

Is Closing the Digital Divide the Answer to Development?
The Case of Information and Communication Technologies in the Caribbean

By

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A Thesis Submitted to
Saint Mary's University, Halifax, Nova Scotia
In Partial fulfillment of the Requirements for the Degree
Master of Arts in International Development Studies

January 2009

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Your file Votre référence

ISBN: 978-0-494-46940-8

Our file Notre référence

ISBN: 978-0-494-46940-8

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Acknowledgements

This thesis is dedicated to my mother, Viventia Thelma Stephen. Without her unwavering support this work would not be possible.

ABSTRACT

“Is Closing the Digital Divide the Answer to Development?” The Case of Information Communication Technologies in the Caribbean

By Vivienne Edward

Coined the ‘digital divide’, technology access and its role in development has increasingly become an issue of intense debate, as information and communication technologies and accessibility are now new additions to existing parameters of poverty measurements. Using ICT for development initiatives, like development institutions, CARICOM is attempting to reduce poverty by increasing ICT access within the region. It is questionable though, whether the inclusion of ICTs in a poverty reduction agenda will bring about the desired result. There is a tendency to severely overstate the potentialities of ICT for development as the digital divide is merely an implicit reflection of existing global inequalities. Ignoring structural factors such as excessive migration and skill loss, non- mutually beneficial technology transfer agreements and unfair market policies pillared on neoliberal capitalistic principles, can only allow Caribbean ICT initiatives to serve as an ameliorative tool, rather than part of a long term development goal.

January 7th, 2009
Saint Mary’s University

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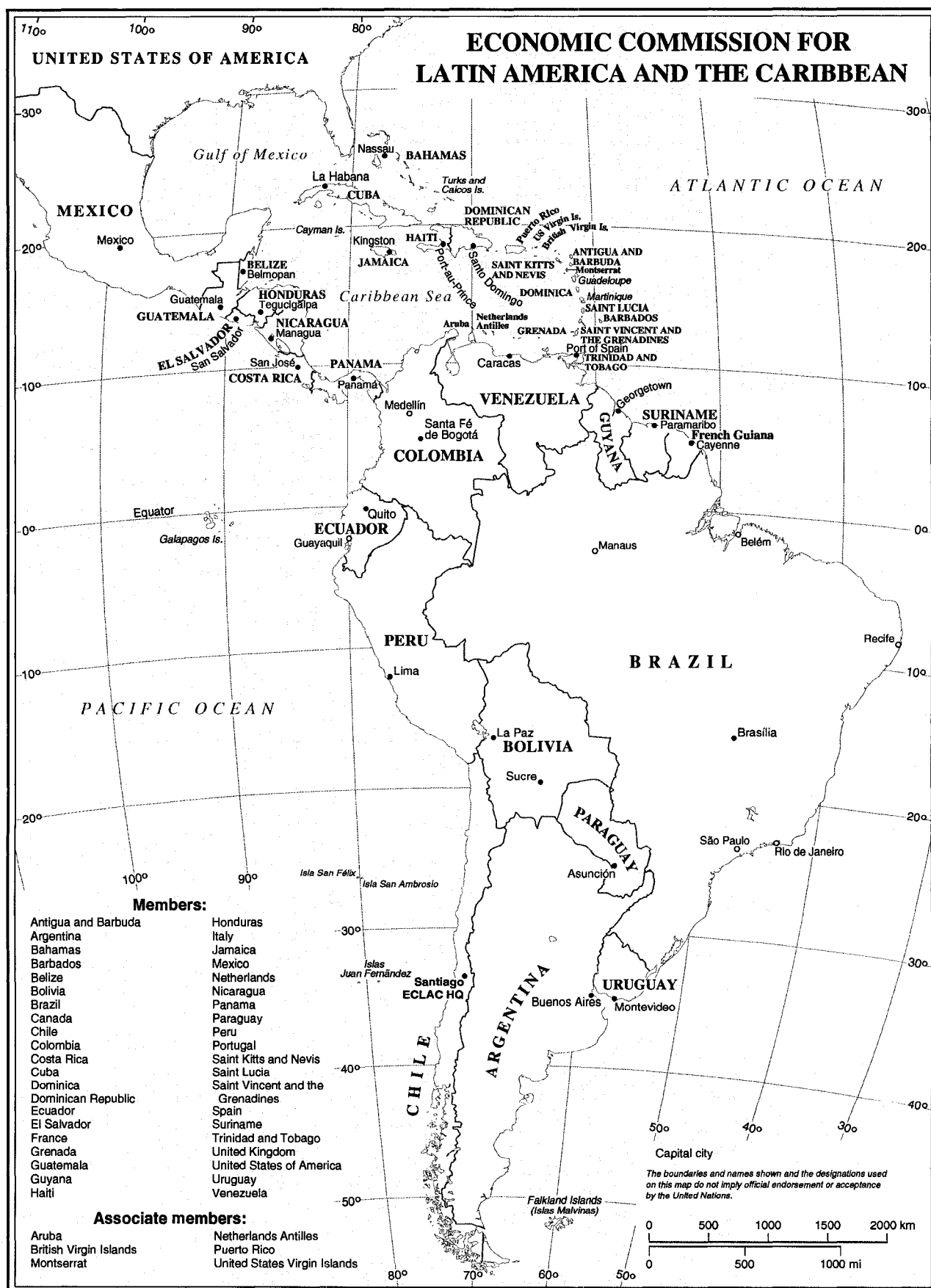
Abbreviations

ACURIL	Association of Caribbean University Research and Institutional
ACS	Association of Caribbean States
IADB	Inter American Development Bank
IT	Information Technology
ICA	Institute for the Connectivity of the Americas
ICT	Information Communication Technologies
ICTD	Information Communication Technologies for Development
IDRC	International Development Research Centre
IFI	International Financial Institutions
IMF	International Monetary Fund
IPE	International Political Economy
ITU	International Telecommunications Union
CAIC	Caribbean Association of Industry and Commerce
CANTO	Caribbean Association of National Telecommunication Organization
CARADOL	Caribbean Association for Distance & Open Learning
CARDICIS	Diversity and Information Society Network
CARICAD	Caribbean Centre for Administration Development
C'BEANGIS	Geographic Information Systems
CARICOM	Caribbean Community
CARIMAC	Caribbean Institute of Media and Communication
CDB	Caribbean Development Bank
CDCC	Caribbean Development and Cooperation Committee
CDERA	Caribbean Disaster Emergency response Agency
CITEL	Inter American Tele Communications Commission
CFTC	Commonwealth Fund for Technical Cooperation
CKLN	Caribbean Knowledge & learning Centre
COL	Commonwealth of Learning
CORIC	Community Resources & Internet centre
CRNM	Caribbean Regional Negotiation Machinery
CSA	Caribbean Studies Association
CSME	CARICOM Single Market Economy
CTO	Commonwealth Telecommunications Organisation
CTU	Caribbean Telecommunications Union
CUPIDE	Caribbean Universities Project for Integrated Education
DOT FORCE	Digital Opportunity Task Force
DOI	Digital Opportunity Initiative
ECLAC	Economic Commission for Latin America and the Caribbean
ECTEL	Eastern Caribbean Telecommunications Authority
EU	European Union
FDI	Foreign Direct Investment
GATT	General Agreements of Tariffs and Trade
GPE	Global Political Economy
GPT	General Purpose Technology
GNI	Gross National Income

HDI	Human Development Index
IPR	Intellectually Property Rights
LAC	Latin America and the Caribbean
LDC	Least Developed Countries
MFN	Most Favored Nation
MNC	Multinational Corporation
NTB	Non Tariff Barriers
OAS	Organisation of American States
OCCUR	Organization of Caribbean Utility Regulators
OECD	Organisation for Economic Cooperation and Development
OERU	OECS Reform Unit
OECS	Organisation of Eastern Caribbean States
R&D	Research and Development
RIA	Regional Integration Agreement
SAP	Structural Adjustment Programme
SAL	Structural Adjustment Loan
SIDS	Small Island Developing States
SIDSNET	Small Island Developing States Network
SIV	UNESCO's Small Island Voice
STABEX	Stabilisation of Export Earning Schemes
SYSMIN	System of Stabilization of Export Earnings from Mining Products
TC	Technological Capability
TRIMS	Trade Related Investment Measures
TRIPS	Trade Related Intellectual Property
TNC	Transnational Corporation
UN	United Nations
UNESCO	United Nations Educational Scientific and Cultural Organization
UNDP	United Nations Development Programme
UNICA	Association of Caribbean Universities and Research Institutes
UNCTAD	United Nations Conference on Trade and Development
UWI	University of the West Indies
UWIDEC	University of the West Indies University of the West Indies
WB	World Bank
WSIS	World Summit on the Information Society
WTO	World Trade Organization
WHO	World Health Organization

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Chapter 1- INTRODUCTION

1.1 Statement of the Problem

“The world is witnessing the creation of a new social stratum: the ‘technology poor’ who (for economical, geographical, social, cultural, or political reasons) cannot gain access to the emerging technological resources needed to ensure productivity in an increasingly digitized global economy” (Rigobert G.T.C, 2006:38).

Technical progress and transatlantic borrowings, to Phillip Scranton (1995), were the fundamentals for the propulsion of the American empire. What Scranton failed to note was that beyond the American empire, both technological innovation and transatlantic movement, would usher in an era of mass migration, mass capital and resource flows becoming known as the age of globalization. Innovations in technology, more specifically innovations in information communication technologies (ICTs) have facilitated an emergence of a global economy functioning primarily through a “connection of [a] vast network of individuals across geographic boundaries at negligible cost.” (DOI, 2001:5). The transmission of massive amounts of information at unprecedented speeds and shrinking communication costs, have now become the foundation of new forms of economic activity, the hybridisation of a cosmopolitan inspired (global) culture, and the blurring of spatial boundaries. Information communication technologies have pedaled developed countries into wealth and economic growth unprecedented.

This explosion of technology has been largely facilitated by the concomitant manifestation of “capitalist globalization” or ‘neoliberal globalization’ (Landsberg, 2006; Bowles, 2004). Together globalization and technical progress has created what Ngairé

(2000) labels a 'borderless world', which he qualifies as a world in which communication technologies allow transnational corporations (TNCs) an omnipresence, that is unhindered by regulation and state interventionist policies. This has produced the phenomenon of TNCs generating annual revenues far greater than gross national incomes (GNI) of several developing countries. Neoliberal globalization as the *modus operandi* of our current global economy, has lent society a period of wealth, yet it has also helped produce extreme poverty, famine, climatic and ecological degradation. Society has come to accept this paradox, as the consequence of a global capitalist system organized mainly under the principles of "[f]ree markets, low tax rates, free trade" and no state intervention (US. President Reagan quoted in Schulyer, 1988:6).

The optimism of neoliberal capitalistic ideas has seemingly materialized only in the North, while clearly contributing to the deepening and widening of poverty in the South, creating an unmistakable division within the world system. This division is also evident with regard to technology access and technological innovations and today has been aptly coined the "digital divide". While there is a definite disparity with regard, to all types of technology access across the world, the focus of late has been with regards to ICTs. This is because ICTs have been isolated as having a direct impact on economic growth in developed countries (Basu & Frenald, 2006:1). On the other hand ICTs have been relatively absent in developing countries. Roger Harris (2004) noted that of the total number of computers in the world, developing countries own only four percent, with almost 85% of all online users coming from developed countries, representing a mere 22% of the worlds' total population. The unmistakable presence of large deficits of

information flows to the majority of the world has presented itself as a serious development challenge.

Currently several developing states and organizations have felt the need to address this with some urgency, prioritizing policy to directly increase digital access across the globe, with the hope of bridging the divide. What is clear however is that this divide is a “result rather than a cause of poverty and efforts to bridge it must be embedded in effective strategies that address the causes of poverty” (Harris, 2004:5). Instead, development institutions and developing states need to carefully plan any national schemes in order to successfully address this issue. Currently macro level discussion fails to recognize that like other material sources of deprivation, the digital divide is simply a manifestation of power and wealth imbalances between and within nations. Thus it stands to reason that the sound approach to addressing the digital divide is to focus on the causes that are both systemic and endemic to the structural reproduction of poverty. Unfortunately this is where states have been slowest to act.

The Caribbean region (for the purpose of the paper the geographic area defined as the Caribbean will refer to the Anglophone Caribbean commonly referred to as CARICOM) has struggled with development and achieving the modernity that most states aspire to.¹ Like most developing regions, the Caribbean is experiencing problems such as large dependence on agricultural exports on poor terms of trade, and little if any negotiating power in the international arena. What makes this region such an interesting case is that unlike many other developing countries with low socio- economic indicators, the region has achieved relatively well maintained social institutions such as above

¹ Pairing concepts of development and modernity have elicited strong debate, as it is argued that they are in synonymous. This is particularly important when reconciling the presence and priority of human development versus economic development.

average literacy, and would seem the most capable of harnessing the advantages of increased digital communications and a stronger technological orientation. The region's history with technology though has been tenuous at best. A convergence of endogenous and exogenous factors has barred their progress in achieving technological success.

Like other developing countries striving for entrance into the global information economy, governments of the Caribbean region, along with supporting agencies such as the UNDP, WB, and ECLAC, have all invested in the implementation of ICT policies, and related initiatives in order to incite a regional digital revolution. What many of these policies and initiatives fail to reflect is an implicit understanding that ICT integration can only be truly integrated into Caribbean society if the policies are accompanied by measures to address the problems that caused the lack of access and underutilization of technology in the first place. Han Reichgelt (2000) argues that if Caribbean countries raise their GDP and subsequently the incomes of their citizens, persons would be able to acquire 'socially desirable goods' such as health care and education and thus increase their ability to access ICTs. The simplicity of such an argument belies the complexity of the reality. The factors that maintain populations in abject and relative poverty have become institutionalized within our economic, political and social way of global interaction and would require a drastic reorganization of economic and political behavior. Like Reichgelts' 'socially desirable goods', technology will continue to elude the Caribbean if the more fundamental issues of underdevelopment are not addressed.

To this end this research has carefully outlined four of the main factors that contribute the structural underdevelopment of technology and ICTs in the Caribbean region:

- The first is the presence of neoliberal global forces as unfair and growth-inhibitive in the Caribbean.
- The second factor present is the non- mutually beneficial and highly restrictive technology transfer agreements.
- The third factor for assessment is the region's antiquated education system that has been impacted by socio historical events such as colonialism.
- Lastly, and quite significantly, the brain drain as a consequence of excessive migration, are the most significant contributors to the digital divide in the Caribbean region.

These four factors form the parameters which it would seem has formed the very limit with which the region has been able to realize technological competencies. This research will draw out each of these factors while also speculating the future possibilities for Caribbean technology. My principal argument in this thesis is that the so-called "digital divide" cannot be an independent, stand-alone cause of underdevelopment, and that, therefore, development policies solely aimed at rectifying this divide are bound to fail.

1.1.2 The Digital Divide

The value of technology as a driver of economic development has been debated for decades as Schumpeter, Marx, Rostow, all theorized that amongst other things, the development of science and technology is the most transformative and catalytic agent in a society's development. Despite the debate surrounding this issue many scholars do agree that "...economic growth depends predominantly on technological change and cannot

occur to any significant extent in its absence” (Usher in Hall, 1986:2). The capabilities of ICTs in delivering information in real time, has been an integral part in advancing the societies of the North, but have been noticeably absent in the societal fabric of the South. Roger Harris, in a 2004 United Nations report on ICTs for poverty alleviation, stated that as of 2004 the developing world owned only four percent of the world’s computers (Harris, 2004:8). He also noted that in 2002 there were only 6.3 million internet subscribers within the entire African continent as opposed to 34.3 million subscribers in the U.K ; this is particularly worrisome when taking into account what these numbers represent as a percentage of the population of their respective region. There is here a clear disparity in ICT access.

Curiously, despite the significant technological innovations that have occurred, in many countries the presumed natural growth of development has not appeared. Of the 177 countries ranked in the 2007/2008 UNDP HDI rankings, 70% of them still ranked between the medium and lowest human development which, startlingly, also represents almost 80% of the world’s population. Moreover, some of these countries, India for example, who have introduced ICTs into their economies and become strong participants in the information communication revolution, still account for some of the world’s highest levels of poverty, indicating that the benefits of these innovations have not trickled down to the majority of the world’s population.

In fact poverty has abated little in the last decade, according to the World Bank “a quarter of the worlds’ people [still] remain in severe poverty” (UNDP, 1997: 1). There are approximately 2.8 billion people living on less than \$2.00 a day and further still, over a billion men, women and children who live in abject poverty; that is on less than \$1.00

U.S. a day (Harris 2004)². That was almost five years ago. More recent world crises such as global oil, food price hikes, and steadily increasing inflation, have caused the number of people spiraling into hunger and poverty to escalate at an alarming rate.

Development thinkers are now facing a conundrum so to speak, needing to eradicate poverty using a global economic system that seems to perpetuate it. They are now seeking new ways of reducing poverty while also steering developing societies to a point where they can function fully in the 'information age'. States recognize that in order to become competitive and economically viable in the current conditions of the global trading system, developing countries are compelled to integrate ICTs into their societies. Therefore what is now emerging from the UNDP, UNESCO, World Bank and other major development institutions is the discourse that not only should we attempt to close the digital gap but we should also include ICTs in the national poverty reduction strategies of developing nations.

In particular one of their focus areas is "[p]ro-poor ICT policies and the integration of ICTs into poverty reduction and strategies related to the Millennium Development Goals" (UNDP). International financial institutions (IFIs) such as the WB and IMF, all subscribe to the orthodoxy that development will occur through modernization; thus developing countries should pursue policies that encourage the modernization process and by extension a reduction in poverty. This strategy has already been applied to many regions such as Eastern Europe, Africa, and Latin America, all with varying degrees of success. One criterion of success is that ICTs will have created jobs

² There are many statistical variations of the actual number of people in severe poverty. In 2006 the world population data sheet (World Bank Publication) reported that actually 3.4 billion people live below \$2.00 a day. Discrepancies aside, neither half nor nearly half of the world's population by any means should be living in such conditions.

and incomes, which in turn lead to skill development and an improvement in the lives of persons. The UNDP has laid out a five pronged strategy which would allow developing countries to integrate ICTs in national development strategies, “promote citizen participation and government transparency, capacity development through strategy implementation, and [create] bottom-up ICTD initiatives to support civil society and SMMEs” (UNDP, 2007) and lastly support of the ICT and pro poor initiative through well developed national awareness and stakeholder campaigns. Their hope along with those of the supporters of this new ICT for development concept is such that “these new technologies will lead to healthier lives, greater social freedoms, increased knowledge and more productive livelihoods” (UNDP, 2001:1).

The idea of using ICTs for poverty reduction however is still problematic and must be analysed carefully, as there is a tendency to overstate its potentialities and underestimate other contributing factors to the global poverty problem. It has become easy to aggrandize the use of technology and proclaim it as a panacea for development. Information and communication technologies, however, cannot be applied in a vacuum; instead they must operate and be integrated, alongside certain other factors such as basic literacy, health and stable physical infrastructure. With that said, it is still questionable whether the introduction of information technologies alone can ameliorate the lives of those who are facing the burden of absolute poverty. Quite frankly we must question whether the aforementioned 1.2 billion people living in abject poverty, who are not meeting their basic survival needs, can harness the capabilities of ICTs for sustainable socioeconomic development. This question is addressed within the 2008 ECLAC report on the Information Society, where it was determined that states must essentially

deliberate as to whether they should create policies that would encompass “development of ICTs” or “development with ICTs”. In other words this would call for states and development institutes to carefully analyse whether the application of ICTs in impoverished societies is an end in itself or should be focused on as a means to bring about development. So far the two concepts have become lost in much of the rhetoric and policies that have already been created. The presence of qualifiers such as ‘so- called’ with reference to the digital divide, is evidence of the growing skepticism that an absence of digital technologies in impoverished societies should be placed high on the hierarchy of needs to be addressed.

Institutions are tempted to use indicators such as physical access to communication technologies and telecommunication infrastructure such as networks and internet connections, as the measures for mapping the closure of the ‘digital gap’, which are undoubtedly important and relevant. However we must also place critical importance on the quality of the networks being provided. Although difficult to measure, we must also allow that the quality of ICT usage has to be qualified before proclamations can be made about the closing of the digital divide. The provision of ICTs cannot in alone constitute a closing of the digital divide, particularly when complimentary skills and services are absent. Other components such as a sound social infrastructure must also be developed well enough to support the integration of transplanted technologies.

This then leads to a question of sustainability. For example the integration of ICTs in rural communities has been implemented with varying degrees of success. Success as one can imagine is highly relative to the donor organization, the NGO and the communities or persons receiving these ICT programs. These programs require steady

financial support, in addition to committed qualified personnel to ensure the ICTs are being implemented correctly and to provide maintenance where necessary. Most importantly sustainability is dependent on the success of the integration of ICTs into communities. When weighing all these factors, one must question the viability of ICT for poverty alleviation initiatives, particularly as much of the resources from these initiatives are highly contingent on external factors. Despite this call for caution what countries must be even more cognizant of is that the lack of technology access within their societies is generally indicative of a lack of other socioeconomic factors which need to be addressed. States should not seek ICT implementation for the sake of it but instead acknowledge that implicitly the acquisition of technology should come with conscious investments in the socio economic infrastructure of their society.

1.2 The Caribbean and the Digital Divide

“The end of the 1980s finds the Commonwealth Caribbean countries very severely tested by the changes taking place in the international economy and by the technological wave that has been a major factor in the widening gap between developed and ... developing countries” (Ralph Henry, 1991: 37).

The Caribbean region seems particularly pertinent to this discussion because of its struggle to successfully engage in the knowledge economy. Concerns over the Caribbean's inability to develop science and technology have been amplified as globalization, (and ensuing information age) has made technological advancement and its application necessary for survival. The small size of these island states, coupled with their lack of natural resources and susceptibility to natural disasters leaves the region heavily reliant on its biggest asset, its people. Koelher and Segal (1997) noted that this dependence on its people has necessitated a drive to produce a well developed human

resource adept at technological capabilities and innovations that would become the impetus for social and economic development. This drive however “is proving to be agonizingly slow” (p.605).

From the perspective of the ‘digital poverty camp’ these island territories would unquestionably be considered digitally poor. Both CARICOM and most Latin American states have been struggling to close the digital gap within their societies with varying degrees of success. For example Saint Lucia, one of CARICOM’s smaller island member states has developed a telecommunications industry that has been rated as one of the best in the region. According to the International Telecommunications Union (ITU), their telecommunications industry, stimulated by the mobile phone companies have enjoyed an 83% market penetration with over a 135, 000 users in a population of 160,000. On the other hand, they also noted that this IT growth has remained relatively isolated from other market segments and has not spilled over into other sectors of the society. Although mobile telephone services are relatively well dispersed, other forms of information and communication technologies, such as internet service and use are still not widely accessible.

This reinforces the notion that technology as useful as it is in boosting productivity, is a necessary but not sufficient condition for socio-economic development (Basu & Fernald, 2006:1). Technology can remain highly isolated within sectoral use and not flow over into other aspects of society. Other factors must be present to enhance and maximize the benefits of technological innovations. For the Caribbean region, the impediments to technology access are structural and rooted in the systems of economic and political activity. Lack of technology access (particularly internet and computer

access) should be viewed as a symptom of much larger problems. While we can identify several problems that contribute to the digital divide in the Caribbean, it is important to isolate the four most significant contributing factors. Within this research we trace the effects of neoliberal globalization, technology transfer and the TRIPS agreements, Education and the Brain Drain as a consequence of rapid migration as the principal factors that are both, structural and systemic and at the crux of the digital access phenomenon. While all the factors interrelate, they will be treated as individual phenomenon to allow a deeper understanding of their role in the digital divide.

1.3 Objective of the Study

This research stems from a discomfort with the assumption that a) globalization has brought with it a new phenomenon of disparity in technology access called the digital divide and b) that a healthy response to closing the digital divide is to equip poor people and rural communities with ICT access. The central argument is that neither of these assumptions can be considered as independent causes of underdevelopment. The Caribbean as a developing region falls on the side of the divide that generally does not have access to technology. Yet there are relatively high social indicators and basic social infrastructure such as education and literacy rates that would make this region aptly poised for strategic ICT policies. Not only has technology been absent from Caribbean society, national policies and strategies thus far have not figured technology as a strategy for future economic activity.

In light of this, this research comprises two objectives. The first is to critically assess the digital divide debate. By tracing the fundamental theoretical ascriptions of this

argument this thesis will show that the economic drivers of this phenomenon are based on modernization and neoliberal politics, both of which have determined the mode in which we conduct socio economic and political activity globally, but have also been identified as having largely negative effects on the global society. By placing an overemphasis on the acquisition of ICTs without a holistic approach of the development needs of individual societies (particularly ICTs), states will not find ICTs successful or useful in achieving substantive levels of development.

As lack of technology access is indicative of far more than income levels, and is beyond simple economic implications. In fact several socio political and cultural factors have become pertinent to this concept. The second objective of this research therefore is to advance the view that while there are irrefutably huge differences in the access and use of ICTs across the globe, these differences in access and use are a reflection of systemic problems resulting from both specific exogenous and endogenous factors, neither of which CARICOM can exert control. This is critical, as many scholars have tried to account for lack of ICT access through explanations of other divides, such as gender, skill and education, income and age. This research asserts that these 'divides' all stem from similar factors. Bridging these divides should entail an effort to remove the structural barriers that allow them to persist in the first place.

This thesis will isolate and classify the four most pertinent factors to this research, which will be divided into two categories, exogenous and endogenous. The exogenous factors are neoliberal globalization as a function of contemporary global economic activity and the issuance of technology transfers and the Trade Related Intellectual Property and Trade Related Investment Measures (TRIPS&TRIMS) agreements, both of

which are highly contingent upon international actors. They are both intensely related but independently create circumstances detrimental to technology access and contribute to the digital divide within CARICOM.

The first endogenous factor, the educational system, is critical as this is the crux of both a society's ability to create technological innovations as well as harness any latent benefits. CARICOM states have an education system that is founded on the legacies of colonialism, colonial principles of elitism, highly focused on law and humanities and not on science and technology. An analysis of this is crucial to understanding the lack of cultivation of a technology oriented society in CARICOM. Lastly this thesis will isolate the brain drain as the final endogenous factor, which presents a constraint to the technology access in CARICOM. The high rate of emigration of skilled workers to metropolitan countries leaving over worked and undersupplied skilled labour, as well as the loss of the capacity to create services an industry that could lead to technology and socio economic development.

