across the region. For instance in St Lucia a local OSS company along with the government and The Open Group, is organizing a series of discussion seminars centered on possible

⁸⁴ Cleland, C and D. Gomez (2003)

⁸⁵ Dravis (2003)

OSS alternatives for private business. The idea is that these seminars will develop into a Caribbean-wide conference on the use of OSS, and create a forum where industry participants can share their practices and experiences.

Digisolv Inc.

Digisolv is a company based out of St Lucia that provides networking and network-oriented solutions to private companies, governments and NGOs. Founded in 1995 by Gerry George, a St Lucian returning home from his studies in the US, the company started out in hardware sales but quickly moved into deeper levels of technology offerings that provided more sophisticated ICT solutions. Currently, the company has two employees and annual sales of about US\$100-150K. Initial financing came from out of pocket savings, since little working capital was needed to begin business operations. As expressed by Mr. George "our main input is knowledge." Digisolv's customer base is made up of private businesses (mostly manufacturing and retail), government departments (Ministry of Agriculture, Ministry of Physical Planning, Statistics Department) and individual or home users, representing 55%, 40% and 5% of their sales, respectively.

Opportunities and Challenges

The owner sees the potential to grow the business in areas such as networking, business communication applications, email group work, scheduling, and document, content and project management. However, there are some challenges that have stalled business expansion. First, there is a lack of trained personnel with an OSS-Linux operating system background. The majority of persons with the skill set attend US colleges and universities and may have little incentives for coming back to St Lucia. Second, there is a shortage of investment capital. In order to expand the business to include providing new IT solutions, the company is looking for approximately US\$100,000. The owner reports that his experience with financial institutions has been unfavorable because they are extremely cautious and require almost 100% collateral. Lastly, there is still a lack of awareness within the private sector of their ability to push ICT application and the extent to which those efforts will improve their bottom line. Hence, companies must work on building the market.

However, Digisolv and some other local IT service providers have been quite proactive and creative in dealing with some of these challenges. For instance, they are looking at organizing a series of seminars in association with the island's chamber of commerce and some of the trade organizations to educate the private sector on how ICT can transform a business. Also, they are lobbying with the government and putting up a request for training that would take place in St Lucia. Finally, they are organizing conferences and seminars throughout the region in order to bring together businesses and individuals working on OSS.

OSS industry participants must also collaborate to promote the growth and potential of this industry to their end customers. At present, the private sector in most of the Caribbean is not aware of how IT can be utilized to improve their bottom line. Studies have shown that most Caribbean SMEs use ICT to perform simple applications such as word processing, spreadsheets and other administrative functions with little use of customized software applications or complex networks.⁸⁶ Furthermore, trade associations or support institutions for SMEs have failed to upgrade their technical assistance for companies in areas where ICT use can lead to considerable efficiency gains. Hence, there is a clear rationale for companies in the sector to come together and educate the local market on the potentials of more complex ICT deployment and software development. Small indigenous companies are the right market for local programmers. Chef Pepper, a start-up gourmet delivery company (see pg. 57 for further description) has recently made such investment, having a local programmer create CRM and logistics back end system customized to its customer base for less than one tenth the price of established off the shelf software.

There are also untapped market opportunities close to home. For instance, the offshore financial services sector is a US\$10-12 trillion industry across the Caribbean that ranges from private banking to trust and insurance services for a global customer base.⁸⁷ To create a "virtual headquarters" coupled

⁸⁶ Carana Corporation (2002)

⁸⁷ Suss E., O. Williams and C.Mendis (2003)

with supreme client services, the offshore industry requires utilization and deployment of advanced ICT. Among the technologies most demanded are interactive asset management tools and brokerage services, built around sophisticated technical components, secure applications and aggressive investment strategies.⁸⁸ However firms in the offshore sector either have the IT expertise in house, or outsource most of this work to North America. For instance, a major offshore bank in Antigua recently signed a five year outsourcing contract with a Florida-based company that delivers client/server core banking software.⁸⁹

Business opportunities also exist in the computer software industry for various complementary services. The offshore market as well as other niche business segments can be served from the region as long as there is a clear strategy that entails targeted efforts to develop the industry. For the local software market to develop, some initiatives to improve the business environment, particularly for start-ups, are necessary such as:

- Training and development of a critical mass of skilled labor in ICT
- Educating the leaders of the private sector to the benefits that ICT can have on the business' bottom line
- Financing of small to medium enterprises for growth
- Helping local firms understand the service and product needs of their domestic market and the subsequent market opportunities, and tapping them.

⁸⁸ Carana Corporation (2002)

⁸⁹ Global Bank of Commerce (GBC) in Antigua recently signed a 5-year outsourcing agreement with London Bridge, a Florida based company that provides client/server core banking software http://www.globalbank.ag/pubs/Phoenix_Press_Release.pdf

4. ICT Enabled-Clusters

When firms compete globally with value-added products that they can sell to sophisticated consumers, they spur economic development. These firms are able to employ more workers and pay them a higher salary. In turn, they invest in training to make sure that they are able to continuously innovate, and provide the premium products or services that spurs the firm's growth. This virtuous cycle is the one that firms and clusters engage in prosperous nations.

So how do we measure the effect of ICT on improving firm level productivity and innovation? Most of the existent metrics have concentrated on the inputs: Access and Ability, instead of the actual productive use of these technologies. Measuring the impact of ICT is not easy, particularly in developing countries where data is scarce. Often the true benefits of ICT investments are diffused and entrenched within firms' operations.

There are five major ways we have identified that ICT can have a positive influence on productivity and innovation, which in turn can spur growth and prosperity. These are the ways in which countries and their firms look for in the deployment of ICT. The next section will explore how ICT create benefits, and how firms and institutions in the Caribbean are exploiting those benefits, and the constraints they face in doing so.

4.1 Communicate with Customers and Forward Integrate

Economists define competitiveness as productivity: how well a firm uses their resources for economic gain. While this is true and valid in an academic sense, it does not signal how a firm improves the productive use of resources. Economists view the world from the perspective that assets drive operations which drive customer selection. Successful businesses take that idea and turn it on its head. Competitive firms identify demanding and underserved customers, developing methods to effectively service those customers, and use their knowledge of their customer needs and operations to drive their asset choices.

Firms compete and win by embedding unique insights about customer needs and preferences into the products they produce and the channels they engage to sell those products. Those insights, which are a fundamental component of competitive firms and clusters, can only be captured through interaction with and feedback from customers. It is not hard to see that the closer a firm is to their end customers; the easier it is to understand those customer needs and to control the processes which create those products.

ICT provides a quick and cost effective way to keep that communication active and permanent. From transactional communication to buy or sell, online surveys of customer preferences, to shared systems that allow firms to monitor customer behavior, and preferences and react to them seamlessly, ICT are at the crux of these exchanges. The ability of operational managers to incorporate this type of data and react to it immediately, instead of procuring market research studies for hundreds of thousands of dollars that provide last year's data, will provide small, as well as established companies, the necessary edge to remain competitive.

Tourism

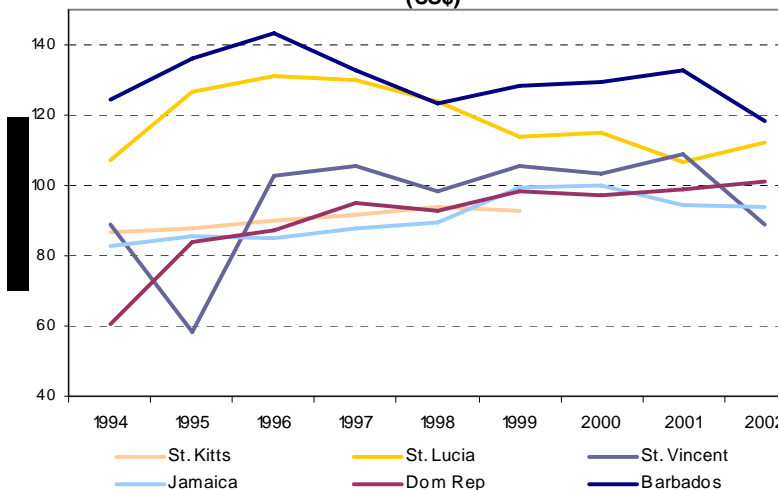
In tourism, the historical perspective has been to provide a great experience to visitors. The new paradigm for competitive tourism is not just to deliver an unsubstitutable vacation experience, but to manage the complete customer experience that includes planning, selection, on-trip, and post-trip events. In order to control and understand all the experiences a visitor has that occur "off trip", the cluster needs to forward integrate through partnership or new business ventures into areas that allow them access to customers and are key points in the complete tourism experience.

Tourism is a cornerstone of every Caribbean country's economy. In most, it is the primary service industry. When done successfully, the multiplier effects of tourism touch every citizen in the country potentially in multiple ways: directly through jobs or business opportunities, indirectly through additional purchasing power of the local population, or further indirectly through services and experiences available to citizens that are sustained because of the tourism industry. When done poorly, tourism exploits cheap labor, provides little or no economic multiplier to the larger economy, and exports the majority of created wealth offshore. For the most part, the Caribbean is a case study for poorly done tourism. Where tourism has been done successfully, there are bountiful case studies for how the industry is quickly migrating to poor tourism practices.

Tourism is a deceptively easy industry to diagnose. While the strategies to create differentiated and sustainable tourism are complex and difficult to implement, diagnosing a failing or failed industry requires only three data points: 1) number of arrivals, 2) length of stay, and 3) spend per day. These three data points, multiplied together, give the most basic and accurate indicator of the industry's direct economic impact on the economy: total tourism expenditure. When one of these variables is elevated in importance (either through industrial policy or for political reasons), the impact on the industry can be devastating.

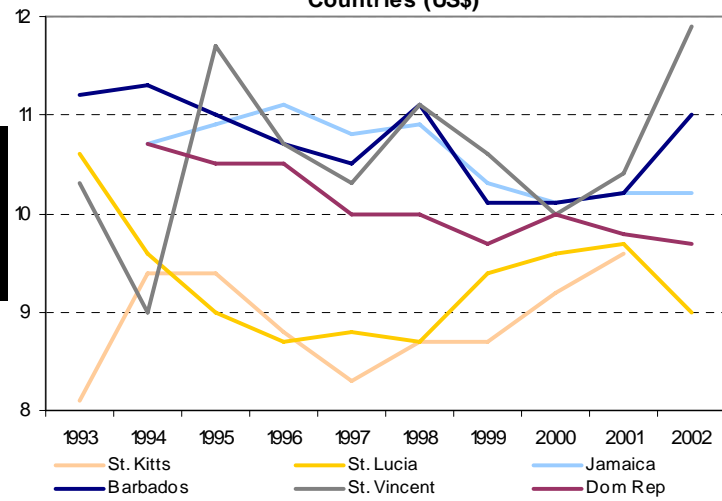
The following figure shows average spend per day and average length of stay for some Caribbean countries where data was available. As illustrated, countries like Dominican Republic and Jamaica have seen spend per day and average length of stay decrease in recent years. This may indicate that the country is moving more to a cruise ship type of tourism offering, since cruise ship visitors generally go from one island to the other and spend significantly less in-land. Others like Barbados and St Vincent have seen spend per day decrease but length of stay increase, which could point towards a move to all-inclusive or enclave tourism.

Average Spend per Day for Selected Caribbean Countries (US\$)



Source: Caribbean Tourism Association

Average Length of Stay for Selected Caribbean Countries (US\$)



Source: Caribbean Tourism Association

The most successful tourism models (in terms of both direct and follow on-tourism receipts) come to countries which embrace a "total island experience". These countries strive to make the entire country the destination, and in doing so, create a wide range of experiences from which a visitor may choose, and create a vast number of opportunities for the local population to serve and profit from the tourism. This model is difficult to achieve and perhaps even more difficult to sustain. Achieving the model requires a moderate and consistent level of infrastructure and security throughout the country, and maintaining the model requires a robust tourism cluster that coordinates their efforts for mutual benefits.

Unique Jamaica

In June of 2003 approximately 100 members of the Jamaican tourism industry came together under the Jamaica Cluster Competitiveness Project (JCCP). This project sought to develop an alternative segment of the Jamaican tourist market. Its primary goal was to unite cluster members in customer and marketing alliances that would allow them to compete internationally for high quality visitors. This was essential, as the majority of JCCP cluster members are small and medium sized enterprises (SMEs) (for example, a 10 room environmentally eco-retreat with revenues of approximately US\$500,000/year, a tour operator with four buses, and a small restaurateur, among many others). Jamaica is chiefly known as an all-inclusive sun, sea and sand destination (these larger resorts tend to produce revenues in 8 figures, and contain virtually all the services guests consume during their visits to the island).

During the course of the first year of work together, cluster members developed a strategy to target nature-adventure travelers. To do so, these firms came together to produce several custom tour packages, offering jointly the services of the various cluster members. International tour operators were segmented and promising relationships established.

In order to begin offering the packages, however, the cluster had to determine a marketing position and launch a marketing campaign. It applied for and won a (pound) 360,000 marketing grant from the United Kingdom's Department for International Development (DFID) to market their packaged offerings under the campaign "Unique Jamaica".

While this budget is large relative to the members' own (much of which has been pooled with these grant funds), it is tiny relative to the \$35 million marketing budget of the Jamaican all-inclusive chain Sandals, or even the Jamaica Tourist Board's \$20 plus million annually. To make the appropriate international connections, technology was essential.

The Unique Jamaica campaign, therefore, was centered around a unifying web site (www.explorejamaica.org), complete with an interactive map providing guidance to the traveler, links to appropriate tours, and individual property information. By forming relationships with the right tour operators off-line (through customer surveys and trade shows), this on-line tool has already produced package and individual bookings.

Today the cluster is using part of its DFID grant to develop a customized booking engine for the web site. This will allow overseas agents and individual visitors to fully customize their vacation packages. The net result is not only a reduced booking cost, but a more tailored selection and booking experience. The Unique Jamaica vacation begins with a trip to the web site, and provides an overview, education, and unlimited flexibility.

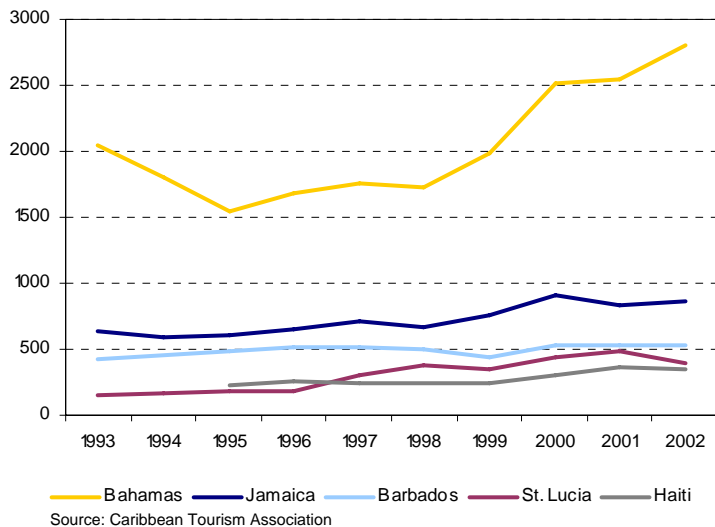
This ICT application is ideally suited to this cluster of Caribbean businesses. Recognizing that a visitor's experience in choosing a vacation is an integral part of that vacation, the cluster used the Internet to strengthen its connection to future guests. As its product offerings are for the upscale but adventurous, the demographics fit perfectly with the new booking engine. Finally, by using digital customer surveys to elicit feedback from appropriate agents and tourists, the cluster was able to design their site to best meet the needs of the customers they most value.

The result is a cluster *enabled* by the use of ICT. The appropriate application of relatively straightforward but powerful tools has built on the core value proposition of the cluster itself. In the process, Unique Jamaica has gone a long way toward creating competitive advantage for 100 SME members of the Jamaican tourism industry. While the campaign is still in its early stages, visitors have already started to arrive, at the premium rates we have established, and approximately a dozen new international specialty tour operators have been retained.

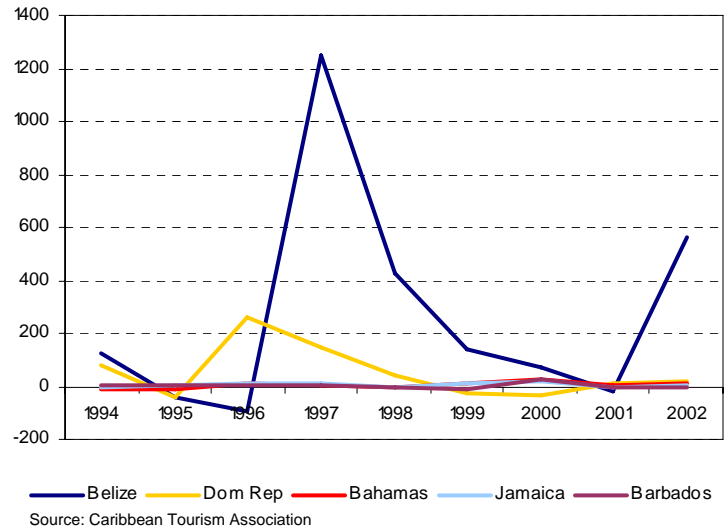
Many countries have seen the large scale introduction of cruise ship tourism to their islands. While cruise ships can play an important role in creating a balanced industry strategy, high concentrations of cruise ship tourism has had a significant positive impact on arrivals but a more than offsetting negative effect on both length of stay and spend per day. Additionally, highly concentrated cruise ship tourism

has had a significant negative impact on the breadth of impact of tourism, tending to concentrate the impact of tourism into government landing fees and a few service providers near the berth. Bahamas or Jamaica provide an important lesson to all countries about the risk of excessive dependence on cruise ships, but also points the way to how ICT can play a central role in recovering from that overdependence.

**Top 5 Cruise Ship Destinations in the Caribbean
(Arrivals by Country in Thousands)**



% Change in Cruise Ship Arrivals- Top 5 Growth Destinations



As illustrated above, countries like Bahamas, Jamaica or even Belize more recently, have attracted masses of cruise ship passengers. The primary story here is one of making bad choices about which customers to serve, leading to a downgrade in tourism offerings and ultimately marginal economic impact on the local economy. The back story on ICT is a) how understanding distribution channels can avoid these problems in the future, and b) how a migration strategy back to land-based tourism requires ICT in numerous ways (i.e. market research, marketing and customer communication, direct distribution / channel management, on-island coordination, etc.)

Likewise, over the past two decades, many Caribbean nations have sought to create enclaves of tourism that offer all the amenities and security demanded by international visitors. These enclaves were to serve as incubators and catalysts of expanding tourism across the country. The Dominican Republic shows us that the promise of enclave tourism failed to deliver the hopes of the nation. Enclaves are by their nature closed environments; limited in their access to the outside, and limiting in their openness to outsiders. While enclaves have successfully created significant direct economic impact, that money has in two important ways been significantly less valuable to the country overall. First, the profit of enclave tourism is highly concentrated in the limited ownership, and fails to promote the ripple effect of indirect impact that flows throughout regions served by a more open tourism model. Second, this concentrated wealth tends to move offshore more often than being reinvested in the development of the region or country.

The Dominican Republic exemplifies this model. The move toward enclave tourism has been rapid, and came at a cost of the pre-existing model. For instance, in the late nineties in the northern coastal Dominican town of Sosua there existed a bed and breakfast and residential tourism sector. This form of tourism offers travelers the experience of living in a rural Dominican home, providing opportunities for cultural exchange and learning. Such an offering creates a uniquely Dominican experience that cannot be imitated by other islands. In addition, the wealth generated from this tourism model is more widely distributed than in the enclave model. However, many of these hotels were forced out of business when large enclave hotels in the surrounding area of Puerto Plata were built and a price war ensued.

As this example demonstrates, for the Dominican Republic or Jamaica to reclaim a more total-island tourism model, it must offer an experience that competes favorably against the enclave option. The non-enclave model, such as the Sosua example, which includes offerings such as residential, adventure and eco-tourism, offers more diversity and local color than the enclave. But to win, it must also compete on ease of the experience. Though there are inherent challenges to compete with enclave tourism on issues such as security, there is opportunity for residential and non-enclave segments to increase the convenience of their experience through the application of ICT. Information of rates and accommodations of large enclave hotels is more readily available to visitors, mostly through the Internet. The application of ICT would not only lower informational barriers to non-enclave tourism, but would allow for greater coordination between the traveler and host, the host and supporting services (travel agents, transportation providers, tour guides) as well as improve internal hotel logistics. This in turn would help non-enclave hotels to offer a more convenient “worry-free” vacation experience.

For instance CocolaPalm, a small 75 room non-enclave hotel located in Negril Jamaica, has implemented information technology systems to improve its internal logistics and service delivery as well as the hotel’s marketing and promotion efforts.⁹⁰ Prior to this upgrade, reservations were done manually and the process was very laborious in planning, controlling and executing room allocations for new arrivals. Inventory of linen and other housekeeping products were improperly controlled and losses were numerous. In addition, an unorganized inventory control system caused the hotel to close its restaurant and send guests to neighboring hotels for meals. As a result the hotel suffered from a reputation of poor service translating to a low number of return visitors.

Since the implementation of an IT operations system which controls room allocation, cash and inventory control, the hotel has witnessed a significant decline in these problem areas. The hotel now runs three internal restaurants, boasts an average annual guest return rate of 35% and has won accolades from the local hotel association for service provision.

In addition to improving service delivery, CocolaPalm has also used ICT to improve its promotion and marketing efforts. In 2001, the hotel rebuilt its website specifically to improve the convenience of booking rooms online and planning vacations. It also installed web cameras in the pool and beach areas, giving visitors to the site a real-time glimpse into the CocolaPalm experience.

However, the majority of countries in the Caribbean region have simply failed to keep up with changing preferences and demands of international travelers often relying too heavily in the enclave all-inclusive model. Understanding and serving the unique demands of tourists is the key to both sustaining and growing the industry. In almost every action, from market analysis to service provision, ICT has an important role to play.

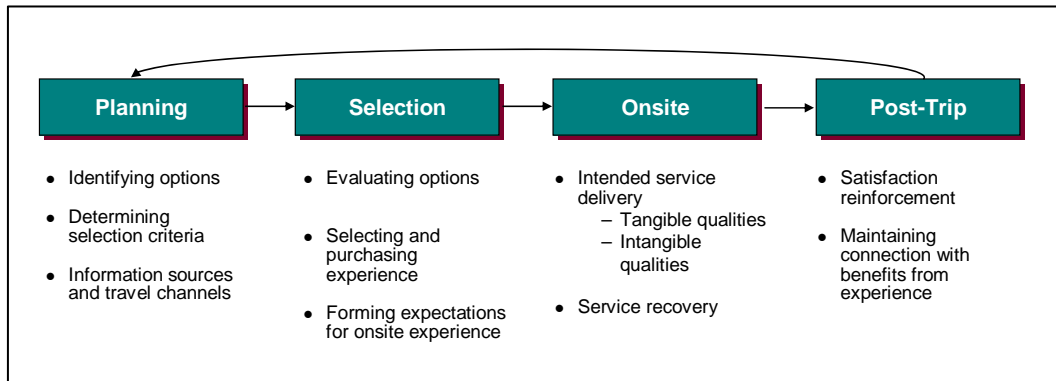
The Customer Experience Model

While these archetypal experiences are important to demonstrate the results of tourism choices, the Tourism Customer Experience Model offers a systematic way to understand the range of choices that any destination must consider in developing a sustainable competitive strategy. At each step in the model, ICT plays an increasingly important role in enabling countries to capitalize on tourism opportunities.

In the Planning Stage, a customer identifies potential products or services which may satisfy his/her needs, and the criteria by which to evaluate which products or services to purchase and use. Providers attempt to get his/her product or service into the customer’s set of options and attempt to influence, to the client’s advantage, the criteria by which the customer will evaluate the options.

⁹⁰ ICT4D Jamaica (2004)

OTF GROUP'S TOURISM CUSTOMER EXPERIENCE MODEL



In the Selection Stage, a customer evaluates potential products or services in the option set, selects one by making a purchase or purchase commitment, and forms his/her expectations for the use of the product or service. Providers attempt to influence the evaluation process to the client's advantage, make it possible for the customer to purchase the selected product or service, and attempt to set the customer's expectations appropriately for using the provider's product or service.

In the On Site Stage, a customer experiences the product or service and seeks help if any problems arise. Providers deliver the intended product or service and provide service recovery if the customer experiences any problems.

In the Post-Trip Stage a customer evaluates the use of the product or service, forms an opinion about whether to use the same or different product or service in the future, and decides whether to recommend the product or service favorably or unfavorably to others. Providers attempt to learn the customer's evaluation of the product or service, attempt to motivate the customer to use one of the client's products or services in the future and help the customer to share favorable recommendations with other potential or current customers.

ICT can play countless roles in enabling this model of tourism as the case study of Bermuda demonstrates below.

Bermuda Escapes: Tourism Customer Experience Model and ICT

Bermuda tourism has suffered in recent years. Twenty year trends show decreasing numbers of visitors from new and easy to reach Caribbean competitors; decreasing length of stay as Bermuda's primary US markets came to perceive the island as a "shoulder" season weekend getaway (which refers to the September/October and April/May periods that are peak times for Bermuda); and decreasing spend per day as hotels migrated to lower cost wholesaler distribution channels in efforts to prop up volume.

The tourism destination of Bermuda was no longer relevant. One hundred years of people flocking to the island had blinded them to the last twenty years of slow decline and changing trends. The market was optimized for a world that no longer existed. Tourism preferences no longer sought the hotel as the destination; they sought the island as the destination.

Axiom Computer founded Bermuda Escapes with a simple idea: visitors don't come to the island to stay in a hotel, they come to the island to experience Bermuda. If Bermuda tourism was to survive, it needed to offer the complete island experience.

If the idea of Bermuda Escapes was simple, the technical solution was even simpler: catalog and coordinate tourism experiences through a single back-end database and provide points-of-presence

throughout the island to allow anyone in the industry to cross-book each other's business and receive a small commission for the effort. Concierges would be able to arrange complete itineraries for guests. Dive operators would arrange transport and food for guests. Small hotels could arrange dinner reservations at Hamilton restaurants. Taxis would know where to pick up guests, and guests would experience a completely integrated vacation.

Not only would visitors have a better experience, but the industry would have an accurate picture of what visitors value. Smart people could segment this data and create unique and targeted packages that succeeded in the market because they created most value, not because they offered the lowest price.

Lessons Learned

Four years into the effort, Bermuda Escapes has reason to celebrate, but the effort was more difficult than envisioned, and the successes smaller than anticipated. Bermuda Escapes learned two important lessons that are applicable to any broad initiative using ICT to coordinate cluster activities. Both of these points are about issues of culture and trust:

1. Openness to new ideas –While nearly every tourism enterprise, from the largest hotels to the smallest souvenir show, was in decline, the 'discontinuous leap of new technology and new solutions' had to compete against the entrenched idea of 'doing things the way we've always done them – only work harder'. Underestimating the investment required to educate the industry and a failure to consider a conservative innovation diffusion rate meant that the network didn't expand as quickly as anticipated, and therefore, the value to the early adopters was lower than promoted (as the size of the network of participating enterprises correlates to the value of the system to allow complete on-line booking).
While the professional concierges immediately saw and adopted the idea and the technology as a way to improve their service offerings, smaller operators (especially experience providers such as dive boats, taxis, tour guides, etc) were unable to reconcile the perceived risk of sharing information and tying themselves to a centralized system with the promised upside of increased business. As a result, the concierges were initially unable to book many of the smaller experience providers to which they attributed the greatest benefit from participation.
2. Enforcement – While Bermuda Escapes did a good job of creating positive incentives through commissions, they failed to design, implement or enforce punishments for not adhering to the system. A lack of understanding and internalization of the commission system, a significant lack of trust in Bermuda society between black/white, rich/poor, large/small, etc. led many of the enterprises that might have self-identified as disenfranchised to not accurately reflect their operational capacity or direct bookings. As a result, visitors suffered, commissions were disputed, and the value of the system was minimized.

Role of Country Tourism agencies

As depicted by the few examples above, the tourism industry is bound to benefit from further ICT integration among players to create this "total island experience." ICT and the Internet have become ubiquitous in the promotion of the tourism product – to the point that an Internet presence and online interactivity are prerequisites for survival. Under these pressures, most hotels will eventually adopt the technology, and more quickly than other industries. The real test will be whether whole industries and competitive players can come together to provide more integrated and seamless experiences. Tourism Boards and promotion agencies can play a role in promoting this view, providing technical assistance and starting to link members together. While their role has been historically in advertising, the generic campaigns are becoming less effective as the advertised experiences are at odds with the actual experiences, or are too generic to escape falling into the low cost, sun & sea experience.

Tourism is the most obvious and significant opportunity for increased customer intimacy and forward linkages. Yet this type of thinking, and applications of ICT, can be applied to most industrial clusters of the Caribbean.

