

Jamaica's E-Readiness Assessment



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ABBREVIATIONS AND TERMS

Asymmetric digital subscriber line (ASDL)– Movement of data at high speeds from exchange to customer. It permits the downloading of data at speeds up to 30 times faster than regular 56-kb modems.

Bandwidth – The amount of data that can pass through a given communication channel in a standard amount of time (usually per second). It is also an indication of the capacity of the pipes.

Broadband – A network that can transmit a wide range of signals, including audio and video. Broadband networks are especially useful in the networked world. They carry many signals at once resulting in faster data transmission.

CAP – Community Access Point

Dial-up Internet Access – A common means of accessing the Internet for households and small businesses which involves dialling into an ISP line through the public switch telephone network by means of a modem. The connection is temporary as opposed to a dedicated line service like Digital Subscriber Line.

Domain name – A string of words used to identify computer addresses on the Internet. Commonly points to names on the www.

Digital Subscriber Line (DSL) – A high bandwidth Internet access service offered by some ISPs and Telecom operators.

E-commerce – Business transactions which incorporate the use of ICT to enhance interactions and exchanges and which augment or replace physical contact or exchanges.

Frame Relay – Telecommunications technology for the Internet working of local area networks (LANs). Frame relay may be carried over a variety of lines, including fibre optics and ISDN.

GDP – Gross Domestic Product

HRD – Human Resource Development

ICT – Information and Communication Technology

ITU – International Telecommunication Union

Internet cafes (cyber cafes) – Public establishments offering access to Internet (enabled terminals) in addition to other services such as food and drink.

ISDN (Integrated Services Digital Network) – A high-speed communications network which combines voice, data and video into single cables.



ISP (Internet Service Provider) – A company which offers Internet access and possibly other services such as e-mail and web hosting to individuals or companies through either temporary or dedicated connections.

KMA – Kingston Metropolitan Area

NVQJ – National Vocational Qualification - Jamaica

OECD – Organization for Economic Cooperation and Development

Penetration – The degree to which a community has adopted a technology.

PKI – Public Key Infrastructure

PAP – Public Access Points

R&D – Research & Development

SSL – Secure Socket Layer

Telecentre – A facility that offers community members use of ICT facilities in a publicly shared manner. Telecentres often provide the only connectivity available to many members. Their services may be offered with or without a fee.

Teledensity – A term commonly used to describe the number of telephone lines per unit of population (often 100 people). It also indicates the density of telephone lines in a community.

UNCTAD – United Nations Conference on Trade and Development

UNDP – United Nations Development Programme

VSAT – Very Small Aperture Terminal

WTO – World Trade Organization



PREFACE

Recognizing the importance of Information and Communication Technology (ICT) in the development and facilitation of social and economic growth, the Government of Jamaica approved a National Strategic Plan and established the Central Information Technology Office (CITO) to coordinate and monitor the Plan.

A significant component of this initiative is the laying out of a sound national foundation to support the public and private sector. An e-readiness assessment is therefore critical to the provision of a basis for moving forward with E-business activities.

CITO secured a US\$50,000.00 grant from InfoDev/IBRD to conduct a survey to assess the electronic readiness of Jamaica.

The major findings of the assessment, which was conducted by Allied Research Associates Limited, are contained in the booklet, which it is hoped will be of significant value to its readers. A copy of the entire report is available on CD from our offices.

Errol Hewitt
CEO



INTRODUCTION

The progress and changes in the field of information and communication technology together with the diffusion of the technological advances have resulted in the digital revolution and the emergence of the information age. This has had significant impact on cross-border relationships and expanded the global frontier in hitherto unimagined ways. The arrival of broadband technologies, access to the computer and the Internet together with changes in the collection, storage and retrieval of information, have broken down geographic, social and economic barriers and transformed economies and social relationships. Jamaica as a developing country has no choice but to participate in the global economy; indeed, it is already incorporated by its historical economic and political relationships with the international community. The issue is the country's level of readiness. This will determine its new mode of incorporation into the global community and its ability to secure the economic, social and political benefits that the networked world offers. These include economic growth, employment generation, social equity, administrative efficiency and strengthened participatory and functional democracy.

The Prime Minister, conscious of the changes in the international environment and the demands of globalization, has enunciated a vision of a "Jamaica with an educational system and educational opportunities that equip our children to meet the needs of the technologically advanced world" (Broadcast, January 16, 2000).

This vision has since been reflected in the formulation of an IT project, which can support the "development of industries which both create and contribute to growth. It will continue to reorient the economy to becoming knowledge-based and service-oriented" (Budget Speech 2001-2 Hon. Phillip Paulwell, Minister Industry, Commerce & Technology).

Major policy initiatives have been designed, as stated in the *Economic and Social Survey Jamaica* (2000), "to create a more dynamic, efficient and globally competitive economy in which growth and employment creation are the bedrock for improvement in living standards."

The principal strategy for achieving growth and employment is the investment in the ICT sector which has been designated the principal industry for attracting investment and generating thousands of jobs over the next three years. It is also considered the route to improving productivity and efficiency, better targeting and delivery of services and the benefits of development programmes to citizens island-wide. It is this policy direction which has driven the need for an e-readiness assessment at this time.

The purpose of the exercise was therefore to:

- A. Assess the e-readiness of Jamaica, primarily the public and private sectors, and the preparedness of its technological infrastructure, policies, human resources and institutions to participate in the local and



international technological and communications network. The most important consideration was the determination of the extent of access to information and communication technologies and connectivity to the global network.

The e-readiness status of civil society (households, NGOs etc.), although secondary, is important. This is because the values, perception and attitudes of the society toward information technology as well as the social and economic status of the population all affect the policy

environment and hence the demand and supply for network connections.

- B. Identify and review the obstacles and problems that inhibit e-readiness and propose solutions and recommendations to eliminate obstacles and improve it. The impact of the technological changes on resource allocation, strategic planning, policy formulation, student performance, productivity planning, economic growth and efficient and effective service delivery in the public and private sectors were given due consideration.