This research accepts that in reality these factors move between fluid boundaries of cause and effect, all having indistinguishable influences on the other. The demarcation of these factors within this research is for organizational purposes only. It must also be noted that this research accepts that there are other factors that will to a lesser extent play a role in the lack of access to technology and the digital divide in the CARICOM region. It is important therefore to reiterate that this thesis is going to show that the aforementioned four structural factors are the most significant contributors to CARICOMs digital divide and serve as the most pertinent inhibitors in the lack of technology access.

1.4 Thesis Statement

It is clear that the aforementioned issues play a critical role in current development discussions. If they remain unaddressed these issues limit the opportunities of developing countries in fully realising their technological potential and continue to allow developed countries to retain their hegemonic position with regard to innovations in ICTs. In light of this, this research will address three main areas of knowledge deficit.

- This thesis will argue that the ‘digital divide’ as it is commonly known, is reflective of larger socio economic and political inequalities, therefore, any policy created to bridge this divide should reflect a congruent approach in stemming these inequalities as opposed to a primary focus of increased ICT access.
- Secondly it will argue that given the relatively high levels of human development, the CARICOM region can benefit from holistic policies aimed at increasing technological innovation, research and development, in order to increase local technological orientation.
- Thirdly as theorists continue to debate what the central problems are in attaining technology access in the Caribbean region; this thesis will argue that in the case CARICOM there are four main factors, neoliberal policies, Technology transfer agreements, Education and the Brain Drain, that most closely contribute to the disparity in digital access in the CARICOM region.

This thesis identifies that these factors are both structural and systemic, requiring policy stratagem aimed at the complete reorganization of economic, social and political operation.

1.5 Methodology

Definitions

To answer the research question and advance the areas of knowledge as established within the objectives of this research, a qualitative methodological approach has been used. This allowed the data collected to be analyzed and assessed with satisfactory depth and comprehension. To avoid confusion with regard to the geographical area of study, this research relied on the definition of the Caribbean as the group of countries forming CARICOM. These countries consist of Antigua and Barbuda, The Bahamas, Barbados, Belize, Dominica, Grenada, Guyana, Haiti, Jamaica, Montserrat, Saint Lucia, St. Kitts and Nevis, St. Vincent and the Grenadines, Suriname, Trinidad and Tobago and Associated members Anguilla - 4 July 1999, Bermuda - 2 July 2003, British Virgin Islands - 2 July 1991, Cayman Islands - 15 May 2002, Turks and Caicos Islands - 2 July 1991. With the exception of Suriname and Haiti, all other states within this grouping represent the Anglophone Caribbean and all are members of the British Commonwealth. This definition allowed for easy access to information and English documents as well as an analysis of states with relatively similar histories.

The definition of the 'digital divide' was taken from the ECLAC/CEPAL organization as

“technical systems that receive manipulate and process information and facilitate communication between at least two parties. ICTs are therefore more than just informatics and computers, since they do not operate as isolated systems but are instead embedded into a network. They are also more than just broadcasting technologies..., but also permit interactive communication.” (ECLAC, 2001:3).

This definition was chosen because it provided the most comprehensive definition of ICTs. This research did not want to concentrate on individual types of technologies per

say, but instead wanted to focus on the general lack of technologies and access to them in the CARICOM region. Although there is a strong reference to internet and internet based access, it is not the only types of technology access focused in this research. This definition was also the most satisfactory because other definitions attempted to incorporate the 'effective usage' of ICTs as a parameter for measurement; however this would be problematic in this research as effectiveness would be difficult to evaluate.

Theoretical Framework

The theoretical structure of this thesis relies heavily on mainstream neoliberalism, modernization theory and data to account for the increasing prioritization of technology within current economic systems. This thesis consulted several journal articles, and books, on globalization as well as world human and economic development statistics from the World Bank, UNDP Human Development Reports, journal articles and books. Works from the dependency school of thought were consulted to provide a theoretical understanding of the current state of development across the Caribbean region.

The theoretical definitions of technology provided by Cline (1985), Hoselitz (1960) clearly identify the social and economic components of a society as a critical base to technology production. Therefore analysis of the lack of Caribbean technology access required an assessment of those social and economic factors that inhibited the process. Four factors were isolated for examination. The four factors chosen were chosen based on rigorous analysis of contemporary socio economic and political problems in academic literature, journal articles, CARICOM reports and technology assessment reports, particularly from ECLAC, World Bank, UNDP and the ITU.

Data

This research is a comparative study of the Caribbean region. I chose to keep the study at a regional level because thesis research wanted to show that a) the factors affecting technology access were common to almost all CARICOM member states, and b) that the similarities in socio economic development, coupled with similar histories, emphasized the causality of the factors chosen and that their effects were not just incidental but were more deeply entrenched and systemic.

The data relied upon was sourced primarily from comparative secondary data found in journal articles and books, as well as data from institutions such as the World Bank and the United Nations. Government documents from specific CARICOM countries will also be used in conjunction with CARICOM documents to further support and qualify any data drawn from CARICOM reports.

To show the regional financial constraints in technology investment and acquisition, this thesis relied on economic information from CARICOM such as debt repayment and GDP for the last 10-15 years in the following tables:

Table 1	Sectoral Share of Output, 1990 And 2000
Table 2	Value of Total Imports by CARICOM Countries
Table 3	Value of Total Domestic Exports By CARICOM Countries 2005 - 2007
Table 4	CARICOM'S Debt Service Payments as a Percentage of Its GDP at Market Prices 1998-2000
Table 5	CARICOM'S Debt Service Ratio (Debt Service Payments as a Percentage of Exports of Goods and Services 1998 – 2000

To compare current regional ICT policies, initiatives and progress, this thesis relied on data from several secondary sources, represented in the following tables:

Table 6	Caribbean (Selected Countries): National Strategies for Information Societies, January 2008
Table 7	Select Caribbean ICT Agenda Lead Organizations
Table 8	Caribbean Information Society Regional Stakeholders
Table 9	National ICT Budgets
Table 11	Select Caribbean Countries and ICT Penetration

Comparative migration data was obtained from international institutions such as the UNDP and ECLAC. The information is represented in the following tables and figures:

Table 14	Data on Population And Migration From The 2000 Revision Of World Population Prospects.
Table 15	Caribbean Government's Views and Policies on Emigration, 1996 and 2000
Table 16	Percent of Labor Force That Has Migrated to OECD Member Countries, 1965-2000 (By level of Schooling)
Figure 1	Estimated Government Expenditure on Education of Migrants (In Percentage of GDP)
Figure 2	Top 20 Countries in the World with the Highest Emigration Rates, 1970–2000 (Percent of Educated Labor Force that has Migrated to OECD Member Countries)
Figure 3 Countries	Percent of Labor Force that Has Migrated to OECD Member Countries Caribbean vs. the Rest of the World, 1965–2000
Figure 4	Percent of Labor Force that Has Migrated from the Caribbean Countries to OECD Member Countries, 1965–2000

Data on education such as curriculum, degree granting institutions as well as expenditure was represented in the following tables:

Table 12	Human Development Education Indicators for (Select) Caribbean Countries
Table 13	Caribbean Degree Granting Institutions
Table 17	Government Expenditure on Education, Average 1999–2002 (Per student, as a percent of GDP per capita)

As much of this debate is relatively recent, much of the documents from the World Bank, UNDP, IDRC and UNESCO were within the last ten to fifteen years. Although several of the journal articles were recent, there was a fair amount of information coming from Caribbean scholars such as, Pantin (1987), Hilbourne and Watson (1994), Koehler and Segal (1987) who have been writing on Caribbean technology issues since the early 1980s. Their work was invaluable to this research.

1.6 Thesis Overview

This thesis is divided into five chapters. This chapter will provide a synoptic view of the problem of the digital divide in the Caribbean region and a brief review of the conceptual issues surrounding it. This chapter will also provide a clear statement of thesis objectives, our central hypothesis, a brief discussion of our methodology and a description of the thesis structure.

The second chapter will be an extensive look at the theoretical constructions that frame this research. These theories are fundamental to the general understanding of the themes presented, and its relevance to contemporary issues. The four focal points of theoretical research will be: technology within the context of growth and development

theories, as well as related definitions and terminology; debates on globalization and neoliberalism and the positions on the relationship between the current global economic system and the proliferation of technologies as an integral factor in its operation; debates concerning the TRIPS agreements, followed by an account of the digital divide discourse as presented by scholars, states and institutions. This chapter will then review the literature and debates, linking the development concepts of technology and development to the CARICOM region. There will be a theoretical exploration of 'Dependency Theory' as it pertains directly to the economic and social structure of the Caribbean reality.

The third chapter will be a presentation of comparative empirical data relevant to the discussion, while the fourth chapter will provide the analytical discussions based on the findings. The fifth and final chapter will bring together our conclusions and final thoughts while adding perspectives on future possibilities of technology access and innovation in CARICOM.

Chapter 2 – TECHNOLOGY AND DEVELOPMENT

2.1 Introduction

“To be certain, globalization is not a random phenomenon but it is in fact a product of both technological progress and conscious economic policy” (Benn, 2000:24).

The technology and development discourse, particularly over the last decade, has been discussed in *ad nauseum* proving no closer to reconciliation on the points of discontent. The discontent has so far stemmed from an ascription of necessary relationships between technological innovations (ICTs) and its products, and socioeconomic development. This is because the ‘information technology revolution’ as Keniston (2004) denotes, was far more remarkable because of the rapid and expansive nature of its evolution³ (p.11). The ICT revolution under processes of globalization has seen the growth of massive wealth and prosperous economies. This wealth accumulation is distributed, however, in such an inequitable manner that, according to Kelles-Viitanen (2003:82) it currently leaves 1.2 billion people in extreme poverty who are either unaffected or reaping only marginal benefits. The deliberate attempts to include ICTs in national socioeconomic planning with the explicit purpose of both poverty reduction and economic prosperity have raised eyebrows. Although the majority of supra national organizations, aid agencies and developed countries view this juxtaposition as completely logical and desirable, others view it as oxymoronic and completely competing ideals that will serve to perpetuate current inequalities. The objective of this section of the thesis is

³According to Kenneth Keniston (2004) in his book the *IT Experience in India: Bridging the Digital Divide*, he stated that it took at least a century for the printing press to capture a 50 million audience and 38 years for the radio to acquire the same number. The internet, meanwhile has achieved that in only four years (p.11).

to provide the critical contributions to the ideas and concepts that surround this complex issue.

This section will first introduce the ideas surrounding technology and address the at times confusing terminology in order to provide a definition that is suitable for the analysis within this paper. This will be followed by a critical analysis of modernization and growth theories from theorists such as Kuznets (1976), Rostow (1960), and Todaro (1977), who invariably offered significant contributions to our understanding of the role that technology has played and continues to play in our society's attempt to 'develop'. This is particularly important because these ideas have not only accounted for the 'growth through technology' concept that society adheres to but also facilitates its continuation and proliferation.

This will be followed by an analysis on globalization with specific attention drawn to the neoliberal ideologies that are driving current globalization processes. This is a significant section of the thesis as it will offer insight from theorists such as Harvey (2007), Bowles, (2004), on the 'neoliberal globalization' as a driver of the economic and technological booms that fuel the current global political economy. This will help situate the motivations of states and development agencies who create policies geared at becoming highly engaged in technological processes and by extension an economically 'prosperous' digitized information society.

This Chapter will provide a general discussion on the digital access (or lack thereof) of developing countries and burgeoning digital divide debate, with a holistic overview of the particular niceties and concepts. This section will uncover the issues of technology transfer and the related international intellectual property rights agreements.

The review of this issue is material to this research as it is at the crux of the highly inequitable and dependent relationship that developing countries have with the developed world, particularly the Caribbean with regard to technology access. The final section will offer a recapitulation of the digital divide debate and its relevance to developing societies.

2.2 Technology and Information Communication Technologies: Working Definition

“We cannot get on with our work ... even reasonably well until we ‘unpack’ the word technology – take apart the various usages and agree on names for each of the important concepts” (Cline, 1985:2).

Conflicting terminology with regard to technology has incited much debate as terms are given and used interchangeably to represent both its processes and products. The sheer expansiveness of this issue has called for a narrowing down of definitions and concepts. This required a delving into the theoretical underpinnings of ‘technology’ and what Cline suggests as a need to ‘unpack’ the word and remove ambiguity. The main objective of this section will be the provision of a deconstruction of a specific type of technology; information communication technologies also commonly referred to as ICTs. This paper is primarily concerned with providing a general overview of the paradigm that will allow a better contextualization of the research issue and allow us to become better acquainted with the general concepts.

In general, ICTs can be classified as a general purpose technology (GPT), e.g. the steam engine, waterwheel, internal combustion and electricity (Sadayoshi in Kurihara, 2008; UNCTAD, 2007; David & Wright, 1999). These technologies are seen as being ‘enabling technologies’ or complimentary innovations that boost the productivity of existing and potential technology (David & Wright, 1999:7). This definition has been

extended from earlier manufacturing products to more recent and abstract capabilities in organizing knowledge. It is highly expectant that GPT lead to increases in total factor productivity (TFP) and contribute to increasing efficiency in product development. As such, ICTs serve infrastructural purposes and further socio economic development. This is based on the premise that the creation of networks through ICTs serves as a production factor. The development of new ICTs spawns new information, knowledge and education which nurture a highly qualified human capital, and eventual 'deepening of other resource capital'. This falls in line with neoclassical growth theories that also see economic development as consequence of knowledge accumulation.

Another view presented by Sadayoshi, is that ICTs within development is an effective means of communication ICTs provide an easy exchange of information and ideas which promotes business and consumption and is also considered social capital. Further as an GPT are seen to fundamentally reorganize productivity, ICTs therefore are theorized to provide an increasing demand for complimentary services and products, which in turn pushes the "demand curve for ICT to shift further and further out, thereby offsetting the effects of diminishing returns" (Basu& Fernald, 2006:4).

Technology as a general concept encompasses much more than the products we associate with it. Cline (1985) identifies the four main categories of reference for the term technology based on popular usage. While the terms may well present some overlap, what Cline attempts to do is highlight how society has internalized different meanings of this one concept. He sees our contemporary understanding of technology as products, the processes with which we create these products, the knowledge we need to carry out these processes and the system within which it all occurs. He deconstructs technology as:

- Technology as Hardware: this would umbrella all products manufactured by humans.
- Sociotechnical System of Manufacture: even broader this reference to technology is inclusive of all inputs needed to create hardware including the people. It also includes social processes such as the legal and economic processes that contribute to the technology production.
- “Rationalized Methodology”: Cline isolates the use of technology as meaning techniques, methods, knowledge and or the ‘know how’ (the science behind all things).
- Sociotechnical Systems of Use: this reference Cline denotes is the system with which all of the above concepts form and work to create a network that is the basis of human accomplishment.

Again this approach offers a broad view of what we consider to be technology.

Many scholars have built on this seeing technology not as its parts, but as a sum. It is the “totality of methods [that] rest on scientific principles hence their inherently rational nature” (Bardouille, 1998:33). Although the extent to which technological innovation has been oriented with science has been a perennially disputed issue, Mansfield (1968) agrees that there is general consensus that modern industrial society has seen a distinguishable positive shift in the translation of science into technological products. As states continue to invest in the melding of science and technology, continually the two concepts create processes and products that have garnered immense commercial value and subsequent economic development.

This is even truer when focusing on information communication technologies. As just one aspect of the technological paradigm, ICTs have been largely instrumental in changing how society operates. The significance of the ICT revolution is embedded in a principle that is simple and basic. It rests solely on the precept that “all human behavior is based on the exchange of information and communication” (ECLAC, 2001:2). By

creating and innovating methods to facilitate communication that is cheap and instantaneous, states have been able to harness immense commercial value and economic development, particularly in developed countries. Defining these technologies however has not escaped the dissent that has permeated technology literature. In fact understanding of these technologies has become even more difficult in part, due to their proletarianization unlike more complex technologies that are restricted to industrial use and or use by technocrats, ICTs are more widely dispersed among people and thus meanings and interpretations have become easily blurred. According to the ECLAC 2001 *Information Society Report*, ICTs are defined as,

“technical systems that receive manipulate and process information and facilitate communication between at least two parties. ICTs are therefore more than just informatics and computers, since they do not operate as isolated systems but are instead embedded into a network. They are also more than just broadcasting technologies..., but also permit interactive communication.” (ECLAC, 2001:3).

They argue that there is a convergence of all of the above capabilities, ‘information disseminating technologies’, ‘communication enabling technologies’, and ‘informatics solutions’, than summates what we call ICTs or network(s). ECLAC’s definition of ICTs is the most comprehensive in its acknowledgement that ICTs is really a convergence of communication systems and not isolated products. Other institutes however have been narrower in their definitions. The World Bank for example view information communication technologies in more specific terms referring to ICTs as all types of “hardware, software, networks, and media for the collection, storage, processing, transmission and presentation of information (voice, data text, images), as well as related

services” (World Bank, 2007)⁴. Although the World Bank’s definition of ICTs is possibly the most widely used, for the purpose of this paper any reference to ICTs will be based on the definition provided in the 2001 ECLAC report. As aforementioned the allowance for ICTs as a convergence of systems and not just singular products provides a more comprehensive view of an already broad concept.

While it is not within the scope of this paper to explore the intricacies of how these technologies work, it is important to note that it is in part, the transformation of information into codified binary ‘digits’ that allows the “manipulation of information and to communicate between one another” (ECLAC, 2001), hence the “digitization” of media or the digital aspect of communication.

Beyond the use of ICTs, states are now attempting to gain not only the physical structures of ICTs but to also become full participants of a knowledge society (also referred to as a information society, learning society, or the weightless economy)⁵. The concept of a knowledge society is a primarily economic one. Following the previous revolutions of steam and electricity, information has presented itself as the third revolution with radio, gramophones, television and computers, the medians that would advance the information age (Kumar, 1996). Information society is a construct that has been developed to accommodate the growing importance of knowledge and innovation as drivers of economic determinism. At its simplest, an information society is a “*substantial* characterization of societies in which information increasingly is the primary means and

⁴ For more technical explanations on the workings of ICTs refer to the European Commission report on Communication from the Commission to the Council and the European Parliament; Information and Communication Technologies in Development: the role of ICTs in EC development policy (2001). Brussels 14.12.2001; COM (2001) 770 final p;3

⁵ It would be impossible to state all the terms that are being used to coin this new phenomenon. Therefore any other subsequent reference to this new economic paradigm simply connotes an economy based on knowledge and its method of diffusion.

product of all processes” (Van Dijk, 2005:132). The set of criteria most agreed upon for this type of society is one in which there is “investment in, diffusion and use of modern information and communication technologies [ICT] in households and firms, education levels and lifelong learning, patents, research, and development [R&D] characteristics indices etc. (Robach, 2007:4).

Scholars such as Dijk (2005) cites that there is a difference between a network society and an information society which is a “formal characterization emphasizing a particular social (infra) structure and organization of contemporary society.” (p.133). This ‘difference’ in terminology however is semantic and has no bearing on the chosen definitions of the concept of an information or network society, within this research paper; Both terms will be used interchangeably. While societies are always in a development flux, information(al)⁶ societies either are, or leading to organization of systems based on science and rationalization, economic activity based on information production, a human resource based on technical education for more complex information creating and processing and a culture that has symbolized and placed the highest value on information products (Van Dijk 2005).

However, an information society does not imply a complete reorganization of praxis with regard to economic and market principles, as a matter of fact “the imperatives of profit, power and control seem as predominant now as they have ever been in the history of capitalist industrialism”(Kumar in Van Dijk, 2005:133). Developed countries have more closely been identified information as societies because of their high emphasis

⁶ Manuel Castells (1996) has argued that because all societies have been based on information regardless of form, it is inaccurate to now distinguish our present society as an information society. Instead we must denote it as an informational society that now prioritizes the generation, processing and transmission of knowledge.

on information and its facilitating technologies as economic drivers. These countries, particularly those within the Organisation for Economic Co-operation and Development (OECD), have attained status of post modern, post industrial in which information - should one make it analogous to a primary good (Van Dijk, 2007; Sen, 2001) – has become essential to their very survival. This knowledge essentialism has been co opted into the language of poverty and inequity development theory particularly that of economist Amartya Sen. He argues that information should be seen as a primary good, is not distributed equitably across the globe and thus has resulted in information and or digital poverty. Moreover Sen argues that individuals and developing countries lack of access to ICTs and inability enter into an information society represent the deprivation of a basic right.

2.2.2 Evolution of Technology and Economic Development: Analysis of Growth Theories

“No one has seriously questioned the idea that economic change is driven by the introduction and diffusions of innovations either in technique or in organization.” (Schumpeter in Metcalfe, 1989:54).

One can hardly discuss the value of technology to contemporary society without a brief review of the literature on the history of economic development and growth theories. Growth theorists have made significant contributions in accounting for our economic development, but more importantly is rooted in (neoclassical) schools of thought that has and continues to shape the way most of society organizes and operates. The relationship between technology and growth has had its theoretical foundations in modernization theory and later neoliberal theory, as symbiotic and necessary in its role in society's transformative development. Technology has also played a central role in these

theories because it is seen rather circularly as a driver of economic growth and a *sine qua non* factor production. The unprecedented rates at which developed societies have been achieving economic growth and development, has led to revolutionary innovations in technology and an increasing dependence on it.

More importantly there is a tentative consensus that human beings have moved into a “post-” era where technology and information are ‘king’. It is no longer adequate to contextualize current technology within the economic machinations of society but instead we now use the development theories of ‘post industrialism’ and ‘postmodernism’ to account for societal axioms that are being used to validate techno-essentialism. To frame appropriately our future references to technology within society’s economic determinism it is essential to establish the works of growth theorists who have established a corollary between technology and development as well as those who have isolated other factors such as the social and political as having a greater catalytic role on growth and development.

Modernization theory evolved from the theories of evolution of Charles Darwin and Hubert Spencer and the liberal economic works of Adam Smith (Farmer, 1999:9). These theories conceptualize the processes that societies go through from undeveloped to modern, industrialized; a process they parallel with individual human evolutionary behavior. While there is general consensus amongst theorists that all societies do go through a process from the traditional phase to eventually become highly modern, many however have offered different perspectives as to the specific course of progression.

The modernization paradigm is seen as the application of both the “endogenous and exogenous dynamic” while some theorists see modernization as a result of purely

endogenous factors such as “social differentiation, rationalization and the spread of universalism, and achievement...” (Pieters, 2001:43-45), others have also factored in the increasing influence of external factors, such as global market trends, increase in international trading, the birth of large conglomerates of supranational corporations and the creation of global governance in the form of large multilateral and supranational organizations. Pieters sees the external factors as coming under the umbrella of globalization, imperialism and capitalism.

The Modernization theoretical approach to growth and development is based on the understanding of “a dichotomy between two ideal types: the traditional society (...’rural’, ‘backward’ or ‘underdeveloped’) and the modern society (‘urban’, ‘developed’, and ‘industrial’), (Larrain, 1989:87). This concept identifies these two societies as polar opposite points which circumvent the development transition. The stages in the movement from a traditional society to a modern society are characterized by increased complexity in systematic organization, at both the micro and macro level.

Influential theorists such as Walter Rostow, Micheal Todaro and Simon Kuznets, early on identified that it is the development of technology which became the catalytic agent in societies’ ability to organize and modernise. For Rostow the two most important things seen as the basis for his modernization model and resulting societal transformation, was technology and economic determinism. He saw the process entailing five progressions from a traditional society, then to a society experiencing the preconditions of take off, a take off stage, a drive to maturity, then would at last apex at a stage of high mass consumption. He argued that any society not able to move beyond a traditional phase was because “the potentialities which flow from modern science and

technology were either not available or not regularly and systematically applied.”

(Rostow,1960:4-16). Modernization theorist Micheal Todaro (1977), like Rostow, agreed that it was technological progress and capital accumulation that were the main propellers of economic development. Though modernization theorists disagree to some extent on what the drivers of modernization really were and are, it is still those like Rostow and Todaro whose analysis have had the most lasting and influencing effect on contemporary thought and behaviour.

Traditional societies were very unstable with marked fluctuations in political and social harmony. Populations were not stable either, and were modified by inconsistent harvest output and “incidences of war and plague”. Rostow identified these societies as pre-Newtonian societies, including early Chinese dynastic society, medieval Europe and early Middle Eastern and Mediterranean civilizations. The application of science and rational thought was limited and certainly not being used in mass production of goods.

His next stage, preconditions for take off, is traced to a period where “the insights of modern science began to be translated into new production functions in both agriculture and industry.” Britain and the rest of Western Europe have been isolated as the societies which first showed initiative in creating the preconditions for take off, during the renaissance period of the sixteenth and seventeenth century. In fact (Apter, 1987) argues that “[m]odernization first occurred in the West through twin processes of commercialization and industrialization”. Rostow argued that at this stage, education became more important and changed to accommodate the demands of new economic activity. The most significant feature of this transition, according to Rostow, was the

creation of a strong, centralized political structure, or, the emergence of a nation state, which was necessary for the next stage, take off.

Continuing on the linear move to development Rostow argued that societies increased their individual and national investment and savings over 5% or more of their national incomes. Todaro (1977), like Rostow saw the necessity of capital accumulation and technological progress as propellers for economic development. This stage is also characterized as one of expansion with claims that, industry, urban development, technology, expanded almost explosively, along with a support service sector to accommodate this expansion. Fruits of this “capital accumulation” are now reinvested into “social and economic infrastructure- roads, electricity, water, sanitation, communications, etc.” At the same time social and political structures continued to stabilize and formalize, so as to maintain steady growth: “the vast majority of citizens in a democracy to be, must have no doubt, or mental reservations as to which political community they belong to.”

Long before Rostow and Todaro’s assertions of technology and economic growth Marx and Engels in the early twentieth century also theorized the growing relevance of technology within then growing industrial society. Much of Marx’s work was not given due consideration because of the attached eristic political views (Rosenburg 1976). That aside however, scholars have had to revisit Marx because of his early recognition of technology as “indeed a fundamental factor accounting for the growth in resource productivity and man’s enlarged capacity to manipulate his natural environment for the attainment of human purposes” (p:127). Both Marx and Engels saw technological innovation as being borne out of social needs and not necessarily the linear

eventual process that Rostow maintained. For Marx and Engels, they saw development occurring due to the increase in productive activity that proliferated through the innovations of technological processes and products. More importantly this occurred under the growing capitalism. Rostow's work entailed similar thoughts particular when he detailed society's drive to maturation. As societies tried to become more organized and technology became more infused into economic activity growth was "sustained if fluctuating". Rostow argued that this period was one of expansion and increasing complexity, producing a much wider range of goods before. Societies had even begun to organize international economies and were thus able to trade transnationally.