Agribusiness

ICT also provides an opportunity for agribusinesses to communicate with customers and forward integrate. For instance, Country Traders is a relatively small coffee distributor based in Kingston, Jamaica. Traditionally the majority of their sales have been to local clients. The vast majority of local buyers seek low-to-medium grade coffee which carries a relatively small gross margin. In fact, the majority of consumers in Jamaica drink instant coffee. Unfortunately, until recently, the export market wasn't that much more attractive. The majority of exports were in the form of low value-added green beans sold in bulk to overseas buyers who then roasted and branded the beans, thereby capturing most of the profits.

Recognizing the value of the Blue Mountain brand abroad, Country Traders decided to sell a branded finished product to overseas consumers who were willing to pay a premium for a top-quality blend. To connect with these costumers the company developed an on-line ordering system. Orders are received on-line using a basic software package and fulfilled with the services of an international courier company. Although Country Traders does not have the capital to develop a sales or distribution network in North America the Internet has provided the company with an effective distribution channel into an entirely new market. In so doing they have broken away from the constraints of the local market and cut out numerous parts of the export value chain thereby capturing a much larger share of the total value-added for themselves, and by extension for Jamaica. Although on-line sales currently account for only 4% of total sales they account for 8% of profits. It is therefore not surprising that Country Traders is moving to grow this segment of their business, and other distributors and farmers in the sector are looking to follow their lead.

4.2 Improve Logistics

Most firms incorporate technology to gain efficiency and productivity only when they have to in order to survive. There are many ways in which ICT can improve logistics, and the greatest benefits accrue when they are incorporated both inside the organization and as a way to transact across the value chain. The former often requires a deep reorganization of the way the organization works: incorporating efficient back up systems, knowledge sharing databases, to achieving seamless communications between divisions. The latter involves connecting and integrating with others in the value chain to achieve better times to market, improved coordination of supply and demand and excellent customer service.

Given the vast inter-Caribbean business and the dispersed nature of the islands, this should be an evident concern for the increasingly regional companies. For example Sagicor, the largest regional insurance company was able to increase efficiency by using customized software to lower the time it took for insurance claims to be processed—claims went from taking a couple of weeks to get sorted to being ready in just a few days. The company recently launched a portal for health services, where customers access their claims, view their claim history, and determine how much money is ending. However, efficiency is still not a priority within the Caribbean business community because of a history of protected industries and subsidies. The challenge for Caribbean companies often does not depend on the adoption of ICT *per se*, but is related to a lack of understanding of the necessary organizational and mindset changes necessary to reap benefits. Organizations do invest in computers and other forms of IT. However, these new systems are frequently used to replace traditional paper trails and simplify existing processes through the use of word processing, spreadsheets, etc. The time devoted to think through and strategize around new work flows, business logistics and process re-engineering is usually deficient and numerous projects have fallen short because they fail to consider this “big white elephant”.

Governments also have much to gain from efficiency gains and improved logistics, given the widespread services they provide to their communities. Through the Special Envoy of the Prime Minister in Technology, Trade & Investment, Barbados presents a good example of pushing reforms through. However, efforts in this sphere receive particular pushback as the fear of causing ‘redundancy’ makes efficiency not a politically popular effort. Here’s a telling example: there is a post where government officials are employed to cut bushes and make sure that citizens are taking care of their lands. When a property is uncared for the official needs to go back to the office to determine the owner of the land before leaving a note that calls for their attention. When a technology company offered a GPS system that would incorporate ownership maps allowing them to determine the owner immediately, the response from the officers was “what will happen with our Travel Pay.” The human side cost of improving efficiency is the first thing to tackle to pass such programs through. The government’s paternalistic role in society has created a culture where causing redundancies is close to immoral, so training programs need to go hand in hand with such initiatives.

Nonetheless, there are telling examples across the Caribbean, ranging from manufacturing and services to agribusiness, of companies or clusters that have used ICT to transform the way they do business. For instance, Chef Pepper, is a start-up launched by two brothers that saw a business opportunity in exemplary customer service in the meat delivery business.

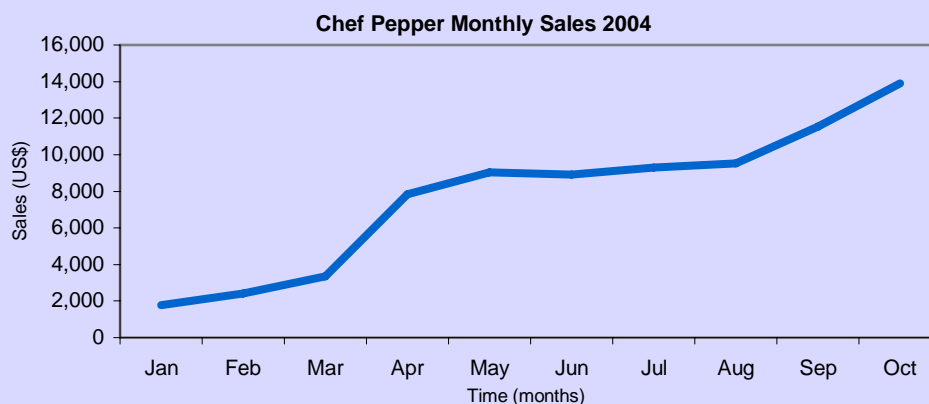
Chef Pepper

Chef Pepper, a small Dominican start-up which supplies high-end hotels, restaurants and private households with imported high quality steak, salmon and shrimp uses ICT to ensure the efficiency of its business logistics. When asked why they succeed in the commodity business of meat distribution, the young founders’ answer is “while many claim to be reliable, we actually are – and that makes the whole difference in the high-end market.” The operators are in close communication with US suppliers and local customs brokers via the Internet and cell phones. Bulk orders are placed on demand and flown in by plane. Their integrated IT systems also helps Chef Pepper reduce inventory costs: it utilizes a

First In, First Out (FIFO) inventory control system that assigns each item a electronic bar code which allows the tracking of the products to limit spoilage, and tells each delivery boy exactly which piece of salmon to pick from cold storage. When an order is taken by their customer service unit and inputted into their customer management software, their outsourced transportation provider is automatically notified of the order by electronic pager. Simultaneously, a map with directions to the client's location from the head office is printed out using I-Ruta, a local Dominican service, and provided to the transporter upon pick-up. Chef Pepper guarantees that the order will be delivered to household clients within 45mins of the time of order.

Most of their systems have been locally developed and customized, the customer relationship management (CRM) software was coded by a local programmer and costs merely 10% of the similar US-made alternatives. Through this software, they track purchases and segment customers to customize promotions. These components have allowed Chef Pepper to deliver high-quality service at competitive costs in the Dominican marketplace. Their main competitors for household business are the few gourmet meat stores such as Omaha Stakes that do not deliver, nor meet their prices, their variety, or customer service.

Chef Pepper's use of ICT extends beyond their logistics. The business has also undergone a targeted Internet promotion campaign that increased its customer base and revenues for its household customer segment with minimal cost. Chef Pepper purchased email lists for their target customer segment, upper-class Dominicans in Santo Domingo, and designed an electronic flyer with product promotions. The emails also directed potential clients to their website. The immediate results of the Internet campaign were dramatic. In on month, Chef Pepper was able to increase is client base and revenues 34% and 134% respectively. Their 3-month compound average growth rate *after* the email promotion was 48.3%, as compared to 334.6% before the promotion.



However, as will be discussed in later sections, Chef Pepper's growth, like many SME's across the Caribbean is limited by their ability to obtain financing at competitive rates. With their current facilities, they are unable to meet the demand of their commercial clients. In addition to importing the meat from abroad, Chef Pepper also adds value to the product by trimming each cut to the appropriate weight to be served in restaurants (8 and 12onz). This service saves hotels money and ensures client satisfaction. If hotels serve cuts larger than displayed on the menu they lose money because they pay for the meat by bulk weight. If they serve smaller cuts, customers complain. To meet the demand of their commercial clients, Chef Pepper would need major investment in storage and meat proportioning capacity. However, high interest rates from Dominican banks ranging from 14%-23% makes this less viable. So far all growth has come internally and they are considering some Angel investors. They are considering doing meat packaging for US chains, as well as branded, seasoned cuts. However, it will be difficult for them to migrate to a medium/large business and grow outside of the Dominican Republic without significant financing.

Agriculture is another area that could benefit much from ICT logistics improvement, both to internally transform the practice as well as to transact across the value chain. The agricultural sector continues to show declining levels of performance in the region and has been taken over by the service sector in most countries. Despite the fact that large scale agricultural production may not be a viable option for the region, there are attractive niches that could benefit from a more agribusiness entrepreneurial approach (areas such as sauces and spices, Sea Island cotton, premium coffee and rum).

In agriculture, where most of the players are small and fragmented, there is an important benefit to coordinating cluster firms to make mutually beneficial initiatives happen that would otherwise require hefty investments if undertaken by a single player in the market. In this sense, ICT has a crucial role in allowing these single entrepreneurs to work together and deal with some of the evidenced coordination failures.

For instance, the agricultural sector in Jamaica is beset by numerous inefficiencies. One of the most costly is the lack of supply and demand information amongst the players in the industry. For a wide variety of commodities like peppers and cassava, numerous market prices will exist at any one time. Moreover, the lack of market information frequently leads to periods of under and excess supply. Farmers are particularly hard hit by their lack of market information. In many cases farmers are simply too far from the end-consumer to know the market price. These inefficiencies have been addressed by middlemen who work to match supply with demand. Although they have helped to increase the efficiency of the market, they have pushed farmers further away from the end market.

To address the information asymmetries that exist in the market, a pilot project was launched last year to test the ability of text messaging and voice messaging services to convey market information to farmers on a daily basis. Although the incidence of poverty is relatively higher in rural communities cell phone use is quite ubiquitous throughout the island. Farmers were very enthusiastic about the initiative – particularly the voice messaging service. A locally based consulting firm is now exploring how the service can be launch across the island on a for-profit basis.

Manufacturing

Manufacturing in the Caribbean is small relative to other sectors of the economy. There is a large disparity between the rate of adoption of ICT and process re-engineering that is highly dependant on scale.

Benchmarking studies conducted with over 100 manufacturing SMEs have shown that the majority fall short in terms of a weak foundation of their practices. Several areas of weaknesses were identified in areas such as marketing and promotion, product development, engineering and innovation, and plant and equipment, etc. Some of these issues are directly related to poor technological adaptation. Those that try to break this mold have seen the benefits, more so in niche products sold at a regional level. Gale Force Windows is a good example of such innovation of a good business idea benefiting from proximity to its market.

Antigua GALE FORCE Windows

Profile and ICT use

GALE FORCE is a company based in Antigua that builds high-end, hurricane resistant windows and doors. The company was founded in November 2001 by Hugh Marshall, former Minister of Trade in Antigua, and last year had a turnover of US\$ 750,000 with a healthy margin of approximately 30%. Mr. Marshall saw the opportunity to create a highly digitized, low cost premium product to sell to neighboring Caribbean countries in the growing business of construction. The plant is small but fully digitized with state of the art machinery imported from Germany. The company has built relationships with architects throughout the Caribbean both in the hotelier and high-end homes market that can send their AUTO CAD drawings online, and Gale Force can provide immediate pricing quotes for the necessary windows and doors. This is very helpful for architects and developers to accurately predict build-out costs. Gale Force also has the

technology to custom design the windows to fit the architect's creativity, as opposed to the majority of international competitors that prefer to work with standardized sizes and shapes.

Gale Force's fully digitized equipment reduces human error, minimizes waste, and eliminates time and distance in connecting with customers, enhancing overall productivity. The Welding plant allows workers to weld the four corners of a window in 70 seconds, instead of 40 minutes if it were done manually. The company pays competitive wages for factory workers, twice the minimum wage (between EC\$ 1,500 – 3,500/month). It also usually employs young operators and invests heavily in specialized training, which has considerably reduced turnover rates.

Gale Force has a website where companies and architects can connect with them online, but have yet to implement a purchasing system online. The main reason is that their customers are not ready to purchase online, and since it usually involves large orders and significant investments, personal contact and relationships are part of the sale process. As the business grows, and recurrent customers are the norm, online purchasing can become a viable option. However, new customers have approached Gale Force given its online presence, so it has been mostly a marketing tool.

The company sells 70% outside of Antigua, mostly in Trinidad, Barbados, St. Lucia and Grenada. They have recently received inquiries from Puerto Rico. They have an installation team that travels to the location to install the windows and a small office in Dominica with technicians to assist in implementation, and fully connected to the factory in Antigua.

Challenges: Financing and Skilled labor

The company has taken advantage of the incentives law passed in 1974 that allow tax free importation of materials for the first 10 years of a new company. Initial financing of U\$1.8 million came from a local bank, at interest rates of 13.5%, making it hard for the company to break even. Furthermore, the company required UU\$ 4.8mm in raw materials to start production. As Mr. Praise explained, "it is easier to get a loan for a car than to start a business; banks feel it's more secure because it's saleable. The bank does not consider Gale Force equipment as collateral. This is probably the most difficult aspect of making the business succeed, attain financing at reasonable costs".

The company has also felt the scarcity of high-level, driven professionals in the areas of marketing and sales. Most of the professionals that excel are expatriates. They have also sought help from an NGO (actually, an ex CIDA organization) based in Dominica to get IT capacity development training to link the office to the production facilities. However the capacity training was never approved, according to management, because decisions on funding are made far away from the field and are not in touch with the needs of entrepreneurs.

Lastly, the enabling environment is sub-optimal. High connectivity rates, landline installation delays, energy power outages, and Internet providers without a culture of customer service. Starting a business still requires bureaucratic delays and red tape.

Services – Tourism and Others

The service sector is a prime arena for logistical improvements, not only to provide excellent customer service, but to enter new and more complex niches. There is an untapped opportunity in the niche tourism for Caribbean islands: the Wellness Center concept. As a natural extension of specialized tourism offerings, wellness centers can offer a range of services from a spa or retreat experience, to rehabilitation facilities for people undergoing surgical procedures or retiree complexes as the ones seen in Florida or Southern Spain.

For instance, the rehabilitation facilities or retiree complex option will benefit from two of the region's assets: the already well-developed tourism infrastructure and the vast supply of nurses that currently go to the US or UK for higher paying jobs. The development of specialized communications infrastructure with international health care providers (telemedicine) will also be crucial, especially for many of the smallest islands that have limited number of medical specialists. Finally, transportation companies, hoteliers and other supporting services that need to accommodate the needs of this customer segment should be up to par.

One of the challenges this hospitality offering would have to surpass is the issue of trust, particularly as it relates to serving patients that have undergone surgical procedures. The perception is that Caribbean countries have poor health care sectors and will not be able to cope with premium post-hospitalization services. One option is to partner with US hospitals or universities and have this seal of approval to overcome this issue.

A recent experience in Barbados illustrates the opportunity of not just high-end hospitalization services, but the potential for cutting edge research facilities in-island. Barbados is currently in the process of setting up a wellness center to carry out research and offer regenerative therapy using fetal stem cells.⁹¹ The Institute of Regenerative Medicine in Barbados is being set up as a joint venture between American investors, Ukrainian stem cell researchers and the Barbados Tourism Authority. The Barbados institute will import stem cell preparations from Ukraine, and offer specialized therapy for US\$25,000 per patient. The project is still in its initial phase, and as of mid-November, 2005 the center had treated three patients. The idea is to start by focusing on people suffering from auto-immune diseases, diabetes and neurological disorders.⁹² The current US policy to not provide federal funding for certain stem cell research provides an excellent opportunity for near shore facilities for US patients and researchers. These types of opportunities require a fast reaction to get the first mover advantage and be able to attract future investment in this lucrative and high-potential area.

Other medical opportunities, such as Telemedicine, offer improved efficiency and service for the local population.

Telemedicine in the Caribbean

Industry Background

Across the Caribbean many countries are underserved in health services due to a lack of medical specialists. Furthermore, those patients that seek second opinions or need specialized diagnoses have to incur tremendous costs and be clinically stable to travel to the site of a medical specialist.

Given these conditions, telemedicine is a very attractive option for the region. In essence, telemedicine is medicine offered at a distance and that entails the use of audio, video or computer technology to investigate, monitor and manage patients who are geographically separated from a medical specialist. It also allows doctors to collaborate on patient care, participate in diagnostic procedures, keep abreast of current practices and enhance medical care to Caribbean people at an affordable cost.

The Caribbean Medical Imaging Center (CMIC)

Caribbean Medical Imaging Center (CMIC) is a privately owned radiology center in St Vincent and the Grenadines. The company was set up in 1998 by Dr. R.E. to provide a range of radiology services from X-rays and CT scans, to ultrasounds and mammography medical imaging. To date, the center is able to attend on average, 10-15 patients for ultrasound services and 5 a week for ultrasounds. The cost of a CT scan is between USD 4,400 to USD 4,800.

Telemedicine was incorporated in the practice almost three years ago as way to improve diagnosis and treatment of patients. As the sole radiologist on the island, Dr. Ambrose had to go through the cumbersome procedure of sending hard copies to colleges around the world to get second opinions on some cases or the judgment of medical specialists in some areas. When dial up was made available, she started using digital cameras to upload images in the computer and send them online; however, the volume of data transmitted also made the process significantly long. With the advent of DSL in the island three years ago, transmitting was made virtually instantaneous and of superior quality. In fact, CMIC was received one of the first wireless commercial installation programs in the island.

⁹¹ Financial Times (2004)

⁹² Ibid

Opportunities and Challenges

Probably the most difficult challenge for centers setting up telemedicine practices is having the right ICT infrastructure and capabilities. As with CMIC, most still operate with analog images since digitizers are quite expensive (the cost of a digitizer for a practice like CMIC fluctuated between US\$20-30k). Also, the cost of wireless Internet seems prohibitive for small, specialized practices (CMIC reported paying between US\$300-330 for DSL access per month.). Sourcing skilled technicians, both to handle and provide maintenance to the equipment is a problem. Finally, the absence of a formal structure for reimbursing physicians for telemedicine consultations has to be resolved before it can truly become an essential part of a country's health care system.

The Leisure Marine cluster in the Eastern Caribbean is another activity that has the potential to provide a competitive and differentiated product, both as a niche market of the tourism industry and for complementary services like pleasure boat building and maintenance operations. There is currently a growing demand in North America for lower-cost pleasure boat building locations and for more sophisticated Caribbean service facilities.⁹³ The eastern Caribbean is poised to capture this niche market by becoming a destination for the leisure marine community. These islands have become destinations for high-end yachts because of their pristine beaches and untouched nature. Locations such as Antigua & Barbuda, St Lucia and St Vincent & Grenadines already have a critical mass of skilled craftsmen, specialized businesses and boat building facilities. Others, like Trinidad & Tobago are poised to compete on comparative advantages, being the only protected port in the Caribbean outside the annual path of hurricanes.

In the US alone, yachting is a 30 billion dollar industry that has doubled in the last 10 years. In most Eastern Caribbean countries, yachting is the 2nd most important element of Tourism, even more profitable than Cruise Ships.⁹⁴ Although the contribution of this cluster to overall economic activity has been difficult to assess due to shortcomings in data gathering, it has been estimated that yachting expenditures amount to less than 1% of GDP in countries like Trinidad and Tobago, to more than 3% of GDP in places like Antigua and Barbuda and St Vincent and the Grenadines (refer to figure below). Furthermore, of the average expenditure per boat going to these islands, over 90% goes to food, accommodations, entertainment, etc., which is an indication of the potential tourism revenue that can be accrued for one island. These countries collect a substantial amount of the approximately US\$75,000 per week that most high-end cruise boats spend inland on fuel, dockage, electricity, food, etc.⁹⁵ And these expenditures do not include what goes into hiring the crew, which amounts to close to US\$18,000 per month for a six-crew motor yacht.⁹⁶ Likewise, direct and indirect employment in the yachting industry is considerable; ranging in some cases to more than 5% of labor force.⁹⁷

The industry as a whole, however, lacks a common vision of its potential and of its relative competitive position. The greatest challenge is for these islands to realize that their main competitors are not neighboring islands but other sailing destinations such as the Mediterranean.⁹⁸ The customer experience in yachting and marine-based tourism unfolds in what may be called the "island hopping" adventure. This requires seamless inter-island collaboration in areas ranging from customs and boat facilities management to site specific entertainment. However, regular consultation among the Eastern Caribbean on the management and upgrading of the leisure marine experience are rare if non-existent. The industry is currently highly fragmented and firms could benefit from more corporate depth in areas such as market development, improvement of the production process, training and the necessary linkages and coordination in the supply chain. With regard to this last area, ICT could help upgrade this tourism offering by allowing flawless coordination of logistics among different service providers.

⁹³ PriceWaterhouseCoopers (2001)

⁹⁴ ECLAC (2004)

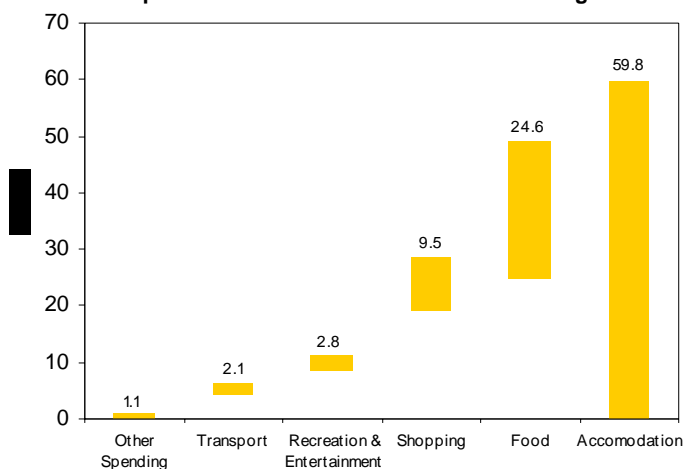
⁹⁵ Based on average figures provided by industry expert for expenditures on 6 crew, 115 ft. motor yacht with cockpit. Interview held on January 2004.

⁹⁶ Interview with industry expert, January 2004.

⁹⁷ ECLAC (2004)

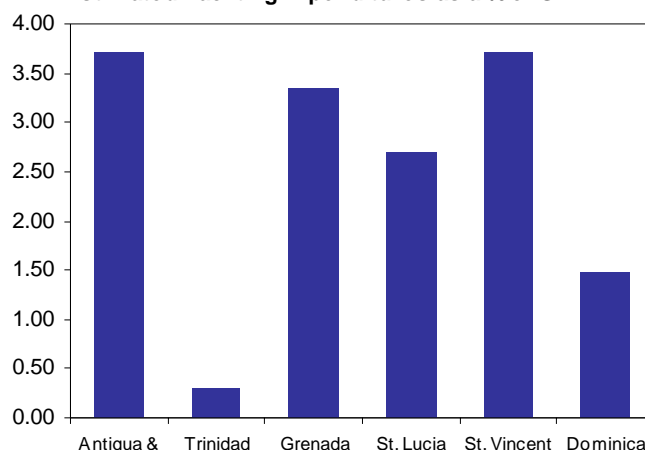
⁹⁸ Ibid

Expenditure Structure for Yacht Chartering



Source: ECLAC (2004)

Estimated Yachting Expenditures as a % of GDP



Source: ECLAC (2004)

Estimated Employment in the Yachting Sector

| Country | Employment |
|-------------------------|------------|
| Antigua & Barbuda | 838 |
| Dominica | N.A |
| Grenada | 250 |
| St Lucia | 350-575 |
| St Vincent & Grenadines | 152 |
| Trinidad & Tobago | 1100-1400 |

Source: ECLAC 2004

One area that could largely benefit from improved logistics is immigration and consultation between port authorities. To date, yachts complain of the cumbersome procedures that exist in many islands for clearing vessels and passengers. In turn, many yachts override customs clearance resulting in loss of government revenue from yachting permits. ICT could be a potent tool for harmonizing rules and standardizing and simplifying immigration procedures across islands, while at the same time making the in-island experience as seamless as possible. Another area where ICT usage can increase coordination is in the services provided by charter marinas and boat yards. The majority of marinas and boat yards in the Caribbean offer a *one-stop shop* for repairs, with quality monitored by each marina. ICT could help upgrade these services by allowing an integrated experience across islands, where a vessel can coordinate which port offers the best services in different areas.

4.3 Make Distance Irrelevant

The distance between buyers and sellers has been a strong comparative advantage since commerce commenced. Historically the time and effort required to move physical goods reduced – and often prevented - distant competition. As barriers to movement and shipment reduced over time, the difficulty of coordination and communication still gave the edge to local firms. With the advent of global ICT, distance has ceased to become a barrier to entry of competition in all but the most niche products or markets. ICT have made it easier and cheaper than ever to stay in touch with customers and suppliers, and as knowledge and insight become an increasing percentage of the ‘value-add’ of products, ICT creates significant value by allowing the free and instant transport of digitized knowledge and insight. Geographically based clusters are still fundamentally important (in fact, some argue even more so). However, this importance is increasingly on the interconnections of the human capital and other factors on the supply side, as opposed to the proximity to final markets.

Although popular examples of ICT overcoming distance are often those of international coordination of production, or the ability to communicate with customers half a world away, in many countries overcoming the physical distance is not nearly as important as the elimination of a barrier to competition. Imagine the local impact of a fishing boat on its way to shore using a cell phone to learn which harbors are offering better prices, or which markets have greater demand for the types of fish in the holds. No longer are producers beholden to middlemen who simply broker information; they negotiate in a market closer to perfect information, with each party benefiting in proportion to the value they contribute.

The Caribbean has a significant number of companies and sectors that are using ICT to expand their market base, overcome geographic distances and coordinate their business processes. The rate of deployment and usage, however, varies significantly across industries. The service sector appears to be the most progressive one in this realm, especially consulting and offshore financial services. To compete, most of these companies have deployed advanced ICT to manage client services and provide “virtual headquarters”.

Caribbean Offshore Financial Centers

History

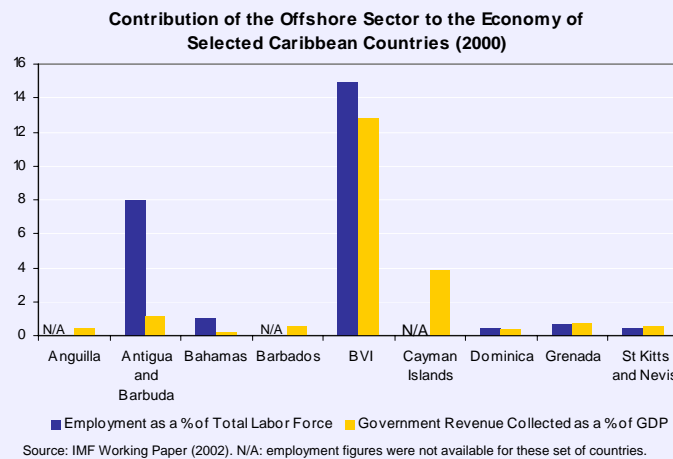
The first offshore center was established in 1936 in The Bahamas to provide management services for wealthy international clients. Thereafter, operations expanded into other British overseas territories such as Anguilla, the British Virgin Islands, and the Cayman Islands. As these centers benefited from employment creation and revenues coming to governments and authorities, other Caribbean countries looked to replicate these efforts. In 1982, offshore companies began setting up operations in Antigua and Barbuda, followed by a handful of companies in Nevis and Grenada. Dominica started promoting this sector in 1996 and just recently, St Lucia and St Kitts have introduced legislation to attract offshore companies.

Benefits of the Industry

As of 2000, the size of the offshore industry in the Caribbean was estimated at US\$10-12 trillion and foreseen to grow at an average rate of 15%. However, these growth rates have been recently downgraded since a handful of companies have come under legal scrutiny and some countries are considering a number of bills aimed at eliminating offshore re-incorporation.

The economic benefit of offshore centers has been largely analyzed, generally for the early entrants (The Bahamas and Cayman Islands). The contribution of this sector to overall employment and government revenue varies across the Caribbean and depends on the offshore operation that is set up. In general, “banner like” companies, which are entities registered in a jurisdiction but with no real physical presence, only pay annual fees but do not employ a considerable number of workers. Most employment in this type of operation is limited to a couple of accountants or lawyers that take care of specialized services for the company. In other countries, as is the case with the British Virgin Islands, overall employment is significant (the high number of employees in Antigua and Barbuda is associated with the inclusion of Internet gaming).

Likewise, fees collected by central governments were small relative to GDP in most of these territories, with only Antigua, the BVI and Cayman Islands receiving more than 1% of GDP.



Finally, some studies have tried to gauge the contribution of this sector in term of spillover effects to other sectors of the economy.⁹⁹ In general, they have found that as financial services grew in the local economy, positive spillover was attained in areas such as services (hotels, restaurants and catering) and infrastructure (telecommunications and transportation), since they had to be upgraded and expanded.

Today, many of these offshore centers have become commoditized, offering little more than tax havens. This, however, is a degradation of the original differentiated value proposition. One innovative path forward is the virtual headquarters.