METHODOLOGY

INFORMATION COLLECTION AND ANALYSIS

The methodological approach focused on the collection of data from primary and secondary sources together with interviews from key informants and informal focus group sessions.

The primary data collection involved surveys of over 500 citizens in civil society, specifically four major town centres across the island and 300 in small business enterprises similarly distributed. Several interviews were conducted with key informants in the public and private sector as well as the NGO community.

E-readiness Assessment Methodology

The assessment of e-readiness was undertaken using the Harvard University Guide (HUG) prepared by the Centre for International Development at Harvard University. The guide describes the determinants of a community's readiness for the networked world. It postulates five categories (namely, network access, network learning, networked society, networked economy and networked policy) and enunciates a set of indicators which delineate the community's actual state of readiness. Specifically, these indicators are:

- information infrastructure
- Internet availability
- Internet affordability
- network speed and quality

- hardware and software service and support
- state of schools, workforce access,
- e-commerce and e-government

The Harvard University Guide (HUG) was selected based on its flexibility, consistency, comparability and adaptability. It had the following characteristics:

Its focus was on the society as a whole, not just the economy.

It was flexible enough to allow for modification without violating the principle of comparability.

It was comprehensive, encompassing a wide range of indicators.

The underlying concept and standard of e-readiness were consistent with the views of the Central Information Technology Office, the World Bank and the consulting organization.

The assessment methodology was modified to include assessment of the impact of ICT on the everyday life of Jamaicans and their interactions with their local community and also on their ability to participate successfully in the networked world or global information society. Only the categories and indicators that allowed for standardization and international comparability were used.

The assessment method was based on the five categories enunciated in the HUG with fifteen indicators in each category developed in relation to the specific characteristics of the Jamaican ICT



climate and socio-economic and business environment.

The indicators focused on the domestic ICT situation and the country's ICT capability, response and involvement in the global environment and networked world.

The assessment was based on five progressive stages related to each indicator with each variable scored on a scale of 1-5. The data is arranged to reflect quintiles.

The choice of quintiles is consistent with the number of stages used in data presentation in Jamaica and by international organizations such as the UNDP. It has the advantage of convenience in that it allows for the determination of the medium.

In summation, the selected methodology was designed to:

- Ensure the comparability of the findings with other assessments recognizing the country-specific and unique characteristics.
- Facilitate data collection, analysis and arrangement in order that the findings might be available as far as possible in a specific, precise and non-ambiguous format that allowed for application of the assessment indicators and elements while recognizing the qualitative nature of the exercise.
- Aid the selection and application of variables and elements to the review that were of relevance and would yield information and findings regarding not only the status of incorporation of the country in the networked world but also the

development problems and obstacles the country faces and the types of development initiatives that are realistic and likely to succeed.

The categories and indicators applied in the assessment are listed below:

ASSESSMENT CATEGORIES

- ICT Infrastructure
- E-Learning
- E-Society
- E-Economy
- E-Policy

ASSESSMENT INDICATORS

The indicators include:

- Infrastructure: access, connectivity, knowledge, hardware, software
- Technical quality of infrastructure
- Social and cultural infrastructure: E-Learning
- Propensity for risk-taking, entrepreneurship and innovation
- Policy and Regulatory framework: security, privacy, standards
- E-Economy
- E-Business and E-Commerce
- E-Government and service delivery
- Community infrastructure and citizens participation
- ICT industry and economy



PRINCIPAL OBSERVATIONS & FINDINGS

- Although there has been rapid growth in bandwidth capacity, growth in fixed and mobile telephones, extensive computerization within the financial sector, moves toward liberalization of the ICT sector and its recent growth from a low base, the sector's contribution to the GDP and impact on the economy is somewhat marginal.
- The ICT sector is not identified as a separate sector in the National Accounts; nor have the appropriate methodology classifications been developed to facilitate measurement.
- Production of hardware is non-existent and software production is concentrated at the low end of the value chain. The current investment focus is at the low end of the value chain. Only one local company has attracted any significant buy-in from external ICT players.
- Software development is concentrated on adapting imported software and conversion to serve the unique and country-specific needs and characteristics.
- Local manufacturing capability (whether for computer chips, electronic components, or transmission and line telephony equipment) is non-existent. Component assembly with its high import content and foreign exchange outflows is the norm.
- The ICT industry is skill intensive. However, the current focus of public investment is on the lower occupational and skill levels.
- New innovations in ICT are non-existent. This is reflected in the relative absence of patent applications. Research funding as well as venture capital is very limited and seemingly not a priority in public or private sector resource allocation.
- New skills have emerged with the accelerated rollout of ICT. However, the supply of essential IT skills is constrained by the lack of interface between the ICT industry and the educational institutions, as well as by social factors including poverty, educational curriculum deficiencies and illiteracy.
- Migration and the brain drain have had their effect on the ICT labour market as the push/pull factors operate to increase movement of qualified ICT personnel. This has resulted in the issuing of work permits for various IT positions and hence the increase in the import of ICT skills.
- E-commerce is rudimentary and its growth is constrained on the supply side by the lack of diversification in production; lack of investment in product development; lack of focus on niche markets; and use of more



appropriate marketing techniques. There is some prospect for growth in e-commerce with the increase in knowledge, investment in call centres and rollout of facilitators such as merchant accounts and Internet training sites.

- Community development, which is the key to sustainable national development, requires the focus of ICT on the enhancement activities that will improve living standards and reduce poverty, generate growth, employment and equity. It does not require the distribution of IT equipment and facilities for its own sake. The latter is likely to result in waste or excessive use of IT for purposes unrelated to value added or productive endeavours. Reduction in the duplication of activities, increased interaction and integration of efforts and plans would enhance programme effectiveness and release resources for complementary development activities.
- Currently, there are partnerships in education and training between international agencies, local private sector, the Ministry of Education and non-governmental organizations. These need to be expanded significantly.
- There is only one ICT Company listed on the Jamaica Stock Exchange. Small IT proprietorships litter the ICT sector landscape. This has resulted in under-capitalization. Only one ISP has been able to receive capital injection by

collaboration with an international partner. The lack of capital and inability to engage and retain a critical mass of skills adversely affects the competitiveness of these companies. Indeed many of the companies that received licenses under phase 1 have not yet started operations. There are currently no functional programmes to enhance their ability to compete internationally. There is therefore, a concentration of market power in the hands of the dominant player.