Modernization theory has also had some major contributions by Hollis B. Chenery who examined patterns of development of several developing countries in the post-war period. His work in this area included cross-sectional as well as time series analysis of countries at different levels of per-capita-income. Chenery highlighted distinct markers that indicate these countries transitioning from traditional societies such as a: A shift from agriculture to industrial production, a steady accumulation of physical and human capital, change in consumer demand, from emphasis on food and basic needs to the desire for diverse manufacture goods and services, the growth of cities and urban industries, as people migrate from farms and small towns, a decline in family size and overall population growth as children lose their economic value and parents substitute child quantity for quality.

Chenery categorized countries according to the developmental stage of their industry, such as early industries, middle industries and late industries. Early industries were characterized by industries that supplied essential goods to the population, also

industries that relied on simple productive technologies and also subscribe to 'Engels law' which is that the "share of these industries in GNP rise with the population growth at low levels of income, and as GNP grows, the share stops rising, stagnates and then falls. Example: food processing plants, textile etc." (Devlin, 2005). Chenery's middle industries were all those industries that fall in between the early and the late industries. Late industries were all those "whose share in GNP continue to rise even at high levels of per capita income. Example: consumer durables, cars, etc." (Devlin, 2005).

Chenery fell in line with Rostow's view of societal maturation that he viewed as synonymously as the age of mass consumption, which was first enjoyed by developed societies, such as the United States, Britain and Japan. Classes of skilled workers and owners of production dramatically increased, while manufacturing was being centred on the production of 'durable consumer goods'. Kuznets agreed that increases in factory production and resultant labour productivity increases led to higher growth rates per capita. Kuznets acknowledged the conscious adjustment of the market, especially within countries seeking supplementary resources to increase production.

None of these transformations however were happening in isolation but instead were juxtaposed with events that (Eisenstadt in Peet and Harwick, 1999) arguably were of a high extent of differentiation: the development of free resources which are committed to any fixed, ascriptive groups; the development of non traditional, national, or even supranational group identifications; and the concomitant development in all major institutional spheres, of specialized roles and of special wider regulative or allocative mechanisms and organizations...(p:76).

Growth meant a movement away from the traditional and cultural to embrace secularism that encouraged rational thought and the “emergence of an intelligentsia” (Peet & Harwick, 1999:77). Eisenstadt felt strongly that as society modernised it became more organized, which was critical for its social transition. Kuznets too posited that societies also went through a social and ideological change, which was necessary to fully embrace growth.

While modern technology and production became a fundamental part of society, society also became concerned with social welfare and the creation of complex social systems which indeed saw the birth of the welfare state as the nation state became highly effective and democratized. Bert Hoselitz (1960) was one of the strongest proponents of stressing the sociological factors of growth and economic development as well as a staunch critic of growth theorists who focused primarily on economic determinism. In fact he “emphasized cultural change as a precondition for economic development” (Hoselitz in Peet & Hartwick 1999:77). Using Parsons' theories, Hoselitz argued that the complex (more developed societies) moved beyond ‘kinship ascription’ as a means of distribution of goods and labour. Instead these societies valued individual meritocracy which was more efficient and fostered higher levels of productivity.

Both the economic and social approaches to growth and development, despite their differences offer one important similarity. Societies as they changed and modernized became more rational and systematic in its organization. Technology has flourished in this environment and today is now positively associated with modernization. This would be apparent in the balance of scale in terms of economic theorists who lent more responsibility to technology for the growth and modernization of society as opposed

to social and psychological factors. The above debate is in no way representative of the wealth of theories that have been presented to offer an explanation of society's development; instead it should serve as a summation of the most critical debates.

The ensuing presentation of debates will now provide a synoptic view of contemporary development debate within the context of globalization and neoliberal theory. Globalization as a socio economic paradigm has carried us through an era of massive increases in interaction and integration on micro and macro scales. One of the most significant by products of this interaction is the development and dispersion of information communication technologies. These technologies have profoundly affected the lives of billions of people globally with some seeing massive wealth generation while others severe poverty. Therefore it is important to review this paradigm to provide a more comprehensive if not taxonomic exploration, so as to account for the significance of globalization as the driver of technological innovation of a system of that allows such inequitably with regard to wealth across the world.

2.2.3 Beyond Growth Theories Free Markets and Neoliberalism

Neoliberalism is a central permeating cord of many an ideological clash between scholars, states, economists and the global citizenry. This is in part because neoliberalism (commonly viewed as a negative agent) has been moving osmotically through all aspects our global society, even though as Bowles (2004:2) aptly noted it is "primarily an economic concept dedicated to free markets". Its transcendence into the socio economic and political fabric of society is arguably cause for concern because of the devastating affects it has had on the global society thus far.

Neoliberalism can be sourced to the monetarist economics of Friedman who decried that inflation and debt was a direct result of government spending, strong resistance to the Keynesian economic models in favor of Smith and Ricardian principles of a laissez faire economic approach, and lastly the strong influence of individualism and conservative views on production and societal organization (Peet & Hartwick ,1999). As a response to the 1970s' oil crisis neoliberal policies seemed an optimal choice to combat the high inflation and to satisfy the conservative regimes of Regan and Thatcher.

Neoliberalism is primarily an economic perspective that proposes that economic welfare is best achieved through the maximization of free entrepreneurship operationalised within the framework of private property rights, individualism, unencumbered markets and free trade while the political is relegated to the primary role of facilitating this economic activity, (David Harvey, 2007). State intervention must at best be given a minimal role in economic activity. The lesser role of polity in neoliberal pursuits is precisely one of the points of debate as many argue that the new dynamic of neoliberalism coupled with globalization has seen a shift in the role of the state.

Neoliberal principles were the inspiration for policies such as the International Monetary Fund's (IMF) Structural Adjustment Policies (SAPs), that many attributed to the reversal of fortunes and the "cause rather than the solution to the economic problems" of many developing countries (Choussoudosky in Schuurman, 1993:11). The foundations of neoliberalism are grounded in modernization theory, and thus trajectories' growth and development through the facilitation of modernization, industrialization, individualism and most importantly the minimalising of state activity in market operations.

Despite the argument that neoliberalism is primarily economic, we cannot deny the pervasiveness of this mode of thinking and operating within all facets of society, from governments, even antithetically opposed states such as communist China, universities, (international) financial institutions to name a few. David Harvey (2007) posits that neoliberalism has become 'naturalized' and that this naturalization took place because the founding fathers of neoliberalism used the values of individual liberty and freedoms "as sacrosanct- as the central values of civilization" (p.24). These values have now become entrenched and even taken for granted in what we conceive as fundamental to our being.

2.2.4 Globalization

"To be certain, globalization is not a random phenomenon but it is in fact a product of both technological progress and conscious economic policy." (Benn 2000:24).

Under the hegemony of neo classical economics, contemporary globalization has manifested itself as the movement of "unprecedented global flows in information, products, people and capital" (Leye, 2007:2). These flows have also spawned the proliferation of technological innovation that thus far has not been enjoyed by any society to the magnitude as it is now. This is particularly important when one isolates information communication technologies as the most important and arguably the most revolutionary of those technologies. The previous discussion presented the core concepts of neo-classical theory and laid out the theoretical explanations for the increasing prioritization of technology in industry and society. This section will first give an account of various theoretical contributions to the meaning as and definitions of globalization. This will be followed by a summation of the dynamics of the two processes as they

operate in contemporary society. It will also provide an understanding of how this 'new' system of operation (neoliberal globalization), has facilitated the increasing use of technologies, and the Omni prevalence of information communication technologies

Deconstructing the concepts that underlie globalization is paramount because as Tony McGrew (2001) aptly notes "despite the fact that, in a little over a decade, it has colonised the intellectual imagination of the social sciences, it remains for the most part largely under- (if not un-) theorised." (p.293). In fact the fundamental problem with the globalization argument today Shaw (2000) argues is that "[b]ecause both proponents and critics have misunderstood the significance of the global, they have exchanged false antinomies, in an increasingly sterile argument". The sterility of this argument is largely due to conflicting perspectives with regards to two areas; one globalization as intrinsically neoliberal, or as a process operating under the socio economic organization of dominant neoliberal ideology. Two, globalization theorists also arrive at an impasse when ascribing cost benefit value judgments or attempting to answer the perennial question "*cui bono?*" or 'Who benefits?', (Woods, 2000). Many see the process as inherently bad whilst there those who see it as (at least) for the most part as having contributed a greater good to our society.

Globalization is assuredly not a new process. Woods (2000) instead argued that to understand this process one had to view the global changes through a quantitative and qualitative approach. Quantitatively, he argued globalization meant increases in trade, investment, capital movement, and immigration. He implied that on this level contemporary globalization is simply an increase in processes that were occurring at least a century before. It is through a qualitative analysis that he accounts for profoundly

different processes attached to globalization. He viewed the changes as one in which people, firms and states identify themselves and manifest their interests differently (p.2). An example of this change is the increase in cosmopolitanism and a view of the world as a shared territory as opposed to the identifying simply to the national and ethnic grouping of borders and territories.

Jan Aarte Scholte (2000) offers a comprehensive account of globalization and contextualizes it with respect to the four core processes where it has had the greatest influence. Scholte (2000) sees globalization as internationalization because of the massive interaction and interdependence of people across the globe. Inexpensive communication technologies and the relative ease of cross migration have all facilitated this interaction. Globalization as liberalization is yet another factor as this easy and free exchange of goods, labor, resources and finances across borders, especially with large transnational corporations driving economics and trade. Particularly between countries that have even had historically had isolationist policies like China. The third concept, globalization as westernization, makes reference to the intensely homogenizing and hegemonic effect that western culture has on the consumptive patterns and cultural dynamics within the global. Joseph Nye et al.(1999) also equates this process with “Americanization”. Some argue that globalization creates choice (Clarity 2005), and allows people a multicultural view of the world.

Yet another concept of globalization as ‘supraterritoriality’ or ‘deterritoriality’ Doucete (2001), has sparked a lot of debate because of its severe political implications. Consequently scholars now see governance not just within the spatial constraints of the nation state, but instead, have instead have expanded the political imaginary to

perspectives that embrace global governance and identities irrespective of territory. The development of supranational organizations and corporations, along with the increased awareness of issues has elicited collective and certainly borderless responses to global issues. Proponents for globalization counter the weakening state argument claiming that “nation state, its territoriality, and its sovereignty are not so much eroding as transforming” (Perry 2003).

Proponents of globalization such as Jagdish Baghwati (2004), argues that “the perils of globalization happen to be exaggerated because of the ...fallacies of aggregates.” (p.6). He postulates that economic globalization is multi dimensional and that the discourse has homogenized both pros and cons of globalization as an undifferentiated process. Baghwati is of the view that though not perfect globalization is an advancement of the human condition and represents half a century of progress. This progress he refers to reside in the technological innovations with communication, health, transport and manufacturing technologies. “The driving force of what is dubbed ‘globalization’ is imputed to the ‘revolutionary’ consequences of electronic information systems that operate across national boundaries.”(Petras and Veltmeyer, n.d.:11).

2.2.5 Proliferation of Information Communication Technologies and the Knowledge Economy: A Consequence of Neoliberal Globalization

Globalization and neoliberalism are seen therefore as conceptually different processes. Neoliberalism is seen as a rational policy response by some, enabling the benefits of globalization to be spread far and wide. Others view neoliberalism as an undesirable response, to be rejected and replaced by new forms of governance so that the

potentials of globalization can be realized by those who are currently excluded by the neoliberal architecture (Bowles, 2004:10).

As Bowles notes, though conceptually different, globalization and neoliberalism share a symbiotic relationship that is “cohesive, powerful, unavoidable, and tending towards integration and uniformity” (Chase, 2002:4). The relationship is such that the ‘neoliberal globalization project’ is summarily entrenched in an ideology based on the pursuit of economic growth within the complete autonomy of the market which neoclassical theorists such as Lal as cited in Hunt (1989) argues that a country’s “opportunity to trade extends its choice” (p.300), thus subscribing to the principle of comparative advantage and legitimization of free international trade. Understanding this relationship is critical to how and why we have seen an accretion of ICTs in modern society⁷. States are now in an intense pursuit of an information society, as they see this as an acute factor to gaining access to and sustaining economic development.

Globalization in its early forms was not a function of comparative advantage principles or the value of private enterprise and government un-involvement, instead it took the shape of early colonialism which flourished with the birth of early global trade. Capital transfers were at its peak with raw materials flowing unreservedly to the metropolises while surplus manufactured goods were sent back to the colonies. The Commonwealth Caribbean is a shining example of how capital transfers became the way of life for the region. Contemporary globalization however, according to Desai (2001), is

⁷ The relationship between technology, globalization and neoliberalism is seemingly circular, operating fluidly between integrative processes. Therefore each must be singularly understood and deconstructed before elaborating on their combined role in contemporary society. Dennis Benn (2000) provides a comprehensive account of the workings of this relationship in *Globalisation and the North South Divide: Power Asymmetries in Contemporary International Economic relations*.

simply “[c]apitalism in its global phase...” (p.1). Ellewood (2002) also supports this view that this new type of globalization is not only fostered by laissez faire capitalism or what Adam Smith coined as the unrestrained pursuit of individual interests (magic of the marketplace), but also the increasing reliance on money and affluence as the criterion for success and value. This process is cyclical however, in that as these attitudes that drive globalization; the pursuit of technological innovation, deregulated markets, the commoditization and homogenization of values and culture, in turn are also fed by the beast of growth and profit that globalization has delivered, through the facilitation of capital flows that the growth of technological innovations of information and communication.

Phillip Cerny (2000) argues that the rise of the ‘competition state’ is another important consequence of the new dynamic of neoliberal globalization which presents itself in three paradoxical manifestations. He argues that within the neoliberal ideology the state actor has not declined in its roles as many would argue but instead has been redefined in three important areas. This new competition state “necessitates the expansion of de facto state intervention and regulation in the name of competitiveness and marketization.”(p.117). He suggests that in fact state actors are now even promoting globalization and its processes in order to become efficient players. Lastly Cerny sees a paradoxical relationship at play between state polity and the globalization process. He notes that the values of state/society values and practice conflicts with economic globalization. This he argues inhibits states from embodying a “communal solidarity or Gemeinschaft” and thus threatens the legitimacy of ‘institutionalized power’. Thus the

competition state is not only a new form of the state it is also a significant political agent in catalyzing political globalization within the confines of neoliberalism.

This view however is not widely shared; rather both proponents and critics of globalization lean more to the view of the decline of the nation state. Petras and Veltmeyer lend credence to this view stating that “the nation state has retreated from the development process and [has] been replaced by what Robinson conceptualizes as the ‘internationalized state’ (Petras and Veltmeyer, 1996: 12). The nation state is an historical product, one which is localized in time and space (Amen, 1997:65). This is also a critical aspect to our central issue in that countries within the Caribbean and the larger south face a loss of power and sovereignty in their already vulnerable position as small nation states in the global community.

Early European conceptions of the nation state provide the foundation for what we now understand to a state. The process is ever evolving, allowing us no preconception aside from a clear decline in its role as a welfare provider. There is a fundamental mismatch between the global scope of markets and the national level at which politics are organized (Garret, in Woods, 2000:107). He notes that this incongruence allows increasing global market to continue to pressure governments to become competitive in its goods and service provision and production, the incorporation of external actors in the market process through multinationalization of production, and integration of financial markets. Development has become almost synonymous with industrialization and technological innovation of production, obliging countries to use outside agents as mediums of policy creation thus reducing the autonomy of state led development.

There are too, those such as Gilpin (2000), who would see globalization as completely reversible. They argue that while globalization is important it is not the sole possibility of societal operation and in fact rests upon the very political foundations that it is being purported to weaken. Gilpin hypothesizes even further that this political foundation could disintegrate if the dominant powers did not strengthen their political ties (p.294). While certain innovations such as technology and digital media may be irreversible the policies that govern these movements aren't and can thus be as restrictive or liberal as states may desire.

Neoliberal globalization as an agent for improvement in quality of life is more of a pseudo-belief because it has caused just as much harm in that same pursuit. For those who see it as having greater economic and social benefits argue that the technological innovation spurred on by globalization has contributed decidedly more benefits than otherwise. Globalization hopeful and economist Martin Wolf (2004), senior divisional economist in India in the 1970's, after years of observation of the Indian economy saw that post independence India was faced with a stagnant economy and a population "mired in hopelessness". Wolf noted that economic progress only resurfaced when the green revolution (increased agricultural production through advanced technology) coupled with India's transition from a 'pseudo Stalinist control Raj' and incorporation of domestic policy on individual, private enterprise and foreign investment. By the year 2000, India's GDP had more than doubled. He argues that the adoption of these market policies and embracing of globalization saved India from a fate of poverty similar to that of Sub Saharan Africa. Wolf also noted that China too experienced over 400% increase in income per capita between 1989 and 2000 because of their willingness to embrace

globalization, neoliberal market policies and the adjunct qualities associated with it such as increased technological innovation. To this end the IDRC argues that “technological progress supported by the new economic and political arrangements, has been responsible for vast improvements in the physical and living standards of most of the world’s population” (p.8).

There are however those who scoff this argument arguing that there can be no denial as to the marked inequalities that persists between the developed and developing world generated by these very policies and economic and political arrangements that Wolf and the IDRC make reference to. The realities seemingly contradict this perspective. For example “developed countries impose the highest trade barriers on goods in which developing countries have competitive comparative advantage at almost 50 billion dollars a year... The poorest 20 % of the world’s people saw their share in income decline from 2.3% to 1.4%..., whilst that of the richest 20% grew from 70% to 85%.”(Girvan, 2000:69). Simply allowing the market to choose what is best for society is proving to not contribute to the ‘common good’ as Adam Smith proposed. This becomes an argument of ethics versus economics. If the nation state assumes the responsibility of the common interests then it must intervene when there is conflict with the private interests (Dierckxsens, 2000:17), also proposed by Keynes who vied for a healthy interaction between private interest and common interest and the subordination of the private to the common. (Dierckxsens, 2000:17). Instead the modus of political economy today does not function under a monitored hand of ethics but instead proves that private interest and competition does not always lead to the realization of the common good. In fact the global ratio of incomes between wealthy and poor in 1969 was

30 to 1 and grew to 59 to 1 by 1989, raising the global gini coefficient calculation to .87. Additionally the distribution of the worlds wealthiest remain in just a few developed countries while the majority of the poor almost a third of the population are in developing countries. (Dierckxsens, 2000:97). This is certainly not representative of any common good being realized. Despite arguments otherwise it is clear that states must reconsider and determine whether it can, in good conscience let the market determine the development of our society.

It is this seemingly fluid relationship with indistinguishable demarcations of processes between globalization and neoliberalism that many are opposed. If innovation and technology decline because of decreasing profit as does happen with recessional periods, given the current value system we can only gloomily presuppose that those already marginalized in this global system will be even more excluded from realizing economic success or gaining entrance into the global market, both on the micro and macro scale. Already events such as China's overheating economy and US currency decline have spiked oil and food prices, are being felt most severely by the world's poor.

This examination of the theoretical construct of neoliberal globalization will be particularly appropriate when moving into the following section on this research document to analyse global technology transfer issues. This issue is significant as it has in part shaped developing countries' orientation with technology in such a way that it is seen as a major aspect in developing countries gaining access to new innovations. The following section will provide a brief synopsis of technology transfers, intellectual property and the relevant agreements (TRIPS).

2.2.6 Technology Transfer and Intellectual Property Agreements

Technology transfer is the mechanism for the shifting of information across borders and its effective diffusion into recipient economies, thus involving numerous processes, ranging from innovation and international marketing of technology to its absorption and imitation. The process of technology transfer itself, trade terms and intellectual property rights, and policies of technology exporting countries, investment, and competition issues that can affect the terms of access to knowledge (South Centre Trade Analysis, 2005).

In the previous section, there presented was an exploration of the issue of technology and the role it plays in countries' development. Theoretically, technological progress has been seen as one of the most important drivers of economic development (UNCTAD, 2007). In the pursuit of attaining this economic development, developing countries have been facing several obstacles. Their inability to create and integrate *avante garde* technologies into existing economic structures has led to what Gamster, Appleton, and Carter (1990) noted as an economic "tale full of problems and short on progress" (p.10). This issue of technology transfer is critical to this debate as aforementioned technology has been linked as a powerful catalytic force in enabling socio economic growth in the north, however if under the rules of neoliberalism, barriers are being placed to prevent the acquisition of these new technologies, we begin to question the structures that allow this inequality to persist in the first place.

Technology transfers are not all equal but instead come in the form of packages usually transferred through foreign direct investments (FDI) or through contractual agreements (Robinson, 1988; Bozeman, 2000). The transfers can come in the form of

core or peripheral technologies; the former refers to that which are essential to a process, product or for the provision of a service, the latter is simply all other non essential technologies. Furthermore, Robert notes that the transfers may be in the form of hard or soft goods which are embodied and disembodied technology respectively. Other associated transfer products such as skills and knowledge, are sometimes just as delicate as the physical products themselves, because of the patents that may be held for these products. Many of these patents are protected under the TRIPS and TRIMS agreements, giving the sending firms or states a “legal monopoly” with an opportunity to benefit greatly from the ‘rents’ received, for any material that is legally patented.

Currently technology transfers represent the most prevalent method for developing countries to gain access to technologies from developed countries. This is in part because countries in the south generally do not have the capital, developed human skills, to invest in extensive research and development (R&D) ; in fact the South[still] remains ill equipped to locally research, and produce modern technologies” (Bardouille, 1998:80). Developing countries rely heavily on both the physical technologies and the assistance in maintenance, training etc. for equipment.

Serious issues have arisen from this relationship; the appropriateness of technologies, the socio cultural constraints to integration of technologies, cost of technologies and use of used technologies. Martin Hart-Landsberg (1987) in an attempt to debunk the ‘myths of the superiority of free trade’ notes that with respect to the trade related aspects of intellectual property rights (TRIPS) and trade related investment measures (TRIMS), the rules of the engagement and gains of these agreements have been dubious. One reason for this Robinson (1988) argues is that when negotiations between

firms take place, say between a large fortune 500 firm and a smaller single product firm it “is unlikely to lead to an equitable arrangement for the latter, which is likely to the party on the LDC end.” (p.86).

Landsberg (2006) argues that the TRIMS agreement severely handicaps states’ ability to restrict place performance requirements on (FDI), while TRIPS limits states jurisdiction in either denying patents or controlling the use of patents within their own borders. This for example then bars states’ ability to control the affordability and accessibility of important medicines for particularly poor nations. He argues that as a tool in the neoliberal free trade process, TRIPS and TRIMS has served to increase gains for developed countries at the expensive of poorer nations.

2.2.7 Developing Societies and Digital Access: The Digital Divide

“In general the wealthy people are seen as the ones who can afford to purchase the technology and acquire the skills necessary to use it while the poor are restricted by barriers such as poverty and illiteracy; this is baseline for the Digital Divide concept.”(Henry, 2007: 3).

In a report released by the UNDP on the issue of development and digital opportunities, a correlation was established between the growth and level of technology. In 2001 the United Nations expressed full support for the establishment of the two phased World Summit on the Information Society (WSIS) held in Geneva and Tunisia respectively. The purpose of this Summit was meant to create open dialogue and “foster a clear statement of political will and take concrete steps to establish the foundations for an information society for all” (WSIS, 2003). The adopted resolution was a clear indication

that the UN saw ICTs as a crucial part of contemporary development issues and that it could be significant too in achieving the Millennium Development Goals.

To state simply the digital divide is the “uneven access to and diffusion of technology” (UNDP 2001 in Rigobert, 2006: 38). For example OECD countries alone currently have 79% of the world’s internet users (UNDP, 2001: 3-8). Since its entrance into the political economy debate from the early 1990s, the digital divide concept has been privy to much “scientific hairsplitting and political opportunism”(Djik, 2005:3). This is because for each unique interpretation, there are usually severe implications, whether political, economic, or social and many times all three. The digital divide is not independent of other world issues but instead is a direct reflection of the inequalities that already persist in our society. The implications of this lack of access to information technologies are married to the implications of other structural issues which both cause and maintain poverty around the globe.

As in our previous section on technology, to better understand this issue is it imperative to unpack and deconstruct its meanings and implications. The ubiquitous use of technology, particular information communication technologies in all spheres of life has called for us to pay attention to who has access and who does not. Scholars predict that computer literacy and access to information technologies will become a relevant currency in providing persons an opportunity to participate in economic activities. Economists such as Kirkman, Sachs and Stone (2001), likewise argue that there can no longer be any doubt about the importance of every economy plugging into global information and communication networks. The new information and communication technologies and the Internet in particular, have changed the rules of economic

competitiveness. The UNDP has also “identif[ied] the roles that information and communication technologies (ICT) can play in fostering sustainable economic development and enhancing social equity inter and intra nationally.

The growing importance of these ICTs only makes its highly inequitable distribution both inter and intra nationally even more troubling. Allowing for differences in population in the 2002 United Nations Digital Access Index indicated that countries ranking with the lowest access were, on a scale of 0-1, were Niger with 0.04, Burkina Fasso 0.08 and Mali 0.09 (note all countries were developing countries), while ICT access in developed countries was at the highest as 0.85 in Sweden, 0.83 Denmark and 0.82 Iceland and Korea (Rep) respectively⁸ (WSIS 2003). One can see that there is .8 of a difference in access between the countries with the highest and lowest access. It is this discrepancy with regard to digital access that has now captured the attention of the global community. In recognition of the digital access gap by the mid ‘00s digital poverty had now been seen as part of the material resources that all human beings had a right of access and has then become part of the measures used within the poverty index.

Kenneth Kennistan and Deepak Kumar argue, in their *Experience in India: Bridging the Digital Divide*, that the digital divide encompasses four divides or four gaps which separate those who have and those who do not. They see that this divide has much wider implications than just an international gulf between internet users and non users and instead posit this issue within a much larger context while acknowledging the

⁸ This index was based on five categories such as infrastructure (phone lines and mobile cellular availability), affordability (internet access prices as a percentage of gross national income per capita), knowledge (adult literacy and enrollment in primary, secondary and tertiary levels), quality (international internet bandwidth per capita as well as broadband per 100 subscribers), and lastly usage (internet users per 100 inhabitants).
http://www.itu.int/newsroom/press_releases/2003/30.html.

different levels of disparity between and within societies. Kenniston and Kumar noted that the intra nation wealth gap which exists within, and between societies, even in countries that experience high economic growth.