The Offshore Financial Sector- the “Virtual Headquarters”

The offshore financial services sector has been at the forefront of ICT usage both in terms of developing a sophisticated interface to communications with their client base, as well as to diversify the financial offerings provided. Companies are now providing “virtual Headquarters” built around sophisticated technical components, secure software applications and aggressive investment strategies. Clients can also take advantage of interactive asset management tools and brokerage services. The development of this sector has also created increased demand for supporting and administrative services, such as customized software applications, specialized strategic and legal consulting, knowledge management and bank compliance services, etc. However, the extent to which this market is served by local services is fairly limited. Although accountants and lawyers are regularly employed locally, most offshore companies outsource sophisticated IT requirements to North America or Europe. As was discussed in 3.3 (software development), the availability of skilled labor is the major obstacle for the development of this highly attractive market of supporting services.

There are other niche services sectors that are exclusively reliant on ICT as a way to compete without geographical borders. An interesting example is the gaming industry in Antigua.

The online gaming industry has developed in places like Antigua and Dominica thanks to the welcoming regulatory environments of these countries, and ICT providers able to upgrade to the industry's requirements. Gaming is a US\$6 billion industry worldwide, and virtual casinos are overtaking sports betting. There are essentially two types of services: one is *Virtual Casinos*, where all games are played online (black jack, poker, slot machines, etc.) and the company has a predefined hold, or margin of around 2.5% (this is lower than in a land-based casino, as Las Vegas which has a 3-4% hold).¹⁰⁰ The second type of service is *Sports Books* that allow customers around the world to bet on real-life sports and other events. These require much more highly skilled labor to run, including risk managers who are experts on the different sports to be able to calculate the starting odds. In this type of betting margins vary between 4.5% in football, to 11% in certain soccer combinations.

⁹⁹Suss E., o. Williams and C.Mendis (2003)

¹⁰⁰Margins refer to InterTops, on of the largest online gaming companies left in Antigua, from an interview with its COO, Michael Mearz.

Running these businesses involves a number of ICT services from web design and interactive web tools, to setting up secure systems for online transactions.

Gaming Industry in Antigua: How to Make a Good Business Go Away

History

The gaming industry began as an illegal activity in many small Caribbean islands. Antigua's government approached this situation as an opportunity and entered the industry early on. In 1996, the government took the necessary steps of legalizing, licensing and regulating the industry. The development of the industry was undertaken in a very proactive manner: the country invited experts from around the world and studied legislation in major gaming markets like the UK and Australia. The result was not only the provision of a set of incentives to attract foreign companies, but also a well regulated environment supervised by a rating organization that would control quality in the industry, and receive complaints from customers. This seal of approval has become a stamp of credibility and attracted companies to Antigua despite their higher licensing fees (Licensing fees range from US\$50-80K and involve an in depth due-diligence process. Compare this to Costa Rica that offers fees as low as US\$800). Also, a population with solid communications skills and the comparative advantage of the same time zone has given Antigua the lead in servicing the US market over other destinations.

Benefits of the industry

In 1996 – 2000, the industry provided US\$ 25 million of revenue for the government. In 2000, there were close to 100 firms operating from Antigua. These companies are obliged to keep their servers on the island, so they employ highly skilled engineers, web-designers, customer service representatives, etc. Salaries are relatively attractive, paying US\$15 – 18 per hour. Intertops, one of the top firms in the industry, employs a total of 53 staff members and 12 bet managers, with a monthly salary ranging from US\$ 2,900 – 3,700. Further, the company invested in training and recently sent their technical team to a series of courses at the newly opened International Institute of Technology in Antigua. Despite the negative societal connotations, young IT professional are eager to take jobs in the gaming industry and there is low turnover, because aside from the pay, "it's much more fun to be in a laid back atmosphere, watching the NFL games, dealing with customers, than working in a bank", according to one manager. By law, companies need to hire 3 locals for every foreigner.

Current Challenges and Opportunities

There is still a certain stigma around the gaming industry, and most governments in the Caribbean either do not want to get involved or have passed very restrictive regulations to monitor this sector. Not surprisingly, this has often inhibited growth. For instance, in 2001 there was an exodus of firms from Antigua as a result of a new government policy that required a 3% tax on income. This made it unviable for the Virtual Casinos whose margins were 2.5%. The government also wanted to introduce a black box into every operator's servers so that all betting transactions would be monitored by the regulating agency. This caused several operators to leave. After 18 months, the government then decided to abolish the 3% tax, but by then Antigua had gone from 80 to 15 online casinos.

The US has also become more stringent in regulating the industry. The Oxly Bill prohibiting the funding of offshore casinos was piggybacked in the 9/11 commission but was not passed. Still the US is making business difficult by prohibiting Visa and MasterCard transactions for online betting, under the reasoning that funding could end up in terrorist hands. In August 2004, Antigua had an important victory in the WTO, respecting Antigua sovereign rights to allow gaming within its borders. It complained of US\$ 85mm in lost revenue due to a US regulation that forbids credit card companies from allowing gaming transactions. The Gaming Commission has played an important role to secure the interests of the industry. This should be advertised since having a government that goes to bat forcefully for the industry might bring some operators back to the island. A potential solution that Antigua could negotiate with the US is to allow transactions from Antigua since they are fully compliant with stringing regulations and auditing to make sure their funds and gains are legitimate. If a new credit card code for billing could be devised for those coming from Antigua (or those countries with good regulation), it would bring further transparency to the industry. All of these problems have a solution that employs both policy and ICT.

Others still see an opportunity in the business, since they are some of the largest employers of programmers, web designers, etc. The International Institute of Technology has explicitly asked for the skills necessary for the gaming industry to train Antiguan, and the impetus of the school was partly due to the uptake in demand from this industry. Still, experienced bet managers are scarce, and are highly coveted world-wide.

The telecommunication rates are also a big impediment, particularly on international telephony. InterTops pays US\$ 10,000/ month for connectivity and telephony. Although these prices are very high, Cable & Wireless has been compliant in upgrading their equipment to manage the traffic brought by gaming companies. Service providers should also provide solutions to protect against hackers that sometimes swamp the sites with traffic and blackmail the companies. Finally, customs ought to be streamlined: although no duties are levied, companies need to wait for weeks for servers and IT equipment to clear customs, imposing unnecessary costs throughout the system. Once again, the potential solution to every problem includes ICT.

The manufacturing and agro-processing sectors have had fewer positive examples of using ICT. Yet particularly in facing the problem of repositioning and transforming the agricultural sector, ICT have a very important role in the marketing of products and search of new niche markets.

For instance, Erica's Country-Style is a US\$ 200,000 agribusiness company in Kingston, St Vincent that manufactures pepper sauces and other food snacks for the Caribbean and US markets. Founded more than 20 years ago by Erica McIntosh, the company employs close to 10 people in its Kingston facility and buys produce and raw material from more than 200 farmers across the island.

Three years ago, the company decided to launch a website to make their products known to a wider market (www.ericascountrystyle.com). Soon after, customers in the US started sending orders and requests for product information through the Internet. Initially orders were processed from St Vincent and delivered by courier; however, the costs associated with delivery were disproportionate to the US\$2.00/bottle retail price. Hence, since April of 2004, the company has partnered with an agent in the US that distributes other types of Caribbean ethnic foods and serves the company's North American market.

Currently, customers wishing to buy this product need to contact the company's agent in NY to have orders processed. However, Ms. McIntosh foresees that by end of year online transactions will be possible. Most of the delay has been associated with the website developers, a Canadian based company handling the project. Notwithstanding, after launching the website 3 years ago the company went from having no presence in the US market to receiving 7-10% of its revenue from this new market segment.

While this example is on a small scale, it holds widespread promise for the legions of Erica's throughout the Caribbean.

Services

Trinidad and Tobago offers another example of how the use of ICT could leverage its domestic energy sector to develop world-class upstream industries and related services such as geological consulting. There is an important opportunity for Trinidadian firms to target this profitable market of sophisticated multinational firms with services such as geological modeling, deep-sea drilling, and construction of drilling platforms. There are also some important opportunities around specific oil-industry software and data processing that can be developed given proximity to sophisticated demand inside the country and in Venezuela. According to a BP executive, sourcing these services locally would be extremely attractive to his firm.

Literally billions of US dollars are spent every year for these upstream activities. For instance, BP spends almost half a billion dollars in geological work, design engineers, deep sea drilling, fabricators to build platforms, and other oil and gas consulting services. It has been projected that almost 40% (US\$ 200 m)

of those outsourcing services could be contracted out to Trinidadian firms.¹⁰¹ Although a whole range of skills and capabilities are missing since training and education has not kept up with labor market demand in this sector, there are some examples that hold promise. One such living proof of success is deep sea drillers, which are by world standards very resistant because it is hard to drill on Trinidadian ground. These drillers have so far been exported to Egypt and the potential is there to broaden this market elsewhere.¹⁰² Another relevant example is data modeling and visual graphics (such as next-generation CAD). This is particularly relevant for geological design, and infrastructure projects in the energy sector. More training in this area would improve local firms' access to contracts around exploration and/or design of extraction platforms.

These are high-tech services that *build on* Trinidad's natural resource wealth, as opposed to exploiting it. These complex services will be just as relevant as exports even after Trinidad's own natural resources reserves are exhausted.

¹⁰¹ Interview with ex-BP manager. January 2004.

¹⁰² Ibid

4.4 Understand and Improve Competitive Positioning

Information can, in truth, be a double-edged sword. In the past, when physical barriers like oceans mattered much more and unprocessed commodities commanded high prices, the concept of a competitor was largely limited to the other local plantations, mines, or factories. While the advent of ICT has been heralded as the opportunity for firms to enter new markets and better serve customers, firms must also recognize and embrace the idea that they have no lock on their existing markets and customers. Just as they should seek to find and serve better customers, they should prepare to see competitors looking to take existing customers away.

Only a few years ago, firms wishing to undertake market research were facing significant costs and implementation times. For all but the largest firms, or those lucky enough to serve slow moving markets, the data was often outdated before the actions upon which the data depended could be implemented. Now companies of any size (with almost any size budget) can utilize ICT to gather customer and competitor information in near real-time, allowing them to make timely and informed decisions about how and where to compete.

The sources of industry information have proliferated in the Internet, and they are investing more and more to improve their reputation as reliable, updated sources of information. Savvy entrepreneurs can use these online sources: from company descriptions, industry reports to customized research to understand what similar companies are doing around the world, and how to stake out the right competitive positioning.

The music industry in Jamaica went through this exercise. Musicians and producers in Jamaica were seeing their music rise in international charts, but were unable to either control that process, or reap the benefits of their talent. An in-depth analysis of their competitive positioning in world markets, allowed them to create a new offering that reversed these trends. They looked at markets growing in reggae bands and worked to advertise their production services to them, instead of seeing them as competitors. At the end of the day, the more Jamaica is involved in music production, particularly if international bands come to Jamaica for their services, the more financial benefits they could accrue from the popularity of their music.

Jamaica Music Production- Jamaica Signature Beats

Founded in August 2004, Jamaica Signature Beats (JSB) is a non-profit company comprised of Jamaica's most talented music producers, studios and professionals which have joined forces to provide technical and creative expertise to the international music industry. The project was initiated by the Jamaica Cluster Competitiveness Project, financed by USAID, DIFID and the Jamaican Exporters Association. JSB members seek both to distinguish their services in the international market and to make them easily accessible to bands interested in recording music in Jamaica. The organization has grown over the past three months into an exclusive network of over 30 members who have the ability to produce and record a range of musical genres which include Reggae, R&B, Jazz, Hip Hop, Rock, Country and Instrumental.

Market analysis uncovered two characteristics of the Jamaican Entertainment Industry which made the Jamaica Signature Beats initiative a unique opportunity: market distortions and informational barriers. The two are linked, in that market distortions (low trust, low communication and low collaboration) have resulted in informational barriers and asymmetries within the industry – which translates into a fragmented and disjointed international perception of the Jamaican Entertainment Industry. If these informational barriers could be eliminated, it would be easier for international participants to approach the Jamaican Entertainment Industry thereby facilitating stronger linkages between the Jamaican and Global music industries. International labels and bands would benefit from the technical expertise, authentic vibe and cost effectiveness of Jamaican music production while Jamaica would benefit from increased revenues and investment in its entertainment industry and secondary benefits affiliated with tourism. Bands spend between U\$ 10,000 to 100,000 in a 10 day trip between music services (studio time, engineers, mixers, producers, musicians, etc) and logistics, making this an attractive, high-end service.

Jamaica Signature Beats has applied ICT to address both the market distortions caused by low trust and communication and the informational barriers that result from the industries fragmentation. The most tangible example of JSB's application of ICT is through its interactive website. www.jamaicasignaturebeats.com. In order to connect with international clientele the website provides an outline of the services provided by JSB (booking and logistical services) in addition to extensive credentials of its respective members. The website allows international labels and bands interested in recording in Jamaica to browse through the various bio pages displaying the history, genre of expertise and track record of the each member. Viewers can also download and listen to 2 digital sound files for each member, providing prospective clients a real taste of the talent and expertise of Jamaican producer. This information had not been captured and verified in the past, making it difficult for producers to promote themselves. Furthermore, besides giving prospective clients samples of the products of JSB members, the website also displays JSB's strict membership criteria helping ensure the client of the quality of the service provision. JSB has an operational arm in charge of checking that members comply with standards of quality, service and security. They provide randomized surveys to track customer satisfaction to make sure that producers and studios are on time, full-fill their contracts and produce great music for their clients.

In addition to the website, JSB embarked on a public relations campaign with the assistance of Ruder Finn International that relied heavily on the Internet. JSB electronically distributed its press release to over 100 printed publications within the United States at marginal cost to the organization directing prospective clients to their interactive website. This campaign has resulted in a dramatic increase in transit to the site, and members being called from international clients interested in coming to Jamaica to record.

JSB represents the first initiative coming out of the Jamaican Music Industry in which various players have cooperated and shared information to produce a unique offering to the market. Hence the value added through the application of ICT surpasses its marketing efforts. The creation of the JSB website facilitated trust building between industry players as it served as a public platform through which each member shared information and worked together to bring business to island. The cooperation and ability to showcase a one stop shop of music production was greatly facilitated by technology tools. ICT was not used merely as a marketing strategy but as a platform through which the mental norms of how business was conducted within the industry was changed for the better.

The JSB campaign and information gathering was done intensively through the use of ICT. Also members of the industry realized that the need to be connected, have an email account, record and share music digitally was imperative to increase their revenue potential.

Manufacturing

More traditional manufacturing companies are even more at risk of quickly losing their competitive positioning by the lowering of logistics costs and new low cost destinations entering the market. S.M. Jaleel in Trinidad and Tobago (refer to Case Study on pg. 71) and Gale Force Windows (Case on pg. 59) were two companies in the Caribbean aware that understanding their competitive positioning was imperative in entering their market.

Investigating the competition and their shortcomings, Gale Force Windows saw an opportunity. Traditionally construction companies imported their materials from Miami, but once they arrived they found the windows would not fit correctly. Gale Force focused on the regional markets and made sure it could be price competitive with international vendors, despite importing most of its materials from Germany, US and Canada¹⁰³. Their proximity to the markets it serves and the fact that US companies need to pay taxes and duties while they benefit from the ECS common market were important advantages. They also focus on the high-end of the market, both in terms of the hurricane-resistance and the materials used; PBC windows with embedded steel are resistant to the salt water and require no maintenance. Also, sales in the high-end market involve creating personal relationships with regional architects and developers, which is easier given their presence and familiarity with the market.

¹⁰³ Gale Force imports UPVC glass, steel, handles, hinges, etc. to make French doors and sliding doors.

Unfortunately, this type of in-depth research of the competitive landscape is rare in companies in the Caribbean. Most companies make decisions based on what has worked in the past, without realizing that new competitors and market trends are changing their businesses faster than anytime before. Companies without the agility to both understand their relative competitive positioning and adapt to these changes will not succeed in the long-run. With ICT, being able to get that competitive information and stay abreast of changes is also easier and more cost effective. However, first firms need to understand that competition is no longer within their borders.

SM Jaleel- Company Background¹⁰⁴

SM Jaleel is one of Trinidad and Tobago's premier corporations— today the largest soft drinks manufacturer in the Caribbean. It dominates the Caricom market with leading brands in 4 different sectors, employing over 1200 Trinidadians in factories and distribution hubs across the island. Despite its 80 year old history, SM Jaleel has only risen to competitive levels in the last 25 years. Increased competition and obsolete technology had turned early success into a small 1% of the T&T drinks market by the 1970s. When the founder's grandson took over the company in 1980, however, SM Jaleel was transformed into the company that it is today, exporting to 60 countries worldwide, most notably in the United States, where for example in 2003 it sold 2.6 million cases of drinks through the supermarket chain Wal-mart.

Technology Deepening

The reason for this success is technological innovation. Since 1980 the modernization of technology has been a key strategy, and large investments were made in new modern plant machinery to revamp the factory in 1981. The company continues to update its technology, currently spending between US\$3-5 million on capital investment each year. It currently employs a state-of-the-art integrated production process, including strict quality control, based on Italian-crafted P.E.T. bottling machinery, capable of production at a rate of up to 40,000 bottles per hour. The low marginal costs created by such a modern production line have not only kept SM Jaleel soft drink products competitive, but also led to contracts to supply P.E.T. bottles to other firms, and to package bottles for other international brands. Investment in plant and equipment has been accompanied by investment in human capital. The company places great emphasis on its staff, and invests a significant amount in training each year. SM Jaleel employees go through a structured 3-year training program combining classroom with on-the-job training. Moreover, a strategic partnership with the University of the West Indies, and the Institute of Business, intends to further develop specific training at higher levels. These investments have increased labor productivity and staff retention rates— there is 2-3% turn over with 90% of staff having been at the company for over 5 years.

Niche product marketing

Strategic thinking has been a key feature behind the success, both in terms of the products developed, and how and where they are marketed. SM Jaleel's "Chubby" is the first Caribbean brand to be listed by major retailers like Wal-mart, K-mart and Kroger, and is currently available in 60 countries and 4 continents.¹⁰⁵ While many food processing companies were proud and complacent to have conquered the Caribbean market, by 1993 SM Jaleel— already the premier soft drink company in the Caribbean— was studying the global market in an effort to create an international brand and compete for market presence. After two years of exhaustive market research, they identified an untapped market segment: soft drinks targeted to 4-10 year olds. They identified three product characteristics that drove success: (i) kids wanted the right size and right fit for their small hands; (ii) kids were attracted to bright, transparent colors and (iii) kids were fascinated by a world of fantasy, hence the need to develop a character around the new soft drink. The result was *Chubby*, a bright-colored soft-drink in a 250ml/8 ounce bottle that is now patented in 150 countries and being exported worldwide. The company is now at the stage where it is transferring operating knowledge back to its US and European partners, and is earning royalties.

¹⁰⁴ Case study is drawn from OTF Group interview with SM Jaleel's CEO, Mohamed Aleem and data provided in Wignaraja, G. (2004).

¹⁰⁵ Industry Quarterly (2002)

4.5 Enhance Transparency

In the same way that private sector enterprises use ICT to manage operations or have a better understanding of customer needs, government can use ICT to operate more efficiently and cost-effectively in the services it provides to firms and citizens.

Governments can generally use ICT in three broad ways to improve their service delivery. First, governments can improve the transparency of the business environment by making data widely and freely available. They can manage data and speed up transaction processing times through the use of technology such as database management and data entry systems. Making information readily available to citizens is a move being adopted broadly, from descriptions of legislation, tax codes, bills proposed in parliament to interactive transactions, applications for documents, benefits, etc. Often, government institutions enter this process naively to find themselves forced to improve their processes and outputs given the public scrutiny possible through the web. Secondly, governments can help the business community make more informed decisions. For example, access to up-to-date data such as tax rolls and unpaid taxes can give firms and individuals data to evaluate the quality of potential partners, customers or suppliers. Thirdly, data integration and sharing of information between government agencies can improve the quality of services. When a person registers for an identity card with a new address, those updates can automatically be shared with agencies such as the revenue authority (for tax purposes) and the interior ministry (for census planning).

The yet untested benefit of ICT in the Caribbean is in increasing civic engagement: creating virtual town halls where citizens can quickly provide government officials feedback on policies, referendums and similar initiatives.

Undoubtedly, government can be a very powerful force in instigating change throughout the economy. Given the size of government intervention, this is especially true in the Caribbean. Posting online proposals or creating online procurement sites forces companies that want to win government contracts to become technologically adept. Countries like Argentina and Mexico have successfully made that transition. Despite the important potential, government is also the hardest sphere in which to implement these types of reforms. As in St. Lucia (FINMAN), young, technologically savvy people were hired to change all the back end systems, but did not have authority to change workflows or overcome the organizational resistance to technology.

Antigua's Own Government Local Loop

Antigua is not part of ECTEL, the regional agency that provides advice and makes recommendations on telecommunications matters, and helps to manage the sector in its five member states of the ECS.¹⁰⁶ This is because the government has a Joint Venture with C&W, and owns the local loop network. In many countries this would lead to exorbitant rates and bureaucratic procedures to gain access to the Internet. Antiguan claim this fact has made their ability to transition to e-government much easier than neighboring countries, by not having to negotiate with private companies and pay high rates to connect their offices and put services online.

Their plans are ambitious: to connect all government departments and schools to its central data bank. In the past, after paying Cable & Wireless over US\$1mm for Internet access, only a few privileged had access to connectivity yet since 2001, they managed to connect all government buildings through fiber optic cable, leased line and dial-up to the Internet, and give every government employee access to e-mail. Their website www.antigua.gov.ag publishes up-to-date information on parliamentary discussions, laws, and next year forms will be uploaded for free.¹⁰⁷ All government agencies are being asked to put their information in similar formats so that public sector actors can have information readily available to inform their projects. For example if the Ministry of Education interested in knowing how many schools to build in the next 5 year

¹⁰⁶ www.ectel.int

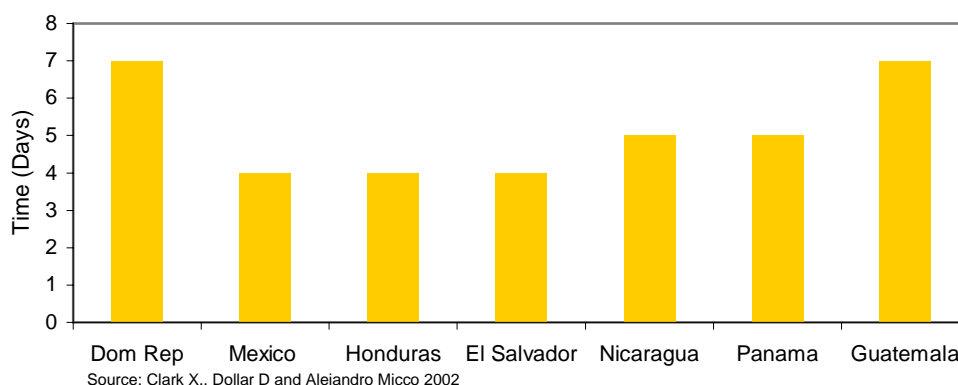
¹⁰⁷ Many of the forms necessary for government services involved a fee. A recent law has repealed this source of revenue to make forms more readily available online, but it will only go into effect in 2005.

period, he can find online the birth registries, number of school age children, immigration numbers, etc. to make informed decisions.

This is the right vision; however, Antigua is still lagging behind its neighbors in computerizing the government, and putting in place any transactional interactivity. The real challenge will be mobilizing state actors to change the way they report information, and to create a transparency that is not customary in this government.

Many of the ECS countries are trying to reform their customs services, but few have had significant success. Their ability to survive as vibrant trade ports, or create distribution hubs for the Caribbean and elsewhere, depends on clear, efficient, and expedited customs operations. For instance, the Dominican Republic lost the valuable business of Dole Dominicana who produced and exported Dominican pineapples due to the corruption and inefficiency of Dominican ports, leading at one point to the spoilage of a whole container. On average, a ship stopping to stock or refuel spends 7 days at Dominican ports, making it a less attractive option than Central American ports such as Honduras and El Salvador (4days). Port efficiency is a significant component of overall shipping cost. Improving port efficiency from the 25th to the 75th percentile reduces shipping cost by 12%. On average an inefficient port is equivalent to being located 60% further away from markets.¹⁰⁸

Median Clearance Time at Ports



E-government

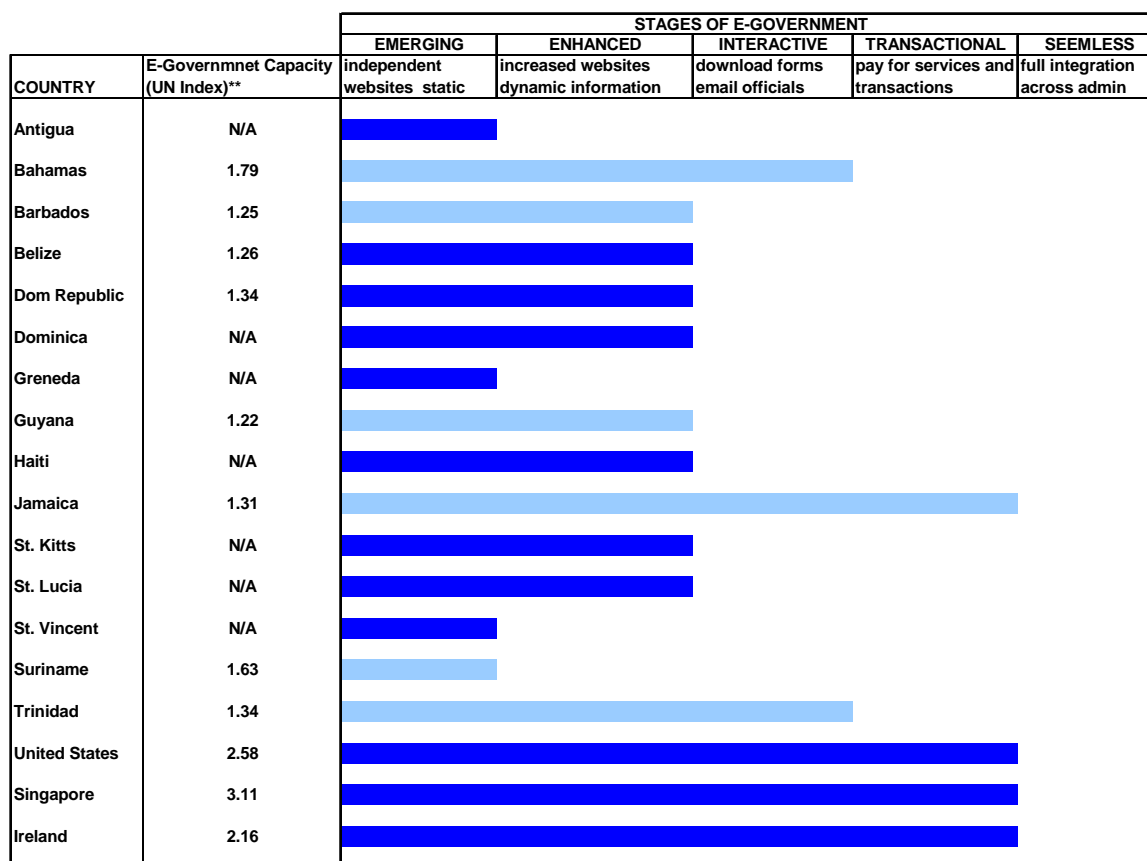
The move towards digitizing government operations and using the Internet as a forum of service provision and reach has been denoted as e-government. According to the United Nations¹⁰⁹, there are 5 stages of e-government- emerging, enhanced, interactive, transactional and seamless. Countries with emerging presence have formal, but limited web presence in the form of independent government websites, with static organizational or political information. An enhanced presence is defined by an increased number of government sites with more specialized information with links to other government pages. These pages also include email addresses and search engines. Countries enter the interactive stage when their websites allow for formal interactions like discussion areas and the search of specialized databases. This stage is also characterized by users' ability to download and submit relevant forms and applications. Countries with transactional presence have government websites that allow users to complete and secure transactions such as obtaining visas, passports, birth and death records and licenses. Users can pay for these online in addition to utility bills and taxes. Digital signatures can be recognized for procurement of government contracts. Lastly, seamless or fully integrated e-governments allow for instant access to any service in a "unified package." This stage, where ministerial and departmental lines are of no consequence, has yet to be attained by any

¹⁰⁸ Clark X., Dollar D and Alejandro Micco (2004)

¹⁰⁹ United Nations (2001)

country. The following table illustrates the stages for the Caribbean countries included in this study as well as countries more advanced in their efforts such as United States, Ireland and Singapore.

Stages of E-Government



■ UN 2001
 ■ Gumansingh, Jassodra. 2003.