- ICT access and use is limited in the society and is constrained not so much by techno-fear as by the limitation in knowledge, infrastructure, cost, technological competence; and illiteracy.
- The digital divide is large, especially with the expansion of bandwidth capacity and broadband facilities that are accessible to higher income groups as well as the technologically and functionally literate. In addition, although duties have been removed from computer and related accessories, the cost is still high in a country where average incomes are low.
- The current focus of state policy has been on the opening of the telecommunications market, public investment in telesales facilities or call centres and establishing the regulatory framework and institutions.



E-READINESS

Two panels undertook the assessment simultaneously. The first internal panel was comprised of the team of consultants who worked on the project; the second panel was a diverse group scattered in various geographical areas. The latter are for the most part unacquainted with each other and include individuals in the Diaspora.

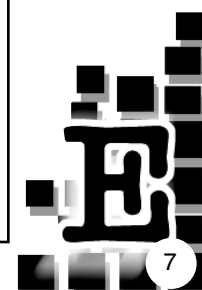
This external assessment panel was selected from the various stakeholder groups but in order to avoid bias or attempts to advance personal or group interests, individuals were not nominated by any group or organization. The group comprised individuals drawn from academia, business, the public sector, civil society and the ICT sector.

The principal conclusion of the assessment (Table 1) is that Jamaica ranks on most indicators in the 2nd quintile and on a few in the 3rd with the overall ranking in the 2nd.

It is reasonable to conclude that the country is in a changing situation where the foundation for transformation (of the economy in particular and society in general) into the information age, is being laid. The current status is therefore that of a developing society which requires a set of competently designed and effectively implemented ICT development initiatives to bring about the desired changes necessary to promote human development.

Table 1: Assessment Findings

Indicators	Description	ICT Quantitative & Qualitative Status	Ranking Quintiles 1-5
E-infrastructure (a) Physical Infrastructure	Teledensity, power supply, computer and Internet penetration, cable penetration, bandwidth availability, ISP, market shares	Mainlines per 100,000 inhabitants = 19,600 No. of mobile phones per 100,000 inhabitants = 19,200 No. of personal computers = 121,784 No. of computers per 100,000 inhabitants = 4,800 No. of cable television licenses issued = 45 No. of VSAT licences issued = 4 Sophisticated broadband capacity = ASDI, Frame Relay, ISDN, DSL Limited Broadband rollout	3



Indicators	Description	ICT Quantitative & Qualitative Status	Ranking Qunitiles 1-5
(b) Access & Connectivity	Internet connection, mobile telephone subscribers, cable and television usage, pagers, hand held devices, CAP, PAP distance, price etc.	<p>No. of Internet subscribers = 70,000</p> <p>No. of Internet subscribers per 100,000 inhabitants = 2690</p> <p>No. of mobile connections per 100,000 inhabitants = 19,200</p> <p>Cable penetration: Subscribers throughout all parishes</p> <p>No cable Internet access as yet</p> <p>No wireless Internet access as yet</p> <p>Wireless data access available</p>	2
(c) Technical Support & Customer Service	Service quality, inventory adequacy and stock availability, hardware & software suppliers, sales, revenues, complaints	Service and maintenance delays, parts unavailability, lengthy repair time, cost, delays in response time, misleading advertising etc.	2
E-Learning			
(a) Education: school access	Computer and Internet connection and access	66% of all schools currently have at least 1 computer. Less than 1% of pupils have access to computers.	2
b) Education: teacher/instructors	Teacher ICT education Use of IT in teaching	Most teachers untrained in the use of computers. Computer instruction offered by specialists; not multi-skilled individuals.	2

Indicators	Description	ICT Quantitative & Qualitative Status	Ranking Qunitiles 1-5
(c) Education: teacher receiving computer instructions	Computer exposure & use	Teacher training institutions under-equipped. IT instructional courses currently being introduced Secondary enrolment - age group 17-19 (43%) - yr. 2000	2
(d) Education: non-formal system, unorthodox training programmes, worker education	Distance learning, worker education, training centres State of human resources in the ICT industry, migration	Computer training for workers and use in adult education courses at the low to emerging stage. Distance learning offered only at the tertiary level.	2
E- Policy legislation (a) Enablers: Policies & Regulations	Privacy, liberalization, competition, security, data sharing, information access, institutions, Intellectual Property protection	Telecommunications Act passed ICT licenses issued: 67 Intellectual Property Office/Right Bill passed e-government services in initial planning stage	3
E-economy (a) private sector ICT status (b) e-commerce, (c) e- transactions (d) ICT & growth	E-transactions - outward & inward bound, facilitating institution (e.g. banks), suppliers, private sector players, citizen's attitude to trust-based transactions involving private sector over the Internet	1 Merchant Account 1 ICT Trade Point- e-shopping centre Domestic e-commerce: limited Outbound transactions: very limited ICT as % of GDP: marginal No legislation on e-commerce:	2



Indicators	Description	ICT Quantitative & Qualitative Status	Ranking Qunitiles 1-5
<p>(e) E-society</p> <p>(f) E-Government public institutions, organizational effectiveness</p>	<p>Information flows, G2C mail, e-service delivery, revenue collection</p> <p>Attitudes to trust-based transactions involving government over the Internet</p> <p>Centralization vs. decentralization in governance system, public agencies' ICT capacity</p>	<p>e-signatures, privacy, security, jurisdiction, consumer protection</p> <p>Public investment: targets achieved</p> <p>Employment: significantly below target</p> <p>Income Tax – revenue collection computerised</p> <p>No e- tax filing</p> <p>No legislation on e-documents & e-signature</p> <p>e-government project in initial stage</p>	<p>2</p> <p>2</p>
<p>(g) ICT Industry & the Economy</p>	<p>Current status of ICT as the engine of growth</p> <p>Competitiveness of the industry</p>	<p>3 mobile phone distributors</p> <p>1 fixed line supplier</p> <p>1 company registered on the Stock Exchange</p> <p>ICT sector dominated by small businesses; no company producing hardware</p> <p>Software application adapted rather than developed</p>	<p>2</p>