Even within the U.S that has one of the world's highest levels of connectivity of both internet and telephone, there were still distinct differences within the access of families which was strongly related to their income brackets and ethnic orientation. White and Asian Americans had three or more times greater connectivity than African American and Hispanics even when all households were in the same income bracket of \$35,000 a year. Kenniston and Kumar argue that the cultural relevance of internet material is largely responsible for this alienation of Blacks and Hispanics, particularly because most American websites did not cater to the interest of neither group; instead there is a distinctly dominant English speaking "Anglo Saxon culture" (Kenniston and Kumar 2004). In the 2002 ECLAC report, serious concerns were highlighted that the "internal digital divide in Latin America and the Caribbean was more worrisome than the international one" (p.6). This was because they understood the significance of technology as continually polarizing and perpetuating income inequalities in a region that already faces some of the world's highest inequality. Other than socio economic status, Selwyn (2000), Servon (2002), note that within states the digital divide is manifested between other social groups. He argues that the divide also runs between genders and generations. He notes that more men have access to ICTs while access is inversely correlated with age (p.5).

A second divide exists within the international realm where disparities with access to digital media and economic opportunity are juxtaposed. An incredible 69% of

Americans own a computer versus the 8% of Indians who do. There are millions in rural India who not only have no access to telephones connections but have also never even made a telephone call. This is not surprising when one takes into account the lack of socio economic and physical infrastructure that still exists in India and in many developing countries. Bangalore in India for example has an adult education rate of only 5.1 years and illiteracy rate of 44%. Developed countries who have reached literacy rates of 100% are therefore much better able to participate in the digital economy and utilize the technologies that are available.

The third and also critical divide is the linguistic and culturally relative information gap. The cultural and linguistic hegemony of English and 'northern' languages within digital media has barred many non English societies from participating in internet experiences. This perpetuates the divide between the 50 million Indians who do speak English as opposed to hundreds of millions more who do not. This scenario is replicates both internationally and intra with many non English speakers excluded from growing movement of digital information. Kennistan and Kumar argue that "60-80% of all websites in the world are in English while almost all the rest are in one of the major "Northern" languages like Japanese, German, French, Spanish, Portuguese, and increasingly Chinese" (p.15). Contrast that with the 1.2 billion South Asians who speak other languages. Bourdieu argues is this essential, for persons to use the technologies of ICTs properly they must "access to embodied cultural capital; either in person or proxy" (Bourdieu in Selwyn, 2004:15).

Lastly they argue that there is a strong emergence of a "digerati" which is a growing affluent class of workers of information based industries creating new forms of

elitism (Keniston, 2004:19). While this divide is more particular to the case of India, it does carry over in other developed and developing countries where those with increased familiarity in the digital industry are gaining eminence and a new status of successes as opposed to the many millions who are not directly benefiting from this new economic boom. Pantin (1994), suggests that the future dominance of industries such as genetic engineering and alternative energy, and space production (to name a few), will spell a certain doom for the majority of the world as most are not exposed to the specialized education needed for these industries.

Another aspect to the digital divide is the issue of quality of access. OECD countries have seen a marked increase in the rate of broadband usage at 15% compared to 2% in Latin America and the Caribbean. We cannot underscore the importance of dial up as opposed to broadband connections because broadband of course caters for faster, and multiple processes. The shift from to increasing internet services can only have the impact and harness its full capabilities if the infrastructure of a reliable and fast network connection facilitates it (ECLAC, 2007).

One would be hard pressed to find critiques of this digital divide. That is simply because one cannot deny or dispute that there is a large gap between those with access to ICTs and those who don't. That said however, there is a growing debate amongst those who argue that digital access is not a new phenomena and that it should not be made to overshadow other more basic issues such as the provision of basic health and education facilities. In fact scholars like Jan Van Dijk (2006) argue that the digital divide is yet another manifestation of the gross inequalities that have been a consequence of globalization and is an implicit reflection of the larger global wealth gap between the

north and south. Many question whether this new buzz word has not empowered states and development institutes to mask the deeper structural issues that have created such poverty and underdevelopment in the first place and more importantly has allowed it to continue. There are also growing concerns by critics of the digital divide camp that the implementation of ICTs and the creation of digital access will improve the lives of some in the developing countries, but only those with the basic knowledge skills to harness that technology.

As a result the existing relationship of inequality and globalization seem clearer when placed in a cause and effect equation. As long as inequalities such as dependency on foreign aid, unequal and unfair trade relations in the global market are also the structures that create and sustain endemic poverty. The addition of digital access or digital poverty discourse as new phenomena becomes problematic because it makes certain assumptions that in order for developing countries to truly develop they must integrate technology into their society and by extension the current neoliberal/modernization ideology is the 'true' path of development.

Benjamin Compaine (2001), in his book, *Digital Divide Facing a Crisis or Creating a Myth?*, makes a pertinent point that the critical divide is (in part) the real issues such as the low levels of literacy and human development which prevent persons from using these technologies. Technologies are useless to a society that does not have the basic capacity to harness its potentialities. According to the UNCTAD 2005 report noted that in Botswana "GDP growth has outpaced human development. [For example] Botswana's GDP per capita ranks 61st among nations and is 131st on UNDP's Human Development Index. No other nation has such a great gap." (p.35). It is large income gaps

such as that of Botswana's that has critics such as Sagren Moodley (2005) arguing that "the key to integrating ICT in the fight against poverty is not to begin with ICT, nor to postulate them as an essential need. Rather, it is to develop and implement a strategy for encouraging the deployment of ICT, in support of and subordinate to a national poverty-reduction strategy." (p.10). ICTs arguably serve better in societies where basic literacy and skills are already established.

Kenneth Keniston notes that the dilemma governments now face is that in attempting to allocate scarce resources; should ICTs be invested in as a priority, or should monies go into establishing basic social infrastructure such as schools, hospitals etc. He argues that the reservoir of unmet needs in developing countries far outstrip the available aid or funds that can be allocated to basic survival needs.⁹

2.3 Caribbean Structural Dependency a Theoretical Background

"The functioning of the plantation economy generally inhibited [Caribbean] economic development" (Mandle, 1982:53).

Dependency theory became well recognised from the early 1950s to the 1970s. It was developed as "a radical alternative to both the conservative theorizing of [modernization theorists] and United States global expansion" (Berberoglu, 1992:27). Dependency theory conceptualized development through relationships between world systems. A. Gunder Frank, one of the most cited dependency theorists, argued that

⁹ Kenneth Kenniston author of "Bridging the Digital Divide IT Experience in India" talks about an exchange with an Indian scholar where he says... "When I mentioned to the great scholar of India the late Myron Weiner, my interest in IT in India, he asked whether I meant the use of computers in Indian schools. I allowed that this was indeed an interest. He burst out, "Are you insane? Don't you realize that there are 60 million Indian children who are not in school at all? "For the cost of a computer, you can have a school". (Keniston, 2004:19). This shows the opportunity cost developing countries face in investing in ICTs.

underdevelopment was “the result of historical development and contemporary structure of world capitalism,” which “arose from the way the third world was incorporated into an international economic and political system, dominated by Europe and later the United States”(Ghosh, 200:41). Although dependency theory arose primarily from a Latin American conceptualization, the Caribbean was co opted under these theories because of their similar shared colonial history. Later, Andre Gunder Frank established dependency theory as an understanding for all developing countries as opposed to the specialized reality of Latin America region.

Frank made a clear distinction in dependency theory between undeveloped and underdeveloped and surmised that in order to understand the difference between undevelopment of underdevelopment, it was essential to recognize the significance of the society’s economic and social history and its impact on their present condition. For him, being undeveloped as is implied, was a country that had not initiated the development process as opposed to underdeveloped, which implies countries that had been developed and was going through a reversal of process. Poorer countries historically did experience development due to colonization, but regressed after independence.

The fundamental premise of this perspective focused on the presence of “asymmetrical relationships of trade, investment, finance and technology with metropolitan economies” thus dividing the world into two basic systems (Girvan, 2005:5). These two subsystems are part of what is considered the world capitalist system, which was also paralleled to internal, local capitalist economy systems. Developing countries were considered the periphery or satellites, while developed countries were the centre economies. The two systems engage in an uneven relationship where a “systematic

transfer of economic surplus continually occur[s] from the base of the world structure (periphery) to the metropolitan centre of advanced countries” and saw this type of relationship occurring at not both the macro and micro level (Frank, 1966:42). The main purpose was to extract an economic surplus, usually raw materials, from less developed countries, at comparably low prices to allow a larger profit margin in metropole countries. It also allowed the manufactured goods to be shovelled back into peripheries at much higher prices than their own products.

To dependency theorists this certainly was not a new phenomenon, but in fact was a progressive truth in history. Frank noted that the economic and social history of underdeveloped nations continued in much the same vein from colonialism, to their free trade era, progressively increasing in ‘polarization’ of domestic economies. “Centuries of colonialism became so deep seated that they served to perpetuate the essential economic dependency of the peripheral nations on leading capitalist centers even after... decolonization” Beckford in Girvan (2005) argues that the ‘persistence of poverty’ in former plantation economies are the direct result of both a distortion in resource allocation and the exclusion of large portions of the population (in the case of the Caribbean the slaves) in this resource distribution, generally determined by ones class orientation. In the Caribbean this legacy lives on with class systems closely tied to income and educational opportunities.

Frank also theorized that given such a relationship of servitude, satellites had their “greatest economic achievement and especially their most classically capitalistic industrial development if and when their ties to their metropolis [were] weakest,” (Frank, 1966:42). He isolated five periods in history, the Napoleonic wars, the European

depression, the First World War, the 1930's depression, and the Second World War, when centre economies experienced economic crises and were not as economically active. Frank surmised that at those points in history "satellites initiated marked autonomous industrialization and growth," and or experienced social revolutions (p.45). Therefore alluding that "peoples of the periphery can only liberate themselves from its disastrous effects by breaking with the world capitalist system (delinking)" (Amin, 1996:63). While Amin's assertions and delinking may seem drastic if nothing else, what Caribbean states can gather from this is a strong desire to achieve greater independence within the global system. Currently countries such as Brazil and Venezuela are both on this path, the former claiming independence from foreign oil sources and the latter attempting to gain more control of its own vast oil sources.

What dependency theorists made note of that is particularly important for the Caribbean region is that countries today that are the most underdeveloped, were generally the largest exporters of raw material. The Caribbean has historically been intensive providers of raw materials to the British and Portuguese empire and was the 'backbone of the mercantile system'. Frank opined that when these regions were given independence their economic, social and political structure "prohibited autonomous generation of economic development and...degenerate[ed] into the underdevelopment we find today" (p.48). Dependency academics essentially have theorised the development quandary of comparative advantage.

Sir William Arthur Lewis' economic prescriptions strongly influenced the direction in which many Caribbean governments steered their policies. He argued that as Caribbean countries were labour surplus economies, their engagement in the production

of intensive labour products was far more beneficial than the incorporation of factory technologies. He argued that the production of labour intensive products allowed Caribbean countries to keep costs low and maintain a competitive edge in world markets. Lewis' model relied on keeping labour costs low a factor that heavily impacted the displacement of funds away from investments of new technologies. The rationalization was that low labour would bring in foreign investments and multinational corporations to invest in the region. The vestiges of these economic strategies have survived. Today CARICOM states continue to court MNCs at the cost of ecological liberalization and overly generous tax holidays. Most importantly however the region has spent the last few decades organizing their economic come-out *vis á vis* the policies of external agents.

The Caribbean exemplifies this idea of a colonial and neo-colonial dependency moving from structural dependence on a plantation economy to a dependence on multinational corporations. The latter will be particularly pertinent to this research when we delve into issues of technological dependency and technology transfers, as well as well as the Caribbean's earnest courting of foreign direct investments.

2.3.1 Uneven Development CARICOM Responses to Globalization

"globalisation has generated strong cross currents within the region. Differences in production structures and external association have often resulted in contradictory short term interests among countries and marked divergences in economic policy" (Girvan, 2000:75).

Like any region attempting to forge a path to economic prosperity, the Caribbean or more precisely for the purpose of this thesis, CARICOM¹⁰, has met with several

¹⁰ CARICOM is a fifteen member state organization comprised of former British colonies and is currently all Commonwealth territories. With the exception of Suriname and Haiti, CARICOM is

obstacles. A commingling of exogenous and endogenous factors has played a role in inhibiting the region from exploring its full potentialities and maximizing its scarce resources. This is no less true with regard to the regions' affiliation with technology. As it stands most of the CARICOM member states are on the disadvantaged end of the digital divide, with technology sectors that are underfunded, outdated and heavily reliant on technology transfers from foreign companies and countries. CARICOM states however have expressed a clear desire to increase technology access and ICT availability and use, thereby emerging them into a knowledge society. Member states have recognized that in order to stay competitive in the current global economy, it is vital to integrate technology in such a manner that it can increase efficiency, productivity, consumption and the capacity and the well being of their citizens. Theoretically the incorporation of technology investments in national strategy would be an excellent socio economic macro policy direction for CARICOM states; however there are several constraints in achieving this valiant goal. The rest of this chapter will engage in discussion to address the obstacles that CARICOM faces in achieving a technologically capable society. This chapter will serve as the thematic tier to this research giving us a narrower perspective of the issues before presentation of data. It will be necessary to trace CARICOMs unique circumstances such as the small size of majority of its member states, dependence on preferential markets and foreign aid, and fragmentation, all allude to a region that has struggled to find a place in a global economy dominated by powers of comparably mammoth proportions (Girvan, 2000).

a grouping of English speaking territories. CARICOMs' objectives are to approach the regions' political and economic issues from a collectivist stand, thus improving the success and viability of its peoples.

To understand the relationships between the states in the Caribbean and their regional affiliations, one must instantly refer to a Venn diagram, where despite countries sharing specific and common geographical understanding at the core, clear demarcations have been made with regard to size, resources, economic power and language. It is a seemingly homogenous region, with extensive underlying fractioning. The Caribbean is referenced as the countries washed by the Caribbean Sea, yet this definition does not allow for the inclusion of countries such as the Bahamas, Guyana and Suriname who share a common cultural identity as opposed to spatiality. To avoid a nomenclatural trap, this research has chosen to focus thematically on the CARICOM regional grouping and will henceforth refer to this group as the Caribbean. CARICOM¹¹, or the Caribbean Community, is a 15 member grouping, comprising mostly of former British colonies and Anglophone states (the Commonwealth Caribbean), with the exception of Suriname and Haiti. En Masse this region accounts for a population of over six million, With Jamaica having the largest population of over two million (40.3% of total CARICOM population according to the 2000 census round), and Montserrat with the smallest at little over 12, 000. CARICOM was created with the mission of sustaining coordinated macroeconomic policy with regard to economic activity and foreign policy. This integrative initiative has been in process from as far back as the regions' colonial period. Cognizant of their small size and limited resources member states have fashioned a political architecture based on

¹¹ The fifteen members of CARICOM include Antigua and Barbuda, the Bahamas, Barbados, Belize, Dominica, Grenada, Guyana, Haiti, Jamaica, Montserrat, Saint Lucia, St. Kitts and Nevis, St. Vincent and the Grenadines, Suriname, Trinidad and Tobago, and the associated members Anguilla, Bermuda, British Virgin Islands, and the Turks and Caicos Islands. Although these countries represent mostly the Anglophone population in the Caribbean, there is also Suriname and Haiti, former Dutch and French colonies represented within CARICOM. Together, CARICOM accounts for a population of approximately 6 million people (Edward 2007: unpublished, <http://www.caricomstats.org/>).

collectivists principles in the EU model, to help combat the effects of neoliberal globalization and help achieve and sustain development. Their successes however, as this section title suggests, has been inconsistent and has contributed to the existing sense of deep heterogeneity. For example, Haiti, the region's oldest self governing state representing 1/6th of the regions' population, has, as of 2007, the lowest GDP in the region, also ranking 146 out of 177 countries for Human Development in the 2007 HDI report at \$1663.00 US (HDI, 2007). The Bahamas on the other end of the spectrum has a GDP of \$18, 380 US ranking in the top 50 countries with the highest Human Development favorable to developed countries.

Human development is not the only issue CARICOM states have to grapple with. Income levels have been equally disparate in the region owing to a number of factors. The Caribbean historically has served as an area of agricultural production simply for the profit interests of its European colonial powers. Though colonialism has long since been abolished, this economic relationship has not changed significantly save for a decline in the number of agricultural exports to Europe and the US. The accession to full independence in the 1970s, only introduced the Caribbean to their sole responsibility of providing economic security for its citizens, as it became obvious that to ensure a chance for survival, within the existing patterns of trade had to be rethought.

2.3.2 Economic Responses: Changing Macroeconomic Policies

"external actors star in the Caribbean drama." (Schulyer, 1988:6).

The most lasting impression one has of the Caribbean from both a socio-historical and more contemporary view, is that the region has never fully been in control of its

destiny. Its people, culture, language, national identity, economic choices, have all been dominated by imperial powers either through past colonialism, or today what many scholars call a global political economy built on an institution of embedded neocolonial activity (to say ideology would imply a clear intent on the part of western, developed countries who have in so far securely nested their economic dominance and cultural hegemony within the global). The death of Keynesian economics and state regulated economic activity led the world into a new mode of operating, centred on unfettered industrialization and capitalistic growth. Like most developing countries the Caribbean region became embroiled in the new trend paying "little attention to the effects or to the necessity of such measures" (Ramsaran, 1988: 75). As a result the region has not been able to achieve any significant or sustainable growth.

According to Ramsaran (1988), "[b]y the 1950s... policymakers in the Commonwealth Caribbean began to institute incentives to encourage the establishment of manufacturing enterprises" in the pursuit of industrialization (p.75). This trend was spurred on by the ideas that developing countries were poor because their industries were primary good concentric, as opposed to industrialized countries that had since moved into manufacturing goods. Economists and industrialized nations argued that by moving developing countries into a manufacturing, countries would bring experience development (a prediction that arguably has yet to come true). Scholars such as Schulyer (1988) have argued that in the pursuit of development in the case of the Caribbean, it is their dependence on foreign corporations and countries that has been their biggest downfall. Though the region held stronger cultural ties with Europe it was the "power

and proximity of the United States influence in the planning and decision making of every Caribbean government” (p.6), which dictated their economic choices.

These economic choices were tending toward market liberalization, state deregulation, privatization and increased mechanization, none of which proved successful in integrating the region into the global economy. It did not mask the core issues affecting the region, such as low productivity and large gaps between ‘import costs and export earnings. Much of which was effected as a direct consequence of the infamous Structural Adjustment programs (SAPs). The former occurred due to what Demas (2005) calls the product of branch plant industrialization’ where inappropriate capital intensive industries have been installed (p.92). The latter is also particularly important because the Caribbean produces little of what it uses, having to import almost all of their goods while exporting mostly primary goods which garner considerably less market value. Many Caribbean states because of this trade imbalance have times to serious trade and budget deficits every year. These deficits have not advanced the debt repayment schedules that, save for Cuba, (because of its close political relationship with the Soviet) all Caribbean countries have been dealing with (Frasier, 1985).

It would be difficult indeed to make reference to the state of Caribbean economy, without a substantial look at the Structural Adjustment Programmes and the debt that followed soon after. Foreign exchange markets were liberalized, multiple exchange rates were eliminated and state banks which provided cheap credit to the mining and agriculture sector (a significant income generator) were liquidated. These changes were typical of structural adjustment policies and neoliberal in principle. The WB/IMF, run predominantly by rich industrialized countries, peddled a neoliberal approach to

development and arguing that precipitated growth would occur through trade liberalization and reduction of government regulation in the economy. These adjustment programs were preconditions for Structural Adjustment Loans (SAL) which necessitated the aforementioned principles be put in place.

Despite the few attempts to diversify their economies for the most part, Caribbean productivity was concentrated within agriculture. In the period during and directly following the implementation of structural adjustment, the Caribbean saw a significant decline in export revenue. This was reflective of a global decline, as the Caribbean like most developing countries saw a decline in agricultural commodity prices in that time. Although growth rates still remained relatively stable at an average of 5%, most of the Caribbean islands were experiencing increasing external debt and turned to the IMF and SALs for assistance. Jamaica in particular felt the brunt of this as their increasing external debt sparked off civil unrest. The end of the 1980s seemed to spell a certain doom for the region, with decreasing terms of trade, signaling higher trade deficits and higher debt. Most of the Caribbean states were credited with IMF loans, to help curb this cycle but instead meant that their debt to GDP ratio was growing at an unsustainable rate, and today still is.

Today Caribbean governments continue on with the restructuring of their economic activity under liberalization principles. Beyond the austerity measures, (which we must acknowledge is still a significant part of Caribbean economic reality and will be for some time to come) more recently the region has received a serious blow to its export industry. As part of its accession into the WTO the region has accepted the assumptions of reciprocity and equal national treatment (Thomas, 2000). Thus CARICOM has

effectively removed capital controls, allowing free movement of capital both in and out of the region with little temporal control. What this can and has done, for example in the case of the Asian crisis, is create an environment for 'herding behavior', where capital flight is volatile "producing sharp up swings and reverse flows" (p.104) with even a hint of slowing or stagnating growth. This volatility exposes the region's vulnerability to the external shocks of capital flight and reverse FDI flows. Regardless CARICOM monetary policy continues to rely heavily on the wisdom of macroeconomic change tending toward global integration and convergence.

Global integration has not proffered the many benefits as expected. Accepting the authority of the WTO has had some adverse effects. Under the 1975 Lome Conventions, the newly formed African, Caribbean and Pacific (ACP) states, received a series of preferential trading arrangements which allowed them to sell their commodities at special market value and in with predetermined quotas to the European Union. ACP states also received financial assistance to allow them to further develop their industries as well as to supplement the generated revenues. Since its inception the Lome agreements have changed drastically under international pressures and global dissidence. Lome I's significance to ACP trading was critical as "over 99% of ACP's mainly agricultural exports [were] to enter the EU market duty free" (Arts, 1997:4). Lome I was eventually renegotiated and replaced by Lome II, which offered more financial and economic assistance through which European nations were increasingly providing a "framework of cooperation, taking into account the varying needs of developing African, Caribbean and Pacific (ACP) countries" (Montana, 2003:3).

Lome was also pertinent to the Caribbean economy because of the periods of Stabilisation of Export Earning Schemes (STABEX) and System of Stabilization of Export Earnings from Mining Products (SYSMIN) which was significant in the main staying of ACP commodity production. The EU instituted STABEX as a fund where ACP states could claim losses suffered in years of particularly high production losses suffered due to natural disasters, drought or any unforeseen events. This fund was a means of stabilising the economies of developed countries and keep production levels constant and as consistent as possible. SYSMIN however, though the same general concept as STABEX, was sector specific, allowing the covering of losses within the mining sector. This fund was meant mainly to prevent the interruption of mining production and keep Europe's flow of raw materials constant.

By 1992 the political atmosphere within Europe changed as new ideas of neoliberalism and structural adjustment took root and soon emerged within ACP/EU relations. Ideas of liberalization led to a movement away from ACP protection as the European Union wanted to increase trade to other region such as the Mediterranean. Montana notes that by 1995 European trade with the Mediterranean rose from 10.4 billion in 1994 to gross of 13.7 billion in 1995. The problem with the European Union's roving eye was further exacerbated by the GATT/WTO rulings which stated that the "non reciprocal duty free entry of ACP products into the EU market was a violation of the Most Favoured Nation (MFN) principle...that aspires to establish and advance non discrimination among its members" (Barbarinde, 2004:2). Trading partners of the European Union, particularly the US, were increasingly worried about the preferential

treatment given to ACP and brought a complaint to the GATT during the Uruguay Round.

Under this ruling the privileged non reciprocal duty free treatment in the ACP banana industry was deemed illegal (Babarinde and Faber, 2004). Accounting for the WTO's rulings, the new Cotonou agreement gave ACP countries until December 31st 2007 to trade within the non reciprocal arrangements; allowing only the least developed countries to continue non reciprocal trading after the December deadline. ACP states, specifically the Caribbean states that relied heavily on revenue from banana and sugar exports decried this ruling, but subsequently still lost a significant amount of revenue when they faced the realities of a truly open global market.

It is argued that the Caribbean cannot pursue agricultural development without some form of protectionism of developed countries (Mcbain, 2006). What has already happened is a significant decline in agricultural production and a shift into more service based industries such as tourism. Though it has created positive results in that Caribbean economies, the smaller economies of the Eastern Caribbean particularly, have been able to diversify, but what has also happened is a significant increase in food prices as agricultural production stagnated. In moving to service industries Caribbean countries must now engage in hearty technological integration and organizational restructuring in order to make their service efficient and competitive, particularly in tourism. The challenge in creating new industries based on information and technology is that investments in education and personnel are proving fruitless, as now more than ever the Caribbean is experiencing extensive migration to developed regions. The resulting 'brain

drain' is having a significant impact on the region's ability to adapt and maintain new technologies. This will be further discussed in the following section.

2.3.3 Social Responses Managing the Brain Drain

"The Caribbean region has borne the deepest and most continuous impact from international migration of any region in the world" (Segal, 1987:44-45).

Like Segal, Marshall (1987) concurred that the "history of Caribbean can be seen as a succession of waves of migration" and argued that this phenomena had been occurring ever since Emancipation and slaves were granted freedom; 'freedom of mobility' (p.25). However Thomas-Hope (1999) argues that while Emancipation did guarantee freedom in principle, ex slaves were not free in actuality because of an inability to raise their status economically or socially. Migration offered ex-slaves more than just economic opportunities but also an acquisition of personal status that would be recognized as was previously denied. Migration in this period consisted mostly of inter island movement from the smaller islands to larger new sugar producing islands, such as Puerto Rico, Dominican Republic and Cuba. Migration gradually increased as industrial operations such as construction in Central America, oil drilling and refining in Venezuela, and the cutting of the Panama Canal required new labour. By the 1940s Caribbean migration shifted to the metropolises as the labour shortage created by World War II in the US required that a new source of labour be found. Between 1942 and 1945, Marshall (1987) noted that a whopping 400,000 workers had been absorbed by US industry. Similar patterns were reflected in the United Kingdom and later on into Canada.