However, there are significant challenges that Caribbean governments face as they attempt to transition their information and services towards a fully integrated web presence. These include:

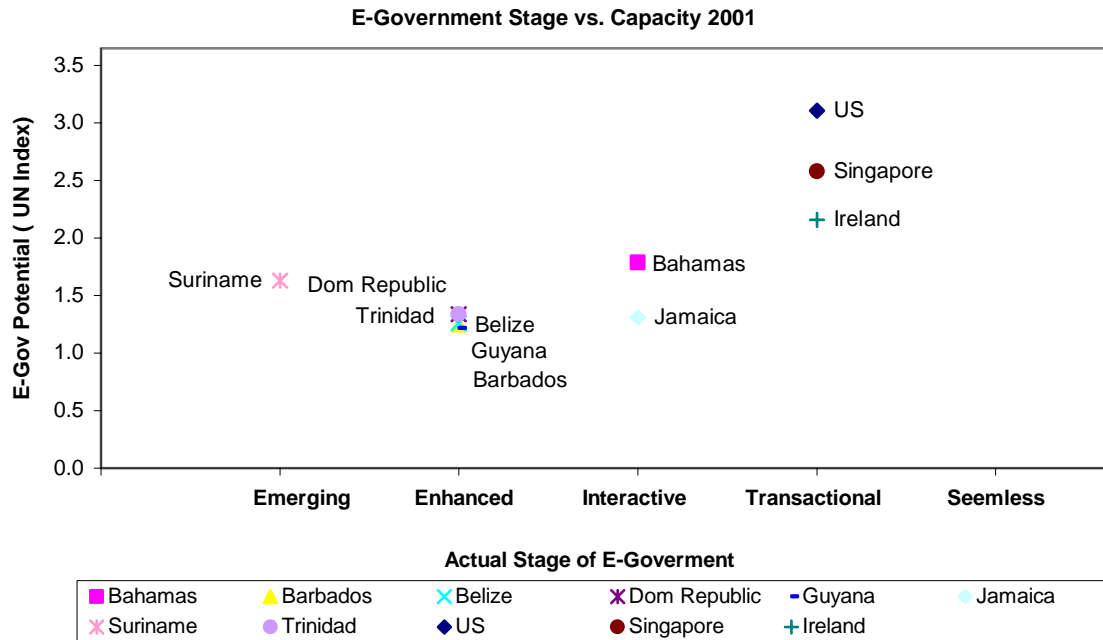
- High cost of telecommunications
- High cost of necessary software and hardware
- Low access to the Internet
- Low levels of ICT education and/or targeted training
- Cultural resistance to ICT adoption

Progress towards overcoming these challenges will require the steadfast commitment of Caribbean governments.

High telecommunications costs and low educational levels are formidable obstacles facing e-government initiatives in the Caribbean. The United Nations survey revealed that the Caribbean has the second lowest regional *e-government capacity index*¹¹⁰ (1.34), second only to Africa (0.84). However, countries with similar e-government capacity indices have attained different stage of e-government. As illustrated in figure X, despite having an e-government capacity index (1.31) lower than the regional average Jamaica is one of the most advanced in its stage of e-government. It is

¹¹⁰ The UN e-government capacity index is comprised of measures of a country's web presence, telecommunications infrastructure, and human capital.

worth noting that Jamaica was also one of the first movers in the region in terms of telecommunication liberalization and is one of the most advanced in its ICT policy frameworks. Jamaica liberalized its telecommunications in 2000, with the passing of its Telecommunications Act.¹¹¹ Similarly, the Bahamas liberalized Internet provision as early as 1996 and successfully passed a telecommunications act in 1999. The Bahamas has an e-government capacity index above the regional average in part due the early commitment of its government to create an environment conducive to ICT usage. The table below shows metrics conceived by the UN that compare a government's potential progress in e-government given its access to connectivity, and its actual achieved progress.



In contrast, Suriname, with one of the highest e-government capacity indices in the region, has an e-government effort that is still in the emerging stage. Analogously, Suriname is the least advanced in telecommunications infrastructure and ICT policy implementation. This observation implies that the vision of the government and its commitment to creating an environment that is supportive of ICT technology is vital to the success of e-government efforts.

¹¹¹ Gumansingh, J. (2003)
Competitiveness and the Role of ICT in the Caribbean

5. Recommendations

The following recommendations encompass areas the Caribbean private and public sector, and multilateral organizations, should focus on to improve the business environment and the ability of firms and individuals to reap the benefits of ICT usage.

| FACILITATE ACCESS | | |
|--|--|---|
| Area | National | Regional |
| Telecommunication Legislation and Policies | Liberalization of telecoms services legislation (facilitation and execution). | Revise regional and national sector legislation to achieve competitive tariffs for consumers and businesses in the region. Regional coordination through ECTEL and CARICOM. |
| International High Speed Connections | Liberalization of international cable connections, and availability of new licenses. | Regional high speed networks along island chains. |
| Wi-Fi , WI- MAX Networks | Support competition in alternative technologies to provide broadband for businesses and consumers. | Leverage support from private sector partners and international donors for pilot projects to determine the viability of the market. |
| Alternative Telecommunications Networks | Examine prospects and policy issues regarding use of alternative telecommunications networks (e.g. utility company networks) to provide expanded communications. | |
| IMPROVE ABILITY | | |
| Training in Applied ICT Business Skills | Develop training programs in ICT applications based on private sector demand (e.g. skill needs identified by firms, trade associations, etc). Programs should include training on market research & data collection systems. | Utilize regional certification boards and regional trade associations to ensure quality and relevance of training programs. |
| ICT Relevant Skill Set | Create & strengthen partnerships between academia and the private sector (e.g. Dominican Republic partnership between the government, local universities and New York's Stevens Institute). | Encourage regional partnerships between academia and the private sector. |
| Tertiary Education & Vocational Training | Applied science and technology need to be a more relevant part of tertiary education and technical and vocational training, as well as entrepreneurial training to support local innovation. | Disseminate and discuss national efforts and outcomes at a regional level. |
| SUPPORT SERVICES FOR FIRMS | | |
| ICT Business Advisory Services | Support development of vibrant ICT business advisory services sector. Use existing SME Business Support Organizations to minimize duplication. | Encourage cross-border ICT business advisory service provision and alliances. |
| Business Incubators | Support business incubators and high-risk financing mechanisms that encourage entrepreneurship and local innovation. | Foster Caribbean-wide networks of SMEs to enable knowledge sharing (e.g. regional business incubator network). |

| REGIONAL HARMONIZATION IN KEY POLICY AREAS | | |
|---|---|--|
| International Compatibility in e-legislation | Develop national e-legislation in compliance with regional and international legislation and best practice. | When possible, move towards international compatibility in e-legislation and replication of best practices. |
| Internet Governance Legislation | Revise existing and draft new legislation to uphold the validity of electronic transactions and records. | Harmonization across the Caribbean in compliance with internationally accepted standards and regulations. |
| Financial Framework for Electronic Transactions | Deploy a financial framework to support electronic transactions | Support a regional financial framework to enable electronic transactions. |
| Knowledge Transfer/Exchanges | Promote public and private sector discussions on the impact of regulation on business. | Promote knowledge exchanges with other countries to learn about different models of legislation and to train regulators on international best practice. |
| TECHNOLOGY CLUSTERS MUST MAKE BUSINESS SENSE | | |
| Assessment of Capital Investments | Feasibility studies, performed in close cooperation with the private sector, are essential to assure that investments in technology clusters make business sense, are demand-driven and guided by a strategic intent. | Create a mechanism or a regular forum for bringing the public and private sector together to discuss key policy issues and proposed public sector initiatives to promote private sector development. |
| Monitoring and Evaluation of Technology Projects. | Regularly evaluate the impact of investments and government incentives in ICT related projects – including spillover effects, knowledge transfers, return on investment (ROI), employment generation, etc. | Disseminate and discuss results at a regional level. |
| STRENGTHEN NEW SERVICE AND NICHE MANUFACTURING | | |
| FDI Attraction | Create public and private sector partnerships to attract investment in promising sectors. | For smaller economies, pursuing partnerships in tandem with neighboring countries could help to create an attractive market opportunity. |
| Innovation and Entrepreneurship | Reward entrepreneurship and innovation through contests and government incentives. Publicize successes. | Support region wide competitions and networking events/workshops. |
| Industry Clusters | Strengthen industry collaboration (clusters) to facilitate access to technical assistance, and address market failures. | Collaborate on inter-island business clusters such as yachting and tourism. |
| Increase ICT Business Usage and Absorption | Facilitate collaborative initiatives that improve access to crucial business inputs and work with governments for targeted support. (e.g. the Irish Industrial Development Authority). | Leverage regional trade associations to showcase best practices and educate the private sector on how ICT can be effectively utilized to improve productivity. (e.g. Caribbean Tourism Organization providing tourism data). |

1. **Facilitate Access.** Access to technology, as noted earlier, is essential for firms and clusters to compete globally. There has been much written about basic and specialized access, including a variety of metrics to determine how and whether a country has a competitive technology platform. They all boil down to one thing: can a businessperson get on the Internet and talk on the telephone with reasonable reliability, and at a cost on par with his/her global competitors? In the Caribbean, the situation is suboptimal in this regard, with some of the highest connectivity prices in the region, and in general, uncompetitive telecommunication markets. For instance, outbound calls are more

expensive than inbound calls, Internet density is still substantially lower than in the US, Singapore and New Zealand and the cost of high-speed Internet is exorbitant.

The liberalization of telecom services is taking place in mobile telephony, but the process needs to be sped up and in parallel, new technologies like Wi-Fi or Wi-Max (longer-range wireless technology) need to be encouraged and widely embraced.¹¹² Most countries continue to grapple with the problems of putting in place effective telecommunications regulations and moving forward with the liberalization process (for example, Trinidad and Tobago, Guyana and Belize among others, are facing these delays). Hence one of the main imperatives is to set clear deadlines for the completion of liberalization in countries that are still pending, and set up statutory bodies to lead and instill continuity in the process of reform. The creation of a Telecommunications Authority is also in an incipient stage in most of these countries and their technical competencies (i.e. standards, competition law, accounting regulation, etc) are still deficient. Further liberalization will largely hinge on the competence, technical capabilities and independence granted to these authorities so that issues such as interconnectivity, rate-setting and investment incentives in telecoms are set to mimic, as close as possible, a competitive model.

Providers of international connectivity for data and voice as well as fixed lines are in most of the Caribbean *de facto* monopolies, because there is no alternative submarine cable network. There is also little economic incentive to invest in underground cable as a second comer in the business in small islands like those in the Caribbean. While current high prices might make it appealing, it is not hard for a regional monopoly like Cable & Wireless to drop local prices and drive competitors out of business. Thus so far, all land line connections from fixed telephones to broadband access required for Internet applications, are bound to use the incumbent's network at their set price.¹¹³

Some Internet Service Providers (ISPs) are already providing Wi-Fi access to the Internet, but the rate of adoption and relatively slow speed offered are still hampering this technology's full potential. As pointed out in a recent study by Eurostrategies, a European-based consulting company, the quality of Wi-Fi service in the Caribbean is still held back by inefficient control of the frequency spectrum and by providers waiting until more competition is in place to increase speed so as to always be just faster than its competitors.¹¹⁴ Governments can create incentives to encourage the entry of more competitors, particularly in Wi-Fi technologies, and help them drive adoption among the population at large.

Pilot projects initially funded by multilateral organizations and the government should be expanded to provide connectivity at greater speeds to the broader community. For instance, Jamaica, with the auspices of USAID has been studying the possibility of adopting the *Last Mile Initiative*, which is a global program to expand the access of communications to a wider scale of the population in emerging markets. One of the components of this program is the innovative deployment of low cost technologies such as Wi-Fi and Wi-Max in remote communities and SME firm networks.

These technologies, however, are usually adopted by the larger and more efficient firms first, and then replicated through the economy. Thus, speedy regulation change, incentives for new competitors and technologies and protection from unfair competitor behavior from the incumbent will have the most profound impact.

2. Improve Ability. A key input for improving the region's competitiveness is the *upgrading of knowledge and human capital*. In this sphere, the Caribbean considerably lags in relation to any developed country. This should become an immediate priority for governments since it is well known that any investment in upgrading intangible assets requires both practice and patience over the long-

¹¹² Refer to Recommendation 4 – Regional harmonization of Key Policy Areas Related to ICT- for a detailed review of what OECS is doing in this realm through a second-round of ECTEL.

¹¹³ Eurostrategies (2004)

¹¹⁴ Ibid

term to fully materialize and translate into improved productive capacity of a country. First, the gap in tertiary education is worrisome. While primary and secondary enrollments are in line or in some instances above other developed countries, enrollment rates at the university are less than 10% in almost every country (except for Dominican Republic, Barbados and Bahamas that have upwards of 20% enrollment). In response to this, governments have created a series of programs and technical schools and have made program accreditation easier and courses more flexible. These are efforts in the right direction; yet, businesspeople still point to difficulties in getting the right local skill set for their businesses. Some highlight deficiencies in general managerial and marketing skills as stated by the CEO of Gale Force Windows in Antigua: "We don't have a problem recruiting for our factory and providing training, what we need are managers that can open new markets, and interact with our customers to create new opportunities for the business"; others, say the skill gap is especially true in more complex direct IT jobs, data processing and software development and maintenance, as noted by the COO of an Internet gaming company: "We are obliged by law to hire locals at a ratio of 3:1, while that is not a challenge given our competitive pay, the real experts in IT and gaming are coming from the UK and Australia."

In this sphere, there is a clear role for government and private sector organizations to provide targeted support. Governments should support private training schemes by providing well-designed training incentives for firms, through fiscal incentives, matching grants or subsidies as appropriate.¹¹⁵ Furthermore, governments and international donors should support training agencies that provide demand-driven programs and prove to have private sector linkages. These linkages can be created through internships and exchanges that bring back relevant market knowledge into the classroom. Private sector organization and trade associations can also spearhead these efforts by working in conjunction with the government to make training relevant to the labor market and to inform SMEs of the training options available to them. For example, a call center in St. Lucia spent over US\$ 10,000 for a specialist to train its staff. This type of training could be organized by trade associations to encompass more players and spread out the costs.

Local universities need to connect to the needs of the private sector, to understand the demands on future employees and to engage in applied research. Currently, most of the successful businesses are led by Caribbean people that have returned after receiving advanced degrees or having job experiences abroad.¹¹⁶ More partnerships, like the one spearheaded by the Dominican Republic's government, local universities and NY's Stevens Institute, need to be replicated to improve the quality and applicability of local degrees. Applied science and technology need to be a more relevant part of tertiary education and vocational training. Government institutions and international donors can help mediate these partnerships and sponsor conferences to share and prize advancements in areas of science and technology.

One of the major challenges in the Caribbean is extending training to smaller and medium sized firms which currently are much less likely to use formal training. Small firms are more constrained by resources, lack of knowledge about training and its benefits, and labor turnover than are larger firms.¹¹⁷ There is a rationale for the government to subsidize firms that provide on-the-job training for *general skills*, or to subsidize private training facilities that offer general training. Regional certification boards can also improve and harmonize regional standards in ICT technical degrees to international standards. Companies like Gale Force windows applied to receive subsidized training from ex-Canadian International Development Agency (CIDA) technical support services in St. Lucia, but were denied for unknown reasons. They wanted to train key personnel on back end IT systems so they could connect their factory to their accounting and sales offices, but could not afford to do so on their own.

¹¹⁵ De Ferranti, et al (2003) and interviews with several company executives included as case studies in this report.

¹¹⁶ This was true in most of the case studies of new ventures presented in this report. For instance, entrepreneurial spirit such as the one depicted by Digisolv (St Lucia), Erica's Pepper Sauce (St Vincent) and the Caribbean Medical Imaging Center (St Vincent) came from Caribbean people that have returned after receiving advanced degrees or work experience abroad.

¹¹⁷ Ibid

Country specific analysis should be performed in order to identify any externalities that may impede effective training (information, financial, labor turnover, etc) to arrive at sound training policy design. However, a general finding of this report is that small and medium sized firms should be the primary targets for incentives to encourage training.

3. Support Services for Firms. The availability of support services and financing for start-ups, particularly in technology based businesses is almost non-existent in the region. The failure to deliver funds and technical capabilities to small ventures is the largest impediment for their growth. A conservative banking sector and exorbitant interest rates contribute to the situation. For instance, most SMEs surveyed in this study raise funds through traditional commercial banks loans, where they face upwards of 12% interest rates and in most cases require 100% collateral. This calls for the development of higher-forms of financial intermediation and venture capital to develop: long-term securities, subordinate debt, equity, etc. Although this is a problem faced by the broader developing world, there are some interesting initiatives in the Caribbean worth noting.

Jamaica has begun a business incubator (the Jamaica Technology Innovation Center -TIC) that currently hosts 26 technology businesses, providing marketing and management services and modern communication facilities. Although a business incubator's core competency is not in providing access to finance, they can be a potent mechanism for intermediating venture capital and establishing networks of investors. To this end, the TIC is trying to establish an Angel Investment Network to help start-ups gain access to funds. This growth investment fund will typically consist of high net worth individuals that want to provide seed capital to emerging companies. For instance, Jamaican/Canadian billionaire, Michael Lee Chin has recently pledged a US\$1 million contribution to be disbursed to the institution over the next five years.¹¹⁸ This strategy is worth analyzing, given that the Caribbean Diaspora communities both in North America and Europe, could become a potent force for new venture financing in the region.

Business Incubation

Business incubators facilitate the process of business enterprise development by helping start-ups survive and grow when they are most vulnerable. They provide a range of services, from hands-on management and technical assistance and access to finance, to support services and infrastructure such as office space and communication facilities.¹¹⁹ Although their core competency is not centered in providing access to finance to SMEs, they can be a potent mechanism for intermediating venture capital and establishing networks of investors.

There are basically two types of incubator models: non-profit and for-profit incubators. The former are typically set up to: "help achieve economic development goals such as job generation, creation of a technology infrastructure and commercializing new technologies, etc".¹²⁰ These incubators generally sustain themselves through the rent and fee based model charged to clients, which is highly subsidized, and through complementary consulting and training fees. The second model usually involves taking equity stakes in the incubator's client companies in exchange for supplying office space and services.

At the end of 2002, there were approximately 3000 business incubators worldwide, with approximately two thirds based in North America and Europe and the rest around the world. In general, research suggests that the less an incubator relies on subsidies, the more successful and viable the incubator is.¹²¹

¹¹⁸ Technology Innovation Center www.jamaicatic.org

¹¹⁹ NBIA www.nbia.org

¹²⁰ Ibid

¹²¹ Ibid

Research by the National Business Incubation Association (NBIA) highlights the following facts about business incubators:¹²²

- Publicly supported incubators create jobs at a cost of about USD 1,100 each; whereas other publicly supported job creation mechanisms commonly cost more than USD 10,000 per job created
- On average, every 50 jobs created by an incubator client generates another 25 jobs in the community
- Business incubators generally reduce the risk of small business failures. Members of the NBIA report that more than 80% of the companies that graduate are still in business after two years

Jamaica's Technology Innovation Center (TIC) is the sole technology incubator in the Caribbean. As the following case study illustrates, TIC has made a commendable effort in adopting and executing this business development mode. The incubator is deficient in terms of setting clear and unflinching performance metrics and success criteria for companies to "graduate", and battles to find ways to become financially sustainable and less reliant on subsidized funds.

Jamaica's Technology Innovation Center (TIC)¹²³

In 2002, the University of Technology Jamaica (Utech) set up a Technology Innovation Center (TIC), formerly the Entrepreneurial Center in Kingston. The Entrepreneurial Center had been operating for more than 17 years, until in 2002 TIC was established as a vehicle to facilitate the broader government's objective to encourage technology development in Jamaica. At this time, a new building was constructed with a total of 26 suites to provide office space, communication facilities and technical assistance to small technology start ups that can stay on premise for a total of three years.

To date, TIC has approximately 17 people working on premise, ranging from an incubator manager, an information systems and marketing officer, and an accountant, to several support employees. The incubator is overseen by a Management Board chaired by the president of UTech, a senior administrative staff from the university and senior member of the private sector. The incubator's total budget amounts to JA\$ 45 million (US\$ 750,000), and is sourced from the government of Jamaica, the Canadian International Development Agency (CIDA) and its own revenue generating activities. The latter constitutes somewhere between 50%-60% of the incubator's total funds that are collected through rent and tenant fees, and consulting and training programs offered to the private and public sector. TIC is associated with the Western Association of Colleges and Employers (WACE) and the National Business Incubation Association (NBIA) in the US.

Currently, the incubator is fully occupied mostly with firms developing Internet-based technology and customized computer software. One client of the incubator is in quality control and another in commercial media productions. In terms of number of employees the largest firm has 17 fulltime employees and 2-3 owners and the smallest one 1-2 employees. Their client base is quite mixed—they serve large Jamaican companies, public sector organizations and international businesses. Those that hold market presence abroad are mostly into software development or software solutions. Furthermore, some have established joint ventures with larger overseas organizations that work in Jamaica.

To apply for TIC office space and complementary services, start-ups go through a series of steps. First, applicants are screened based on the extent that they satisfy the criteria of using technology to enhance business development. Having satisfied that screening process, applicants provide a business plan and present it to the incubator's board. TIC usually facilitates this process by providing technical assistance in drafting business plans and proposals. Finally, applicants are assessed based on a range of expertise and entrepreneurial experience. However, as pointed out by TIC's senior

¹²² NBIA www.nbia.org

¹²³ Information in this case study is based on an interview with Mr. Niven Walker, Senior Manager of the Technology Innovation Center in Jamaica.

manager, this screening process is largely subjective and no clear metrics exist as basis for choosing potential tenants.

Once accepted, clients pay a highly subsidized rent to access the incubator's office space and its support services. Currently TIC is also trying to establish an Angel Investment Network to help start-ups gain access to funds. This growth investment fund will typically consist of high net worth individuals that want to provide seed capital to emerging companies. For instance, Jamaican/Canadian billionaire, Michael Lee Chin has recently pledged a US\$1 million contribution to be disbursed to the institution over the next five years.¹²⁴ The incubator also has in place a partnership with the National Export-Import Bank of Jamaica Limited (Ex-Im Bank) to grant start-ups short-term loans at a fixed interest rate of 12% on the reducing balance.¹²⁵ So far, only one incubator client dedicated to commercial media production has been able to secure a total of JA\$ 4 million in financing through this scheme.

Companies "graduate" when they transition from being start ups to anchors; however, the incubator does not have precise benchmarks or criteria for how the transition takes place. Since the contract for a tenancy obliges companies to share their financial information, the incubator monitors company performance by looking at their cash flow, revenue performance, sales, etc.

Current Challenges

As suggested by the center's Senior Manager, the challenges faced by the TIC fall in 3 areas:

1. Providing financial assistance to client firms: although the incubator's program for launching an Angel Investment Network is underway, financing is one of the biggest challenges for start ups. The incubator sees itself more as an intermediary than the actual provider of funds. Ideally TIC would be affiliated to a fund set up by this investment network.
2. Adapting to changing technological needs: as technology changes, the challenge for TIC is to adapt the incubator's technology since new adoption is quite costly.
3. Managing the incubator to a state of financial sustainability: currently the incubator is very heavily subsidized, but this is not envisioned in the long term. Hence, there is a need to find other profitable complementary activities to subsidize its core business.
4. Expanding capacity and incorporating more clientele: as the concept of an incubator becomes widely publicized, demand increase and current capacity becomes a limiting factor for expansion.

Furthermore, incubators can help nurture new enterprises in their most vulnerable phase until they "graduate"—that is, they are financially viable and freestanding to leave the incubator. To do so, however, there are some guidelines that should be followed so that they do not constitute the next IT fad in the region. First, although the most common sponsors of business incubators are academic institutions and government agencies, research suggests that the less an incubator relies on subsidies, the more successful and viable it is.¹²⁶ This calls for a clear strategy of how the incubator will reach financial sustainability both by providing services to in-house start-ups and training and consulting services to other private and public sector firms. As incubators move towards this path of financial viability, it is typical that their budget moves away from being almost 50% provided by government or multilateral organizations, to almost free standing on its own revenue-generating activities. Second, incubators should draw a clear line between financial intermediation and providing direct financial assistance to firms. The former is their actual role and they should try to set up networks of potential investors that can help raise start-up capital. Finally, the incubator should have clear and unfailing performance metrics and success criteria for selecting companies and for them to "graduate."

Another area for SME support is technical assistance, particularly as it relates to the use of ICT in transforming business processes. Technical assistance is in some cases easier to channel, since financing sometimes lends itself to different pressures and can become concessionary subsidies in

¹²⁴ Technology Innovation Center www.jamaicatic.org

¹²⁵ Ibid

¹²⁶ NBIA www.nbia.org

some developing countries. Government funded SME support agencies are rare in the Caribbean and those that exist tend to lack the strategic vision, resources, autonomy and linkages with successful firms to promote private sector development with an ICT edge. For example, Trinidad established three institutions to support the private sector.¹²⁷ However, they remain disconnected from the needs of firms and lack the technical capabilities and entrepreneurial expertise that is key to uphold the legitimacy of such institutions. As a case in point, the National Entrepreneurship Development Company Ltd. (NEDCO) is perceived as an instrument of political patronage or as a social development program of income redistribution. On the other hand, organizations, like the Centro de Apoyo a la Micro, Pequeña y Mediana Empresa (CAMPE) in the Dominican Republic that provide market information on numerous industries, and legal and financial advice for local businesses are important in fostering entrepreneurship. For best results, these organizations need to have (i) a clear mandate and strategic vision, (ii) the in-house technical capabilities to execute on that mandate, (iii) private sector involvement and personnel with entrepreneurial expertise to bring forth institutional legitimacy and strategic guidance, and (iv) performance metrics to assess an agency's successful interventions with the private sector.

Regional trade associations could also help, not only in aggregating supply and stimulating demand (collective marketing, training, market research, etc), but also in providing knowledge resources on how the sector could improve performance and utilize ICT. Although currently most of these organizations are not active and their use of ICT is predominantly through "static" websites with entry forms, some like the Caribbean Tourism Organization (CTO) are more dynamic in this regard.¹²⁸ The CTO has a Management Information System for Tourism (MIST) and an Intranet/Extranet that serves as an important catalyst to the advancement of technology platforms within this sector and as powerful market research tools for smaller firms. Cluster-based initiatives funded by donors, governments and the private sector organizations can improve the competitiveness of a sector through collective initiatives that upgrade the clusters' products and services. These initiatives often involve improved technology platforms incorporated by the cluster as a whole, as seen by the Bermuda Escapes project that used a common back end IT system to track and tailor tourists' experiences.

4. Regional harmonization in key policy areas related to ICT: As more people turn to ICT to do more of their day-to-day operations, it is imperative that legislation is kept attuned to ICT and its use. The more legislation is harmonized in the region and compatible with international standards, the greater the benefit to these economies and their attractiveness to foreign investors.

The legal enforcement of electronic documents, protection of intellectual property and privacy, further liberalization of telecommunication's market, development of a framework to support electronic transactions, and enforcement of electronic documents and contracts are amongst the priorities in this realm. Laws on intellectual property as it relates to the Internet- in code, data, music or other content -has important implications for businesses selling into a multi-jurisdictional world. Keeping abreast of these changes and providing up-to-date, enforceable legislation will affect the region's ability to transact with and attract foreign businesses. Mauritius for example, has been a leader in this realm in Africa and has convinced Microsoft, Hewlett Packard, and IBM to set their regional headquarters in the island.

Ideally, the Caribbean should proceed in these reforms as a regional block. Alternatively, smaller country groups such as the OECS can proceed in tandem if it speeds up the process. To date, the OECS and the Caribbean Single Market and Economy (CSME) have taken important steps in some of these areas. The advantage of this regional alternative is two fold. First, it constitutes an immediate step towards regional harmonization of practices and legislation, which by default, will most likely guarantee international compatibility in e-practices and attempts at replicating best-practices (for instance in telecommunication's regulation). Second, it allows individual governments to move more

¹²⁷ In Trinidad and Tobago, the institutional map for private sector development is comprised of three organizations: the Tourism and Industrial Development Company (TIDCO), the Business Development Company (BDC) and the National Entrepreneurship Development Company Limited (NEDCO).

¹²⁸ Bertin (2004)

swiftly in the reform process, as each country focuses on facilitation and execution rather than on drafting country-specific legislation. For instance, an OECS Telecommunications Reform II Project is currently being drafted to expand the reach of the first OECS Telecommunications Reform Project and tackle some of the persistent telecom regulatory challenges in the region. Specifically, the new project is expected to build on the reform agenda and set clear guidelines to move forward along two key components:

- Bolstering support for legal and regulatory reforms that are presently underway, such as the establishment of a dispute resolution mechanism for private operators, outlining of policies and procedures for interconnection issues, and capacity building and training to strengthen the Telecommunications Authority and the Spectrum Managing and Monitoring System (SMMS), and;
- Reviewing of the current Universal Access Policy and the establishment of a Universal Access Fund (UAF) to uphold it.

Looking forward, one of the major challenges and, if instituted one of the new project's major accomplishments, would be the design and implementation of regulation for interconnection pricing-physical interconnection and interconnection fees (especially fixed-to-mobile interconnection fees and mobile-to-fixed call termination charges). Interconnection pricing must cope with two problems: the market power of local access carriers in termination charges¹²⁹ and the incentive of the incumbent not to offer interconnection to entrants (or to provide technically inferior connection between its facilities and the facilities of a competitor).¹³⁰ Hence, the goal of the new telecom reform project's interconnection pricing scheme is to determine a modern cost methodology and an interconnection regime that diminishes the incumbent's market power, lowering costs and increasing competition.