Indicators	Description	ICT Quantitative & Qualitative Status	Ranking Qunitiles 1-5
(h) E-society/ economy (i) Entrepreneurship & innovation	Innovation, risk taking	No IT patent application	1
E-Society (a) ICT & Civil Society	Penetration, alternative methods of access, CAP, PAP, cable, mobile etc. limitations to access e.g. distribution of infrastructure, Diaspora connection and impact, IT use by CBO, NGO Workforce & ICT	Community & Public Access Points – post offices and libraries – exist in limited numbers Penetration limited by concentration of providers in large urban centres Community ICT support institutions are largely non-existent Basic literacy rate– 20.1% Poverty – 18.7% Unemployment – 15.5%	2
Overall			2

Key

- 1 - Poor
- 2 - Fair
- 3 - Good
- 4 - Very Good
- 5 - Excellent



SITUATION REVIEW

Jamaica has been experiencing economic difficulties for several years and currently has an IMF Staff Monitoring Programme in place. Specific targets have been set in response to identified problems and obstacles to growth. A heavy public debt burden, high real interest rates and large fiscal deficits have been identified as the major macro-economic problems.

These problems and the general social and economic indicators are outlined in Table 2.

The Government has enunciated some development goals that can be summarized as follows:

- Creation of conditions to facilitate and promote economic growth within the framework of a sustainable environment.
- Initiation of policies and programmes to reduce poverty and improve living standards.
- Design of policies and programmes to reduce inequality and to ensure maximum participation of all citizens in the economic, social and political life of the country.

The major policy initiative to achieve these goals is the maintenance of a stable macro-economic environment i.e. price, interest rate and exchange rate stability. The principal strategy for achieving growth and employment is investment in the ICT sector. The objective is to create a knowledge-based information society based on businesses whose production

techniques require a high degree of labour intensity. However, the demand would be for knowledge rather than manual workers in even those companies operating at the lower end of the value chain. Thus, at least functional literacy and above basic education levels are the minimum criteria for job recruitment, placement, performance and retention.

It is within the context of these goals and initiatives that the ICT industry has been designated the principal industry for attracting investment and generating employment over the next three years. The industry is also considered to be the route to improving productivity, efficiency, better targeting and delivery of services and the benefits of development programmes to citizens island-wide.

It is recognized that the preconditions for the development of the sector are: competition within the sector, the policy and regulatory framework, investment facilitation initiatives, investment climate, macro-economic and social stability, and fostering of an entrepreneurial culture. Some of the ICT industry development objectives and their impact will be affected by the state of ICT "readiness" and the internal "digital divide" which is determined by a combination of factors. These factors include: the extent of the population's access to electricity; computing infrastructure; level of illiteracy; pool of skilled personnel; training opportunities (both among the employed and unemployed labour force); educational infrastructure; attitudes towards technical change by unions, bureaucracies



and the general populace; extent of poverty and inequality; and the efficiency and effectiveness of government service delivery systems.

It should be noted, in regard to e-service delivery, that the status of the ICT environment and the level of e-readiness will determine the success or failure of the introduction of e-services such as the smart card in the transportation sector, electronic meter reading and electronic voting systems. While such systems are likely to improve productivity and efficiency the cost to the consumer may be prohibitive given the income and poverty situation as well as the impact of such labour saving devices in a labour surplus economy.

These social and economic infrastructural problems are captured in the macro data presented below in several tables. The ICT sector issues are translated into quantitative and qualitative variables and indicators such as the number of computers per capita, Internet access per capita, attitude scales, e-services delivery etc., and presented in the relevant category tables.

It is worthy of note, for purposes of this study, that in all the assessments of the ICT and e-commerce status, level of e-readiness and technological achievement of countries operating within the global economy that have been undertaken by

private organizations or international institutions, the countries ranked or rated in the top quintile are leaders or top achievers in indices of sustained GDP growth, computer and Internet ownership and usage, Gini ratios or inequality and poverty indicators, macroeconomic stability, foreign investment inflows, social cohesiveness, political stability, literacy and also human development, economic creativity, innovations and global competitiveness rankings.

The rationale, therefore, for the collection and analysis of the macro data was based on the significance of the physical, social and economic infrastructures for the e-readiness assessment as well as their implication for the planning of ICT development initiatives and the attainment of the desired development impacts and outcomes. The overall state of the country's socio-economy as well as the stability of the polity are determinants of its development potential and also its carrying and absorptive capacity. This is so as these have a bearing on investment inflows and effectiveness, population movements and migration flows, awareness and tolerance of technological changes which, in turn, have an impact on traditional occupations, modes of thought, attitudes and behaviour and, most importantly, citizens' participation in the change process.

Economic and Social Environment

Situation Analysis and Information Technology

It was anticipated that the 2001- 2002 Budget would be financed by a combination of taxes, external borrowing, asset sales and investment inflows particularly in the ICT sector.

The data reveals a situation of high unemployment and underemployment, when the latter is measured by an agreed productivity criterion, relatively high levels of basic and functional illiteracy, a

marginally rising poverty level and a high level of inequality. Although there has been improvement in the economic indicators, these gains have been threatened by the recession in the US economy, the impact of the attack on the World Trade Centre and the status of the Jamaican investment climate.