Contemporary migration is fundamentally similar to that of migratory patterns of the past. Within the Caribbean context and that of most other developing countries, it has

taken the shape of people moving from countries with low economic activity to countries of higher economic activity, where there is the possibility of creating economic prosperity. Migration can be “explained by two contemporary global imbalances: the widening socio-economic polarization (i.e. widening income gap and the divergence of quality of living)” and the “relative ageing of the population in the north necessitating replacement labour” (Nurse, 2006:398). The shortage of labour in the OECD countries, and the need for replacement labour has led these countries to turn to migration as a source of human capital. This need for labour created the ‘pull factors’ (the factors which attract migrants to developed countries). While the “decline in global value added as a consequence of implementing structural adjustment programmes and the negative effect of neo-liberal restructuring” created the push factors (the factors which compel migrants to leave their countries (Nurse, 2006:398). The massive unemployment, poverty, hunger, lack of development of social services pushed migrants to seek better opportunities elsewhere. Jeffrey Williamson of the IMF noted that between 1999 and 2001 the Caribbean lost 10.8 million people due to migration all across the world. It is because of this considerable loss to Caribbean society that we now focus on the impact of migration to the Caribbean region.

The Caribbean region has the highest rate of emigration in the world. Although as one can imagine the number of immigrants from China and India would far outnumber Caribbean migrants, percentage wise, the rate of migration from the Caribbean is much higher. What is even more alarming is the increasing rate, particularly of highly skilled and highly educated migrants, moving out of the Caribbean. According to Mishra (2006) A majority of Caribbean countries have lost more than 50 percent of the labor force in the

tertiary education segment, and more than 30 percent in the secondary education segment” (p.7). She argues that the tertiary education labour force in Jamaica, Guyana, and Haiti have been reduced by 85%, 89%, and 84% respectively and that “[i]n fact, almost all the Caribbean nations are among the top 20 countries in the world with the highest tertiary educated migration rates” (Docquier and Marfouk, 2005:7).

There has been a marked deficit in literature on the direct economic impact of migration on development. In part due to a lack of synchronicity of research and reliable data collection from both sending and receiving countries (Docquier and Marfouk, 1999-2000:2). Growing development problems resulting directly from such a high rate of migration has created a pressing need for Caribbean governments to construct more stringent national policies. Jean Yan chief scientist of nursing and midwifery for the World Health Organization (WHO) noted that the Caribbean suffered a loss of public investment in training nurses in the area of US \$16.7 million and in 2000 and an additional US\$13.5 million by 2003, due to migration (p.7). Yan claims that the nurses left behind then become overworked and underpaid, now having to pick up the extra burden of those who did leave. Yan contemplates that it will take almost 5 years or more to restore the Caribbean’s nursing staff. This is just one example however. Scholars note that the loss to Caribbean development is much higher than can be quantifiably measured. For example, Mishra (2006) argues that there is a decided loss of externalities, where migrants would have transferred knowledge, knowhow, monitoring and motivation, all of which affect productivity.

Migration however is so deeply entrenched in the Caribbean psyche that scholars suggest that it has become institutionalized into Caribbean society, becoming almost

monolithic in the face of a possible reversal of this phenomenon. It is because of this Yan (2006) suggests that Caribbean governments develop an integrated approach to dealing with the loss of their nurses; however the principles can be applied across the board, to all sectors that are feeling the effects of migration. Yan brings attention to the Managed Migration Program which is still in its infancy stages and calls for a collective response to dealing with an issue that has seemingly become entrenched in Caribbean reality.

2.3.4 Political Responses SIDS Strategic Alliances

From 1983-1993, the volume of world merchandise increased 71%, while global FDI flows increased more than five times from what they were 40 years ago. Today the value of world merchandise stands at (US) \$ 11.76 trillion dollars (Bernal 2002, WTO World Trade Report, 2007). Clearly the scale with which economic activity took place in the past few decades has intensified significantly. Political readjustments have been just as significant. Moving from what Bernal posits as an atomized world economy of nation states to a seamless global economy (p, 296). With the integration of world economies, small states are dwarfed by the economic powers of more powerful developing countries. Beyond states transnational and multinational corporations are gaining just as much power, as their billion dollar incomes allow them economic and political might, that have placed them at the centre of many politically driven forums. The amalgamations of these economic giants have left little room for CARICOM countries to exert any influence in the decisions ironically that most affect them. One of these options has been the strategic

collectivization of foreign and domestic authority of CARICOM states into a regional integrated body (RIA).

Under the simple adage of ‘strength in numbers’, the Caribbean region has been engaged in a long and slow process of developing regionalism. From its 1958 inception the West Indies Federation and all integration movements thereafter, have been tainted with failure. Edward Greene (2005) notes that “[t]he birth and growth of the Caribbean integration movement is a fascinating history of progress toward and retreat from objectives identified by respective advocates”, and is essentially a history of division and unity (Nelson, 2002). The commonalities between states within CARICOM have surprisingly not been catalytic in creating a mature regional structure as was enjoyed by the European Union. The political climate within the region has never been of complete solidarity, a situation that has significantly delayed the potentiality that full and mature regionalism would provide.

In 1972, the Caribbean Community (CARICOM) was formed, meant to foster an emerging common market. Over thirty years later the successes of the region in creating an economically prosperous and politically cohesive region area remained dubious. Among the objectives “to promote the expansion and diversification of trade”, (www.caricom.org) secure trade in an environment of fair competition and ensure the equitable distribution of the benefits of free trade amongst members. CARICOM’s objectives were extended to include a more functional arrangement with “the coordination of the foreign policies of Member States” (Treaty of Chaguaramas). The reality of CARICOM was that “experts found that while some modest gains were made in

the area of trade and functional cooperation, very little progress was made towards the achievement of major objectives outlined in the treaty.” (Ramsaran 1989).

In the twenty first century CARICOM is trying to change to accommodate the demands of a fast paced globalised world. Currently several of the island states are operating on budgetary deficits importing significantly more than they earn. Much of the actual revenue generated is siphoned away to pay for the significant debts accrued during the structural adjustment years. While CARICOM markets are small, their integration is vital in maximizing scarce resources. The introduction of CSME in the Revised Treaty of Chaguaramas shows the organizations’ intent on creating a space that can promote regional development while slowly moving toward the preparations for becoming globally relevant. It is the hope that the common single market will create the synchronicity in economic policy to allow CARICOM states to share information, maximize scarce resources, and allow free movement of people thus improving the value and marketability of skill and labour and a free movement of goods that would allow local markets to extend and grow while gaining access to a larger consumer base.

2.4 Technological Orientation: CARICOM and the Digital Divide

“The ongoing debate in Latin America and the Caribbean regarding the transition to an information society and to the digital era is often based on ‘stylized facts’ and theoretical constructs deriving from developed countries” (ECLAC, 2003:9).

The above quote from the 2003 Economic Commission in Latin and the Caribbean (ECLAC) report, ‘Road Maps toward an Information Society in Latin America and the Caribbean’, highlights a critical if not perennial issue affecting the region. Much of the Latin American and Caribbean’s development policy is and has been heavily

influenced by theoretical models based on developed countries and their experiences. Most will argue, more particularly experiences such as the policy prescriptions of Washington Consensus and the Structural Adjustment Programmes (SAPs), has been mostly influential in the architectural design of the regions' political economy, arguably much to their detriment. According to the ECLAC report, the Caribbean region with few exceptions has not achieved conditions satisfactory, to launch itself into the information society because of low "[g]rowth rates in the wake of market liberalization and deregulation programmes," as well, "aggregate performances have deteriorated substantially in recent years" (ECLAC, 2003:9).

These obstacles have been coupled with the declining foreign direct investment, which in the past had facilitated the boom in infrastructure in telecommunications. For example two of the largest communications companies in the region are U.K. based Cable and Wireless, and Digicel, which compete to provide mobile telephony and complimentary mobile services. Most importantly the report notes that the region does not have the institutional capacity to support a transition into the digital age. This lack of investment has severely inhibited the pace at which technological advancement is being introduced and integrated within the region. "In fact local technological advancements do not appear to be a priority for national agents. As a result, the productivity gap separating the region from the developed world has not narrowed, and the structural heterogeneity of firms, regions and social groups has increased." (ECLAC, 2003:9). The generally low per capita income levels of most countries have proven to slow or inhibit the ability of the LAC region in incorporating technology into a more functioning component in their production. Income indicators are one of the most significant factors in determining

local technology demands, however separate from individuals, firms and business in the CARICOM region are generally small they do not have the resources financially or otherwise to maximize and efficiently co-opt any technologies that may have been produced locally, nor do they have the capital to suffer any risks involved in pursuing such ventures (Nasbeth, 1973). CARICOM states are not all equal, thus their responses to technological change have been equally disparate.

Chapter 3 – A CASE STUDY: CARICOM

3.1 CARICOM and the Global Political Economy

“Globalization ...accentuates the differences among Caribbean economies by creating a dual pattern of specialization, so that the countries are divided between service based and goods-producing economies” (ECLAC, Chapt.11:332).

In a general context, globalization almost always elicits conflicting responses, from complete support to complete disillusion. Despite this situation, it is irrefutable that “real interest rates are 4 times higher for poor countries than rich countries or that 83% of foreign direct investment goes to rich countries”, and the perpetuation of many other inequalities (Girvan, 2000: 69). In the case of CARICOM, globalization to a larger extent has made inequalities in member states more visible as sectoral growth responses have varied significantly over time, producing countries in the top 20 of the United Nations Human Development Index and countries like Haiti in the bottom 50. It is fair to say that in the last decade in some Caribbean states namely, Guyana, Jamaica, Suriname and Trinidad and Tobago, there has been a significant drop in personal wealth and people have in general become poorer (Watson, 1994). It is important to note that this is not the same for all of CARICOM, as the smaller states, such as the OECS states have fared far better than the larger territories. More detail will be presented further down in this section. Reduction in personal wealth however, is just one of the challenges that globalization has brought to the Caribbean region.

Over the last decade, in general, CARICOM experienced a blanket increase in the service sector and decline in the agricultural sector (with the exception of Guyana). The reduction in the agricultural sector were attributed to three factors, high production costs, external shocks and unwavering dependence on preferential trading agreements with the

European Union (ECLAC, 2001). Though climatically and geographically primed for agriculture, Caribbean states have not been received the best prices on the market. Manufacturing has gone down; with the only area showing real growth in almost all CARICOM states is tourism and services as Table 1 will show. Overall the Caribbean's share of world exports declined from .28% in 1985 to .13% in 1999 (ECLAC). Though the increase in tourism has not balanced the loss of revenue from reduced production, the region has gained some ground as they account for over 50% of world cruise ship passengers¹². Compounding the reduction in output, CARICOM's imports have significantly outweighed their export bill, accruing yearly trade deficits. Between 2005 and 2007 alone CARICOM countries spent in excess of over US \$4 million more on imports than they earned on exported goods as Table 2 and 3 will illustrate.

In order to stay competitive in the face of growing debt and continual loss of revenue in both the agricultural and manufacturing services, CARICOM embraced the laissez faire polices and adopted the Structural Adjustment Programme (SAPS) package. Structural adjustment was indicative of a time of; one, the dominance of US economic policies facilitated through the machine of supranationalism within the IMF and World Bank and the WTO, and two, the lack of choice that many developing states such as Jamaica were presented with when seeking monetary assistance. Particularly as stabilization packages were to taken en masse or not at all, in the face of growing debt and economic crisis in the 80s, Caribbean states had little option but acquiesce to the policy directives of SAPS. Like many other developing countries CARICOM too is faced with the restructuring of global political sovereignty into the hands of large multinational bodies that arguably are run on the interests of a cadre of developed countries.

¹² See ECLAC The effects of Globalization in CARICOM Caribbean Countries

Reduced government intervention and liberalized markets, the corner stone of neoliberal globalization, did not produce the expected benefits. The foreign debt taken on by many states to initialize the industrial policies, have remained as a fixed feature in contemporary Caribbean economics.

Table 1: SECTORAL SHARE OF OUTPUT, 1990 AND 2000
(Percentages)

Country	Agriculture 1990/2000		Mining 1990/2000		Manufacturing 1990/2000		Tourism 1990/2000		Financial services 1990/2000		Other services 1990/2000	
Antigua	4.2	4.9	2.0	2.2	3.4	2.8	14.4	14.4	7.2	11.2	18.9	25.1
Barbados	7.3	6.1	0.8	0.9	10.0	9.3	13.9	15.0	0.0	0.0	7.8	8.3
Belize	18.4	21.0	0.7	0.8	17.2	17.2	19.2	19.8	5.1	5.2	25.2	24.8
Dominica	25.0	18.2	0.8	0.8	7.1	7.2	2.1	2.4	11.3	13.2	16.2	20.9
Grenada	13.4	10.1	0.4	0.6	6.6	9.2	5.8	11.8	7.8	12.9	20.1	30.5
Guyana	23.6	35.4	9.5	10.9	11.1	11.7			6.0	5.7	8.7	8.5
Jamaica	6.2	7.1	8.7	9.1	21.1	15.8			9.2	14.9	9.4	16.9
Saint Kitts and Nevis	6.5	3.8	0.4	0.5	12.9	14.3	7.6	9.0	8.0	19.3	15.0	17.6
Saint Lucia	14.6	7.7	0.4	0.5	8.2	5.9	9.6	13.3	7.3	10.6	16.8	20.0
Saint Vincent and the Grenadines	21.1	12.0	0.3	0.3	8.5	5.8	2.2	2.5	7.6	9.6	20.5	25.2
Suriname	9.3	11.1	9.1	17.8	13.0	10.6	12.1	10.6	17.8	9.3	5.4	8.9
Trinidad and Tobago	1.9	1.8	57.7	56.5	4.5	6.0	5.7	7.3	5.0	4.7	5.9	6.2

Adapted from: ECLAC Report on the "Effects of Globalization on CARICOM Economies"

For example Jamaica's debt servicing accounted for "approximately 80% of government revenue and 70% of government expenditures in Jamaica, 1990 to 1994" (Williams, 2002:8). For states such as St. Kitts, Guyana, Jamaica and Belize, the debt servicing is over 10% of all revenue earned from goods and services as noted in Table 4. With external public debt growing at a rate of 8.9% for the whole of CARICOM, the amount of money available for other purposes such as education continues to depress. Public expenditure on education has decreased in Trinidad and Tobago, Saint Lucia, and St. Vincent and the Grenadines.

According to Juliet Elu (2000) Jamaica's debt as a percentage of its GDP was at 19%, with Trinidad and Tobago almost doubling from 6.8% to 14.8%. Guyana was hit the hardest with a ratio of external debt to GNP at 158% (Worrel, 1987). What resulted were a series of new loans being siphoned to service debt, as well as a significant portion of revenues from goods and services, rather than being channeled into public expenditure, as per the agreements of the IMF austerity measures. In hindsight what most scholars, economists and politicians of that time will tell you, the result was actually a conscious divergence of state led development to market led development. Something we can appreciate as having almost no sustainable and or desirable effect on human development.

This economic management however has stemmed from an ideological underpinning of neoclassical thought, as "economists in the Commonwealth Caribbean have never abandoned the view that economic theories and prescriptions developed in the metropolitan countries are equally applicable to the Caribbean, with minor adjustments" (Pantin 1994: 62).

**Table 2: VALUE OF TOTAL IMPORTS BY CARICOM
COUNTRIES: 2005 – 2007**

VALUE OF TOTAL IMPORTS BY CARICOM COUNTRIES 2005 - 2007			
CARICOM COUNTRIES	2005 (US\$)	2006(US\$)	2007(US\$)
CARICOM	16,696,998	18,082,904	20,383,020
MDCs	14,267,289	15,142,599	18,011,277
Barbados	1,604,430	1,629,034	1,299,346
Guyana	818,753	882,337	1,030,021
Jamaica	4,883,063	5,043,007	6,750,340
Suriname	1,188,874	1,008,895	1,185,344
Trinidad & Tobago	5,772,167	6,579,326	7,746,227
LDCs	2,429,709	2,940,306	2,371,744
Belize	438,586	660,343	684,346
OECS	1,991,123	2,279,962	1,687,397
Antigua & Barbuda	525,207	670,767	573,083
Dominica	165,346	166,896	195,734
Grenada	334,035	298,909	...
St. Kitts & Nevis	29,761	30,199	29,570
Montserrat	210,469	249,531	273,058
Saint Lucia	485,775	592,171	615,952
St. Vincent & Grenadines	240,529	271,489	.

Adapted from: <http://www.caricomstats.org>

Table 3: VALUE OF TOTAL DOMESTIC EXPORTS BY CARICOM COUNTRIES 2005 - 2007

VALUE OF TOTAL DOMESTIC EXPORTS BY CARICOM COUNTRIES 2005 - 2007			
CARICOM COUNTRIES	2005 (US\$)	2006(US\$)	2007(US\$)
CARICOM	12,104,785	17,466,804	16,754,061
MDCs	11,734,922	17,018,223	16,375,466
Barbados	210,533	299,424	299,424
Guyana	543,238	647,828	761,627
Jamaica	1,486,171	1,952,311	2,160,469
Suriname
Trinidad & Tobago	9,494,980	14,118,659	13,153,945
LDCs	369,863	448,581	378,594
Belize	201,850	268,223	252,858
OECS	168,013	180,359	125,737
Antigua & Barbuda	3,719	...	3,627
Dominica	39,103	40,469	35,768
Grenada	21,539	18,212	...
St. Kitts & Nevis	130	761	1,954
Montserrat	30,007	35,184	31,684
Saint Lucia	39,588	51,963	52,704
St. Vincent & Grenadines	33,928	33,769	...

Adapted from: <http://www.caricomstats.org>

**Table 4: CARICOM'S DEBT SERVICE PAYMENTS AS A PERCENTAGE
OF ITS GDP AT MARKET PRICES**

Table 4: CARICOM'S DEBT SERVICE PAYMENTS AS A PERCENTAGE OF ITS GDP AT MARKET PRICES 1998 - 2000			
COUNTRY	1998	1999	2000
CARICOM	5.8	5.0	4.7
The Bahamas	1.3	1.1	1.0
CARIBBEAN COMMON MARKET	6.9	5.9	5.6
MDC's	7.7	6.6	6.0
Guyana	19.7	10.2	11.5
Jamaica	9.5	8.9	6.9
Trinidad and Tobago	4.6	4.0	4.7
LDC's	3.1	3.2	4.2
Belize	5.1	4.5	6.6
OECS	2.6	2.9	3.4
Antigua and Barbuda	2.2	2.1	3.9
Dominica	3.1	3.0	2.6
Grenada	2.4	2.5	2.5
Montserrat	1.4	0.9	0.5
St. Kitts and Nevis	3.9	5.5	6.3
St. Lucia	2.3	2.4	2.8
St. Vincent and the Grenadines	3.0	3.5	3.0

Adapted from: <http://www.caricomstats.org>

Table 5: CARICOM'S DEBT SERVICE RATIO
(Debt Service Payments as a percentage of Exports of Goods and Services)
1998 – 2000

CARICOM'S DEBT SERVICE RATIO (Debt Service Payments as a percentage of Exports of Goods and Services) 1998 - 2000			
COUNTRY	1998	1999	2000
CARICOM	11.1	9.3	7.7
The Bahamas	3.0	2.1	1.8
CARIBBEAN COMMON MARKET	12.8	11.1	9.1
MDC's	14.7	12.5	9.4
Guyana	18.6	10.3	12.2
Jamaica	17.9	17.3	10.7
Trinidad and Tobago	9.9	8.0	7.8
LDC's	5.4	5.6	7.4
Belize	10.0	9.2	11.7
OECS	4.4	4.8	6.1
Antigua and Barbuda	2.9	2.9	5.7
Dominica	5.3	5.2	5.1
Grenada	5.0	4.2	4.4
Montserrat	3.6	1.4	0.9
St. Kitts and Nevis	7.5	11.6	13.7
St. Lucia	3.7	4.3	5.3
St. Vincent and the Grenadines	6.1	6.5	5.7

Adapted from: <http://www.caricomstats.org>

Liberalized financial markets have left the region vulnerable to large capital flights and capital mobility (massive capital flight can prove extremely detrimental as the Asian economic crisis in the 1990s has proven). Williams (2002) noted that capital flight

“exceeded US\$800, equivalent to about 5% of GDP for Jamaica; for Trinidad and Tobago US\$ 896 equivalent to 2% of GDP; and for Guyana it was \$646 equivalent to 26% of GDP” (in millions) (Bennett in Williams, 1999: 9), a situation which has shown little sign of change.

3.2 Assessing the Caribbean Digital Framework & Digital Strategy

“Recognising too the need for an agenda that is concerned with ensuring a comprehensive CARICOM Connectivity regime that strives to achieve maximum benefits of ICT for the Region=s peoples, and for sustaining economic growth and social development, especially in areas of governance, empowerment, poverty reduction, investment and resource support and widespread access to training and resources; (Revised Draft Georgetown Declaration CARICOM Ministers responsible for Information and Communication Technology (ICT) 2003).

CARICOM over the last ten years have been actively engaged in dialogue surrounding the commoditization of knowledge. Much of the dialogue has been aimed at understanding the extent to which a transition to a knowledge society is desirable and subsequently strategic regional approaches to maximize benefits. In 2001 *The Commonwealth Fund for Technical Cooperation (CFTC)*, commissioned by CARICOM, produced a diagnostic report on the readiness of CARICOM’s capacity for e-business development. These reports were of a few that carefully outlined the then infrastructural ability and future possibilities of ICT development. Although the reports’ focus was centred on ICT development for e-business purposes, they provided a synoptic view of the rationale of ICT development within CARICOM and the strategies that would provide optimal results. Table 6 provides an illustration of ICT agendas across the region and their progress as of 2008.

The core findings suggested that as CARICOM states continually increased their proportion of trade and tourism activity relative to their GDPs, their interaction with the global economy would become more integrative and complex.

As such while CARICOM states increased their chances of economic success, they also increased the chances of market volatility and vulnerability. In fact this vulnerability was already proving visible as “much of the CARICOM region ...experienced instances of negative economic growth in the last ten years” (Singh, 2001:6). In the report Singh concluded that the extensive amount of importation and taxation, high transactional costs in shipping and banking, added to low productivity as well as stagnated technology are some of the symptomatic responses of an unprepared region within this highly digitized and knowledge centred economy. The reports’ recommendations called for, an overall development of an info-structure, with attention to the introduction of inexpensive hardware and software, appropriate legal and financial framework, a supportive political and business environment added to a well developed human resource to support any further initiatives. Most importantly the document called for the initiatives to be applied by CARICOM states through a collaborative effort, allowing for a maximization of resources and effective results. Table 8 provides an overview of some of the subsequent national IT agendas that have been created in some of the CARICOM countries.

Table 6: CARIBBEAN (SELECTED COUNTRIES): NATIONAL STRATEGIES FOR INFORMATION SOCIETIES, JANUARY 2008

<i>Country</i>	<i>Characteristic of the current document</i>		<i>Background and Status</i>		<i>Institutional Framework of the current strategy</i>			
	<i>Name of Document</i>	<i>Period of Validity</i>	<i>Type of Document</i>	<i>Previous document and Year of Issue</i>	<i>Status of ICT policy</i>	<i>Main Coordinator</i>	<i>Strategic management</i>	<i>Operational Management</i>
Bahamas	Policy Statement on Electronic Commerce and the Bahamian Digital Agenda	2003- indefinite	Definitive	No previous document	First Generation implementation	Ministry of Finance (e- Business Development Office)	Inter-agency committee	Ministry of Finance
Barbados	Barbados National ICT Strategic Plan		Initial draft	No previous document	First Generation Formulation	National Advisory Committee on ICT	Inter-agency committee	Ministry of Commerce, Consumer Affairs and Business Development Office of Prime Minister
Grenada	ICT Strategy and Action Plan 2006 - 201	2006 - 2010	Definitive	ICT Strategy and Action Plan 2001- 2005	Second Generation implementation	Central Information Management Agency	Central Information Management Agency	
Guyana	ICT4D Guyana, National Strategy, Final Draft.		Draft	National Development Strategy 2001 -2010	First Generation formulation	Office of the President	Inter-agency Committee	Office of the President
Jamaica	E-Powering Jamaica 2007-2012	2007 - 2012	Definitive	NICT Strategy 2002 - 2006	Second Generation implementation	Central Information Technology Office	Inter-ministerial (Strategy Steering Committee)	Independent, attached to the Ministry of Commerce, Science and Technology

Trinidad and Tobago	Fast Forward	2003 - 2008	Definitive	No previous document	First Generation implementation	Executive Group on the National Information and Communication Technology Plan	Ministry of Public Administration and Information, in interministerial coordination	Executive Group
Bolivarian Republic of Venezuela	National Plan for Telecommunications, Information Technologies and Postal Services 2007-2013	2007 - 2013	Continuity draft	National Information Technologies Plan 2001	First Generation formulation	National Information Technologies Centre	Ministry of Science and Technology	Ministry of Science and Technology

Adapted from: the Information Society in Latin America and the Caribbean Development of technology and Technologies for Development

Building on this report, in 2003 CARICOM created the *Towards CARICOM Connectivity Agenda and Platform for Action*¹³ policy framework. These policies were created to address the ‘fundamental elements of the CARICOM connectivity agenda’. The document highlighted that the essential purpose of connectivity is a society’s internal capacity for communication with its global environment through the use of telecommunications, information technologies, and through the products of its content industries and its ability to enable countries and communities in the evolution toward the information and knowledge-based society. In light of this goal, the report identified a three pronged stratagem that would shape policy directed toward ICT development. The three part approach would consist of ICT infrastructure, utilization and content. Infrastructural concerns encompassed the physicality of ICTs such as the hardware and software packages, a capable human resource and a reliable telecommunications network. Utilization extended toward the value added use and application of both the digital information and services provided to facilitate the ease of use and generation of knowledge. The final component for CARICOM connectivity, content, refers mainly to the provision of high quality digital information and services for the region.

The agenda called for the above three pillars of connectivity guidelines be sanctioned through a regional and hemispheric effort, to include Latin America, through Inter American Telecommunications Commission CITELE and the Organisation of American States OAS, yet respecting the individuality of CARICOM members’ national needs. Another notable aspect of the connectivity agenda is the creation of ICT systems

¹³ Note CARICOM has also been engaged in concurrent technology dialogues with ECLAC and CITELE, however the 2003 *Towards CARICOM Connectivity Agenda and Platform for Action*, provided policy guidelines particular to CARICOM and its regional idiosyncrasies.

that are interoperable within the Common Single market Economy (CSME) framework. This is quite significant as under a CSME mandate, ICT development would catapult and deepen regional integrative movements within CARICOM.

The guiding principles of CARICOM connectivity are mainly equitability, universality and affordability, under which civil society participation is deemed necessary in carving out an appropriate regulatory framework. The agenda also outlines other principles such as protection of intellectual property and information protection mechanisms. This framework was created with a specific end goal for the region and individual member states. The end goal of the connectivity agenda is to provide 'access to the global information structure', produce and develop e government, e-communities, e-commerce addressing blanket areas of health, education, employment, human rights, investment strategies, democracy and civil society participation, tourism, gender equality and economic development.