In the case of the CSME, model legislation is being drafted in the area of Competition Law, Consumer Protection and Anti-Dumping and Countervailing measures.¹³¹ But other important issues such as intellectual property and e-enabling legislation (e-commerce regulation, electronic signatures, Internet banking and transactions and Internet crime) have not been tackled on a regional manner. The CSME should extend its reach to these areas, and donors can support these institutions in prompt implementation and regional harmonization in these topics.

As the CSME proceeds as a block, it is also important that regulators be trained in technical aspects and participate in international ICT/Telecommunications workshops to remain informed of the latest trends in international standards, and appropriately customize them to the region's challenges. This is an area where donors can help, connecting networks on the topics and encouraging the transfer of knowledge in these fast moving topics.

Promoting Knowledge Exchange

Norway has been at the fore front of e-legislation. For instance, the Norwegian government has put in place an initiative to use digital signatures in electronic interaction with and within public administration. Furthermore, Norway is sharing their initial success with developing countries as it relates to e-legislation. The Norwegian Agency for Development (NORAD) in partnership with UNDP has worked in countries like Bosnia to support the development of e-legislation. For example, people from the public and private sector in Bosnia have participated in study trip exchanges to Norway to review best practices in the area of e-legislation and other ICT-related fields.¹³² Such knowledge exchanges can be easily replicated in the Caribbean and hold important potential.

Tapping into developed nations that have implemented model legislation successfully is the best way to proceed. Organizations like ICANN and ITU can provide guidance on the latest standards. As these

¹²⁹ Refers to fees charged by the incumbent for completing connection that make use of the entrant's facilities, or in the mobile-to-fixed case, fees charged by fixed line providers for calling mobile numbers.

¹³⁰ Engel, E. (2003)

¹³¹ CARICOM (October 2004). http://www.caricom.org/archives/csme/csme-matrix-keyelements-30oct_04.pdf

¹³² UNDP <http://unpan1.un.org/intradoc/groups/public/documents/UNTC/UNPAN018493.pdf>

changes happen, it is important that consumers and the private sector are kept abreast of what this means for their businesses, particularly as it pertains to their legal rights and responsibilities.

5. Technology Clusters must make business sense. High technology clusters do offer the potential for positive spillovers in the Caribbean. This potential is, however, extremely limited and has to date been heavily over-estimated at significant costs. For instance, as call centers became a fad throughout the Caribbean, investments were often not analyzed in a rigorous manner. Despite the use of basic technologies (telephony), many foreign companies demanded generous concessions from government promising more complex technology spillover effects and employment generation. Perhaps most importantly, the sponsors of basic telemarketing call centers misunderstood the upward cycle they were trying to create. Call centers alone are akin to maquila labor in textiles. The primary attraction is cheap rates (both on financing and, especially on labor). An industry, disconnected from a legitimate software or service infrastructure, cannot hope to migrate upward.

There are some viable opportunities in the call center business if the Caribbean can re-enter at the high end of customer service for large/well-known US companies, instead of continuing with the low-cost telemarketing model. The advantage of higher-end customer service accounts is three fold. First, customer service accounts guarantee longer-term contracts (2 years plus) because the outsourcing company has to make greater commitment in training and development for the call center employees. Training in this sort of arrangement is more holistic, not only focusing on customer service skills, but also on company specific products, policies and procedures and involve more sophisticated software programs. Second, in these arrangements the call center employees become part of the outsourcing company, improving motivation and reducing turnover rates. Finally, large companies and their clients tend to have more contact with their customer service operations offshore and many often visit call center premises on a regular basis.

Many Caribbean nations have also experimented with FTZ and Cyber Parks as the next policy trend to attract FDI and facilitate technology transfer and other positive spillover effects. However, as the case of Antigua FTZ and the Dominican Republic's Cyber Park indicate, very seldom do the promised effect materialize and in many cases the international demand for these services to be offered in such location did not exist. These failures illustrate that these new investments need to make business sense, be demand-driven and be guided by a carefully assessed strategic intent. For instance, the longer the commitment required by the foreign businesses and the greater the need for their close interaction with the local workforce and businesses (through specialized training, procurement of inputs and raw materials, etc.) the more the spillover effects can be realized. These spillovers range from positive externalities in training and human capital, to the adoption of technology and more efficient business processes.¹³³ Academic studies that have attempted to quantify these externalities have produced mixed results, but all point to the importance of establishing links with the local economy as the key determinant of success. Otherwise, very little is left behind when foreign investors exit the economy.

As Caribbean governments seek to attract new firms and FDI to their islands, they should incorporate private sector firms and encourage joint ventures to improve chances of success. The government and donors can help existing trade and industry associations to do feasibility studies along with interested companies before investments ensue. Investment Promotion Agencies, along with the government and the private sector, need to have a vision of the country's growth strategy and work together to execute it.

6. Strengthen new service and niche manufacturing clusters. Technology can and must be a fundamental enabler of high potential clusters of existing Caribbean businesses, such as tourism. This is an essential and largely under-appreciated imperative.

First and foremost, public and private sector partnerships should be created to attract investment in promising sectors such as wellness and rehabilitation centers, high-end tourism and yachting, stem cell

¹³³ Damani (1998).

research, virtual financial headquarters, medical devices, niche agribusiness clusters, etc. This requires the articulation of a coherent and coordinated industry-wide strategy for those targeted clusters that have the greatest potential for growth. In doing so, there is a clear role for government and the private sector. The private sector, through industry associations or business development institutions needs to incorporate those industry goals and facilitate collaborative initiatives that improve access to crucial inputs (training, targeted technical assistance, etc). In doing so, they can also lobby the central government for particular infrastructure and/or institutional improvements and education and training initiatives required to push forth a sector's new vision for the future. Governments can support these organizations by funding feasibility studies¹³⁴, facilitating the emergence of agencies in nascent but promising industries, and implementing the necessary legislation to support their growth. Furthermore, credible private sector institutions or regional trade associations have a crucial role to play in countries where ICT business usage and absorption is minimal. As illustrated in this report's Open Source case study, businesses along with development institutions can make concerted efforts to showcase best practices and educate the private sector in how ICT can improve productivity.

Ireland- Private Sector Institutions in Action

Ireland, through its Industrial Development Authority (IDA), offers an example of how this may be achieved. This agency spearheaded the effort to attract foreign companies to invest in Ireland. It touted to multinationals the relatively-cheap but well-skilled English speaking work force, a low corporate tax rate, and access to the European Union. It arranged for company-specific packages of investment support and lobbied the central government for particular infrastructure improvements and education initiatives such as a swift and decisive action in the area of IT. The Irish government was responsive and answered the call. For instance, it pushed forth education reforms that reduced the secondary dropout rate significantly and increased the levels of tertiary education.

Moreover, the IDA created an overseas network of offices to establish close relationships with executives in specific companies and compiled what many considered to be the best database of potential investors around the world. It developed and fostered close relationships with executives in firms that fitted the pattern of development sought by the country, and maintained these contacts even when individuals moved to different firms. This information was provided free to interested firms, along with advice on how to proceed with potential deals.

In terms of strengthening new services and niche manufacturing clusters, there also needs to be a cognitive shift away from structural incentives as the catalysts for change. This cognitive shift entails having the private sector take the lead in developing its own future, by proactively seeking market opportunities and asking for government support only as an enabler, not as an architect, of the future. In this regard, government policies aimed at rewarding innovation and entrepreneurship are favored as well as merit-based promotions campaigns for public service servants. The government should help publicize, reward and disseminate successful entrepreneurial activity to give Caribbean people the sense of possibility. The idea is to move away from a state of complacency and government as being the caretaker, to one in which attitudes focused on competition as the force that spurs innovation, human initiatives, learning, interpersonal trust and cooperation triumph.¹³⁵

¹³⁴ For instance, governments or donors can support feasibility studies of industries that have the potential to export niche products or provide trade in services. They can provide information on best practices applicable to promising clusters, etc. Governments and donors should restrict their interventions to knowledge gaps that would not normally be provided (or shared) through the private sector because of the investments necessary is unfeasible due to the size and fragmentation of an industry, or the limited private returns to investing in knowledge.

¹³⁵ Fairbanks, M. (2000)

6. Appendices

6.1 Appendix 1: ICT Assessment- 2003 UTI Indicators

Figure 1.1

Main Telephone Lines

| Country | Total (000s) | CAGR (%) | Per 100 inhabitants | CAGR (%) |
|--------------------------------|--------------|-----------|---------------------|-----------|
| | 2002 | 1997-2002 | 2002 | 1997-2002 |
| Antigua and Barbuda | 38 | 4.2 | 48.78 | 2.1 |
| Dominica | 23.7 | 4.3 | 30.39 | 3.5 |
| Grenada | 33.5 | 4.8 | 31.65 | 1.7 |
| St. Kitts and Nevis | 23.5 | 6.5 | 50 | 4.9 |
| St. Lucia | 51.1 | 6.7 | 31.95 | 5 |
| St. Vincent and the Grenadines | 27.3 | 5.9 | 23.35 | 4.9 |
| Barbados | 133 | 4.2 | 49.44 | 3.9 |
| Dominican Republic | 909 | 5.2 | 11.04 | 4.6 |
| Jamaica | 444.4 | 1.3 | 16.97 | 0.5 |
| Trinidad and Tobago | 325.1 | 6 | 24.98 | 5.5 |
| Bahamas | 126.6 | 5.2 | 40.56 | 3.6 |
| Belize | 31.3 | 0.4 | 12.37 | -2.2 |
| Guyana | 80.4 | 7.9 | 9.15 | 7 |
| Haiti | 130 | 16.7 | 1.57 | 14.4 |
| Suriname | 78.7 | 4.3 | 16.35 | 1.1 |
| Lower Middle Income | 394,271.50 | 15.3 | 16.48 | 14.4 |
| Upper Middle Income | 66,305.90 | 5.6 | 20.05 | 4.4 |
| High Income | 562,668.90 | 1.9 | 58.54 | 1.2 |
| Americas | 293,448.80 | 3.8 | 34.73 | 2.3 |
| WORLD | 1,091,575.70 | 6.7 | 17.9 | 5.3 |

Source: ITU 2003

Figure 1.2

Local Telephone Network (2002)

| Country | Main Telephone Lines | | | Residential (%) | Faults per 100 main lines per year |
|--------------------------------|----------------------|---------------|-------------|-----------------|------------------------------------|
| | Capacity Used (%) | Automatic (%) | Digital (%) | | |
| Antigua and Barbuda | -- | 100 | 100 | -- | -- |
| Dominica | 72.1 | 100 | 100 | -- | -- |
| Grenada | -- | 100 | 100 | 81 | -- |
| St. Kitts and Nevis | -- | 100 | 100 | -- | -- |
| St. Lucia | -- | 100 | 100 | -- | -- |
| St. Vincent and the Grenadines | 42.1 | 100 | 100 | 80 | 8.6 |
| Barbados | -- | 100 | 100 | 68.7 | -- |
| Dominican Republic | -- | 100 | -- | 66.3 | -- |
| Jamaica | -- | 100 | 100 | 75 | 39.7 |
| Trinidad and Tobago | -- | 100 | 100 | 82.3 | -- |
| Bahamas | 70.7 | 100 | 100 | -- | -- |
| Belize | 89.6 | 100 | 100 | 67.6 | 55.2 |
| Guyana | -- | 100 | 100 | 70 | -- |
| Haiti | -- | 100 | 100 | -- | -- |
| Suriname | 78.5 | 100 | 56.5 | 80 | 30.2 |
| Lower Middle Income | 78.8 | 99.8 | 96.6 | 79.7 | 20.8 |
| Upper Middle Income | 80 | 85.2 | 94.9 | 76 | 15.1 |
| High Income | 83.6 | 100 | 98.3 | 70.7 | 10.5 |
| Americas | 81.4 | 100 | 97.3 | 69.2 | 11.7 |
| WORLD | 79.4 | 99 | 97.2 | 74.7 | 23.3 |

Source: ITU 2003

Figure 1.3

| Country | Teleaccessibility 2002 | | | Public Telephones | | |
|--------------------------------|------------------------|--------------------|-------------------------------|-------------------|----------------------|-------------------|
| | Residential Mainlines | | % households with a telephone | Public Telephones | | |
| | Total (000s) | per 100 households | | Total (000s) | per 1000 inhabitants | as % of mainlines |
| Antigua and Barbuda | -- | -- | -- | -- | -- | -- |
| Dominica | -- | -- | -- | -- | -- | -- |
| Grenada | 26.5 | -- | 90 | 0.22 | 2.34 | 0.7 |
| St. Kitts and Nevis | -- | -- | -- | -- | -- | -- |
| St. Lucia | 34 | 76.8 | 60.2 | -- | -- | -- |
| St. Vincent and the Grenadines | 19.9 | 73.8 | 90 | 0.21 | 1.87 | 0.9 |
| Barbados | 88.6 | 91.3 | -- | 0.81 | 3.01 | 0.6 |
| Dominican Republic | 602.2 | 25.7 | 33.4 | 11.78 | 1.43 | 1.3 |
| Jamaica | 333.3 | 45.8 | -- | 3.98 | 1.54 | 0.8 |
| Trinidad and Tobago | 256.6 | 74 | -- | 2.6 | 2 | 0.8 |
| Bahamas | -- | -- | -- | 0.97 | 3.16 | 0.8 |
| Belize | 21.2 | 38.5 | 42 | 0.48 | 1.9 | 1.5 |
| Guyana | 55.9 | 28.8 | -- | 0.65 | 0.75 | 0.8 |
| Haiti | -- | -- | 4.3 | -- | -- | -- |
| Suriname | 60.2 | 66.9 | -- | 0.3 | 0.63 | 0.4 |
| Lower Middle Income | 310,811.50 | 49.8 | 49.4 | 12,679.83 | 5.31 | 3.2 |
| Upper Middle Income | 50,273.70 | 58.4 | 59 | 1,586.89 | 4.9 | 2.5 |
| High Income | 356,235.50 | 120.5 | 96.1 | 4,119.85 | 4.36 | 0.7 |
| Americas | 204,646.60 | 84.5 | 70.8 | 4,353.44 | 5.25 | 1.5 |
| WORLD | 733,275.10 | 61 | 49.8 | 21,009.19 | 3.52 | 1.9 |

Source: ITU 2003

Figure 1.4

| Country | Telephone Tariffs 2002 | | | | Local Call (US\$) | Subscription as % GDP per capita* |
|--------------------------------|------------------------|---------------------|-------------------|---------------------|-------------------|-----------------------------------|
| | Residential | | Business | | | |
| | Connection (US\$) | Subscription (US\$) | Connection (US\$) | Subscription (US\$) | | |
| Antigua and Barbuda | 69 | 11.1 | 119 | 22.2 | 0.06 | 1.5 |
| Dominica | 56 | 7.4 | 56 | 20.4 | 0.1 | 2.7 |
| Grenada | 85 | 8.1 | 85 | -- | 0.09 | 2.2 |
| St. Kitts and Nevis | -- | -- | -- | -- | -- | -- |
| St. Lucia | 46 | 8.1 | 46 | 14.8 | 0.09 | 2.3 |
| St. Vincent and the Grenadines | 37 | 6.3 | 37 | 14.8 | 0.09 | 2.5 |
| Barbados | 49 | 14 | 49 | 42.4 | -- | 1.8 |
| Dominican Republic | 54 | 12.1 | 43 | 14.8 | 0.06 | 5.6 |
| Jamaica | 14 | 6.4 | 19 | 15.3 | 0.07 | 2.4 |
| Trinidad and Tobago | 11 | 4.7 | 22 | 28.1 | 0.04 | 0.8 |
| Bahamas | 40 | -- | -- | -- | -- | -- |
| Belize | 50 | 10 | 50 | 25 | 0.15 | 3.7 |
| Guyana | 3 | 2.6 | 16 | 7.9 | 0 | 3.8 |
| Haiti | -- | -- | -- | -- | -- | -- |
| Suriname | 141 | 1.2 | 141 | 1.2 | 0.05 | 0.8 |
| Lower Middle Income | 84 | 4.4 | 121 | 7.4 | 0.05 | 3.7 |
| Upper Middle Income | 62 | 7.5 | 82 | 12.2 | 0.09 | 1.9 |
| High Income | 83 | 11.8 | 94 | 16.7 | 0.1 | 0.7 |
| Americas | 88 | 7.6 | 115 | 15.7 | 0.07 | 11.7 |
| WORLD | 71 | 6.2 | 91 | 9.4 | 0.08 | 5.2 |

Source: ITU 2003

* The % GDP per capita column is the subscription cost as a percentage of GDP per capita and is calculated based on 2002 GDP and population data

Figure 1.5

| Country | Cellular Mobile Subscribers | | | Prepaid subscribers (%) | Population Coverage (%) | As % of total telephone subscribers |
|--------------------------------|-----------------------------|---------------------|--------------------|-------------------------|-------------------------|-------------------------------------|
| | Total (000s) | per 100 inhabitants | CAGR (%) 1997-2002 | | | |
| Antigua and Barbuda | 38 | 48.98 | 93.7 | -- | 85 | 50.1 |
| Dominica | 9 | 12 | 75.9 | -- | -- | 28.3 |
| Grenada | 8 | 7.13 | 50.6 | -- | 65 | 18.4 |
| St. Kitts and Nevis | 5 | 10.64 | 89.4 | -- | -- | 17.5 |
| St. Lucia | 14 | 8.95 | 55 | -- | -- | 21.9 |
| St. Vincent and the Grenadines | 10 | 8.53 | 95.9 | -- | -- | 26.8 |
| Barbados | 53 | 19.8 | 60.5 | 45.6 | 95 | 29.2 |
| Dominican Republic | 1701 | 20.66 | 64.4 | 80.2 | 88 | 65.2 |
| Jamaica | 1400 | 53.48 | 84.2 | | 80 | 75.9 |
| Trinidad and Tobago | 362 | 27.81 | 84 | 84.5 | | 52.7 |
| Bahamas | 122 | 39.03 | 81.7 | 17.1 | 95 | 49 |
| Belize | 52 | 20.45 | 82.7 | 73.5 | | 62.3 |
| Guyana | 87 | 9.93 | 128.5 | -- | -- | 52 |
| Haiti | 140 | 1.69 | -- | -- | -- | 51.9 |
| Suriname | 108 | 22.52 | 116.9 | 97.8 | 35 | 57.9 |
| Lower Middle Income | 380,000 | 15.88 | 67.6 | 40.7 | 82.3 | 49.1 |
| Upper Middle Income | 102,297 | 30.94 | 57.4 | 74.6 | 93 | 59.7 |
| High Income | 638,079 | 66.39 | 29.9 | 44.5 | 97.7 | 53.1 |
| Americas | 252,642 | 29.9 | 28.7 | 33.5 | 91.8 | 46.3 |
| WORLD | 1,162,675 | 19.07 | 40.2 | 46.7 | 84 | 51.5 |

Source: ITU 2003

Figure 1.6

| Country | Information Technology 2002 | | | | PCs | |
|--------------------------------|-----------------------------|---------------------------|--------------|---------------------------|--------------|---------------------|
| | Total Hosts | Hosts per 100 inhabitants | Users (000s) | Users per 100 inhabitants | Total (000s) | Per 100 inhabitants |
| Antigua and Barbuda | 622 | 0.8 | 10 | 12.82 | -- | -- |
| Dominica | 464 | 0.59 | 13 | 16.03 | 7 | 8.97 |
| Grenada | 14 | 0.01 | 15 | 14.15 | 14 | 13.21 |
| St. Kitts and Nevis | 2 | -- | 10 | 21.28 | 9 | 19.15 |
| St. Lucia | 29 | 0.02 | 13 | 8.24 | 24 | 15 |
| St. Vincent and the Grenadines | -- | -- | 7 | 5.98 | 14 | 11.97 |
| Barbados | 160 | 0.06 | 30 | 11.15 | 28 | 10.41 |
| Dominican Republic | 45508 | 0.55 | 300 | 3.64 | -- | -- |
| Jamaica | 1276 | 0.05 | 600 | 22.92 | 141 | 5.39 |
| Trinidad and Tobago | 7209 | 0.55 | 138 | 10.6 | 104 | 7.95 |
| Bahamas | 32 | 0.01 | 60 | 19.23 | -- | -- |
| Belize | 1498 | 0.59 | 30 | 11.86 | 35 | 13.83 |
| Guyana | 63 | 0.01 | 125 | 14.22 | 24 | 2.73 |
| Haiti | -- | -- | 80 | 0.96 | -- | -- |
| Suriname | 24 | -- | 20 | 4.16 | 20 | 4.55 |
| Lower Middle Income | 3,683,093 | 0.15 | 116,234 | 4.86 | 89,202 | 3.8 |
| Upper Middle Income | 3,327,987 | 1.01 | 46,678 | 14.13 | 33,305 | 10.08 |
| High Income | 150,369,694 | 15.64 | 427,999 | 44.53 | 448,416 | 46.68 |
| Americas | 122,555,360 | 14.5 | 217,649 | 25.76 | 239,717 | 28.95 |
| WORLD | 157,581,802 | 2.59 | 623,023 | 10.22 | 587,518 | 9.91 |

Source: ITU 2003

6.2 Appendix 2: Ability Indicators

Figure 2.1

| Country | Key Education Indicators | | | Education Expenditure (% of GDP)* |
|--------------------------------|--------------------------|-------------------------------|---------------------------------|-----------------------------------|
| | Literacy (2002) | Net Primary Enrollment (2000) | Net Secondary Enrollment (2000) | |
| Antigua and Barbuda | 85.8 | -- | -- | 2.6* |
| Dominica | 76.4 | 91.38 | 80.85 | 11.5 |
| Grenada | 94.4 | 84.19 | 45.52 | 11.6 |
| St. Kitts and Nevis | 97.8 | 95.52 | 90.94 | 9.9 |
| St. Lucia | 94.8 | 98.00 | 70.39 | 11.0 |
| St. Vincent and the Grenadines | 83.1 | 91.13 | -- | 10.7 |
| Barbados | 99.7 | 99.86 | 84.91 | 6.5 |
| Dominican Republic | 84.4 | 92.73 | 40.21 | |
| Jamaica | 87.6 | 94.98 | 74.34 | 6.3 |
| Trinidad and Tobago | 98.5 | 92.55 | 72.16 | |
| Bahamas | 99.7 | -- | -- | |
| Belize | 76.9 | 96.22 | 60.41 | |
| Guyana | 96.5 | -- | -- | |
| Haiti | 51.9 | -- | -- | |
| Suriname | 94.0 | 98.55 | 60.88 | |

Source: World Development Indicators

* OECS Human Development Report 2002

Figure 2.2

Performance in the Caribbean Secondary Examination- Percentage of Students passing English Language and Math

| Country | English (2000 in %) | Math (2000 in %) |
|--------------------------------|---------------------|------------------|
| Antigua and Barbuda | 64.3 | 36.3 |
| Dominica | 79.3 | 51.2 |
| Grenada | 42.2 | 26.3 |
| St. Kitts and Nevis | 65.9 | 42.6 |
| St. Lucia | 58.3 | 51.1 |
| St. Vincent and the Grenadines | 64.2 | 44.7 |
| Caribbean Average | 49.0 | 39 |

Source: OECS Human Development Report 2002

6.3 Appendix 3: Sectoral Composition of GDP

Figure 3.1
Antigua & Barbuda
Sectoral Composition of GDP
(as a % of GDP)

| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|--------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Agriculture | 3.35 | 3.41 | 3.40 | 3.56 | 3.40 | 3.39 | 3.39 | 3.37 | 3.32 |
| Crops | 0.93 | 0.97 | 0.98 | 1.01 | 0.95 | 0.95 | 0.94 | 0.91 | 0.90 |
| Livestock | 0.78 | 0.81 | 0.78 | 0.73 | 0.70 | 0.69 | 0.68 | 0.71 | 0.71 |
| Forestry | 0.07 | 0.07 | 0.06 | 0.06 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| Fishing | 1.58 | 1.56 | 1.58 | 1.76 | 1.70 | 1.70 | 1.71 | 1.70 | 1.65 |
| Mining & Quarrying | 1.34 | 1.46 | 1.47 | 1.45 | 1.47 | 1.48 | 1.48 | 1.49 | 1.50 |
| Manufacturing | 2.05 | 2.02 | 1.94 | 1.92 | 1.92 | 1.94 | 1.95 | 2.00 | 2.01 |
| Electricity & Water | 4.48 | 3.54 | 2.76 | 2.76 | 2.21 | 2.71 | 2.57 | 3.43 | 2.72 |
| Electricity | 3.90 | 3.23 | 2.65 | 2.44 | 2.00 | 2.49 | 2.44 | 3.23 | 2.50 |
| Water | 0.58 | 0.31 | 0.11 | 0.31 | 0.21 | 0.22 | 0.13 | 0.21 | 0.22 |
| Construction | 8.36 | 9.10 | 9.58 | 9.62 | 10.10 | 10.52 | 11.04 | 11.84 | 12.11 |
| Wholesale & Retail Trade | 8.85 | 9.50 | 9.45 | 9.23 | 9.25 | 9.24 | 9.42 | 9.24 | 8.87 |
| Hotels & Restaurants | 14.06 | 11.72 | 11.99 | 11.56 | 10.41 | 10.30 | 9.90 | 9.00 | 8.33 |
| Transportation | 11.30 | 10.25 | 10.63 | 11.20 | 10.68 | 10.40 | 10.46 | 10.35 | 10.23 |
| Road Transport | 4.78 | 4.19 | 4.44 | 4.65 | 4.51 | 4.40 | 4.76 | 4.57 | 4.11 |
| Sea Transport | 1.49 | 1.64 | 1.57 | 1.66 | 1.57 | 1.47 | 1.36 | 1.29 | 1.19 |
| Air transport | 5.03 | 4.42 | 4.61 | 4.89 | 4.61 | 4.52 | 4.34 | 4.49 | 4.93 |
| Communications | 6.49 | 6.90 | 6.87 | 6.87 | 6.99 | 7.73 | 7.23 | 7.51 | 7.30 |
| Banks & Insurance | 6.66 | 7.24 | 7.65 | 8.20 | 8.49 | 7.99 | 8.06 | 7.84 | 8.55 |
| Banks | 4.96 | 5.50 | 5.74 | 6.39 | 6.68 | 6.54 | 6.39 | 5.83 | 6.40 |
| Insurance | 1.70 | 1.74 | 1.91 | 1.81 | 1.82 | 1.45 | 1.66 | 2.01 | 2.15 |
| Real Estate & Housing | 6.44 | 5.76 | 6.03 | 5.86 | 5.81 | 5.85 | 6.03 | 6.30 | 6.39 |
| Government Services | 15.24 | 16.25 | 15.72 | 14.66 | 15.84 | 15.06 | 15.05 | 15.40 | 15.86 |
| Other Services | 6.36 | 6.78 | 6.59 | 6.47 | 6.34 | 6.35 | 6.54 | 6.52 | 6.61 |
| Imputed Charges | 5.02 | 6.09 | 5.91 | 6.66 | 7.09 | 7.03 | 6.87 | 5.71 | 6.21 |
| TOTAL | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |

Source: ECCB

Figure 3.2

Dominica
Sectoral Composition of GDP
(as a % of GDP)

| | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|--------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Agriculture | 18.61 | 18.65 | 15.94 | 17.00 | 16.75 | 16.01 | 15.99 | 15.43 | 14.86 | 15.01 |
| Crops | 15.34 | 15.44 | 12.76 | 13.95 | 13.50 | 12.83 | 12.84 | 12.35 | 11.69 | 11.63 |
| Livestock | 1.30 | 1.26 | 1.25 | 1.19 | 1.24 | 1.17 | 1.15 | 1.13 | 1.17 | 1.24 |
| Forestry | 0.62 | 0.58 | 0.58 | 0.55 | 0.55 | 0.52 | 0.50 | 0.50 | 0.51 | 0.54 |
| Fishing | 1.35 | 1.37 | 1.35 | 1.30 | 1.46 | 1.49 | 1.50 | 1.45 | 1.50 | 1.60 |
| Mining & Quarrying | 0.65 | 0.71 | 0.79 | 0.77 | 0.79 | 0.67 | 0.69 | 0.72 | 0.73 | 0.58 |
| Manufacturing | 7.13 | 6.13 | 6.26 | 6.26 | 6.58 | 7.38 | 6.91 | 7.46 | 6.31 | 6.55 |
| Electricity & Water | 3.58 | 3.48 | 3.56 | 3.75 | 4.08 | 4.24 | 4.69 | 4.65 | 5.04 | 5.69 |
| Electricity | 3.58 | 3.48 | 3.56 | 3.75 | 4.08 | 4.24 | 4.69 | 4.65 | 5.04 | 5.69 |
| Water | - | - | - | - | - | - | - | - | - | - |
| Construction | 6.52 | 7.09 | 7.91 | 7.70 | 7.42 | 6.72 | 6.86 | 7.15 | 7.32 | 5.76 |
| Wholesale & Retail Trade | 9.52 | 9.73 | 9.88 | 9.90 | 10.18 | 9.83 | 9.83 | 9.95 | 10.25 | 10.25 |
| Hotels & Restaurants | 2.39 | 2.32 | 2.54 | 2.35 | 2.37 | 2.25 | 2.26 | 2.32 | 2.23 | 2.27 |
| Transportation | 9.14 | 8.62 | 8.68 | 8.65 | 8.31 | 8.06 | 8.06 | 7.91 | 7.40 | 6.66 |
| Road Transport | 4.81 | 4.62 | 4.57 | 4.48 | 4.46 | 4.12 | 3.97 | 4.08 | 3.87 | 3.33 |
| Sea Transport | 3.62 | 3.36 | 3.35 | 3.44 | 3.11 | 3.28 | 3.37 | 3.16 | 2.89 | 2.74 |
| Air transport | 0.71 | 0.63 | 0.75 | 0.73 | 0.74 | 0.66 | 0.72 | 0.67 | 0.63 | 0.59 |
| Communications | 5.98 | 5.63 | 6.46 | 6.27 | 6.94 | 7.18 | 7.30 | 6.56 | 6.20 | 5.82 |
| Banks & Insurance | 9.67 | 9.56 | 10.09 | 9.78 | 9.31 | 9.54 | 9.63 | 9.61 | 9.80 | 9.53 |
| Banks | 9.67 | 9.56 | 10.09 | 9.78 | 9.31 | 9.54 | 9.63 | 9.61 | 9.80 | 9.53 |
| Insurance | - | - | - | - | - | - | - | - | - | - |
| Real Estate & Housing | 3.17 | 3.00 | 3.00 | 2.94 | 2.98 | 2.89 | 2.84 | 2.86 | 2.98 | 3.21 |
| Government Services | 16.06 | 16.81 | 15.79 | 16.04 | 16.16 | 16.38 | 16.32 | 16.68 | 17.94 | 19.56 |
| Other Services | 0.90 | 1.18 | 1.29 | 1.29 | 1.32 | 1.32 | 1.32 | 1.30 | 1.39 | 1.53 |
| Imputed Charges | 6.66 | 7.08 | 7.81 | 7.30 | 6.83 | 7.54 | 7.30 | 7.40 | 7.56 | 7.57 |
| TOTAL | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |

Source: ECCB

Figure 3.3

Grenada
Sectoral Composition of GDP
(as a % of GDP)

| | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|--------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Agriculture | 9.69 | 9.11 | 9.12 | 7.73 | 7.17 | 6.87 | 7.08 | 6.67 | 7.02 | 8.81 |
| Crops | 7.12 | 6.54 | 6.68 | 5.44 | 4.98 | 4.76 | 5.09 | 4.81 | 4.47 | 5.75 |
| Livestock | 0.60 | 0.58 | 0.55 | 0.53 | 0.52 | 0.50 | 0.50 | 0.47 | 0.49 | 0.49 |
| Forestry | 0.38 | 0.38 | 0.36 | 0.35 | 0.34 | 0.32 | 0.30 | 0.29 | 0.30 | 0.29 |
| Fishing | 1.58 | 1.62 | 1.54 | 1.41 | 1.34 | 1.30 | 1.18 | 1.10 | 1.76 | 2.27 |
| Mining & Quarrying | 0.42 | 0.41 | 0.40 | 0.42 | 0.51 | 0.79 | 0.71 | 0.73 | 0.58 | 0.44 |
| Manufacturing | 5.53 | 5.70 | 5.93 | 6.04 | 5.94 | 6.13 | 6.38 | 6.59 | 6.18 | 5.93 |
| Electricity & Water | 3.96 | 4.27 | 4.42 | 4.28 | 4.82 | 4.43 | 4.54 | 4.43 | 5.03 | 5.65 |
| Construction | 7.35 | 7.28 | 7.28 | 7.20 | 7.36 | 8.13 | 8.70 | 9.25 | 7.74 | 7.69 |
| Wholesale & Retail Trade | 10.35 | 10.16 | 10.17 | 10.27 | 10.08 | 9.71 | 9.56 | 9.22 | 9.34 | 9.34 |
| Hotels & Restaurants | 7.47 | 8.76 | 8.07 | 8.48 | 7.89 | 7.82 | 8.23 | 7.81 | 7.58 | 6.98 |
| Transportation | 13.16 | 13.22 | 13.33 | 13.29 | 13.43 | 12.95 | 12.69 | 13.05 | 12.05 | 11.68 |
| Road Transport | 9.49 | 9.33 | 9.26 | 9.20 | 9.03 | 8.55 | 8.33 | 8.44 | 7.56 | 7.40 |
| Sea Transport | 2.40 | 2.51 | 2.58 | 2.66 | 2.86 | 2.94 | 2.77 | 2.96 | 2.89 | 2.73 |
| Air transport | 1.27 | 1.38 | 1.49 | 1.43 | 1.55 | 1.46 | 1.59 | 1.65 | 1.60 | 1.55 |
| Communications | 7.38 | 7.40 | 7.72 | 7.58 | 7.49 | 8.43 | 7.70 | 7.48 | 7.32 | 5.61 |
| Banks & Insurance | 6.94 | 7.34 | 7.82 | 8.09 | 8.04 | 8.28 | 8.11 | 8.57 | 9.08 | 9.49 |
| Real Estate & Housing | 3.86 | 3.64 | 3.61 | 3.58 | 3.40 | 3.12 | 3.06 | 2.90 | 3.07 | 3.10 |
| Government Services | 16.84 | 15.15 | 14.57 | 15.30 | 15.94 | 15.00 | 15.00 | 13.73 | 14.44 | 14.97 |
| Other Services | 2.68 | 2.59 | 2.53 | 2.53 | 2.51 | 2.37 | 2.38 | 2.81 | 3.16 | 2.68 |
| Imputed Charges | 4.39 | 4.97 | 5.02 | 5.21 | 5.41 | 5.97 | 5.86 | 6.76 | 7.42 | 7.62 |
| TOTAL | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |

Source: ECCB

Figure 3.4

St. Lucia
Sectoral Composition of GDP
(as a % of GDP)

| | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|--------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Agriculture | 9.78 | 8.26 | 8.28 | 7.67 | 6.15 | 5.94 | 6.50 | 6.38 | 5.83 | 5.53 |
| Crops | 8.14 | 6.81 | 6.78 | 5.88 | 4.22 | 3.98 | 4.72 | 4.39 | 3.39 | 3.31 |
| Banana | 5.51 | 4.21 | 4.68 | 3.69 | 2.07 | 2.08 | 3.28 | 2.92 | 1.77 | 2.27 |
| Other | 2.62 | 2.60 | 2.10 | 2.18 | 2.15 | 1.90 | 1.44 | 1.47 | 1.62 | 1.04 |
| Livestock | 0.57 | 0.57 | 0.54 | 0.68 | 0.74 | 0.76 | 0.41 | 0.59 | 0.67 | 0.69 |
| Forestry | 0.25 | 0.26 | 0.22 | 0.19 | 0.17 | 0.15 | 0.12 | 0.11 | 0.09 | 0.08 |
| Fishing | 0.82 | 0.63 | 0.75 | 0.92 | 1.02 | 1.05 | 1.25 | 1.29 | 1.67 | 1.45 |
| Mining & Quarrying | 0.42 | 0.32 | 0.40 | 0.37 | 0.39 | 0.38 | 0.34 | 0.44 | 0.35 | 0.34 |
| Manufacturing | 6.27 | 5.52 | 6.01 | 5.80 | 5.45 | 5.03 | 4.84 | 4.37 | 4.16 | 4.11 |
| Electricity & Water | 3.02 | 3.08 | 3.20 | 3.11 | 3.44 | 4.00 | 4.41 | 4.83 | 5.01 | 4.72 |
| Electricity | 2.42 | 2.48 | 2.57 | 2.48 | 2.84 | 3.32 | 3.74 | 3.91 | 4.05 | 3.74 |
| Water | 0.60 | 0.60 | 0.63 | 0.62 | 0.60 | 0.68 | 0.67 | 0.92 | 0.97 | 0.98 |
| Construction | 7.46 | 7.52 | 7.01 | 6.59 | 6.49 | 7.17 | 7.82 | 7.26 | 7.11 | 6.57 |
| Wholesale & Retail Trade | 14.04 | 12.99 | 12.35 | 12.20 | 12.10 | 12.08 | 12.02 | 11.24 | 10.11 | 10.01 |
| Hotels & Restaurants | 8.56 | 9.90 | 9.95 | 10.57 | 11.35 | 11.37 | 11.45 | 12.11 | 11.36 | 11.12 |
| Transportation | 9.48 | 9.19 | 9.57 | 9.75 | 10.22 | 10.10 | 10.09 | 10.15 | 10.76 | 10.89 |
| Road Transport | 5.74 | 5.91 | 6.22 | 6.32 | 6.49 | 6.36 | 6.32 | 6.36 | 6.74 | 6.85 |
| Sea Transport | 2.60 | 2.15 | 2.15 | 2.17 | 2.33 | 2.33 | 2.31 | 2.33 | 2.47 | 2.48 |
| Air transport | 1.14 | 1.13 | 1.19 | 1.27 | 1.39 | 1.41 | 1.45 | 1.46 | 1.55 | 1.56 |
| Communications | 5.64 | 6.67 | 6.26 | 6.41 | 6.27 | 6.23 | 5.98 | 6.18 | 6.96 | 7.40 |
| Banks & Insurance | 7.71 | 7.95 | 7.57 | 7.79 | 7.81 | 8.10 | 7.94 | 7.99 | 8.72 | 9.00 |
| Banks | 6.62 | 6.83 | 6.30 | 6.29 | 6.40 | 6.65 | 6.43 | 6.47 | 7.11 | 7.37 |
| Insurance | 1.10 | 1.12 | 1.27 | 1.50 | 1.40 | 1.45 | 1.51 | 1.52 | 1.61 | 1.63 |
| Real Estate & Housing | 5.58 | 5.39 | 5.38 | 5.33 | 5.21 | 5.15 | 5.12 | 5.15 | 5.46 | 5.55 |
| Government Services | 11.30 | 12.06 | 13.22 | 12.93 | 13.48 | 13.25 | 12.58 | 12.93 | 12.67 | 13.13 |
| Other Services | 4.10 | 3.96 | 4.02 | 4.17 | 4.19 | 4.21 | 4.17 | 4.19 | 4.46 | 4.50 |
| Imputed Charges | 6.63 | 7.19 | 6.79 | 7.31 | 7.45 | 6.98 | 6.75 | 6.78 | 7.05 | 7.11 |
| TOTAL | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

Source: ECCB

Figure 3.5

St. Kitts & Nevis
Sectoral Composition of GDP
(as a % of GDP)

| | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|--------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Agriculture | 6.12 | 5.14 | 4.64 | 4.49 | 4.84 | 3.65 | 2.90 | 2.43 | 2.77 | 2.95 |
| Crops | 3.78 | 3.00 | 2.78 | 2.65 | 3.19 | 1.94 | 1.42 | 1.28 | 1.45 | 1.52 |
| Sugar Cane | 2.77 | 2.03 | 1.93 | 1.68 | 2.28 | 1.26 | 0.71 | 0.64 | 0.86 | 0.73 |
| Other | 1.01 | 0.97 | 0.84 | 0.97 | 0.91 | 0.68 | 0.71 | 0.64 | 0.60 | 0.79 |
| Livestock | 0.78 | 0.70 | 0.45 | 0.51 | 0.42 | 0.46 | 0.37 | 0.25 | 0.34 | 0.40 |
| Forestry | 0.07 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.05 | 0.05 | 0.05 |
| Fishing | 1.49 | 1.37 | 1.35 | 1.26 | 1.17 | 1.19 | 1.06 | 0.85 | 0.93 | 0.98 |
| Mining & Quarrying | 0.32 | 0.28 | 0.30 | 0.29 | 0.28 | 0.29 | 0.30 | 0.33 | 0.32 | 0.38 |
| Manufacturing | 9.97 | 9.03 | 9.35 | 8.94 | 9.08 | 8.64 | 9.14 | 9.26 | 9.19 | 8.15 |
| Sugar | 1.56 | 1.18 | 1.49 | 1.08 | 1.75 | 1.08 | 0.92 | 0.77 | 0.89 | 0.80 |
| Other | 8.41 | 7.86 | 7.86 | 7.86 | 7.33 | 7.56 | 8.22 | 8.48 | 8.31 | 7.35 |
| Electricity & Water | 1.49 | 1.53 | 1.71 | 1.67 | 1.70 | 1.72 | 1.64 | 1.75 | 1.78 | 2.42 |
| Electricity | 1.01 | 1.05 | 1.28 | 1.23 | 1.22 | 1.26 | 1.18 | 1.27 | 1.27 | 1.41 |
| Water | 0.48 | 0.48 | 0.44 | 0.45 | 0.47 | 0.46 | 0.46 | 0.48 | 0.51 | 1.01 |
| Construction | 10.82 | 9.76 | 10.56 | 10.46 | 9.75 | 10.72 | 11.97 | 14.26 | 15.63 | 15.03 |
| Wholesale & Retail Trade | 12.18 | 11.75 | 12.20 | 12.43 | 12.80 | 13.33 | 13.52 | 12.24 | 10.60 | 10.67 |
| Hotels & Restaurants | 9.20 | 10.43 | 7.81 | 8.04 | 8.27 | 8.14 | 6.95 | 4.98 | 5.06 | 4.73 |
| Transportation | 7.04 | 6.79 | 6.79 | 6.77 | 6.55 | 6.33 | 6.39 | 6.33 | 6.52 | 6.99 |
| Road Transport | 3.71 | 3.53 | 3.49 | 3.39 | 3.22 | 2.95 | 2.69 | 2.65 | 3.04 | 2.98 |
| Sea Transport | 2.51 | 2.35 | 2.44 | 2.35 | 2.36 | 2.48 | 2.65 | 2.66 | 2.53 | 3.17 |
| Air transport | 0.82 | 0.90 | 0.85 | 1.03 | 0.97 | 0.91 | 1.05 | 1.02 | 0.95 | 0.84 |
| Communications | 6.78 | 6.70 | 6.84 | 7.21 | 6.81 | 6.62 | 6.14 | 5.82 | 5.69 | 5.24 |
| Banks & Insurance | 8.91 | 9.44 | 10.51 | 10.58 | 11.55 | 11.96 | 12.16 | 13.65 | 13.53 | 13.87 |
| Banks | 7.01 | 7.73 | 8.51 | 8.61 | 9.29 | 9.88 | 10.09 | 11.59 | 11.50 | 11.97 |
| Insurance | 1.90 | 1.70 | 2.00 | 1.98 | 2.26 | 2.08 | 2.07 | 2.06 | 2.02 | 1.90 |
| Real Estate & Housing | 2.86 | 2.76 | 2.75 | 2.72 | 2.73 | 2.32 | 2.43 | 2.36 | 2.41 | 2.42 |
| Government Services | 15.22 | 17.11 | 16.26 | 15.98 | 15.49 | 16.38 | 16.69 | 17.24 | 16.96 | 17.32 |
| Other Services | 3.96 | 3.70 | 3.69 | 3.76 | 3.79 | 3.68 | 3.83 | 3.83 | 3.72 | 3.79 |
| Imputed Charges | 5.14 | 5.59 | 6.60 | 6.66 | 6.35 | 6.22 | 5.94 | 5.52 | 5.81 | 6.05 |
| TOTAL | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |

Source: ECCB

Figure 3.6

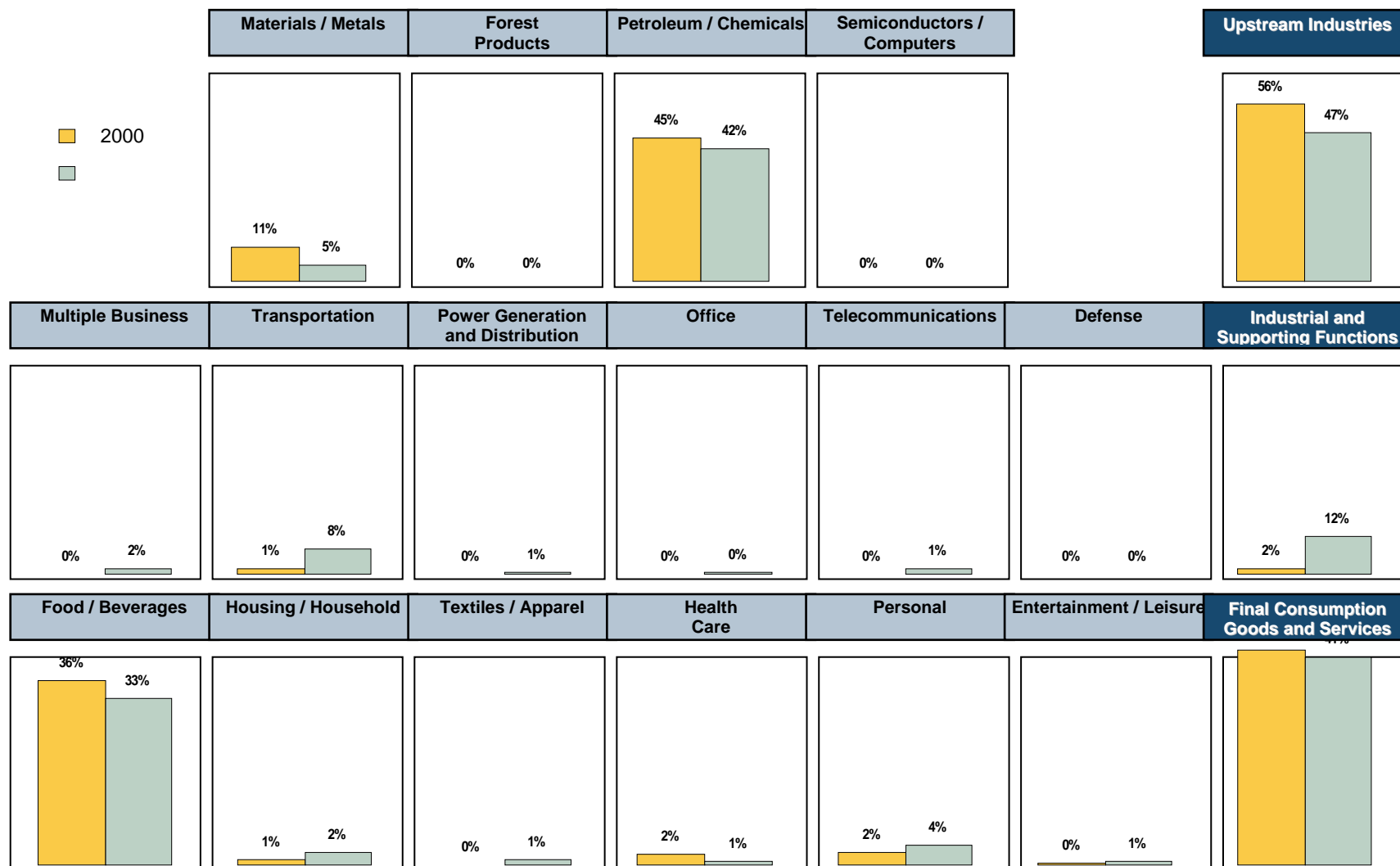
St. Vincent & the Grenadines
Sectoral Composition of GDP
(as a % of GDP)

| | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|--------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Agriculture | 13.42 | 9.95 | 12.57 | 11.36 | 9.03 | 9.72 | 9.42 | 9.58 | 8.54 | 8.86 |
| Crops | 10.17 | 6.55 | 9.33 | 8.14 | 5.92 | 6.77 | 7.02 | 7.10 | 6.15 | 6.75 |
| Banana | 5.76 | 2.51 | 4.25 | 3.43 | 1.52 | 2.54 | 2.85 | 3.13 | 2.30 | 2.62 |
| Other | 4.41 | 4.04 | 5.08 | 4.72 | 4.41 | 4.23 | 4.16 | 3.97 | 3.86 | 4.14 |
| Livestock | 0.78 | 0.79 | 0.75 | 0.74 | 0.72 | 0.68 | 0.67 | 0.66 | 0.67 | 0.65 |
| Forestry | 0.72 | 0.73 | 0.68 | 0.67 | 0.64 | 0.61 | 0.60 | 0.60 | 0.61 | 0.59 |
| Fishing | 1.75 | 1.88 | 1.82 | 1.81 | 1.75 | 1.67 | 1.13 | 1.21 | 1.12 | 0.87 |
| Mining & Quarrying | 0.30 | 0.31 | 0.30 | 0.28 | 0.29 | 0.28 | 0.25 | 0.20 | 0.21 | 0.20 |
| Manufacturing | 8.39 | 8.24 | 7.48 | 7.51 | 7.03 | 6.15 | 5.59 | 5.35 | 6.06 | 6.00 |
| Electricity & Water | 4.18 | 4.51 | 4.47 | 4.77 | 5.09 | 5.10 | 5.13 | 5.69 | 5.83 | 5.47 |
| Electricity | 3.49 | 3.59 | 3.59 | 3.84 | 4.04 | 4.06 | 4.07 | 4.51 | 4.52 | 4.04 |
| Water | 0.69 | 0.92 | 0.88 | 0.93 | 1.05 | 1.04 | 1.06 | 1.18 | 1.31 | 1.43 |
| Construction | 10.00 | 10.39 | 10.04 | 9.47 | 11.32 | 12.66 | 11.64 | 9.99 | 10.56 | 10.20 |
| Wholesale & Retail Trade | 12.50 | 13.32 | 13.32 | 13.68 | 14.02 | 14.61 | 15.28 | 16.08 | 16.50 | 16.49 |
| Hotels & Restaurants | 2.37 | 2.25 | 2.33 | 2.22 | 2.18 | 1.93 | 2.03 | 2.10 | 2.01 | 1.88 |
| Transportation | 11.41 | 11.47 | 11.52 | 12.12 | 12.65 | 12.28 | 12.32 | 12.26 | 12.28 | 12.36 |
| Road Transport | 7.75 | 8.00 | 8.04 | 8.22 | 8.93 | 8.72 | 8.65 | 8.57 | 8.60 | 8.91 |
| Sea Transport | 2.35 | 2.08 | 2.12 | 2.53 | 2.35 | 2.38 | 2.50 | 2.48 | 2.63 | 2.38 |
| Air transport | 1.31 | 1.39 | 1.36 | 1.36 | 1.38 | 1.18 | 1.17 | 1.21 | 1.05 | 1.07 |
| Communications | 6.73 | 7.31 | 6.84 | 7.38 | 6.44 | 6.36 | 6.30 | 5.77 | 4.98 | 4.45 |
| Banks & Insurance | 6.49 | 7.17 | 7.01 | 7.00 | 6.84 | 6.35 | 7.10 | 7.03 | 6.39 | 6.60 |
| Banks | 5.04 | 5.61 | 5.49 | 5.36 | 5.37 | 5.20 | 5.88 | 5.88 | 5.40 | 5.50 |
| Insurance | 1.45 | 1.56 | 1.51 | 1.64 | 1.46 | 1.15 | 1.22 | 1.15 | 0.99 | 1.11 |
| Real Estate & Housing | 2.36 | 2.36 | 2.22 | 2.27 | 2.18 | 2.14 | 2.15 | 2.13 | 2.15 | 2.11 |
| Government Services | 15.35 | 15.83 | 15.04 | 15.67 | 15.98 | 15.81 | 15.98 | 16.37 | 17.13 | 17.89 |
| Other Services | 1.62 | 1.62 | 1.52 | 1.54 | 1.59 | 1.60 | 1.66 | 1.72 | 1.77 | 1.80 |
| Imputed Charges | 4.87 | 5.27 | 5.35 | 4.73 | 5.36 | 5.01 | 5.15 | 5.73 | 5.57 | 5.68 |
| TOTAL | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

Source: ECCB

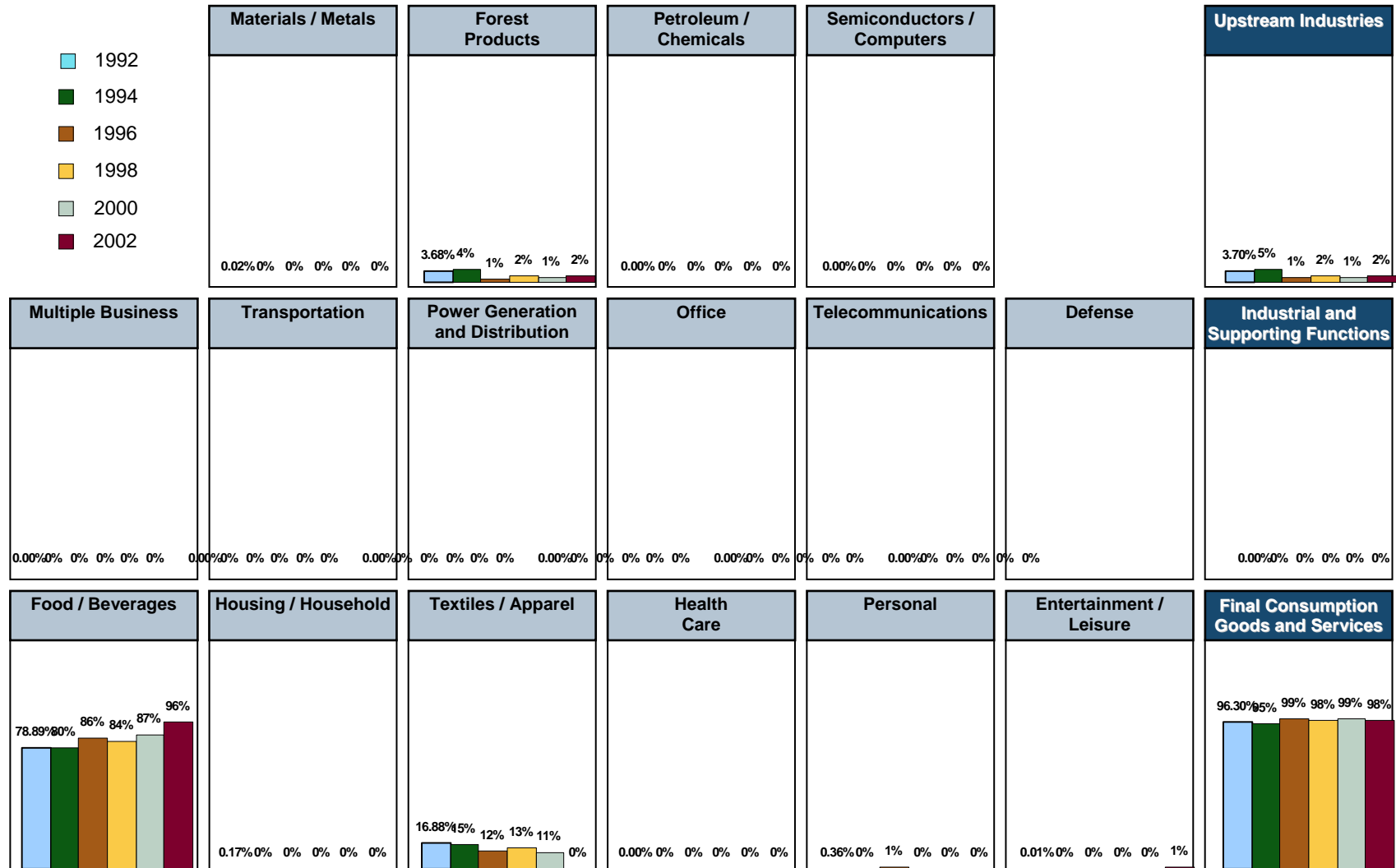
6.4 Appendix 4: Trade Statistics Charts

Figure 4.1 Bahamas Trade Statistics



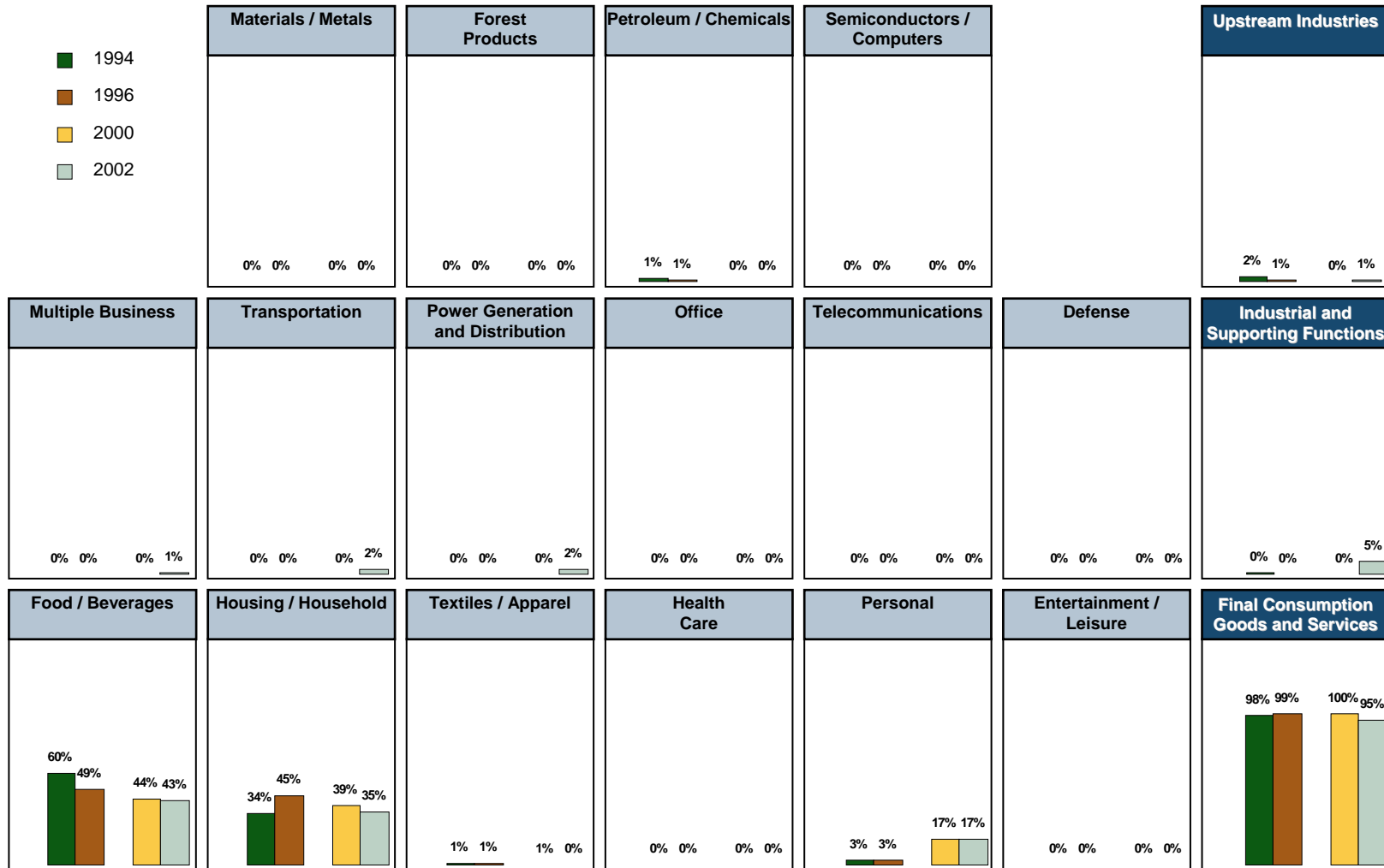
Note: Totals may not add up to 100% due to rounding
 Source: OTF Group; COMTRADE / UN Trade Statistics (Rev. 2)