Foreign Direct Investment flows have declined and combined with the impact of the international situation on the travel industry in particular; the status of the

SELECTED ECONOMIC AND SOCIAL INDICATORS

Table 2: Selected Economic Indicators

Economic Indicators	Unit	1996	1997	1998	1999	2000
Real GDP Growth (1986)	%	-1.3	-1.8	-0.4	-0.4	0.8
Income per capita (constant)	J\$000	7.8	7.5	7.4	7.3	7.4
Income per capita (current)	J\$000	1006.9	109.92	118.55	126.59	1342.6
Inflation Rate (Dec./Dec.)	%	15.8	9.2	7.9	6.8	6.1
Avg. Wtd. Comm. Bank* Loan Rate	%	37.8	31.9	30.1	24.6	22.1
Ja. Stock Exch. Index		16.616	19,874	20,593	21.892	28,893
Stock Market Capitalization	J\$B	66.1	70.1	79	104	160.1
Nominal Exchange Rate (J\$ per US\$)		37.02	35.58	37.2	41.4	45.5
Surplus/Deficit	%	-6.3	-7.8	-7.0	-4.3	1.4
Debt Servicing	%	21.5	21.7	25.3	32.7	32.9
Energy	GWh	2555.8	2768.4	2949.6	3099.5	3301.8
Net International Reserves	US \$m	692.6	541	582	450.2	969.5
Labour Force Participation	%	67.7	66.5	65.6	64.5	63.3
Total Unemployment Rate	%	16	16.5	15.5	15.7	15.5
Aver. Weekly Earnings of all Employees (1990 J\$)	J\$	4296.96	5177.2	5881.9	6869.1	7277.7

Source: Bank of Jamaica *Statistical Digest 8/2001*.

Planning Institute of Jamaica *Economic and Social Survey Jamaica, 2000*.

Table 3: Poverty: Mean Per Capita Consumption

Year	Jamaica (Base 100)	KMA	Other Towns	Rural Areas
1989	100	138	112	78
1990	100	139	108	73
1991	100	143	110	72
1992	100	141	106	74
1993	100	131	101	79
1994	100	141	99	74
1995	100	135	100	77
1996	100	129	103	80
1997	100	142	104	72
1998	100	137	101	76
1999	100	138	105	74

Source: Statistical Institute of Jamaica, *Survey of Living Conditions 1999*

Table 4: Population in Poverty: Distribution by Regions (1999)

Region	Population in Poverty
KMA	10.6%
Other Towns	22.0%
Rural Areas	69.3%

Source: Planning Institute of Jamaica, *Survey of Living Conditions 1999*

Jamaican investment climate, as well as the direct and collateral damages resulting from flood rains, have necessitated review and changes in the budget projections.

An even greater importance will therefore be placed on the projected inflows into

the ICT sector. A great deal of reliance will be placed on the realization of the JA\$450 million investment anticipated from the approval of licenses for 29 new players in the telecommunications sector as a result of the sector's continuing liberalization.



ILLITERACY						
Table 5: Illiteracy & Non-Numeracy Rates by Parish (1999)						
Parish	99		94		99	
	Illiteracy %	# Ranking*	Illiteracy %	# Ranking	Numeracy %	# Ranking*
Kingston	12.9	2	17.5	3	19.7	2
St. Andrew	11.9	1	15.2	2	17.5	1
St. Thomas	20.4	5	23.2	4	25.1	5
Portland	19.8	4	30.2	10	24.9	4
St. Mary	26.4	11	24.0	5	35.0	12
St. Ann	23.2	7	27.9	9	30.0	10
Trelawny	23.8	8	34.8	13	28.3	8
St. James	19.6	3	14.8	1	28.6	9
Hanover	25.7	10	24.1	6	30.4	11
Westmoreland	25.4	9	30.3	11	27.8	6
St. Elizabeth	35.2	13	32.5	12	38.5	14
Manchester	23.8	8	34.8	13	28.1	7
Clarendon	27.3	12	27.2	8	35.3	13
St. Catherine	21.4	6	25.7	7	21.3	3
All Jamaica	20.1		24.6	24.6	25.7	

*1 - Lowest; 14 - highest

Source: JAMAL Foundation, *National Literacy Survey 1994 & 1999*



Statement/Issue	Response Of Companies In Sample By Percentage
Experiencing significant problems with basic literacy	74%
Have taken steps in addressing problems	43%
Awareness of problem by direct observation	61%
Inadequate literacy skills responsible for issues such as accidents, absenteeism, poor work attitudes	64%
Illiteracy adversely affects product quality	48%
Need for excessive supervision, extensive rework, slowdowns, wastage and productivity due to illiteracy	58%
Have illiterate males employed in organisation	63%
Have illiterate females employed in their organisation	37%
Up to 80% of total cost in various cost \categories can be attributed to illiteracy (e.g. Number of defects, pounds of waste, training costs, accident costs)	36%

Source: JAMAL Foundation / KPMG Peat Marwick. Survey:
Impact Of Illiteracy On Productivity In Commerce And Industry, 1997



INFRASTRUCTURE:

Physical

ICT and Related Sectors

Access

The growth rate of Internet users has been slow, with only 70,000 subscribers. However, the rate is likely to accelerate with the increase in public awareness and infrastructure and more vigorous competition among Internet service providers. It is also anticipated that with the increase in the knowledge of business persons of the benefits of Internet use, arising from business to business transactions and growth of multimedia application and exports, Internet connectivity is likely to

increase significantly. There is also likely to be a noticeable increase in the growth of personal e-mail traffic. This will result from the increasing familiarity with the new mode of communication and its impact on communication between Jamaicans at home and the large population of Jamaicans in the Diaspora, particularly the UK and USA. The availability of sufficient international bandwidth will be a great facilitator of this process. Broadband of international connections has expanded significantly; and DSL, ISDN, ADSL, growth of VPN, satellite access, alternate Internet access devices such as cell phones and cable access are or will soon be a reality.

Table 7: Jamaica's ICT Base (2001)

Variable	Data
Population (mil)	2,605
Main lines per 100 inhabitants	19.6
Number of mobile phones per 100 inhabitants	19.2
Number of personal computers	121,784
Number of personal computers per 100 inhabitants	4.68
Number of computers per 100 households	18.74
Total number of Internet subscribers	70,000
Number of Internet subscribers per 100 inhabitants	2.69

Source: Cable & Wireless, Digicel, STATIN, Internet Service Providers, other sources



Table 8: IT Assessment Data Requirements: Infrastructure & Access

CATEGORY	ELEMENTS
INFRASTRUCTURE	Computer, telephony, electricity, conduits, network equipment for backbones & service providers, server hardware
APPLICATION & SERVICES	Software, web enabled database, search engine software, network operating systems, web hosting, support services & systems applications, consulting, training, integration services, transaction processing companies
PROVIDERS BY TYPE	Internet service providers, computers & accessories suppliers, transportation & communication services providers
USERS	Households, private & public sector firms, schools, non-governmental and volunteer organizations.