The connectivity agenda there is also strong emphasis on the provision of legal regulatory bodies in providing a secure environment for new businesses as well as regional cooperation in creating a 'harmonized spectrum policy framework' to realize coordinated efforts such as regional 'hubs' and network access points. Developed in 2003, member states have since then integrated this agenda into their national plan of action, so far some with more success than others. Under the current Caribbean ICT agenda, there are several intergovernmental bodies working together (see Table 7 and 8), on creating national and regional priorities, however one of their constraints so far has been adequate resource support.

Table 7: SELECT CARIBBEAN ICT AGENDA LEAD ORGANIZATIONS

Organization	Mandate
Caribbean Knowledge and Learning Network (CKLN)	An initiative to increase capacity and improve competitiveness of human resources throughout the region with the use of ICT.
Regional Research and Education Network for the Caribbean (CARIBNET)	Endorsed by the CARICOM Heads of States on 2006 as a measure to reduce social exclusion, digital divide, uneven connectivity and limited participation in education, knowledge and Research networks. It is to be managed by CKLN.
Caribbean Centre for Development Administration (CARICAD)	As mentioned earlier, this CARICOM initiative aims to improve the efficiency of the public sector of its fourteen (14) member countries and modernize government institutions through technical assistance, capacity building for strategic management and regional meetings.
Latin America and Caribbean e-Government Network (Red GEALC)	This network of e-government professionals supported by the Organization of American States (OAS) promotes cooperation and exchange of experiences and best practices among government institutions, officials and technicians. It organizes periodic meetings and capacity building initiatives and workshops. It also enables virtual working groups, a horizontal cooperation fund and maintains a database of e-government experts in the region.
Commonwealth's Support for Public ICT Policies	The Commonwealth of Nations groups fifty three (53) states which were once under the rule or politically associated with the United Kingdom, mostly former British Colonies. Among them are ten (10) Caribbean States: Antigua and Barbuda, The Bahamas, Barbados, Dominica, Grenada, Guyana, Jamaica, Saint Vincent and the Grenadines, Trinidad and Tobago and Saint Kitts and Nevis. As a voluntary nonpolitical association, the Commonwealth promotes cooperation among its members and channels technical assistance to key development areas, actively supporting policy development and capacity building initiatives in the Caribbean
The Commonwealth Network of Information Technology for Development (COMNET-IT)	Established in 1995 and endorsed by the Commonwealth Heads of Government, COMNET-IT actively promotes and supports "policy resources and best practice in e-government and informatics strategies".
The Commonwealth Telecommunications Organization (CTO).	The current structure of CTO as an international partnership of governments, businesses and civil society institutions evolved from its former role as the Pacific Cable Board, established in 1901. Through a large number of funding, co-operation, technical assistance, knowledge sharing and capacity building initiatives the CTO aims to "bridge the digital divide and achieve social and economic development" and "fulfill the global development agenda for ICT".
Commonwealth Connects	The Commonwealth Heads of State, following up on the commitments from the recent WSIS Summit, launched the Commonwealth Action Programme for the Digital Divide at the end of 2005. The program, later re-branded as "Commonwealth Connects", makes ICT policy recommendations to bridge the digital divide on five areas:

Adapted from: Carlos Levy 2007 "Information Society and public ICT policies in the Caribbean: a review of advances and challenges, policy instruments and country experiences" ECLAC

Table 8: CARIBBEAN INFORMATION SOCIETY REGIONAL STAKEHOLDERS

International Organizations	Regional Civil Society and Community Initiatives	Regional Business Framework	Regional Content Initiatives	Regional Cooperation Organizations	Regional e Government Cooperation	Small Islands Initiatives	Regional Tele-Communication s Regulators Organizations	Regional Education Initiatives
UNESCO	CARDICS	CRNM	CARICOM	CARICOM	Red GELAC	SIDSNET	ECTEL	CKLN
ECLAC	UNESCOCMC	CSME	Mauritius Strategy	CDCC	CARICAD	SIV	CTU	UWIDEC
UNDO	CIVIC/CARISNET	CAIC	BPOA	CDB			CANTO	CUPIDE
IADB	OECS Cultural		ECLAC	CDERA			OCCUR	OERU
EU	UNDP CORIC		WSIS	OECS				CARADOL
WB	Caribbean GIS			ACS				COL VUSSC
COMMNET-IT								CDL
CTO								ACURIL
ITU								UNICA
ICA								
IDRC								
Fonds Francophone des Inforoutes								

Adapted from: Carlos Levy 2007 "Information Society and public ICT policies in the Caribbean: a review of advances and challenges, policy instruments and country experiences" ECLAC

3.3 *CARICOM Barriers to Technology Access*

In 2004, the CARICOM Secretary General stated that after ten years of aggressive development policy that “it [was] difficult to conclude that they are now in a better position to achieve sustainable development” than they were in 1994. In fact he hazards that the opposite of that reality may be well be the case (Gray 2006). Just one year prior to this statement, Dr. the Hon. Keith C. Mitchell, Prime Minister of Grenada, in an address to the University of the West Indies, also advanced that the region was caught in a “low productivity trap”. This trap he maintained was due to the inability of the region to engage in technologically innovative processes, in part due to a deficit in the necessary skills and knowledge. He emphasized that

“Most of our countries do not have well resourced Science and Technology Councils, conducting research in areas critical to Caribbean development. Our numbers of scientists are declining, just at the time when we need a drastic increase in the quantity of these professionals. Legislation in many countries regarding Science, Research and Technology institutions and activities remains deficient. The number of technology-oriented institutions, including those with a strong technical component, is beginning to lag, even behind other countries in the Latin American Region.” (Dr. the Hon. Keith C. Mitchell, Prime Minister, Grenada, 2003, address at the University of the West Indies).

Drawing on the linkages between technology and productivity, CARICOM heads have realized that there is paucity in both these areas, hindering the creation of an economically viable space ready for the challenges of the new global economy. But understanding that there is a deficit in technology has done little in the way of solid comprehensive approaches.

Recognition of this problem is only a small part of the wider developmental issue. It is important that CARICOM addresses the accompanied structural issues tied to lack of

technology access with a sense of cogency and directness. Admittedly this is difficult as these issues themselves, as previously outlined, are structural and rooted in processes that have been normalized, characteristic of both a historical and international context, both of which are beyond the direct control of CARICOM states. Moreover dealing with many of these structural problems would require resources that are well beyond the means of the region, raising questions of priority and opportunity cost with regard to the implementation of ICTs, and evaluate whether it should be incorporated as part of a larger development strategy. Prime Minister Mitchell further stated that CARICOM, “desperately need[s] to address these issues in the shortest possible timeframe to unleash the potential that ICT makes possible” (CARICOM, 2003).

Five years after Hon. Keith C. Mitchell’s speech, CARICOM has made conscious efforts in investing in ICT development across the region. It is increasingly evident however that “return on this investment continues to fall below expectations” (CEPAL, 2006). Like several of the CARICOM member states Jamaica has developed a national IT strategy with a primary objective of transitioning into a knowledge based society. The state provides loans for new IT start up firms from its technology fund and supplements new businesses in securing office facilities and physical infrastructure.

In 2000 the Jamaican government funded three new call centres however; one of them, NET SERV, went into receivership after only six months of start up, costing the Jamaican government over \$4 million US and calling into question the viability and volatility of the IT sector (ECLAC nd.: 341). Funding has presented quite the challenge, as CARICOM states find it hard to prioritize ICT issues, when arguably more pressing issues have demanded immediate attention. Table 11 gives an overview of the public

sector budget for select CARICOM national ICT budgets. CARICOM states are finding it difficult to establish universal access funds, which are budgets, set aside specifically for future ICT access initiatives. Much of these funds have been received from donor agencies, but have yet to be generated from state budgets.

Table 9: NATIONAL ICT BUDGETS

Country	Availability of Central ICT Budget	Availability of Specialized ICT Budget			
		For National ICT Strategy	For E-Government Projects	To Promote Universal Access	To Promote IT Industry Development
Barbados	No	No ¹	Limited ¹	No	Limited ²
Grenada	No	No	Yes	No	No
Guyana	No	Limited	Limited ¹	No	No
Jamaica	No	Yes	Yes	Yes ⁴	Limited ²
Saint Lucia	No	No	Limited ¹	No	No
Suriname	No	No	Limited ¹	No	No
Trinidad and Tobago	No	Limited ⁵	Limited ¹	No	Limited ^{2, 6}

Adapted from: Carlos Levy 2007 'Information Society and public ICT policies in the Caribbean: a review of advances and challenges, policy instruments and country experiences' ECLAC

Key

1. Internal funds allocation within government agencies as opposed to formal allocation in public budget.
2. Through Business/Technological Parks.
3. Funds available for IT Strategy formulation.
4. The Universal Access Fund has been redefined to be used for ICT in Education.
5. Funds available for IT Strategy formulation and some specific projects.
6. Technology Park and Clusters strategy under development.

With this in mind, this chapter will present data on the four factors that this research has hypothesized as having been most directly causal in both the lack of technology access and the inhibition of organic progressions to technology development.

3.2 Technology Transfer and the TRIPS/TRIMS Agreements

The ideological works on Caribbean technology within the early 60s and 70s came from voices such as economist Sir Arthur Lewis who strongly argued that for any country, technological change and not international trade, should be the engine of economic growth with “international trade serving as lubricating oil not fuel” (Lewis in Pantin, 1987:3). Essentially Lewis was concerned with the generation of organic technology knowledge and capacity, not the type that would necessitate dependence on TNCs and foreign governments like today. This dependence, Girvan would later argue creates technological dysfunction and leads to a perpetuation of underdevelopment.

Pantin (1987)¹⁴, also speaking on technology issues, highlighted nine core elements of the technology transfer for economic development paradigm and made a comparative analysis with the state of Caribbean technology development, with an emphasis on the development of Trinidad and Tobago’s oil and natural gas sector. Some of these elements included established socioeconomic goals, with a clear vision for technology importation the creation of a multidisciplinary technology negotiating unit, the screening of technology importation activities so that they comply with element (1), implementation of human resource policies for continual technological growth and capacity. Table 10 refers to all of the aforementioned elements in protraction. These

¹⁴ Note Pantin’s use of technology does not refer to the specialized definition in this research, but instead encompasses all modes of production.

elements were essential in not only capturing technological innovations that were already established, but were also meant to ensure that it would push Caribbean states into co-opting and developing their own technological capability (TC) and circumventing dependence. The weakness in Trinidad's response to technology transfer in the oil and gas sector in the late 70s is characteristic not only of the rest of the island but other Caribbean islands.

The telecommunications industry in CARICOM, has until recently been almost completely monopolistic. Cable & Wireless is the largest telecommunications network provider in the region, having enjoyed dominance as the single telecommunications provider in several CARICOM states. Some of these arrangements allowing Cable and Wireless exclusive rights in some states were meant to last as long as 40 or more years (INFODEV, 2008). Currently some states have liberalized their markets including Jamaica, all of the OECS states, and Trinidad, phasing out UK based Cable and Wireless to embrace mobile companies such as 'Digicel' also UK based, as part of the WTO Basic Agreement on Telecommunications Services.

While this liberalization has encouraged and improved mobile telephone rates, internet access is still relatively inaccessible as still the "majority of the population does not have internet access because the rates are too high" (ECLAC,nd:341), see Table 10 .

Table 10: ASSESSMENT CHECKLIST OF TRINIDAD AND TOBAGO'S OIL AND NATURAL GAS SECTOR AGAINST NATIONAL TECHNICAL POLICY

1. Identification of socio-economic goals and role of technology therein	Development of the natural gas resource was tied to the objective of economic diversification and the provision of a substitute source of foreign exchange to that of the oil sector. There was no articulation of the role of technology.
2. Creation of a multi-disciplinary technology planning unit	The Pt Lisas projects were developed originally by the IDC. A small team of engineers formed the Coordinating Task Force, which was given responsibility at the critical stage of decision-making on most of the Pt. Lisas projects. The National Energy Corp. has been centrally involved in only the last two projects: Urea and Methanol in terms of decision-making.
3. Enactment of legislation and related monitoring agencies	No specific legislation has been enacted for foreign investment or technology importation. Therefore, no related monitoring agencies exist.
4. Human resource development	Some efforts were, and continue to be, made to develop national skills in the operation of the Pt. Lisas projects. However, there has been a significant foreign presence in the Iron and Steel Company.
5. Identification of specific products by demand analysis	Products were first identified as technically feasible from natural gas. Demand (i.e. market analysis) was then undertaken by foreign consultants (table 3).
6. Analysis of impact of technical change	No evidence was found of the appreciation of this issue.
7. Assessment of the technology market	This was done by foreign consultants on behalf of the Government of Trinidad and Tobago (table3).
8. Identification of enterprises to contract with foreign vendors	The Pt Lisas projects have been totally nationally owned (ISCOTT, Urea, Methanol) or joint ventures BERTRIN, TRINGEN). However no evidence was found of the criteria used for the utilization of either form. Wholly nationally owned firms seem to have resulted in cases where no willing joint venture partner could be found.
9. Continuous assessment	There has been no attempt at public assessment of the decisions made at Pt. Lisas, except perhaps for public relations exercises. No evidence was found, moreover of any rigorous internal reappraisal.

Source: Pantin 1987, "Technology policy in the development of Trinidad and Tobago's natural gas resource"

Table 11: SELECT CARIBBEAN COUNTRIES AND ICT PENETRATION

Countries	Population	No. of computers		Internet Users		Broadband Internet Users	
		Total	Per 100 pop.	Total	Per 100 pop.	Total	Per 100 pop.
Barbados	268,881	33,745	12.55	148,960	55.4	21,157	10.1
Grenada	105,747	16,423	15.53	17,871	16.9	1,216	1.5
Guyana	751,223	26,443	3.52	141,981	18.9	75873	10.1
Jamaica	2,644,593	163,965	6.2	1,054,366	39.87	25,388	0.96 [66]
Saint Lucia	163,651	28,361	17.33	36,003	22%	n/a	n/a
Suriname	446,460	20,741	4.7	30,493	6.83	n/a	n/a/
Trinidad and Tobago	1,301,307	102,803	7.9	159,280	12.24	n/a	n/a

Adapted from: Carlos Levy 2007 'Information Society and public ICT policies in the Caribbean: a review of advances and challenges, policy instruments and country experiences' ECLAC

Liberalization of the telecommunications market while also important in creating an accessible environment for local IT companies to gain entrance, does not address the deficiencies in local companies actually engaging in local ICT adoption and adaptation. For example, while St. Lucia has enjoyed successful market penetration of mobile telephone communication reaching 83% of the population, the ITU noted that this IT growth has remained relatively isolated from other market segments and has not spilled over into other segments of the society. Moreover as most of the telecommunications and network providers are foreign based companies, CARICOM's technology dynamic is such that they are largely recipients of technologies from abroad but is neither a leader in design nor development.

Nonetheless complimentary local businesses and services have developed in response to the telecommunication industry and its increased growth. For example, mobile phone repair and accessory services have sprung up all around the region. In Haiti, Digicel's investment of over \$1 billion dollars in telecommunications investments has made it the largest corporate investment there ever (Levy 2007). There has not been a strong presence of government in facilitating research and development and technology institutes across the region. Individually Trinidad and Tobago, Barbados and Jamaica, have spearheaded slightly more robust schemes than the other smaller CARICOM states. Their resource base is larger allowing them more access to funds, research space and institutional support from local universities. Still these efforts have shown very little overall effect on local ICT access.

3.4 Education Policies and Endogenous Technology Production

"[Caribbean] School leavers—understood to be all pupils, including those that graduate successfully and those that leave school before completing a degree—often do not possess the skills required for the service jobs in the new global economy" (World Bank, 2007: 7).

The literacy rate and persons with basic education (primary and secondary school) attainment rate are both relatively high for the Caribbean region, see Table 11. This however does not speak to the quality of education, which of late has garnered a lot of criticism. Questions have been raised whether the education system has been preparing students for the new conditions of a knowledge based global system. In a 2007 World Bank report on the skill challenges in the Caribbean, it was found that with regard to the smaller eastern CARICOM states, who also align themselves as the Organisation of

Eastern Caribbean States (OECS) there were marked deficiencies in their education system. The report noted that these deficiencies were significant in that they did not prepare students for the vagaries of the new global economy. The four major problems in their findings were that: (1), students were still struggling with basic arithmetic and English language skills, (2) many had problems acquiring behavioral life skills such as team work, pro activity, critical thinking and effective communication; (3) most had not acquired sector specific professional skills such as ICT training, (4) most who received labour market training were the ones who were already highly skilled and many times others who did receive labour market training did not find it particularly useful as the areas were usually in low demand. They also noted that this was significant as the lack of skills reduced the ability of the region in gaining a competitive edge on the global markets.

Banik, O'Iyare, and Bhaumick (2006), all argue that there is significant waste in the Caribbean regional education system. They argue that the transition to regional tertiary and higher level education is limited and isolated three possible reasons. They see the lack of availability of spaces within technical and scientific disciplines such as medicine, natural sciences and technology, as one reason. They postulate that deficiencies at the secondary level and the irrelevance of curricula to the current market demands as the two others. The region has tried to meet skill demands with the establishment of more technical institutions (see Table 12), and distance learning institutes.

Within the OECS alone, the share of GDP by the service sector in total stands at 79%, and contributes to over 50% for the rest of the Commonwealth, signifying the changes and shifts in the economy and the eventual demands of the labour force (World

Bank 2007). Moreover the report notes that there is no strong dialogue between the private sector and tertiary and secondary education policy makers, contributing to an incongruency in skill development and market demand (WB, 2007; UNESCO, 1999). This was especially true in the case of Barbados where a 1999 UNESCO survey indicated that students perceived career success through academic track careers, which was counter to the reality of a market demand for persons in the technical field.

All of CARICOM governments have separately made attempts at developing conscious educational reform policies such as the OECS Reform Project and Barbados Education Sector Enhancement Programme, (EDuTech, 2000) initiative. All these initiatives have taken into consideration the changing needs of students, such as the adoption of computer literacy as a basic skill. Although most states have planned to provide a proportionate number of computers in all secondary and primary schools to provide access for all students, the venture is expensive, and is seen as a longer term goal. Barbados has in so far committed US 75 million financing provided through loans to see this happen (World Bank, 2005). When World Bank analysts calculated actual cost of the computers accounting only maintenance, they estimated that cost of acquiring the computers was only about one third of the real recurrent costs. The other two thirds they allocated for maintenance and repairs; however they did not figure in the cost of teacher training and of the construction for physical spaces (World Bank, 2005).

**Table 12: HUMAN DEVELOPMENT EDUCATION INDICATORS FOR
(SELECT) CARIBBEAN COUNTRIES**

Country	Human Development Index Ranking 07/08	Combined primary, secondary and tertiary gross enrolment ratio (%)	Adult literacy rate (% ages 15 and older)	GDP per capita (PPP US\$)	Tertiary Students science, engineering and Construction (% of tertiary students) 1999-2005
Saint Lucia	72	74.8	94.8	6,707	Na
Bahamas	49	70.8	100	18,380	Na
Saint Kitts Nevis	54	73.1	97.8	13,307	Na
Antigua	57	NA	85.5	12,500	Na
Trinidad Tobago	59	64.9	98.4	16,603	36
Dominica	71	81	88	6,393	Na
Grenada	82	73	96	7,843	Na
St. Vincent and Grenadines	92	68.9	88.1	6,568	Na
Guyana	97	85	65.2	4,508	Na
Jamaica	101	77.9	79.9	4,291	Na
Haiti	146	52 (2004)	49 (2004)	1,663	Na
Suriname	85	77.1	89.6	7,722	Na
Barbados	31	88.9	100	17,297	Na

Adapted from: Human Development Index UNDP 2007/2008

**Table 13: CARIBBEAN DEGREE GRANTING INSTITUTIONS
(DOES NOT INCLUDE DISTANCE EDUCATION OR EXTERNAL
INSTITUTIONS)**

Country	Year Established	Degree Granting Institution
Jamaica, Barbados, Trinidad and Tobago, St. Lucia, Antigua, Dominica, Grenada, St. Kitts, St. Vincent, Belize	1948	University of the West Indies (UWI) is a regional university funded by fourteen Governments of the Commonwealth Caribbean.
Guyana	1963	University of Guyana
Bahamas, the	1996	The College of the Bahamas
Jamaica	1997	Northern Caribbean University
Belize	2000	University of Belize
Jamaica	1988	The University Council of Jamaica has a mandate to award degrees through programmes offered in Jamaican tertiary institutions
Trinidad and Tobago	1996	University of Trinidad and Tobago
Jamaica	1995	The University of Technology

Adapted from: Quality Assurance in Higher Education in the Commonwealth Caribbean, Miller (2002)

Analysis of survey respondents in research conducted for this paper, “educators observed that students favored traditional academic subjects over those related to business and technical studies” (UNESCO 1999). In fact parents were instrumental in encouraging children to choose academic subjects based on the promise of a ‘white collar career’ and shy away from subjects that did not offer a culturally perceived future of “promise, reward, or glamour” as would those of an academic track. The report also concluded that the establishment of technical schools in the 1980s “reinforced the perception that technical training was the option for marginally performing students or low academic aptitude. The research also indicated that there is a strong disjuncture between “modern needs of global capital and the need to prepare students accordingly”

and that local industry does not create specific demand on secondary education (p.12).

Levy 2007 argues that, the Caribbean education system faces the challenges in revamping its methodologies, contents, programs and environments, which are critical in providing citizens with the new skills in order to be competitive and to maximize productivity in the new knowledge economy.

3.5 Migration and the Brain Drain

As mentioned before, migration has been a distinctive feature in the Caribbean development psyche. This is in part because of the length and breadth of migratory movements that today have shaped the regions' behaviors and reinforced cultural norms in a "dynamic that tends to perpetuate the process rather than exhaust it" (ILO Thomas Hope, 2005:3). For example, it is almost a rite of passage for young Caribbean nationals with the means to 'go to school' after A Levels, an implication which usually denotes moving to a metropole country for higher education. Early migratory patterns paralleled the direction of foreign investment in the region, for example the building of the Panama Canal, the Central American railroads and the general post World war reconstruction in the U.S and Western Europe (Thomas- Hope, ILO Caribbean Migration Papers:4). Today majority Caribbean migrant flows are tending toward developed countries, who themselves have established aggressive recruiting drives for skilled and educated professionals to fill their labour demands.

Between 1956 and 2006, the Caribbean has lost roughly 5 million people to migration, with Suriname, Jamaica, Guyana and Saint Lucia, as the largest source countries (United Nations Expert group on Migration and Development, 2005:2). As a

percentage this figure represents a large portion of Caribbean population. Table 14 is a statistical representation of data showing migrant flows in real numbers and as a population percentage. The majority of countries in the Caribbean Basin showed a marked increase in migration (some even double) between 1999 and 2000. Specifically within CARICOM all states with the exception of Trinidad and Tobago, Montserrat and Jamaica showed increases in migration. The Caribbean average percentage to population migration rate was only 0.02 less than the world average and higher than the whole of the Latin America region.

Table 14: DATA ON POPULATION AND MIGRATION FROM THE 2000 REVISION OF WORLD POPULATION PROSPECTS.

Country or Area	Population (thousands)		Migrant stock (thousands)		As percentage of population	
	1990	2000	1990	2000	1990	2000
World	5,254,820	6,056,715	153,956	174,664	2.93	2.88
More developed regions	1,148,365	1,191,429	81,424	104,119	7.09	8.74
Less developed regions	4,106,455	4,865,286	72,531	70,545	1.77	1.45
Least developed countries	514,605	667,613	10,992	10,458		
Latin America and the Caribbean	440,354	518,809	6,994	5,914	1.59	1.14
Caribbean	33,907	37,941	909	1,071	2.68	2.82
Anguilla	8	11	2	4	27.97	35.61
Antigua and Barbuda	63	65	12	16	19.18	24.47
Aruba	66	101	14	31	21.91	30.83
Bahamas	255	304	27	30	10.52	9.85
Barbados	257	267	21	25	8.32	9.16
British Virgin Islands	17	24	8	8	44.03	35.49

Cayman islands	26	38	13	15	48.89	39.12
Cuba	10,629	11,199	100	82.	0.94	0.73
Dominica	71	71	3	4	3.53	5.28
Dominican republic	7,061	8,373	103	136	1.46	1.63
Grenada	91	94	4	8	4.70	8.50
Guadeloupe	391	428	66	83	16.88	19.44
Haiti	6,907	8,142	19	26	0.28	0.32
Jamaica	2,369	2,576	17	13	0.73	0.49
Martinique	360	383	39	54	10.74	14.21
Montserrat	11	4	2	0	18.76	4.86
Netherland Antilles	188	215	38	55	20.48	25.35
St. Kitts and Nevis	42	38	4	4	9.64	11.19
Saint Lucia	131	148	5	8	4.06	5.45
St. Vincent and the Grenadines	106	113	4	8	3.79	6.66
Trinidad and Tobago	1,215	1294	51	41	4.16	3.20
Turks and Caicos Islands	12	17	2	3	18.33	16.23
Unites States virgin Islands	104	121	31	35	30.22	28.79
Central America	111,409	135,129	1836	1040	1.65	0.77
Belize	186	226	45	17	24.40	7.51
South America	295,037	345,738	4250	3803	1.44	1.10
Guyana	731	761	3	2	.43	.21
Suriname	402	417	6	6	2.13	1.49

Adapted from United Nations Secretariat, Population Division Department of Economic and Social Affairs

What is quite puzzling is that despite the sheer expansiveness of the problem Caribbean states have been slow to act making very little clear policy statements on stemming migration issues. Table 14 shows both the views and responses of CARICOM governments on emigration in 1996 and 2000. Some efforts have been made in creating managed migration programs, particularly in the health sector as this is where the Caribbean loses a vast majority of workers to the U.K, Canada and the U.S. This programme however is small and does not capture enough of the workers who leave. Jean Yan (2006) chief scientist of nursing and midwifery for the World health Organization noted that the Caribbean suffered a loss of public investment in training nurses in the area of US \$16.7 million in 2000 and an additional US\$13.5 million by 2003, due to migration (2006). Yan claims that the nurses left behind then become overworked and underpaid, now having to pick up the extra burden of those who have left; leaving tired and angry nurses. Yan contemplates that it will take almost 5 years or more to restore the Caribbean's nursing staff. The number of migrants moving to developed countries is just as important as the demographic of that population. More than any other region, migrants from the Caribbean region are generally the highest educated of all migrant flows to OECD countries. As table 3 illustrated on average, 70 percent of emigrants to OECD countries from CARICOM states have received tertiary education and another 42 % with secondary education. The significant loss of skilled labour to CARICOM has presented several challenges.