Figure 4.2 Belize's Trade Statistics



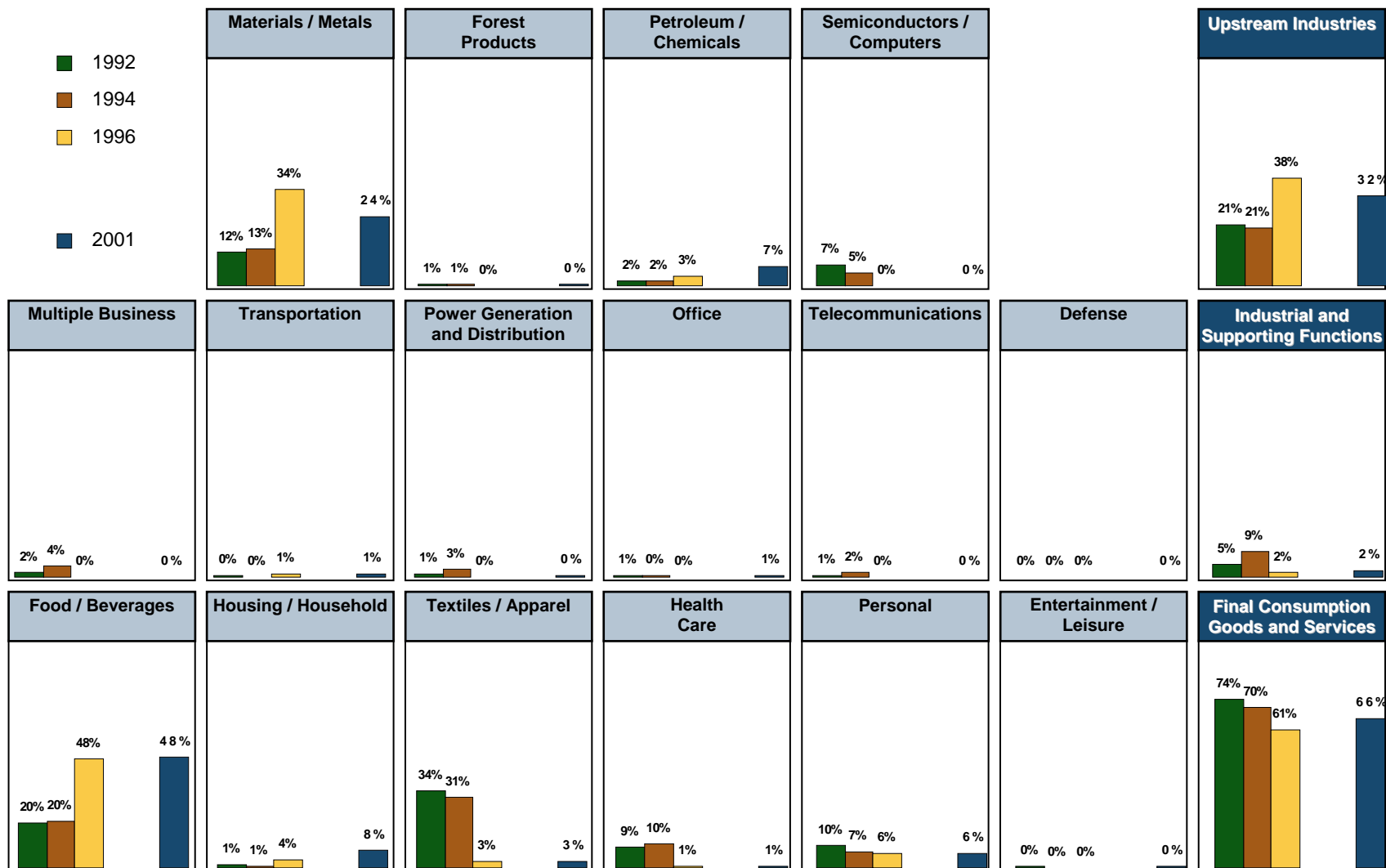
Note: Totals may not add up to 100% due to rounding
 Source: OTF Group; COMTRADE / UN Trade Statistics (Rev. 2)

Figure 4.3 Dominica's Trade Statistics



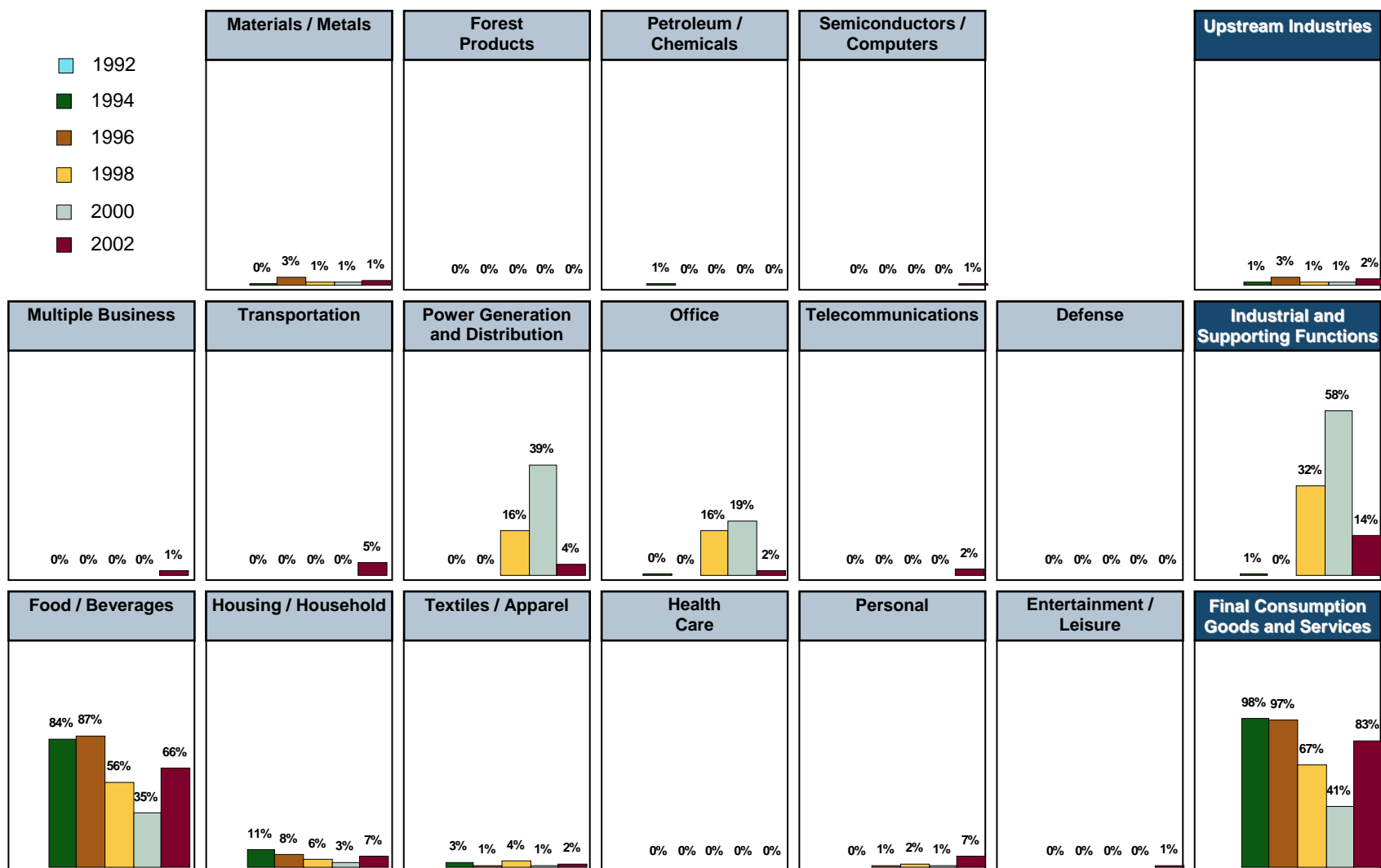
Note: Totals may not add up to 100% due to rounding
 Source: ontheFRONTIER; COMTRADE / UN Trade Statistics.

Figure 4.4 Dominican Republic's Trade Statistics



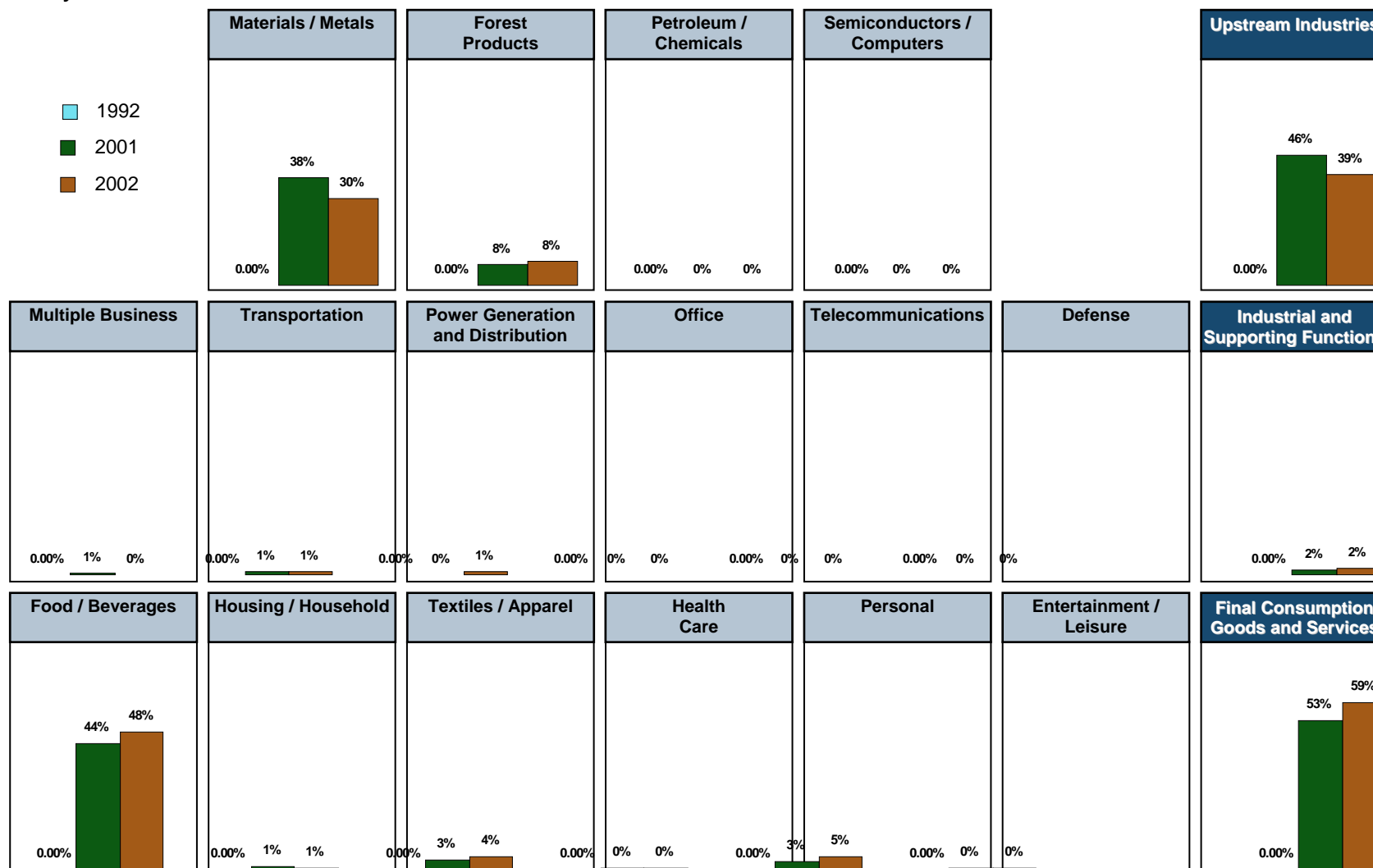
Note: Totals may not add up to 100% due to rounding
 Source: ontheFRONTIER; COMTRADE / UN Trade Statistics (Rev. 2)

Figure 4.5 Grenada's Trade Statistics



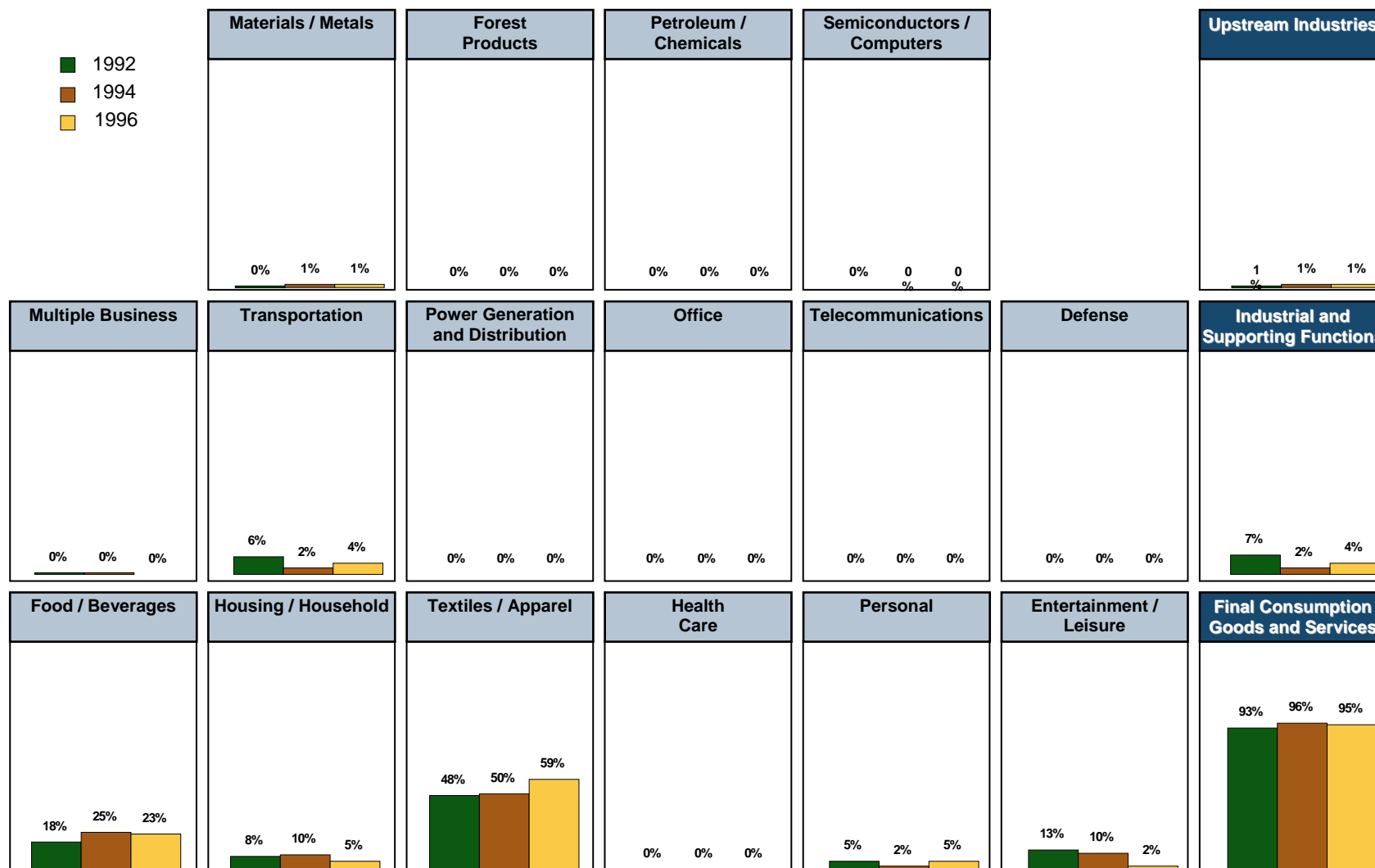
Note: Totals may not add up to 100% due to rounding
 Source: ontheFRONTIER; COMTRADE / UN Trade Statistics (Rev. 2)

Figure 4.6 Guyana's Trade Statistics



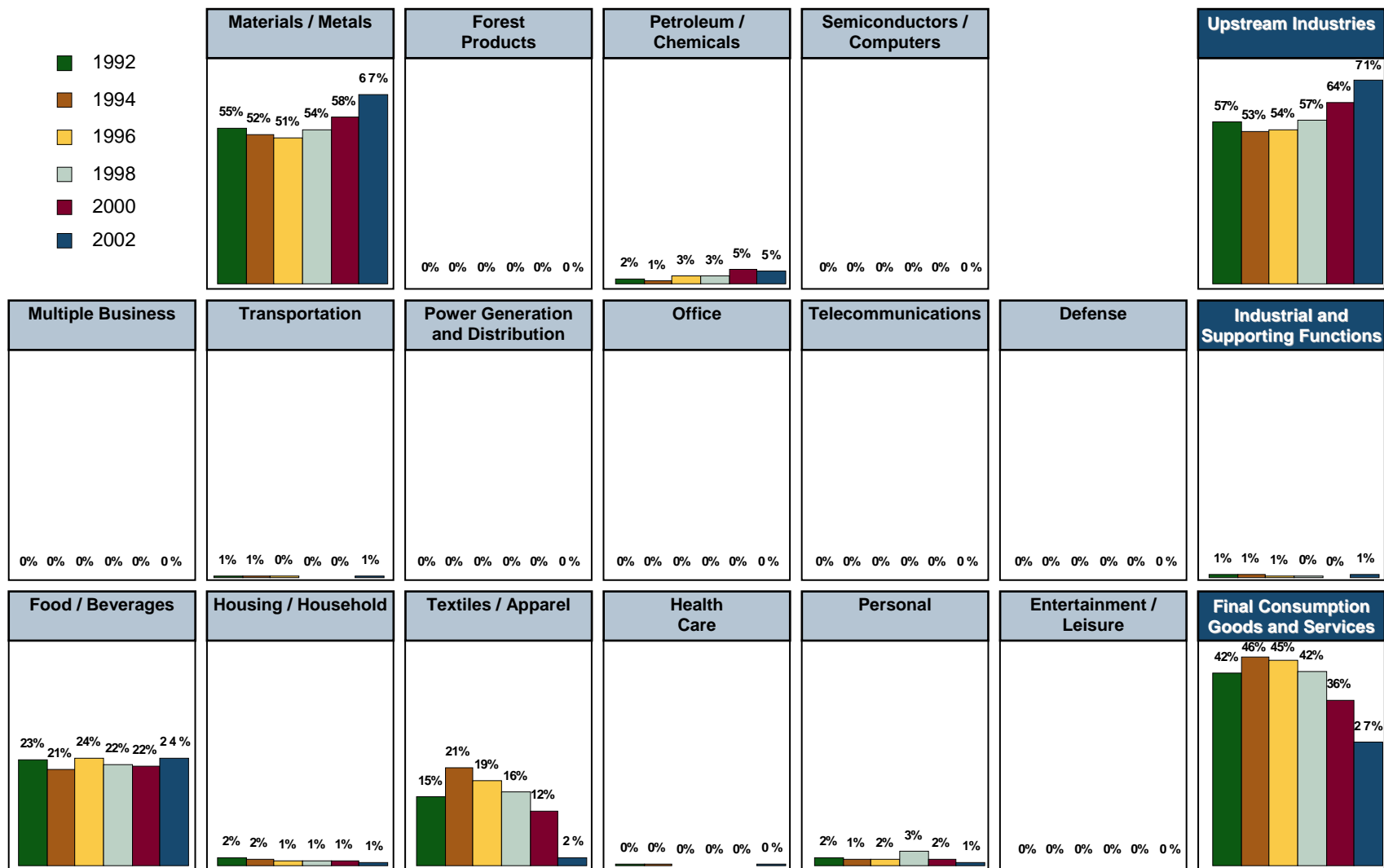
Note: Totals may not add up to 100% due to rounding
 Source: ontheFRONTIER; COMTRADE / UN Trade Statistics (Rev. 2)

Figure 4.7 Haiti's Trade Statistics



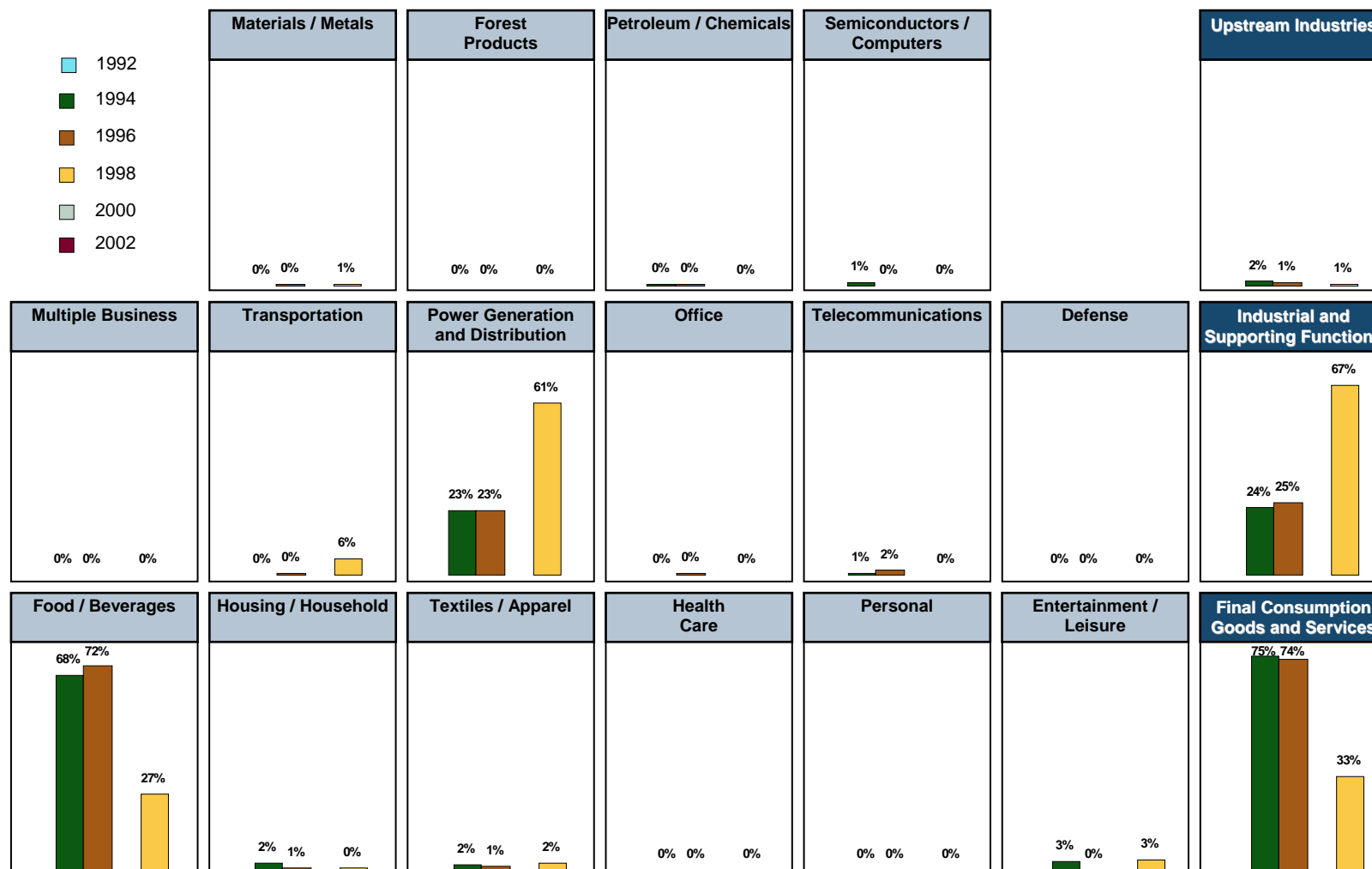
Note: Totals may not add up to 100% due to rounding
 Source: ontheFRONTIER; COMTRADE / UN Trade Statistics (Rev. 2)

Figure 4.8 Jamaica's Trade Statistics



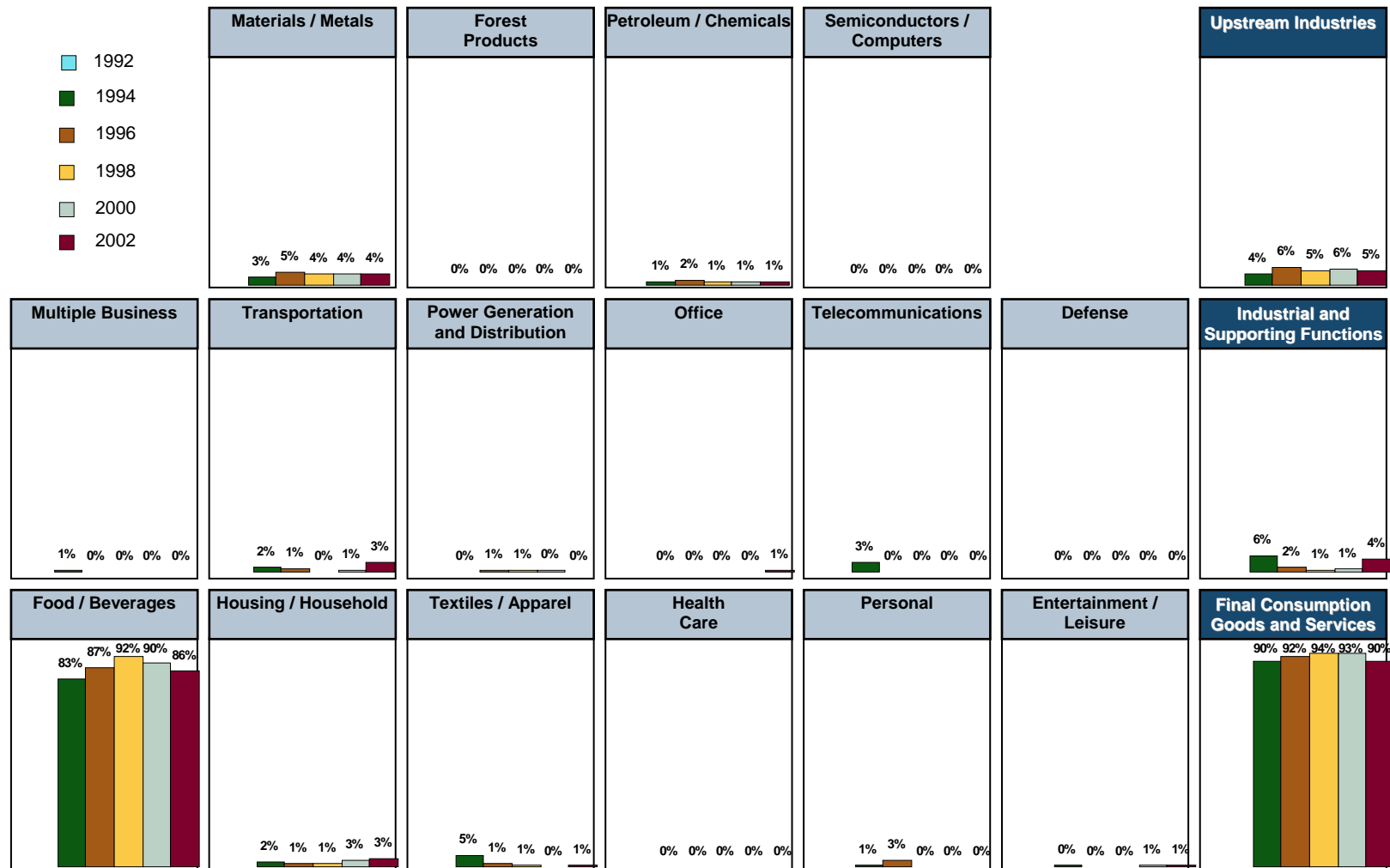
Note: Totals may not add up to 100% due to rounding
 Source: OTF Group; COMTRADE / UN Trade Statistics (Rev. 2)

Figure 4.9 St Kitts and Nevis Trade Statistics



Note: Totals may not add up to 100% due to rounding
 Source: ontheFRONTIER; COMTRADE / UN Trade Statistics.