Source: Allied Research Associates Ltd., 2001

Table 9: Access and Connectivity: Cable & Wireless Connections & Users

SERVICE	USERS
ISP Subscribers	33,000 (47%)
Mobile	450,000
Main lines	511,000
Main lines plan	217,000 lines over 3 years, 100 (80 replacement), 60, 60,
Lines Installed 2000	Net installed = 100 Net loss= 60 Total gain = 80



Table 10: Internet Penetration: No. Of Dial-Up Subscribers by Leading ISPs

Licensed ISP service providers	No. of subscribers	% Market share
Cable & Wireless	33,000	47
Other	37,000	53
Total	70,000	100

Source: Various inclu. C& W. September 30, 2001

Procurement Policy

The government procurement policy can be an instrument for accelerating the rollout of the ICT hardware supply and services infrastructure or it can act to retard development.

Through the National Contracts Commission, the government has opened the process to a large extent by having qualified and certified companies register for contracts in grades valuing from US\$130,000-US\$1,630,000 and over. These contracts are for the installation, configuration, assembly, alteration and repair of computer hardware and peripherals including network cabling, installation and any other necessary work.

There are 13 companies registered with the Commission and they are certified in four grades. (National Contracts Commission 30/11/01). This step toward transparency is significant for e-readiness assessment.

Information and Telecommunications Services

Telecommunications has attracted the largest amount of investment in the ICT sector over the last three years with the sale of cellular licenses, rollout of services by the dominant carrier, expenditure by the licensees and investment in call centres. Four major telecommunications providers currently serve the industry.

In addition, there are three authorized voice carriers currently in operation, with others positioned to commence operations upon full liberalization of the telecommunications industry scheduled to take place by March 2003. Of the 34 ISP licenses that have been issued, only about eight companies are active. Data and IP services available in Jamaica are almost on par with those offered in North America, but they are much more expensive locally. An estimated 1000 Jamaican websites, promoting various industries and interests exist. Many international manufacturers of hardware are represented in Jamaica and two software manufacturers have representation on the



Table 11: Quantity and Value of IT & Personal Computer Imports into Jamaica 1996 - 2000

IT Imports					
	1996	1997	1998	1999	2000
Quantity	38,230	49,792	79,569	76,686	106,135
Value J\$	1,25,868,651	1,157,435,887	1,407,038,907	1,425,999,537	1,400,666,447
Personal Computer Imports					
Quantity	3187	3580	4441	7983	9109
% Quantity change		12	24	78	15
Value J\$	196,241,152	225,502,719	225,920,446	325,361,6777	936,19737

Source: Statistical Institute of Jamaica, *Trade Statistics*, October 2000

island. Many computer resellers have accounts with Tech Data and/or Ingram Micro.

It should be noted that estimates of computers in the country and estimates of installed IT base are different as the latter refers to the current numbers of active IT operational entities within the country in business, academia and homes.

Electricity

The main obstacle to connectivity is power shortage and the price per kWh. Last year (2001) the country experienced prolonged and disruptive power cuts owing to shortages in electrical power generating capacity. Without a reliable, adequate, continuous and price competitive supply of power, the hopes of

development in the ICT sector are pipe dreams. In terms of assessment on price and service the rating is poor.

Cable

The penetration of Cable TV is wide if not deep. Forty-five licenses have been granted and operators are in all parishes but not in all communities. Several cable operators have been recently issued licenses that will allow for start-up of cable Internet service. This should be a boost for under-served rural areas without telephone lines where neither dial-up nor digital subscriber lines are available. The extent of penetration would, of course, be determined by the level of interest, IT literacy and the price.



Table 12: Jamaica Public Service Co.: Rate Summary Effective 01/02/2001

Rate Category	Customer Charge (\$ per mth.)	Energy Charge (\$ per kWh)	Demand Charge (\$ per kVA per month)				Fuel Charge \$ per kWh (See Details)				
			Standard	Off-Peak	Partial	On-Peak	Standard	Off-Peak	Partial	On-Peak	
10 Residential											
First 100 kWh	50.00	3.572					2.465				
Over 100 kWh	50.00	5.047					2.465				
20 General	480.00	3.788					2.495				
40-LV Power											
Low Voltage	1430.00	0.559	615.00	25.00	265.00	325.00	2.474	2.149	2.584	3.220	
40A-LV Power											
Low Voltage	1430.00	2.286	245.00				2.474				
40-MV Power											
Medium Voltage	1430.00	0.519	605.00	25.00	260.00	320.00	2.474	2.149	2.584	3.220	
50-LV Large Power											
Low Voltage	1850.00	0.421	715.0	30.00	305.00	380.00	2.471	2.146	2.581	3.216	
50-MV Large Power											
Medium Voltage	1850.00	0.407	700.00	30.00	300.00	370.00	2.471	2.146	2.581	3.216	
60 Street Light	360.00	See: Details					2.507				
60 Metered Circuits	360.00	3.612					2.475				

Note:

- 1) Minimum standard Billing Demand per month: 25kVA for Rate 40 & 500 kVA for Rate 50.
- 2) Minimum off-peak Billing Demand shall be the maximum of the current On-peak or Partial-peak demand or 80% of the highest off-peak demand in the 6-month period ending with the month for which the bill is rendered or 25kVA in respect to rate 40 and 500kVA in respect to rate 50.
- 3) Standby Rates: See details in the Schedules.
- 4) Base Exchange Rate: J\$44.00 = US\$1.00



Telecommunication Services Market

Competition, Price And Players

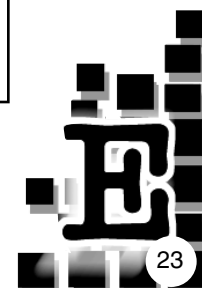
Key To Licence Category

ISP	– Internet Service Provider
FTZC	– Free Trade Zone Carrier
FTZSP	– Free Trade Zone Service Provider
DSP	– Data Service Provider
IVSP	– International Voice Service Provider
DC	– Domestic Carrier
DVSP	– Domestic Voice Service Provider

Table 13: Telecommunications Licenses: Types of Services for Which Licenses Are Available

Services	Authority
International Voice Service Provider	Sale of international voice minutes using Cable & Wireless infrastructure until March 2003
Domestic Carrier Service License/ Fixed Link Domestic Service	Establishment of the physical infrastructure to provide telephony services locally
Domestic Voice Service Provider	Sale of domestic telephone services purchased from existing telecom carrier or other domestic carriers and retail in the form of "calling cards"
Internet Service Provider	Offer Internet access and other services such as e-mail and web hosting to individuals or companies.