**Table 15: CARIBBEAN GOVERNMENT'S VIEWS AND POLICIES ON
EMIGRATION, 1996 AND 2000
(Number of Countries)**

Year	Views			Policies			
	Satisfactory	Too High	Total	Maintain	No Intervention	Lower	Total
1996	7	9	16	3	6	7	16
2000	10	6	16	3	10	4	16

Adapted from United Nations Secretariat, Population Division Department of Economic and Social Affairs

**Table 16: PERCENT OF LABOR FORCE THAT HAS MIGRATED
TO OECD MEMBER COUNTRIES, 1965-2000 (BY LEVEL OF
SCHOOLING)**

Country	Primary	Secondary	Tertiary
Antigua and Barbuda	6	64	67
Bahamas, The	3	10	61
Barbados	18	28	63
Belize	7	58	65
Dominica	19	67	64
Dominican Republic	6	33	22
Grenada	25	71	85
Guyana	18	43	89
Haiti	3	30	84
Jamaica	16	35	85
St. Kitts and Nevis	32	42	78
St. Lucia	12	21	71
St. Vincent and Grenadines	18	33	85
Suriname	39	74	48
Trinidad and Tobago	8	22	79
Average	15	42	70

Adapted from IMF Working Paper Emigration and Brain Drain: Evidence from the Caribbean 2005

One of the more critical issues with such a significant loss of skilled professionals is the loss of government expenditure by CARICOM states in producing these skilled migrants. Table 16 provides a tabular representation of this loss, while Figure 1 illustrates the amount CARICOM specific spends on education as a percentage of their GDP. Tertiary level averages were obtained for Barbados, Jamaica and Trinidad and Tobago as they are currently the only states with full degree granting institutions from the University of the West Indies.

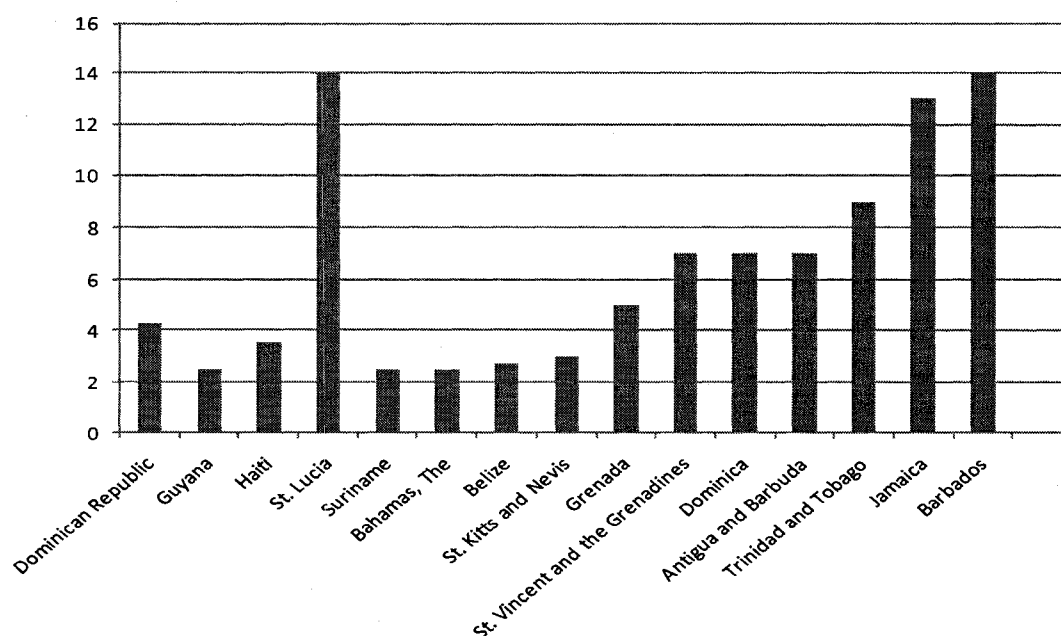
**Table 17: GOVERNMENT EXPENDITURE ON EDUCATION, AVERAGE
1999–2002
(PER STUDENT, AS A PERCENT OF GDP PER CAPITA)**

Country	Primary	Secondary	Tertiary
Barbados	17	26	62
Belize	17	19	
Dominica	21	35	
Dominican Republic	7	5	
Guyana	1	2	
Jamaica	16	24	76
St. Kitts and Nevis	9	9	
St. Lucia	13	2	
St. Vincent and Grenadines	28	28	
Trinidad and Tobago	14	15	69

Adapted from United Nations Education Scientific and Cultural Organization, (UNESCO) in IMF Working Paper Emigration and Brain Drain: Evidence from the Caribbean 2005

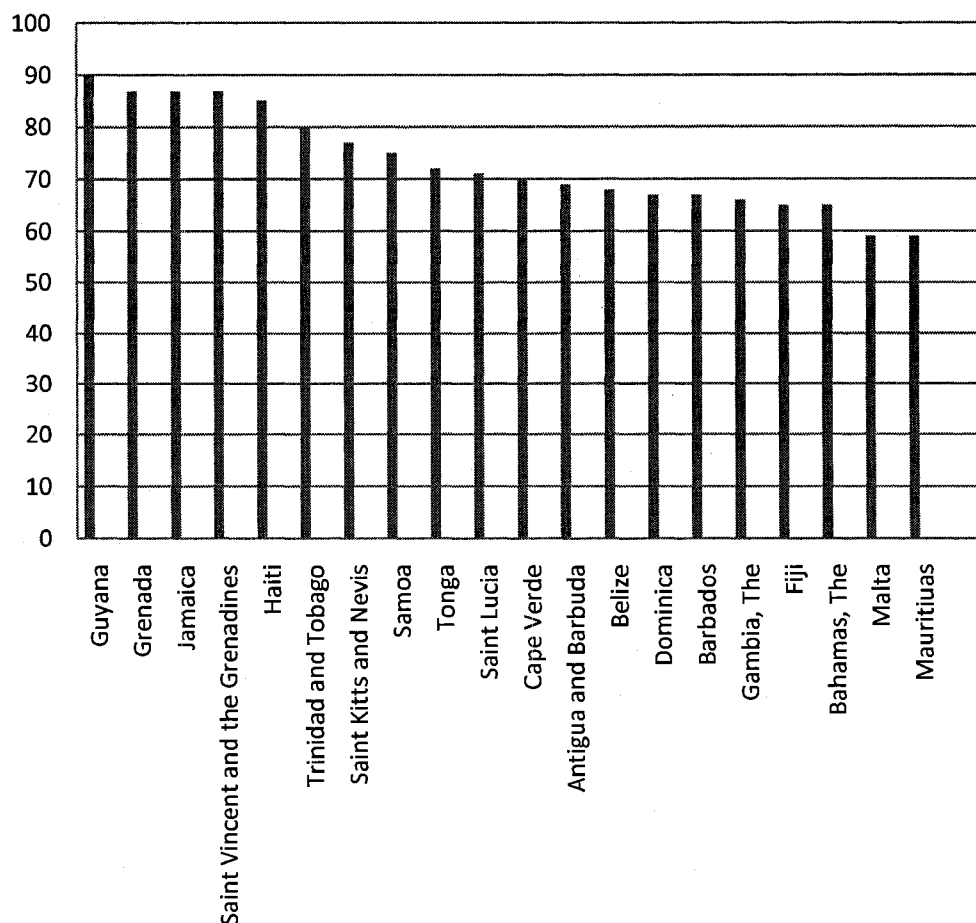
Of the top producing skilled and educated professional, migrant countries CARICOM states are within the top 20 in the world. Figure 2 provides a graphical representation of this data. Almost all CARICOM states are within the top 20 of these countries. Moreover as compared with the rest of the world, the Caribbean by far between 1965 and 2000 has had the largest percentage of persons immigrating to OECD countries as Figure 3 will show.

Figure 1: ESTIMATED GOVERNMENT EXPENDITURE ON EDUCATION OF MIGRANTS (IN PERCENTAGE OF GDP)



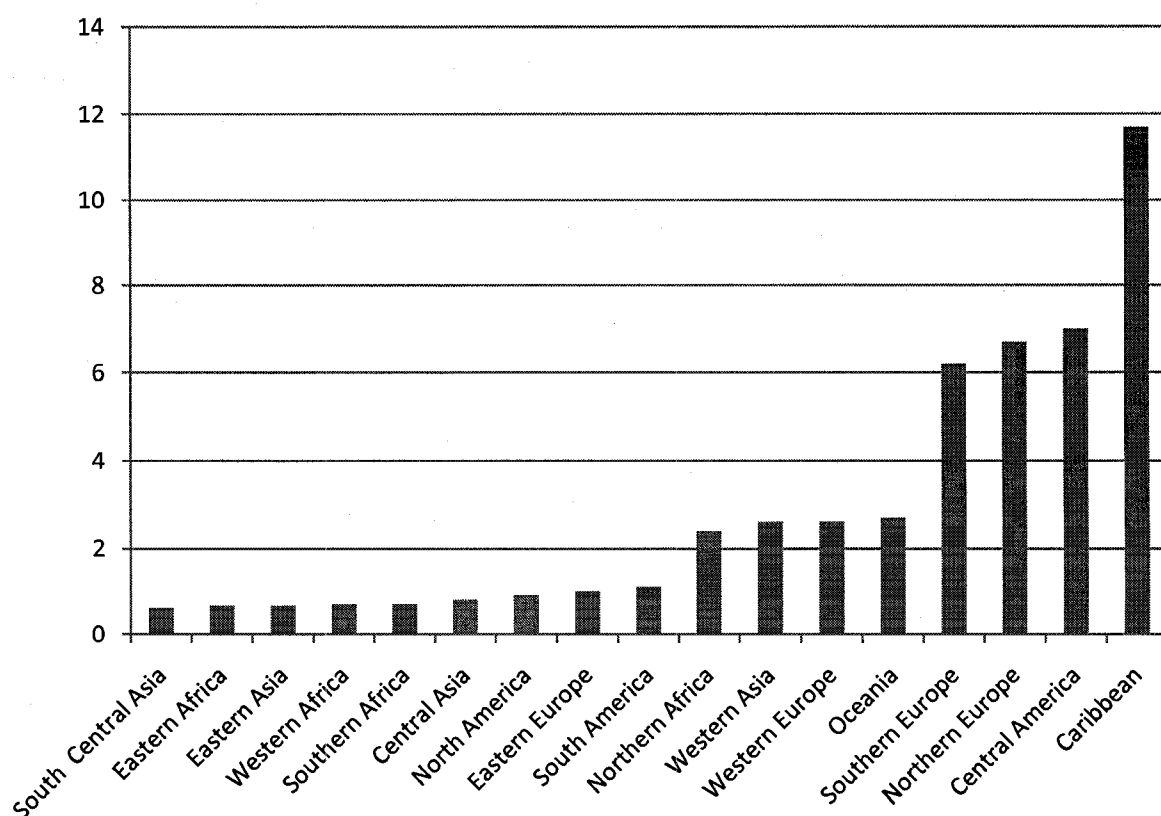
Adapted from IMF Working Paper Emigration and Brain Drain: Evidence from the Caribbean 2005

Figure 2: TOP 20 COUNTRIES IN THE WORLD WITH THE HIGHEST EMIGRATION RATES, 1970–2000
(Percentage of Educated Labor Force Migrated To OECD Countries)



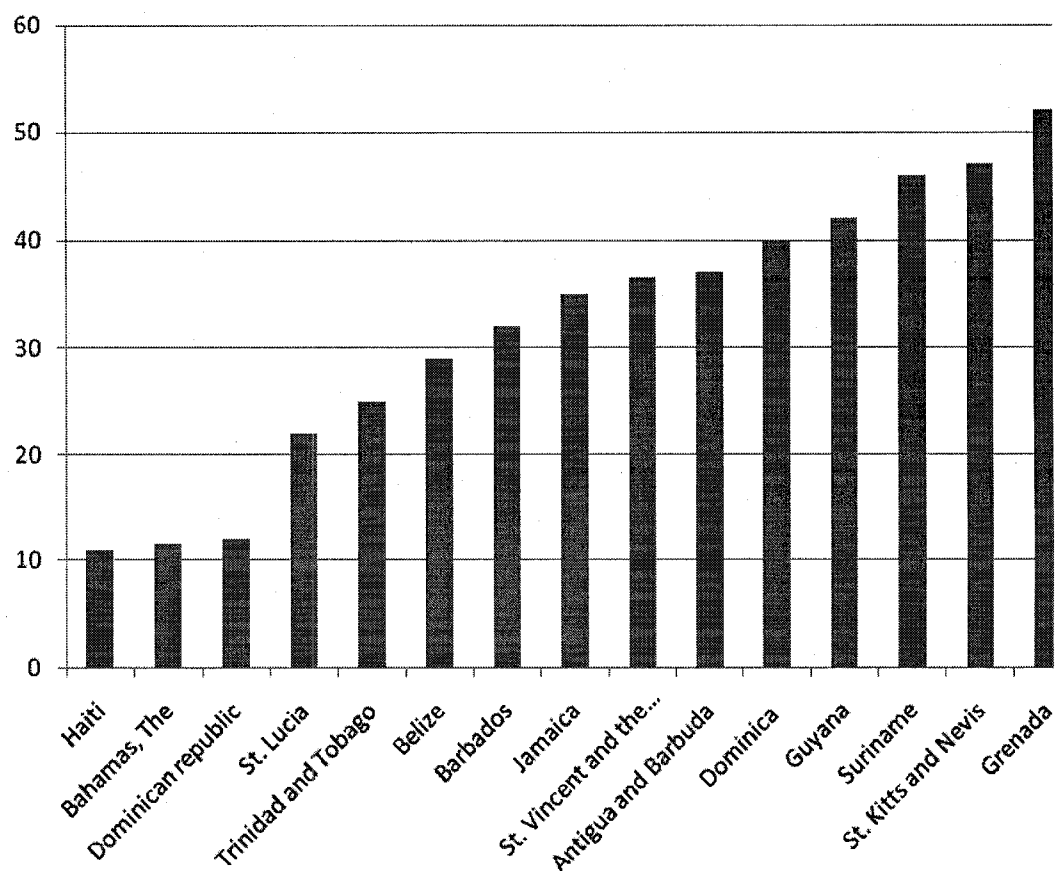
Adapted from Docquier and Marfouq (2005) in IMF Working Paper Emigration and Brain Drain: Evidence from the Caribbean 2005 in Mishra 2005
 (Note: Educated labor force is defined as having 12 or more years of completed schooling)

**Figure 3: PERCENT OF LABOR FORCE THAT HAS MIGRATED
TO OECD MEMBER COUNTRIES
CARIBBEAN VS. THE REST OF THE WORLD, 1965–2000**



Adapted from Docquier and Marfouq (2004) in IMF Working Paper Emigration and Brain Drain: Evidence from the Caribbean 2005 in Mishra 2005

**Figure 4: PERCENT OF LABOR FORCE THAT HAS MIGRATED FROM
THE CARIBBEAN COUNTRIES TO OECD MEMBER COUNTRIES
1965–2000**



Adapted from IMF Working Paper Emigration and Brain Drain: Evidence from the Caribbean 2005

Within CARICOM, the countries with the record of having the largest percentage of emigrant lost to OECD countries can be further correlated to the current level of development of technology. This will be further elaborated on in the following chapter. Intraregional labour flows have not had a significant impact on CARICOM economies, as generally the demographic of these migrants reflect unskilled workers moving from states of extremely low economic activity such as Haiti to islands of higher economic activity such as Trinidad (there has been limited data on actual intraregional flows). Although the free movement of labour is a feature of the new Caribbean Single Market Agreement, this clause has been the least readily accepted, with states (and rightly so) concerned about the effects that an influx of low skill and low wage demanding labour, could have on their indigenous labour force.

In figure 4 one can see that, three quarters of all of CARICOM has lost at least 20% and more of the labour force to migration to OECD countries in the last 40 years. The smaller OECS grouping within CARICOM has had a significantly larger rate of migration at 50%, 46%, 39%, and 35% for Grenada, Skitts and Nevis, Dominica, and St. Vincent and the Grenadines respectively. Noticeably, the Caribbean's loss of skilled labour also coincided with the boom period in the information and communication sector in the early 1990s. The following chapter will continue with a detailed analysis on the relationship between migration and the lack of ICT access.

Chapter 4 – RECONCILING THE IMPACT OF STRUCTURAL CONSTRAINTS ON TECHNOLOGY DEVELOPMENT

4.1 Assessing the Successes of CARICOM ICT Initiatives

“The often cited positive impact of ICT on social and political processes have yet to be felt in the (Caribbean) region” (Levy 2007:8).

Almost all of CARICOM is engaged in national ICT policy development to some degree. Despite these initiatives dating as far back as 2000, see Table 8, many CARICOM states are still in very premature stages of their ICT development. As Table 7 and 8 indicate, even though CARICOM states have created coordinating agencies to facilitate their ICT strategies, only Jamaica had made specific budgetary allocations for universal ICT access and implementation. As such Jamaica and Trinidad’s advancements in ICT implementation are more advanced; particularly Jamaica, which has moved into the second phase of their ICT formulation, see Table 6.

Several policy documents have been created, yet with limited budgetary support. Caribbean governments have not been able to make ICTs a priority, while those who have, have made little linkages between the use of ICTs and its use in all levels of Caribbean society. For example, an examination of the 2006 St. Lucian ICT development strategy reported that ICTs had not been developed as a government strategy nor was any consultation made with the private sector. This can be counterproductive as sustainable ICT and technology development has to be driven by market demand not through policy.

There is a definite sense of urgency in the Caribbean, as states understand their increasing disadvantage in creating efficiency with current economic processes, as well

as becoming even more productive and competitive with future economic possibilities. As such, as we saw in the previous chapter, on the heels of the liberalization of the telecommunications industry, Barbados, Trinidad, Jamaica, and the OECS states, all embarked on new technology initiatives, particularly in education. Because many of the initiatives are recent, it is difficult to determine fully if they have been successful or not. What this research has found however, is that many of the policies governing these ICT initiatives, have not incorporated nor anticipated the constraints of both endogenous and exogenous factors that implicitly prohibit technology access in developing countries and within CARICOM specifically. There has been a strong emphasis on education, which admittedly is essential in harnessing ICT potential; however the education policies do not reflect the need to address social attitudes to technical and business education.

4.2 Implications of Neoliberal Globalization on Technology Development

“The phenomenon of globalization has emerged as a dominant feature of contemporary international economic relations. At the same it has accentuated the polarization between the developed and developing countries as they seek to defend and promote competing interests” (Benn, 2004:21)

As individual concepts, neither globalization nor neoliberalism can singularly claim responsibility for the ills that Benn (2004) has alluded to. Instead these to principles en tandem have resulted in a dynamic of praxis, based primarily on the principles of private enterprise, the laws of comparative advantage and deregulated international trade, and the absence of state involvement in market activity and regulation. These principles are exercised through economic activities that have also coincided with the globalising of cultures, economies, states and governments. In essence

neoliberal ideology was given the free access of markets activity, and was limited only by the technological capabilities of the day. The most important reason we focus on globalization, aside from its very definitive effects, is that it is “creating winners and losers at the international level”, with the losers in general far outweighing the winners (Woods, 2000:9).

The emergence of small nation states after the decolonization period, has presented several challenges. States as small as Montserrat with a population of only 12,000 have had to contend with imperial powers such as the United States with a population of 300 million and a GDP several times over. Not just competition from the west but small nation states like CARICOM faces several competition challenges on the international arena, with countries such as China and India, whose economic production is manned by a population a billion strong.

The small island developing states (SIDS) in CARICOM are particularly vulnerable to the shocks of the international community because they hold such little sway in according any satisfactory terms of trade. In fact the Secretary General of CARICOM in 1994 noted that the running problem in the Caribbean is a need for “special consideration to assist them in building resilience to external and internal shocks and to organize in order to reduce constraints the impact of their inherent constraints to sustainable development” (Gray, 2006:16). His reference to ‘inherent constraints’ is essential to understanding the fundamental issues with regard to Caribbean development, in that the obstacles they face are not as easily solved through influxes of money or foreign investment as many economists would suggest. Instead these obstacles have arisen from age old inequitable power imbalances that are entrenched in the activities of

the global economy. No one can deny that the interests of the governments of rich countries and their transnational corporations are realized more often than not, through double standards and unfair trading rules that developing countries can rarely renegotiate.

Developing countries infrequently realize full profit on goods in which they have a comparative advantage. Many developing countries have been traditional producers of raw materials, which has historically always gained lower prices on the world market as opposed to manufactured goods. Unless there is economic refashioning of trade rules and power balances, approaching poverty and material deprivation (including digital deprivation) through alleviation strategies is counter-productive. Take the example of the United States and the African, Caribbean and Pacific (ACP) countries debacle over the Lomé conventions in the WTO. The US consistently bargained for expulsion of preferential treatment for ACP countries' agricultural produce that previously was supplied to the EU on a guaranteed quota basis. The preferential treatment was successfully disbanded under the General Agreements of Tariffs and Trade (GATT) and subsequent Uruguay rounds, formally liberalizing EU markets and removing any protection the Caribbean and other ACP countries enjoyed. One can imagine the state of agricultural produce in the region since the protectionist policies were removed. Sugar earnings in Barbados for example by 2007/2008 would drop by almost 40%. One has to question whether the US truly feared competition from states as small as Barbados or whether, the protectionist policies represented defiance to the neoliberal agenda (something the US would not stand for).

This is an example of the incidence of US dominance and the lack of negotiating abilities of not just CARICOM, but all of the ACP states. Their decisions are even more

limited than their choices which do not bode well for a region hoping to enter a new economy (the information economy) based on the terms of developed countries.

It is impossible to isolate all the negative impacts neoliberalism and globalization has on the economic development on the Caribbean; however with regard to technology access we can isolate some direct processes that have in so far made the acquisition and adaption of technology difficult. As Chapter 3 indicated the rise of the IFIs such as the World Bank, World Trade Organization, and the International Monetary Fund as having tremendous political dominion over national economic policies has led to the proliferation of destructive packaged economic policies with adverse lasting impacts. Secondly the rise of free markets and false choice in engaging in the neoliberal global economy has led small developing states like those in the Caribbean forced to compete with large transnational corporations and developed states with much more highly mechanized and efficient production systems, not to mention the extreme disadvantage in capital.

As we can see from Chapter 3, Tables 4 and 5, structural adjustment policies in the 1980s have had the lasting effects of producing high external and public debt in CARICOM. This was in order to finance industrial schemes, as was laid out in the SAP policy packages. Concurrently money was siphoned away from public spending on social spending like education. This debt has simply snowballed over the last decades, as governments continue to borrow money to finance social reformation schemes, which have been recognized as undeniably necessary in creating a highly skilled human resource base for the needs of knowledge, based global economy. The reticence of CARICOM states in allocating monies left after debt servicing to ICT development is

understandable. The lasting effects of the structural adjustment period in having a negative impact on real incomes is evident, as per capita incomes in some CARICOM states such as Jamaica, Guyana and Haiti have gone down significantly since SAPs were instituted. This is important as with regard to ICT access, as states where per capita incomes, ICT access will invariably be lower. Persons are much less willing to purchase communication technologies when they have little disposable income.

What we can also glean from the SAPs and the international political fora, is that the ability of developing countries and CARICOM to negotiate terms of trade, favorable financial loans and investments has been extremely limited. Particularly as these negotiations have been and are being done under the ideological parameters of neoliberalism. Biased free market policies have led to the region losing substantively in trade negotiations over the goods they have comparative advantage. The WTO has institutionalized the attempts of developed countries in ascertaining their dominance in the current international political economy (IPE). Through the WTO agreements, the false choice of free market adoption has pushed CARICOM states to compete with companies such as Dole and Chiquita. It is also allowed framework for the ability of foreign companies to pay low wages and depress local business, as well as the dumping goods into Caribbean markets at prices that local producers cannot compete. The overall result is an inability for CARICOM states to become truly competitive on a global scale.

Although many CARICOM states have increased their service sector share in relation to their overall contribution to national GDPs (with service industries on average accounting for over 50% of the GDPs of some member states, and over 70% in others), many CARICOM states such as Dominica, Jamaica, Guyana, Belize and Saint Lucia still

rely heavily on agriculture, as you can see from the data in Table 1. The central call of neoliberalism and globalization is a restructuring of economies from highly intensive knowledge driven and high innovative technologies (Watson, 1994:68). As the Caribbean has been so highly engaged in agricultural pursuits, the change to this type of economic activity currently is slow. Restructuring requires a strong social reformation strategy as well as an economic one, yet the concept of changing ideas and attitudes toward business, work, and education in CARICOM have also been slow.

Not investing in technology is not an option if CARICOM is to maintain decent levels of development. As the global economy continues to organize itself around the commoditization of knowledge, it will become imperative for CARICOM states to increase their orientation with information communication technologies as a user and as a creator. Therefore if CARICOM does not make active attempts at establishing an authoritative presence in the global economy, with particular regard to negotiating trade terms, opportunities to create favorable terms will be lost. The dictators of globalization have so far been the countries who have become the exporters of technology. While CARICOM cannot completely delink from the current global system, nor can it completely change the outcomes, therefore it is imperative to understand that any long term technology policy has to be written with a practical understanding of their future technological and economic goals with regard to their orientation in the global economy.

4.3 Implications of Education on CARICOM ICT Development

More than any other region, the Caribbean's survival is highly dependent on the development of its people. As such, education has remained the primary method in which to develop their human resource. Currently education has had to take on a more substantive meaning, requiring that the region to invest in pedagogical strategies that embody the changing economic and technological demands of the global economy. Koelher and Segal (1987), Benn (2000), noted that this ability to produce a human resource adept at technological capabilities and innovations has overall been quite slow. They articulated that the reason the region is experiencing such a slow or significant progression of its endogenous science and technology (S&T) development is largely due to the historical factors such as colonialism.

The remnants of colonialism are proving stubbornly difficult to erase. Colonial attitudes such as an elitist bias within the education system toward law have translated to a contemporary bias for law and other subjects within the humanities as opposed to more technical areas such as IT, and engineering. While the costs to obtain a professional degree in IT or a technical field is comparatively the same (an indication of the market value of technical degrees), there is a second issue of lack of availability. Within CARICOM there are very few degree granting institutions for persons majoring in science and technical fields. It is only more recently that governments have made concerted efforts in focusing on their state curriculum development in placing more emphasis on both science and technical subjects, with initiatives such as the addition of computer labs to all secondary schools, the creation of technical schools, and the promotion of distance learning.