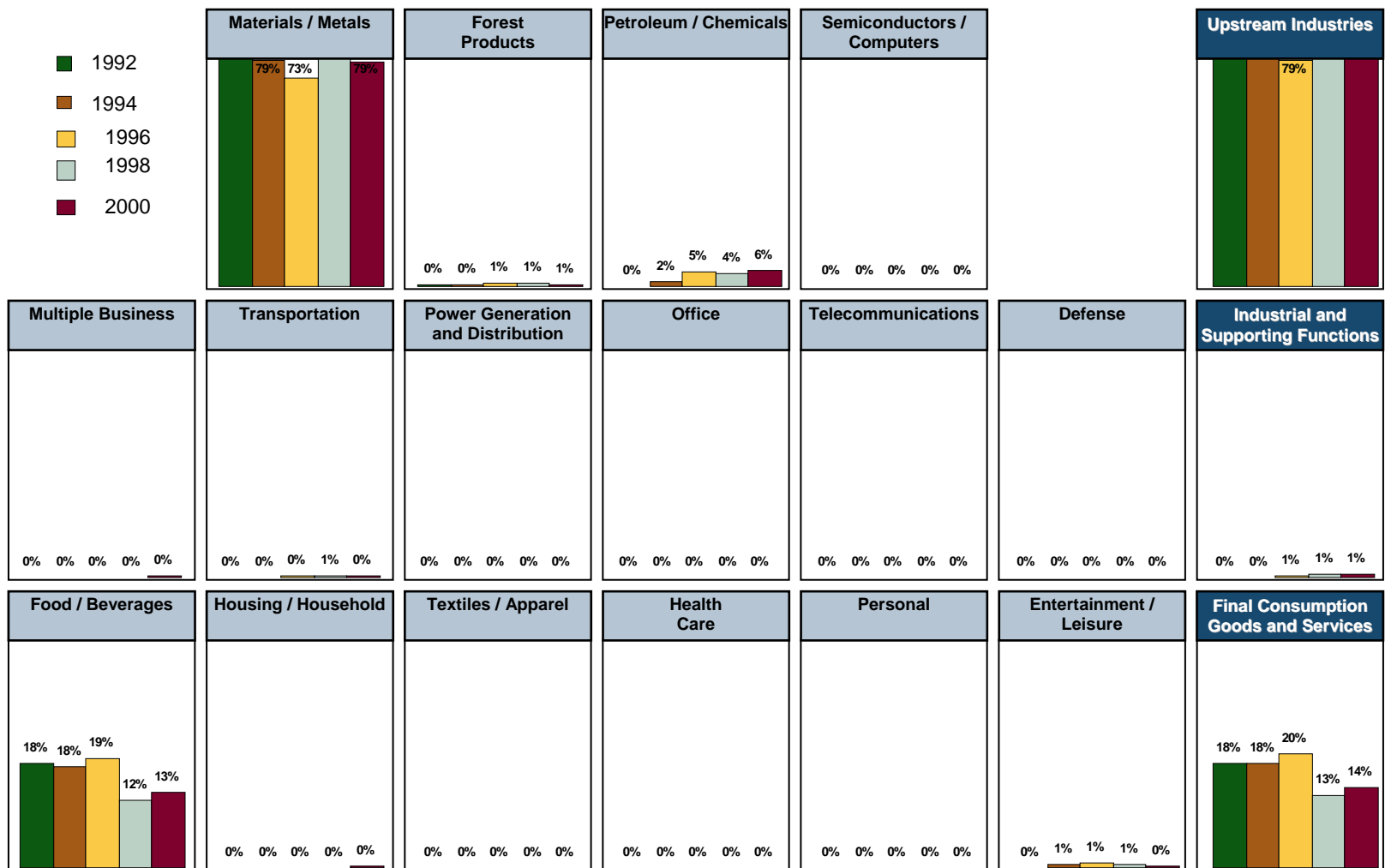
Figure 4.10 St Vincent and the Grenadines Trade Statistics



Note: Totals may not add up to 100% due to rounding

Source: ontheFRONTIER; COMTRADE / UN Trade Statistics.

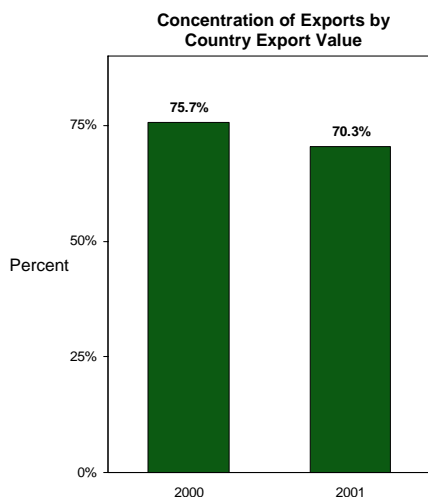
Figure 4.11 Suriname's Trade Statistics



Note: Totals may not add up to 100% due to rounding
 Source: ontheFRONTIER; COMTRADE / UN Trade Statistics (Rev. 2)

6.5 Appendix 5: Top 5 Exports by Country Export Value

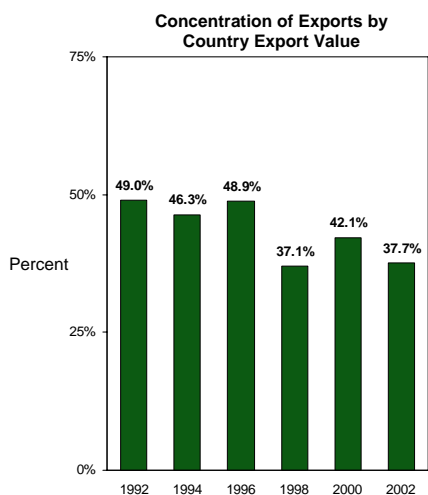
Figure 5.1 BAHAMAS



Top 5 Exports by Country Export Value, 2001

- Polystyrene, Its Copolymr — In Primary Forms
- Shell Fish Fresh, Frozen
- Gas Oils
- Other Alcoholc Bevs, Cmpnds
- Common Salt, Etc

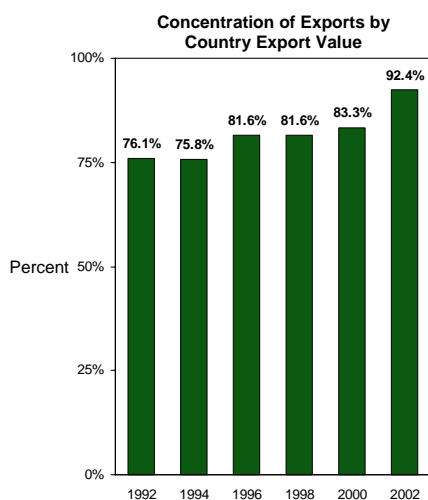
Figure 5.2 BARBADOS



Top 5 Exports by Country Export Value, 2002

- Oth Alcoholc Bevs, Cmpnds
- Raw Beet And Cane Sugar
- Kerosene Incl Jet Fuel
- Fixed, Variable Resistors
- Misc Food Preprtions NES

Figure 5.3 BELIZE



Top 5 Exports by Country Export Value, 2002

- Raw Beet And Cane Sugar
- Banana, Plantain, Frsh, Dry
- Shell Fish Fresh, Frozen
- Orange Juice
- Leguminous Vegetbles Dry

Figure 5.4 DOMINICA

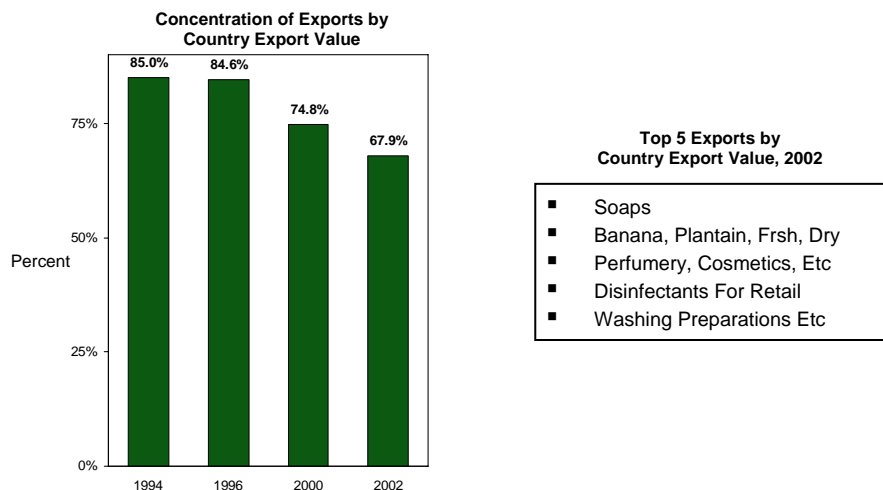


Figure 5.5 DOMINICAN REPUBLIC

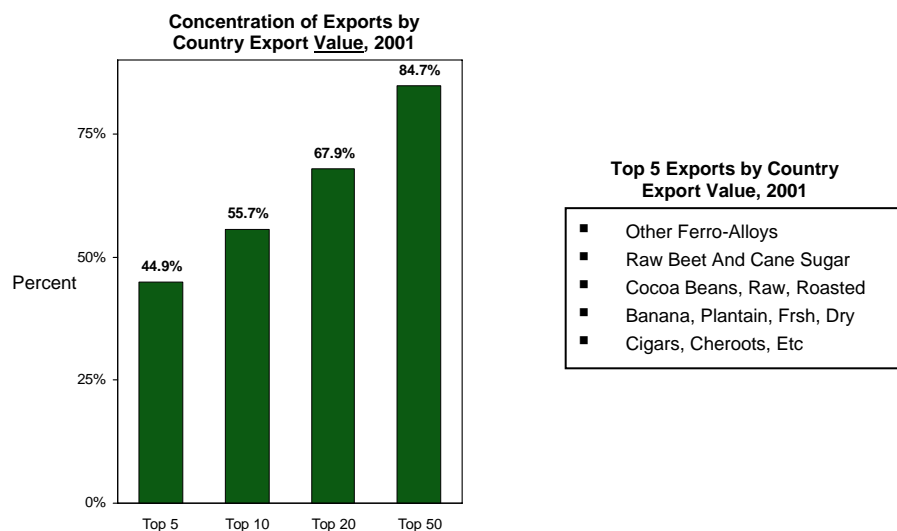


Figure 5.6 GRENADA

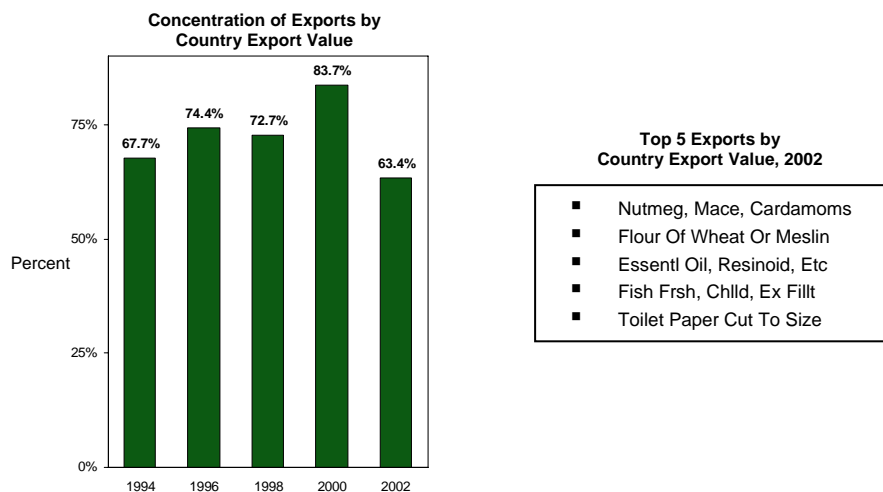
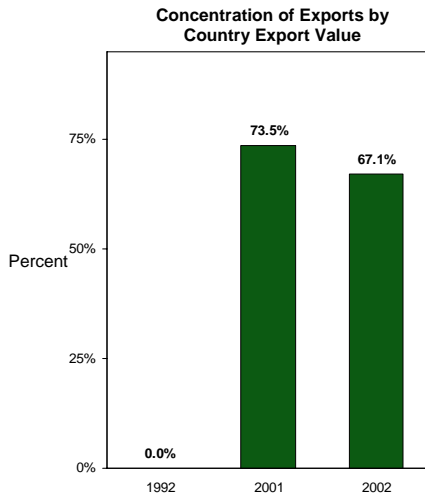


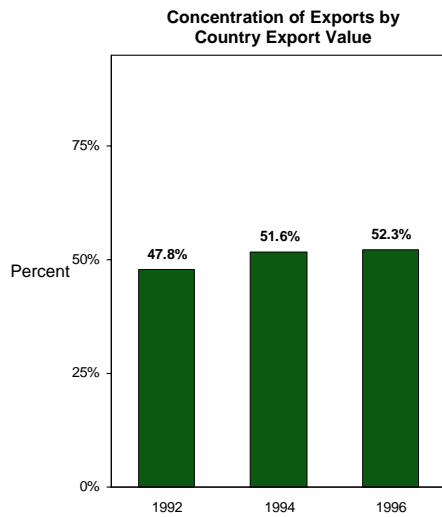
Figure 5.7 GUYANA



Top 5 Exports by Country Export Value, 2002

- Nonmon Gld Unwrt, Semimfd
- Raw Beet And Cane Sugar
- Rice Husked
- Shell Fish Fresh, Frozen
- Aluminium Ore, Concntrate

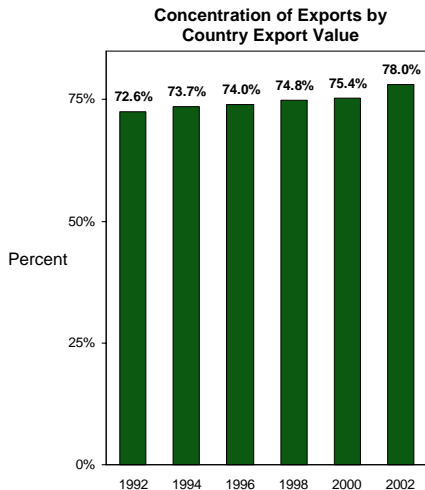
Figure 5.8 HAITI



Top 5 Exports by Country Export Value, 1996

- Womens Outerwear Nonknit — Blouses
- Coffee Subst Cont Coffee
- Corsets, Braces Etc
- Mens Outerwear Not Knit — Trousers, Breeches Etc
- Knit Gloves, Etc Nonelast

Figure 5.9 JAMAICA



Top 5 Exports by Country Export Value, 2002

- Alumina(Aluminium Oxide)
- Aluminium Ore, Concntrate
- Raw Beet And Cane Sugar
- Oth Alcoholc Bevs, Cmpnds
- Ethyl Alc, Denatrd Spirit

Figure 5.10 ST KITTS & NEVIS

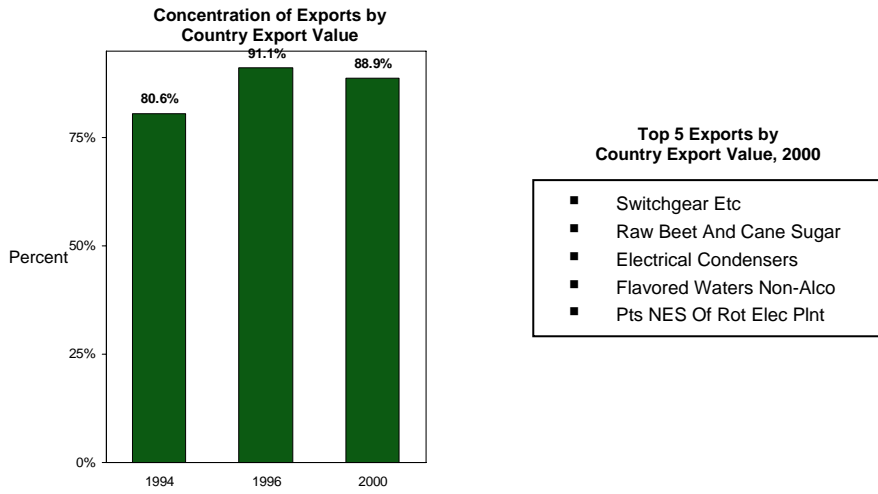


Figure 5.11 ST LUCIA

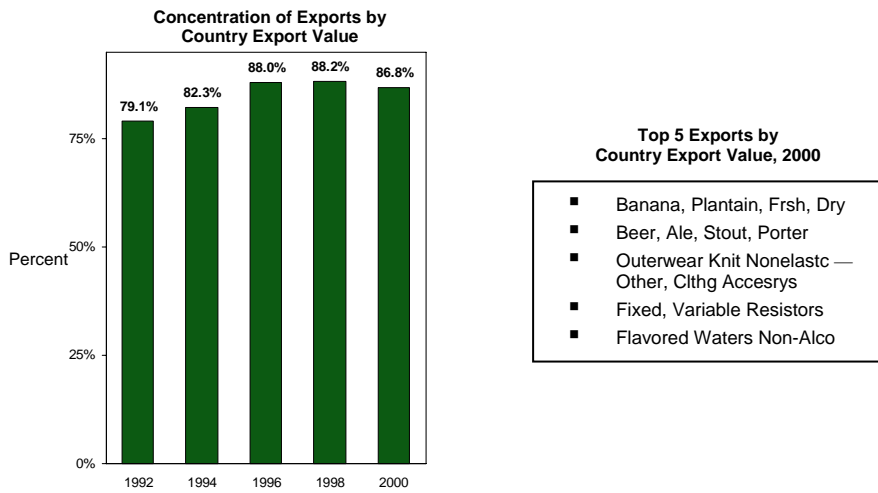


Figure 5.12 ST VINCENT & THE GRENADINES

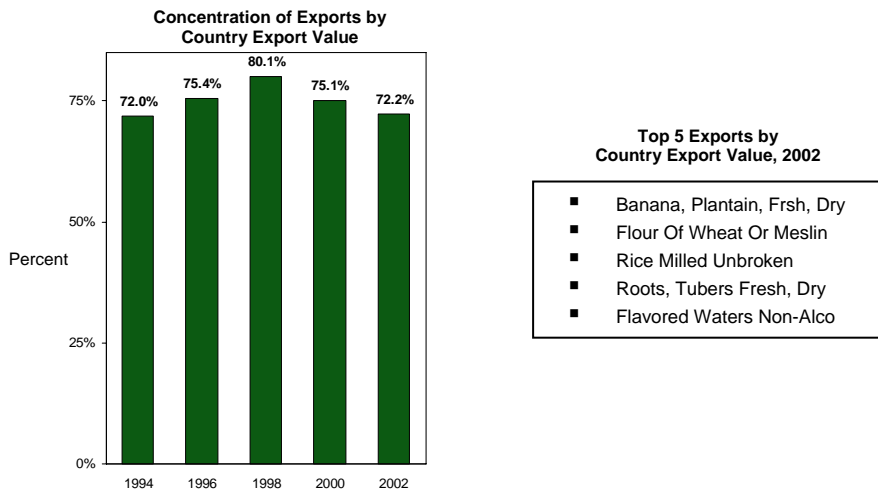
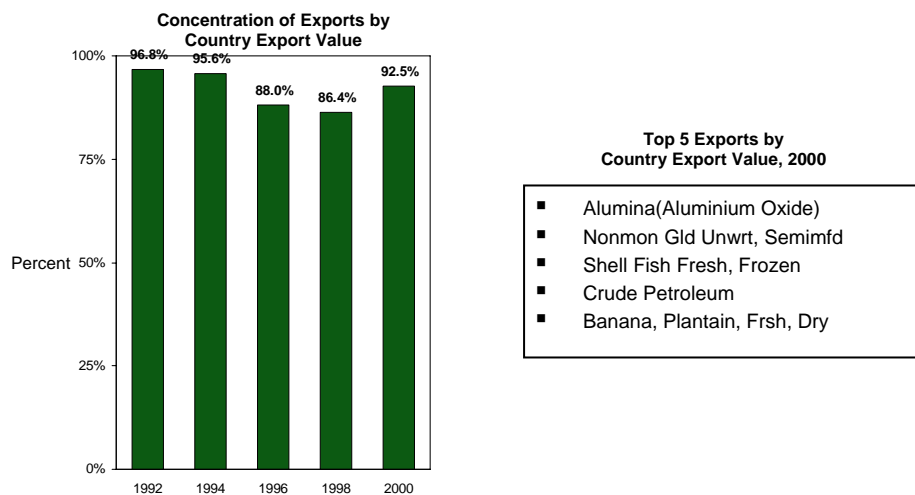


Figure 5.13 SURINAME



7. Bibliography

Amirahmadi, H. and W. Wu, 1995. "Export Processing Zones in Asia" in *Asian Survey*, vol. 35, September 1995, 828-49.

Asian Trade Hub <http://www.asiatradehub.com/bangladesh/finvest.asp>

Bertin, C. (2004). Information & Communication Technologies and Tourism: Information Systems Implementation and IT-enabled Organizational Change in the Tourism Sector. UWI Series, St Lucia Paper.

Borensztein, E. and J. DeGregorio (1998). "How Does FDI Affect Economic Growth" *Journal of International Economics*. Vol .45 June

Brenzel, L. and E. Le Franc (2001) The Potential Role of Health Services in the Development of the Eastern Caribbean. Sir Arthur Lewis Institute for Social and Economic Studies, University of the West Indies, Cave Hill, Barbados.

Carana Corporation (2002). St. Kitts and Nevis ICT Assessment. 17-22 March, 2002.

Carana Corporation (2004). OECS/Telecommunications Liberalization Program Impact Assessment: ECTEL States. USAID/CARANA ECICT Project. January 2004.

Clark X., Dollar D. and A. Micco (2004) "Maritime Transport Costs and Port Efficiency." NBER Working Papers 10353, National Bureau of Economic Research, Inc.

Cleland, C. and D. Gomez (2003). Prospects for CARICOM Services Exports in Information and Communication Technology – Trade and Investments Issues. Prepared for the Caribbean Regional Negotiating Machinery. Bridgetown, Barbados. April 2003.

Damani, M. (1998). A Review and Impact of Export Processing Zones. The World Bank.

De Ferranti, *et al* (2003). Closing the Gap in Education and Technology. World Bank Publications.

Dravis (2003). Open Source Software. Perspectives for Development. *infoDev*.

Duncombe, R. and R. Heeks (1999). "Information, ICT and Small Enterprise Findings From Botswana". Institute for Development Policy and Management, University of Manchester, Manchester, UK.

ECLAC (2004). Yachting in the Eastern Caribbean: A Regional Overview. Economic Commission for Latin America and the Caribbean. Sub regional Head Office for the Caribbean. January, 2004.

Eurostrategies (2004). Feasibility Study on the Future of the ICT Regulatory and Institutional Framework and Establishment and Development of the Information Society in the Caribbean. Framework Contract 2000-2005.

EIU (2003). Economist Intelligence Unit Jamaica Country Profile.

EIU (2004a). Economist Intelligence Unit OECS Country Profile.

EIU (2004b). Economist Intelligence Unit Belize Country Report.

EIU (2004c). Economist Intelligence Unit Bahamas Country Report.

- EIU (2004d). Economist Intelligence Unit Dominican Republic Country Profile.
- ITU (2004). ICT in the Eastern Caribbean: Saint Lucia Case Study. International Telecommunications Union. June 2004.
- Fairbanks, M. and S. Lindsay (1997). *Plowing the Sea: Nurturing the Hidden Sources of Growth in the Developing World*. Harvard Business School Press, Boston, MA.
- Financial Times (2004). "The Strange Tale of Ukrainian Stem Cell Experts, American Investors and Caribbean Tourism." By Clive Cookson and Jill James. November 10, 2004.
- Global Bank of Commerce (2003). "Five Year Outsourcing Agreement in Antigua Opens New Caribbean Doors for London Bridge".
- Gumansingh, J. (2003). Assessing the Progress Towards E-government: The Bahamas, Barbados, Guyana, Jamaica, Suriname and Trinidad & Tobago. Inter-American Development Bank RE3/OD6.
- Harvard Business School (1998). "Hewlet-Packard: Singapore (A)" Case Study No. 9-694-035. Harvard Business School Publishing, Boston, MA.
- Harvard Business School (1999). "1-800 Buy Ireland" Case Study No. 9-799-132. June 30, 1999. Harvard Business School Publishing, Boston, MA.
- Harvard Business School (1999). "IBM Ireland: Reinventing Education Across the Atlantic" Case Study No. 9-300-034. November 16, 1999. Harvard Business School Publishing, Boston, MA.
- ICT4D Jamaica (2004). ICT Enabling Tourism Development - The CocoLaPalm Resort, Negril: A Case Study. Draft/Unpublished.
- IMF (2003a). Eastern Caribbean Currency Union: Selected Issues. IMF Country Report No. 03/88
- IMF (2003b). "Trinidad and Tobago: Selected Issues and Statistical Appendix". IMF Country Report No. 03/233. Washington D.C.
- Industry Quarterly (2002). "Plastic Manufacturers Team up to take on the World". November 2002, Issue 1.
- Inter-American Development Bank (2002). "Post-Secondary/Tertiary Education in Barbados".
- Inter-American Development Bank (2003). Business Environment Report: The Dominican Republic. Washington D.C, April 2003.
- ITU (2003). World Telecommunication Development Report: Access Indicators for the Information Society.
- ITU (2004). ICTs in the Eastern Caribbean: St Lucia Case Study. June 2004. International Telecommunications Union.
- McIntyre, J., Narula, R. and L. Trevino (1996). "The Role of Export Processing Zones for Host Countries and Multinationals: A Mutually Beneficial Relationship?" *International Trade Journal*. Vol. 10 (4).
- Moore, W, Skeete, R and K. Greenidge (2003). Exchange Rate Misalignment in Selected Caribbean Countries. Research department, Central bank of Barbados, Bridgetown.
- National Business Incubation Association <http://www.nbia.org>
- Competitiveness and the Role of ICT in the Caribbean

OECS Human Development Report (2002). Building Competitiveness in the Face of Vulnerability. Organization of Eastern Caribbean States. Castries, St Lucia.

Porter, M. (1990). *The Competitiveness of Nations*. McMillan, New York.

Price Waterhouse Coopers (2001). *TIDCO Investment Guide to Trinidad and Tobago*. March 2001.

Suss E., O. Williams and C. Mendis (2003). Caribbean Offshore Financial Services: Past, Present and Possibilities for the Future. IMF Working Paper 2003. WP/02/88

Tallon and Kraemer (1999). Information technology and Economic Development: Ireland's Coming of Age with lessons for Developing Countries. University of California.

Technology Innovation Center. <http://www.jamaicatic.org>

Technology Parks- Characteristic and Role. <http://www.techpark.ir/Parks/English/Articles/Lalkaka2.htm>

The Economist (2003). "A Spectacular Fall from Grace". Article on the Dominican Republic.

The Free Trade Zone Council of the Dominican Republic. www.cnzfe.gov.do

The Global Information Technology Reports, 2000-01, 20001-02, 2003-2004.

United Nations (2001). Benchmarking E-Government: A Global Perspective – Assessing the UN Member States.

United nations Development Program (2003). How to Build open Information Societies. A Collection of Best Practices and Know-How: Bosnia and Herzegovina.

Wei. (2000) "Acquisition of technology capability through special economic zones (SEZs): The case of Shenzhen SEZ" *Industry and Innovation*. Vol. 7.

Wignaraja, G. (2004). Building Business Competitiveness. Discussion Paper for the Session "Building Business Competitiveness" at UNCTAD XI, Sao Paolo, Brazil 17 June 2004.

World Development Indicators. <http://devdata.worldbank.org.ezp2.harvard.edu/dataonline>

World Bank (2003). ICT and Development: Enabling the Information Society.

World Bank, IFC, OUP (2004). Doing Business in 2004: Understanding Regulation.

Zagada Markets Inc (2002). Caribbean Call Center Report. Sponsored by Nortel Networks.

Zhen-Wei Qiang, Pitt, A. and Ayers, S. (2004). "Contribution of Information and Communication Technologies to Growth." World Bank Working Paper No. 24. World Bank.