Source: Office of Utilities Regulations, September 2001



Phases	No. Of Applicants In All Categories	No. Of Licences Issued In All Categories
Phase I	61	34
Phase II	40	29
Total	101	63

Source: Ministry of Industry, Commerce and Technology, October 2001

Since the liberalization of the market the focus has shifted from centralized in-house IT capability as the IT rollout has accelerated to a client-server environment in which network services are increasingly outsourced. The limitation is that the local hardware manufacturing and

production capability, and to a lesser extent software development is non-existent in the case of the former and infant in the case of the latter. ICT development means significant dollar outflows rather than inflows at this stage of development.

IT Products & Services	Products /Services Produced/ Offered in Jamaica*
Hardware manufacture	None
Hardware Assembly	Reasonable
Software development	Some
Services/Consulting	Reasonable
Telecommunication Services	Reasonable
Telecommunication equipment manufacture	None
Internet services/E-commerce	Reasonable
Hardware/software-marketing (retail/wholesale)	Reasonable
ICT human resource recruiting/headhunting	Some
Outsourcing vendor	Some
Training	Some

* Assessment based on 3 point scale - (none, some, reasonable)

Source: Allied Research Associates Ltd. *ICT Market Survey*, October 2001



Network Speed and Quality

The technical capacity in terms of bandwidth is comparable to international standards. The system offers wireless bandwidth 128, 256, 512 and 1544k. DSL, Frame Relay, Lease Line, ASDL are all available with less emphasis now placed on the use of ISDN. Satellite hook-up is not too distant for wireless communication services, particularly to provide cable services in rural areas that are without telecom lines.

The quality of service is reasonable but limitations in the telecom market means some uncertainty in the situation as there is always the possibility of the dominant carrier taking advantage of its position and offering access lines of lower quality to its competitors. The constraints on this are, however, vigilant consumers and an active and responsive Fair Trading Commission.

ICT Supply and Service

The quality of service is measured by the waiting time, response time, number and quality of service personnel, error rates, complaints, cost of repairs vis-a-vis work completed etc. The main reason for service complaints has been the unavailability of parts by suppliers. The scarcity of computer repair technicians is also a factor in the quality of repair and response times. Most e-supply enterprises in Jamaica lack the number and quality of personnel as well as the critical size and financing to provide the state-of-the-art services that are required in the information age. This speaks to the question of technical and customer service training

Telecom and Internet Rates and Prices

The prices of ICT products and services were very expensive prior to the Telecommunication Act and the introduction of competition in both the information technology and telecommunications markets. ICT product prices have been reduced considerably since the removal of tariffs on computers and related items. Prices are now competitive, with a plethora of retailers and wholesales entering the market. The question of support and service is still open.

The broadband tariff structure had made it uncompetitive for Internet service providers to compete unless they bypassed the dominant carrier's network by use of VSAT. There were disputes regarding by-pass that resulted in legal action, which was resolved in favour of the competitors. The Spectrum Management Authority has since issued thirteen VSAT (spectrum) licenses.

The prices of mobile telephone connections were extraordinarily high. In the last year there has been a dramatic change in the price of telecom services with two licensees implementing services. In addition, Cable and Wireless has made significant reduction in its rate structure. The prices for its T1 lines compare favourably with those in some areas of the United States.

The average price for basic dial-up unlimited Internet access is around US\$30 per month inclusive of one e-mail account, user name, web hosting, and 2mb storage. Comparatively, in North America the average rate for unlimited e-mail access, local technical support and



10 mb for personal web hosting is on average US\$18. The price of connectivity is not conducive to continued access given the average income levels in Jamaica. Internet access is, therefore, still out of the range of a wide cross section of the population.

Increased access to the Internet requires:

- Review of its existing tariff structure by Cable and Wireless, which competes with other service providers by offering leased lines and dial-up service and now provides linkage through its telecom system to the international Internet backbone.
- Review of the pricing structure of ISP providers. The hourly prices offered

for e-mail access by the Postal Corporation is higher than private providers resulting in low usage of the Corporation's facilities.

- Increasing installation of land-based telecom services and provision of international voice services by the new licensees.
- Unlimited market entry by Internet Service Providers within an adequate regulatory framework.

Widespread access to computers and the Internet at reasonable prices is the necessary condition for ICT e-readiness, ICT growth (including e-commerce and quality of e-government) and sustainable development in Jamaica.

Table 16: Internet Service Rates: Leading Internet Service Providers

Internet Service Providers	Rates & Services Offered
Cable & Wireless	Voyager 5: US\$ 10 per month, 2 e-mail address, 5 free hours usage per month, US\$ 1.90 additional hours Voyager 15: US\$ 26.50 per month, 5 e-mail address- 15 free hours online usage per month, additional hours US\$ 1.55 per hour Voyager 35: US\$ 45 per month, 8 e-mail addresses, 1 mb web page, 35 free hours of Internet usage per month, US\$ 1.25 for additional hours Voyager Flat Rate: US\$ monthly, 2 hours maximum log on session, (1) e-mail address, unlimited online usage Deposit J\$2000 on all Voyager Accounts, US\$3 for each additional e-mail account.