The region however has seen the effects of neocolonialism, with regard to “[t]he globalization of knowledge,” “Western culture constantly reaffirms the West’s view of itself as the centre of legitimate knowledge, and the arbiter of what counts as knowledge and the source of ‘civilized’ knowledge”(Linda, 2006:5). This largely affects the migratory patterns of many Caribbean nationals to developed seeking higher education, rejecting regional institutions, on the premise of seeking a more ‘recognized’ education.

Koehler and Segal argue that within the tertiary level of Caribbean’s education system, there have been some significant attempts at research and development. In particular, the University of the West Indies, the region’s oldest and largest degree granting institution, however has also not been able to create suitable networks that would allow direct knowledge flows of research and development to industry and other appropriate sectors, instead much of the technology (in the forms of machinery) used in the region is still directly and largely imported. Like educational institutes, much of the local technology is not legitimized and not institutionalized even though Girvan, Patel argue its appropriateness and adaptation would lead to more productivity.

Basic education levels are significantly high for the region however they are not concentric within science and technology, nor are they supported by investments in local R&D. Thus the region is losing a significant link in their orientation with technology and their population, leading to a wider digital divide.

The only country within CARICOM with adult literacy levels at below 50 % is Haiti at 49%¹⁵. With the exception of Guyana and Jamaica; all other CARICOM states have achieved adult literacy rates from 80% to 100%, although Barbados is the only state with 100% adult literacy rates. Relatively speaking, literacy rates are at an acceptable

¹⁵ 2004

level, though enrollment rates for all levels of education overall are still low in Haiti, Trinidad and Tobago and St. Vincent, see Table 12. With regard to education there are three important issues that this research isolates as having a direct contribution to technology access issues. First, as the data suggests curriculum development within CARICOM education is such that it does not provide a solid foundation for the requirements (such as basic computer literacy) of a knowledge society. Secondly, attitudes toward education are still rooted in colonial and elitists behaviors where technical areas are perceived as less valuable as professional and white collar areas.

Over the last two decades, CARICOM has invested quite extensively in education, creating partnerships with UNESCO and the World Bank to research and develop strategy papers. Out of this research, the most prominent conclusion was that CARICOM education curriculum had a deficit in meeting the demands of the changing labour market. As CARICOM continues to expand and move into larger service providing economies see Table 1, the dynamic of the labour force has not caught up with this change. The market value and entrepreneurial benefits of subjects such as business studies and information communication technology, has not been communicated to students, partly because there is no strong dialogue between the private sector and its demands and the provisions within the education system. With the market demand and education supply functioning independently, the resulting incongruency has resulted in a labour market that is not; (1) using technology tools of innovation to create new business and production strategies, (2), becoming themselves a highly innovative and

technologically capable group. Both of which will hinder CARICOM in becoming more aligned with the changing IPE¹⁶.

This issue is undoubtedly cyclical. As noted in the previous chapter local (small and big) business tend not to make any specific demands of secondary students, in part because the businesses themselves are risk averse and do not engage in extensive innovative practices. Economists argue that to successfully transition out of the current non innovation cycle and over-dependence on current basic commodity exports, requires a move towards new markets sustainable growth potential, means investing into higher-value as well as niche markets, both of which require an educated, innovative and technologically skilled labour force, in order also to be competitive with more developed markets (Wehrmeyer, Chenoweth, Clayton, Fernandez-Lopez, Lum, 2004).

Technical and commerce education has been under prioritised, in large part due to the aversive attitudes toward this type of school, stemming from colonial elitism. Instead CARICOM colonial heritage, have made them more partial to grammar type education (Lewis and Lewis, 1985). Caribbean Colonial education at the time of slavery was geared toward white plantation owners, with the idea of future resettlement in their respective motherlands' and even then had a very little scientific component. Post emancipation education, when opened up to the majority ex-slave population, catered to meeting the clerical needs of the civil service. Contemporary Caribbean education is still structured around this ideology, with business and vocational/technical subjects seen as having less future reward. This culture and idea has been reinforced as students in technical and vocational schools have lower requirements upon entrance.

¹⁶ For example lack of medical technicians to operate X-Ray machines etc. result in unnecessarily long wait times and expensive machinery left unused.

All CARICOM states have tried to put in more computers in their secondary schools, in order to try to encourage basic literacy in students. This venture is expensive and so far most states have only been able to put in a small number of computers. Barbados however has made an exceptional effort in putting in computers in schools, taking on a World Bank loan of almost \$US 75 million dollars. The real costs however of inputting, maintaining the computers' hardware and software, as well as training and paying personnel and building proper infrastructure, is accounted as substantially more than the \$75 million. For many of the smaller CARICOM states with far less income and existing debt, this type of investment although necessary is difficult. Moreover it is also difficult for governments to rationalize loans of such magnitude to their citizens, for computers when many are unconvinced of their utility in schools.

It is clear therefore that within CARICOM the residual colonial attitudes to technical education are a constraint to developing a sound technological base. Unless governments can make stronger connections between the changing labour market needs and the current curriculum, this attitude will continue to undermine any future ICT projects. Governments must engage in dialogue that is mindful of the responsibility of the current and more importantly the future needs of CARICOM in meeting the demands of global economy. Education is a part of the structure with which a society can propel itself into a stage of modernity based on information as is now. The disjuncture between education and technological innovation is wide enough that it would make expensive ICT projects seem a waste of money.

4.4 Implications of the Brain Drain and Human Resource Scarcity of CARICOM ICT Development

Contemporary migration is fundamentally similar to that of any migratory movements of the past. Within the Caribbean context, and that of most other developing countries, it has taken the shape of people moving from countries with low economic activity to countries of higher economic activity, where there is the possibility of creating economic prosperity. Nurse (2006) argues that today migration can be “explained by two contemporary global imbalances: the widening socio-economic polarization (i.e. widening income gap and the divergence of quality of living)”. The other imbalance is the “relative ageing of the population in the north and the need for replacement labour” (Nurse, 2006:368).

Nurse argues that the shortage of labour in the OECD countries, and the need for replacement labour has led developed countries to turn to migration as a source of human capital. This need for labour has created the ‘pull factors’ (the factors which attract migrants to developed countries). Massive unemployment, poverty, hunger, lack of development of social services as a result of what Nurse attributes to a “decline in global value added as a consequence of implementing structural adjustment programmes and the negative effect of neo-liberal restructuring” (Jeffrey, 2006) created the ‘push factors’ (factors which compel migrants to leave their countries).

Jeffrey Williamson of the IMF noted that between 1999 and 2001 the Caribbean lost 10.8 million people due to migration all across the world. Comparatively “[t]he Caribbean region has borne the deepest and most continuous impact from international migration of any region in the world” (Aaron & Barry, 1987: 41-45). This considerable loss to Caribbean society has forced attention to the possible impact this has had on the

progress of socioeconomic development and the contribution to a lack of technology development.

One critical effect of migration has been the loss of highly skilled labour, in a phenomenon labeled as the 'brain-drain'. Nurse argues that the percentages of highly skilled migrants with tertiary education are particularly high for the Caribbean. In 1990 41.7 percent of Jamaicans who migrated had tertiary education, Trinidad and Tobago had a 46.7 percent share and Guyana a 40.7 percent. Francis Bourguignon stated that "over 40 percent of people with university education who were born in the Caribbean countries now live outside of their country of birth" (Nurse, 2006). The implications of this one can imagine are quite negative, especially on a country's socio-economic development. Bourguignon sees the loss of this large group of skilled persons translates to a loss of "positive externalities generated by highly skilled workers in a developing economy, it also reduces the capacity to deliver key services that are important for economic and social development". Literacy services are just one example of the key variables necessary in promoting a society that can be driven by and knowledge and information communication.

From the data presented in the previous section we can see that CARICOM more than any other region in the world exports a significant number of skilled and educated migrant to developing countries. At a rate of only 0.02 percent less than the global rate, the migration rate in the region is clearly an issue that has left a lasting impact on several sectors of Caribbean society. More specifically with regard to technology access, migration has two specific negative effects; it becomes a significant loss of expenditure for governments with already scarce resources and extensive external debts, and it is

socially inhibitive in organic technology creation as qualified persons leave for other opportunities.

Based on the data presented in Table 16, between 1965 and 2000 CARICOM countries such as Suriname lost as high as 89 percent of their tertiary educated labour force to migration to OECD countries, in an increasing trend over the last 20 years; even doubling for some states like Jamaica and Grenada. This has presented a significant skill loss for the region signifying a “net transfer of human capital and scarce resources” (Burns and Mohaptra, 2008: 1). CARICOM bears the cost of educating these migrants, therefore their loss represents, the cost of educating each individual, as well as forgone taxation from future income generation, and forgone revenue generation if individuals remained to start new business enterprises and engaged in economic activity.

Jamaica and Barbados subsidize tertiary education, which accounts to 62% of the per capita GDP per student. For other CARICOM territories subsidizing secondary education is also heavily subsidized, as seen in table 17, Dominica spends 35%, St. Vincent and the Grenadines 28% and Belize 19%. States like St. Lucia as a percentage of their whole GDP spend a critical 14% on education between 1999 and 2000 alone. Keeping in mind these states are lower income earning states with large external debts. Methodologically migration can be analogized to dropping money in a bucket with a whole in the bottom, as migrants enrich the economic and social development of their receiving countries as opposed to their own.

While not the focus of this research it is important to note that there has been much debate over the issue of the inflow of remittances to the Caribbean. Remittances are described as all monies sent from migrant workers back to their home country (DFID,

2002). This trend has increased substantially, becoming the second largest capital flow to developing countries, after foreign direct investments, and way before official development assistance(ODA) at 260% of ODA ;“regionally Latin America and the Caribbean receive the lion share of remittances in nominal terms”, DFID (2002). Remittances serve as both a source of income and a balance to the costs governments’ bear when migrants leave. Though substantial, remittances are not a practical development tool as is being purported. The sheer magnitude of this capital flow has many states, faltering on more aggressive migration issues. It is clear that

“the *total losses* due to skilled migration (which includes the “emigration loss,” externality effects, and government expenditure on educating the migrants) outweigh the recorded remittances for the Caribbean region on average, and for almost *all* the individual Caribbean countries. (Mishra, 2005:5-6).

Monies gained from remittances however are neither sustainable nor a desirable replacement for the loss in labour, skills, knowledge, culture and money spent on educating each migrant. In fact acceptance of remittances as a source of income negates the negative impacts of migration on CARICOM development, as is an implicit reminder of the factors that lead to migration in the first place. For more comprehensive background information to this issue one can refer to Mishra, 2005; Bourguignon, 2006; Louise Berg, 2004; Wendell, 2005; Orozco, 2003; and Portes, 2007.

With regard to technological progress, emigration of professionals such as engineers and medical technicians and professionals who directly impact production, may result in reduced rates of domestic innovation and technology adoption” (Kapur and McHale, in Burns and Mohaptra, 2008: 2). Scholars such as Cline in chapter two argued that theoretically, integral to the technological development process is the sociotechnical

systems of manufacture, which incorporate the social components of science and technology development. The most important social component in this process is people. Therefore the loss of skilled persons in the development of more complex technology production and or adaptation can be an inhibiting factor. In the case of CARICOM we can extrapolate therefore that along with other handicaps such a scarce resources, the loss of skilled technical persons is a significant contributing factor to the continued lack of technology accumulation in the region.

In an awareness of migration as a development issue of such consequence, we can understand that to preclude migration in any technology dialogue and subsequent policy, on both a regional and national level within CARICOM, will be to the folly of member states and ultimately lead to unsuccessful ICT initiatives and reconstitute the digital divide and lack of technology access.

4.3 Implications of Technology Transfer on Technology Infrastructure

“the initial optimism about development via imported technology has turned out to be ‘profoundly misplaced’ and that policies based on these early views will continue to hinder rather than promote industrial development and ‘catching up’” (Bell and Pavitt in James ,2004:2).

Another instance where external factors have given the Caribbean region little opportunity in raising their technological capacity is with regards to technology transfers. This issue is closely linked with neoliberal globalization (one can say as a direct consequence of even), but on its own presents very serious challenges to the Caribbean. According to Benn (2000), The proliferation of supranational organizations such as the WTO, ILO and the United Nations, has become an extension to a current global economic system, where preexisting forms of economic activity relegated within state

boundaries have been 'multilateralised' and given supraterritorial jurisdiction. This has done nothing to advance the position of developing countries; one could argue rather that it is developed countries that have mostly benefited.

Currently technology transfers to developing countries represent the most prevalent method for accessing technologies from developed countries. This is in part because countries in the south generally do not have the capital and human resource capacity to invest in extensive research and development (R&D) , "in fact the South[still] remains ill equipped to locally research, and produce modern technologies" (Bardouille 1998:80). Developing countries rely heavily on the foreign physical technologies, knowledge capacities, and assistance in maintenance, training etc. for equipment.

What has arisen from this arrangement are a set of unfair rules and agreements with regard to how these technologies can be used within recipient countries. Economist Dr. Norman Girvan (2005:3), drawing on Surendra Patel's extensive research on technology transfers, argued that "the contracts and practices of multinational companies were rife with restrictions whose objective was precisely to prevent the transfer of technology to users". He argued that primarily these contractual agreements were intended to prolong use, restrict assimilation, restrict local adaptation, and to magnify social cost. All of which would summarily discourage the technologies acculturative absorption. Negotiations of TRIPS agreements have neither produced more development friendly clauses, nor have they fostered true technology transfer. Instead many technology transfer contracts are mostly prohibitive in developing states obtaining true technological assimilation, for future productive use.

A long colonial period saw much of the technology being used transferred into the region from its colonial rulers as well as its light adaptation to agriculture for the sole purpose of mono crop export that would benefit the region's mother metropole (the colonial territories were Britain, Spain, France and the Netherlands). They have not had the gradual evolution of indigenous innovation and investments in research and development (R&D). Originally used mostly for extractive purposes, the region's sole purpose was for the creation of profit gains for its metropolises. Transfers of technology were simply for industrial purposes and were not co-opted into other sectors of the society. Today many scholars would argue that this tradition of technology transfer denied the region a natural progression to gaining an aptitude for science and technology.

Unfortunately contemporary technology transfer is similarly restrictive. Girvan notes that in the 1970s a study on Jamaica showed that 67 percent of contractual agreements on technology had secrecy and confidentiality clauses, while 15 percent had grant back clauses and another 65 percent with clauses that preventing the use of technologies past the agreements' expiry dates. Also with regard to the physical equipment that is imported (which many times are old, second hand and in disrepair) neither the patents nor the expertise in maintenance of the equipment is shared with the Caribbean, perpetuating the cycle of dependence on knowledge and expertise from developed countries. These clauses indicate the bargaining position of these Caribbean states and developing countries at large, having no ability to determine more favorable terms. Summarily "TRIPS reinforces the technologically dominant positions of [these] firms and reduces the pressure on them to share technology" (Girvan, 2005:5).

Technology transfers play a direct role in contributing to the digital divide in that the dependence on external technology acquisition leads to the “underdevelopment of local technology and an application of inappropriate production techniques”, both of which reinforce a cyclical need for more imported technology, as potential investment into local R&D and or education is subverted. It certainly perpetuates a divide between those who lead in innovation and those who merely receive it.

For developing countries to transition from low income earners to high income earners it is essential for them to invest in endogenous technological capabilities and increase their technological capacity (Manfred 2008), Surendra Patel Memorial Lecture Saint Mary’s University, October 30th). For small developing states this is exceptionally difficult as discussed in the previous section, their ability to be competitive and generate the necessary revenue for research and development, and technologically advanced pursuits are extremely limited. CARICOM has relied quite heavily on foreign direct investment and technology transfers as their main source of technological advancement particularly in the telecommunications sphere. While technology transfers in and of them are not negative processes, as many developed and developing countries have benefited immensely from them, they do encourage the regression of local technology adaptation.

As noted in Chapter 3, the Caribbean has mostly been party to monopolistic telecommunications arrangements with foreign based companies. The previous lack of competition allowed companies to become comfortable in providing basic services at high costs. Also barring local companies from participating in the local telecommunication industry. As we saw from the example of Pantin’s assessment of technology absorption within the oil and gas sector in Trinidad Table 10, in general

Caribbean states have not developed long term technology policies nor have they made the linkages between technologies and their adaptation for use in other areas. Also the use of expensive foreign consultants on many government projects as noted in Table 10, perpetuates the inability of; one, the ability for states to cultivate and invest in their own knowledge and skills and two, the ability of states in adapting technologies to the Caribbean environment in order to maximize the outcomes.

Foreign direct investment can be elemental to countries with very little capital for their own research and development. However the caveat remains that FDI in many instances comes with ties with political and economic ramifications. In the case of the telecommunication industry in the Caribbean, the ability for Cable and Wireless to successfully negotiate monopolistic agreements has been telling. The lack of competition within communications, has in part discouraged a faster pace in local ICT innovation as well as the development of locally (regionally) competing businesses and firms. In addition, this research found that while telecommunications firm Cable and Wireless, has provided relatively up to date technologies with regard to digital network availability, the access costs have been very high. This has retarded the access to locals particularly in CARICOM states where GDP per capita is low. Internet penetration and computer ownership is still low. The high access costs have also been a large factor in small and medium enterprises (SMEs) becoming more technologically competent. Though liberalization of the ICT sector is creating change, it has not reached the revolutionary impacts as expected.

Another component of technology transfer is the transfer of knowledge and skills through the use of foreign nationals. While this is a process that occurs in virtually every

country in the Caribbean, there is a tendency to rely too heavily on foreign consultants and not look internally for local experts. Moreover foreign consultants are grossly overpaid, and their knowledge not archived or stored for further local use. Pantin noted this particular phenomenon with regard to the example of Trinidad's oil and gas sector.

From the data, this research has concluded that technology transfers and intellectual property issues on its own is not a fundamental contributing factor in the lack of technology access in the Caribbean, however, it is sufficiently causal. It is a limiting factor in so far as the policies that CARICOM have thus created. For example the monopoly of foreign telecommunications company Cable and Wireless. Technology transfers do play a significant role in all the types of technologies developed in the region, however with regard to ICTs, it has only been limiting because CARICOM states have allowed Cable and Wireless such a long monopolistic control of the telecommunications market. With liberalization of the industry, new companies have helped reduce costs to some degree, it is expected that further demand will have the same effect on other telecommunications services.

Conclusions

The Caribbean region is unique in that its potentialities in easily harnessing the capabilities of ICTs are high and great. There are however severe structural issues that serve as constraints to this. Within the current architectonic global system, the rules applied to global interaction whether through the economic or the political serve the interest of the rich and magnify the deprivation of the poor. Digital poverty and the digital divide are a reflection of this system. Thus it compels states and institutions alike

in attempting to address this inequality to not focus primarily on the physicality of digital access but instead focus on what is at the crux of the access problem. In the case of the Caribbean four main factors serve as the main hindrances to the region's entrance to an information economy. The forces of neoliberal globalization, the restrictions within technology transfer and TRIPS agreements, the lack of focused education on technology innovation within a socio historical context and lastly the migration of a large groups of skilled and educated individuals to the developed north. The interplay of both endogenous and exogenous factors today have created a labyrinth of processes and impact that leaves the region unsure as to how to begin to address the situation at its true core. Ameliorative measures such as the implementation of telecentres are not sufficient. Unless states are willing to address the systemic causes of digital deprivation, certainly it will either continue and increase or replicate itself into another aspect of Caribbean life.

Chapter 5 – CONCLUSIONS and RECOMMENDATIONS

5.1 CARICOM, the Digital Realities and Digital Possibilities

I have argued that the digital divide is in fact a manifestation of inequalities and disparities that already exist within countries, regions and throughout the world. It is certainly not the only divide. In fact, one could possibly name hundreds of divides: a water divide, a food divide, a shelter divide, a healthcare divide, an education divide etc., with no end to the 'divides'. What all these 'divides' have in common is the very same source of causality. We have in place processes that have and continue to keep the world in a state of divides. An unfair global trading system, hegemonic power of transnational corporations, unequal distribution of resources, are just some of the issues that contribute to the 'divides', and extend far beyond a lack of access to a computer. These processes are systemic, and endemic to a global socio economic system that is based on the principles of capitalism, that has many times advanced the interests of the few, at the expense of the broader population. It therefore begs the question, that given the structural conditions that continue to perpetuate poverty at the international, regional and intra state level, whether the inclusion of ICTs in the poverty reduction agenda is merely treating the symptoms of poverty and not the actual cause. If so, focusing on ICTs for the poor, would act merely as a short term ameliorative tool and not a long term solution.

What this research has found is that migration, the current inefficiencies in the education system, coupled with negative attitudes toward technical education, and the forces of neoliberal globalization all play a direct role in the Caribbean's inability to develop local organic processes toward creating and accessing ICT technology.

Technology transfer issues and intellectual property agreements with regard to ICTs specifically are also causal however they work in tandem with other factors and are a direct result of government's only partially thought out choices in policy development. CARICOM has stated that due to capital constraints it has had little other choices in technology acquisition except to rely on international telecommunications firms. These development issues must be addressed concurrently in order to stem the negative impact of one issue on the other, while maximizing the potential for future success for the Caribbean.

The overall consequence of all these barriers is the inability of CARICOM to develop what Cline calls the socio-technical systems that form the basis of human innovation. Without that systematic application of science and technology, state emphasis on the physicality of technology can only bring about short term economic benefits as opposed to the future long term technology independence. Therefore the consideration should now be placed onto those factors which are both social and economic barriers to technology access. These issues as advanced by this research as massive emigration and education curricula development, technology transfers and the consequences of neoliberal globalization, should be addressed concurrent to more direct ICT focused strategy. Because these issues are far reaching and require extensive resources, they should be dealt with using a two pronged approach.

First, CARICOM should see ICT policy as a multi development approach that addresses the real causes of the region's ICT "deficit", an approach that combined with other efforts can produce an innovative oriented society. The long term goal should accommodate a desire to have a society that is well adapted to technology as opposed to

the pursuit of technology itself. As we have mentioned, the question that CARICOM member states must fully acknowledge and answer is whether there is a desire to develop *with* ICTs, or focus on the development of ICTs. Therefore there should be constant, open and collaborative consultation in designing ICT policy and how these policies figure into a long term development model.

This research concludes that of these two possible policy strategies, CARICOM should focus on development with ICTs, understanding that they are tools and nothing more. Their presence, or lack thereof, are clear indicators of the socioeconomic conditions within the region. Therefore, implicitly ICTs will not cause or bring about development, but instead are consequences of planned economic change and social policy.

The second approach should be a regional one that can push the region toward a uniformed development strategy. CARICOM states would unnecessarily prolong technology development process were they to attempt to do so individually. It would be difficult for a state like Montserrat for example, with a population of 12,000 to gain the appropriate resources. Smaller states would need more time to become better financially equipped to make such investments. If CARICOM were to intensify its initiatives towards political integration, their ability to strengthen both their international presence and their pool of resources would be intensified. Moreover regional engagement in research and development, and solid investments in science and technology can also intensify movements toward an effective single economy. This can have a twofold impact of: a) one changing the nature of the Caribbean from a technology importer to a technology exporter (more importantly CARICOM can be less dependent on external

methods of technology for its own purposes), and b) further intensify the integrative processes by shared responsibilities and claims in the outcomes of more sophisticated research and development.

The debates underlying this research, established that neoliberal globalization as the most dominant economic ideology has presented developing countries with an inability to create favorable terms of trade, or foster more equitable negotiating power. CARICOM in several instances has been subject to these negative influences through structural adjustment and WTO negotiations, both of which have severely limited the financial resources of Caribbean states. The severe debt in the region has made investments in technology difficult and under prioritised. While CARICOM cannot stop globalization, nor can it plausibly become a region of superpower nations, what it can do is anticipate that the policies from developed countries are limited in capturing the true essence of Caribbean reality. CARICOM should look internally for direction with their socio-economic goals and focus their energies on internal development as opposed to the dictate of external actors.

Another aspect of this research was strictly to explore the attitudes to technical education and the links to colonial legacies. This plays a real impact in the local responses to education, despite the changes and demands on the international sphere. Attitudes are difficult to change; however, concerted effort, founded on dialogue with the private sector and education boards, as well as direct emphasis on curricular changes toward more science and technology, can help push students toward valuing science and technology studies. A programmatic approach to education has to also be integrated to a long term national technology goal.

Liberalization has presented an opportunity of increased competition which in so far has fostered better investments in new technologies. Undoubtedly increases in the quality of ICT services, can allow better business practices and foster economic growth. More importantly, cheaper and better services can allow Caribbean nationals easy accesses to telecommunications, and also allow them to develop better regional connections, as well as create investments from transnational connections with large diasporas in developed countries (this last point is said with a caveat that diasporas should be approached so as to exploit current opportunities without creating renewed cyclical opportunities or encouragement for emigration). Current technologies suggest that Caribbean infrastructural capacity both physically, socially and regulatory, has been limited by the prolonged monopoly of telecommunications company Cable and Wireless

The guiding research question hypothesizes that ICT development policies in the Caribbean are severely limited by the inability of states to capture holistically the structural issues that impede the organic process of technology adaptation and use. The data suggest that currently the focus of ICT for development rests heavily on the physical structure of ICT, which does not capture the lived of reality of the Caribbean population. Providing information and communication technologies does not address the serious economic problems that have resulted from their integration into a highly inequitable global economy, nor does it does address low incomes, lack of education, or national debt. Like structural adjustment, ICT for development strategies have become a concept that has captured development institutions and states, without true analysis and thought to the cyclical reproduction of poverty. This research does not disparage a pursuit of

technology, but instead it contends that states should consider technology access as a long term goal, that cedes to human development.

The digital divide as an economic concept highlights that the inequalities within and between countries, persist and replicate itself in an endless number of areas.

Technology is simply a “new area”. Though the region has created policies to close the divide these initiatives have not showed a move to effectively address the factors that lead to the inhibition of technology growth in the first place.

Although many argue that technology demand must be market driven and not policy driven, it is essential to recognize that states must create an environment where technology demands can occur, whether it is through indirect methods such as a change in education. A “socio-institutional framework” for technology is more important than just the physical access. While technological-economic goals are important, it is the adaptation and internalization to growing knowledge and innovation, as well as recognition to the structural impediments to innovation, that will provide the base for appropriate development strategies, and a sustainable future for the Caribbean.

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