Table 16: Internet Services Rates: Leading Internet Service Providers Cont'd	
Internet Service Providers	Rates & Services Offered
International Communications (JamWeb)	<p>Gold: US\$ 40 per month plus GCT; e-mail, one user name, registration US\$25 + GCT.</p> <p>Platinum: US\$ 45 + GCT, registration US\$25+GCT</p> <p>Limited: 10 hours at US\$12 per hour + GCT, registration US\$25 + GCT, US\$2 for each additional hour</p> <p>Limited: 25 hours at US\$20, registration US\$25; US\$2 for each additional hour</p>
Jamaica on Line (JOL)	Unlimited US\$35+tax 24/7
Kasnet	<p>Unmetered access: J\$2348.88</p> <p>Economy: 10 hours per month J\$656.50</p> <p>Economy: 15 hours per month J\$983.25</p> <p>Economy: 20 hours per month J\$1311.00</p>
N5 Systems Ltd	Unlimited: J\$1021 per month, registration J\$612
World Telenet	Unlimited: US\$35+ GCT per month personal web page hosting, free 2mb storage, 1 e-mail address.

Source: ISPs & related companies



E-LEARNING: Training and Education, Institutions and Programmes

Training and Education

The status of IT infrastructure, instruction and opportunity is fair. Significant progress has been made when one considers the low base from which IT in schools has emerged. The lack of sufficient interface between the ICT industry and educational institutions as well as social factors such as poverty, educational curriculum deficiencies and illiteracy have constrained the supply of essential IT skills. A partnership between the Ministry of Education, USAID, DFID, Cable and Wireless and Jamaica Computer Society to improve student access to computers, student/computer ratios, and teacher computer literacy is currently underway. However, these need to be expanded significantly.

About sixty-six per cent of all schools currently have at least one (1) computer, but less than 1% of pupils have access to computers. Most teachers are untrained in the use of computers and computer instruction tends to be offered by specialists.

The Ministry of Education has expressed its commitment to ensuring that all schools have computer and Internet access. Primary schools should have at least one computer by December 2001. However, that is a worthy but elusive

objective in the short or medium term, given the severe financial and human resource constraints. These constraints would affect not only infrastructure acquisition but also productive utilization of the ICT equipment and services, given the existing and projected output of ICT teachers. Trainee teachers should, therefore, be computer literate irrespective of the discipline they are pursuing.

The ultimate objective would be for all students in the educational system to have computer and Internet access. This will require the extensive rollout of integrated and shared ICT learning systems involving clusters of well-equipped schools, community centres, libraries, post offices etc. within designated school districts and communities. This would promote not only the concept but also the reality of lifelong learning.

Table 17 gives an idea of the current level of ICT penetration in the school system.

Investment in the Human Resource Development sector is a key to e-readiness and ICT development as the supply and demand of ICT skills determine the pace and extent of development. The ICT skill base and



Table 17: Computer Infrastructure in the Formal Education System			
Distribution of Computers in Schools			
School Type	No. of Each School By Type In Jamaica	No. of Schools With Computers	% of Schools With At Least 1 Computer
Infant	29	11	38
Primary	350	218	62
All Age	353	228	65
Primary and Junior High	91	41	45
Junior High	2	1	50
Special	5	5	100
High	134	134*	100
Technical High	14	13	92
Vocational/ Agricultural	3	3	100
TOTAL	981	654	66

* (All High Schools have established laboratories.)
Source: Ministry of Education, October 2001.

educational and training infrastructure are central elements in the assessment of the quality of the investment climate. The ability to communicate in English, which is the principal language of the Internet, work ethics, and the output of quality ICT skills are drivers in foreign indirect investment flows.

The situation requires new approaches to description of job content and classification of the new skills.

The educational base is weak. Results for year 1999-2000 indicate that in the CXC school leaving examinations the pass rate in subjects related to ICT were as follows:

Information

Technology	-	49%
Electronics	-	56.6%
Mathematics	-	37.4%
Physics	-	39.3%
English	-	49.7%.

These grades are likely to have adverse effects on the number of students matriculating in Computer Sciences and in the projected supply of essential and higher occupational level IT skills.



Age & Education Level		1999	2000
3 - 5 years	Early Childhood	91.4	93.5
	Primary	3.0	1.6
	None	5.6	5.1
6-11 years	Early Childhood	3	0.3
	Primary	92.6	97.2
	Secondary	3.9	2.4
	None	0.5	0.1
12-14 Years	Primary	17.9	20.5
	Secondary	79.6	78.2
	None	2.5	1.3
15-16 Years	Primary	0	0
	Secondary	83.3	87.2
	Tertiary	0	0.8
	None	16.7	12.1
17-19 Years	Secondary	42.4	43.4
	Tertiary	5.6	5.0
	None	52	51.6
20-24 Years	Secondary	1.4	2.6
	Tertiary	5.1	4.9
	None	93.5	92.5

Source: *Jamaica Survey of Living Conditions*, Planning Institute of Jamaica, 2001

There is generally low enrolment in secondary and tertiary institutions. The reproduction of persistent poverty and inequality is likely if action is not taken to improve enrolment and graduation rates among the poorest quintiles (Table 19). The even lower enrolment in ICT courses is likely to have adverse effects on ICT labour supply. Most students matric-

ulating at the secondary and tertiary levels are not registered in ICT or related courses. Consequently, the number enrolled in ICT as a small percentage of total enrolment. There is therefore cause for serious concern regarding the future available human resources to drive the development of the ICT industry.



Table 19: Percentage Enrolment of 3 - 24 Year-Olds by Quintile (1999 & 2000)

Age & Education Level		1999	2000
3 - 5 Years	1 poorest	93.2	91.2
	2	96.2	95.7
	3	96.0	96.0
	4	92.3	98.7
	5	94.2	95.5
6-11 Years	Poorest	98.6	100
	2	99.5	100
	3	100	99.5
	4	100	98.0
	5	100	100
12-14 Years	Poorest	93.3	96.4
	2	97.2	99.0
	3	100	99.0
	4	99.0	100
	5	100	100
15-16 Years	Poorest	67.3	74.5
	2	79.7	88.3
	3	87.9	90.9
	4	90.9	88.7
	5	94.4	97.8
17-19 Years	Poorest	21.2	28.6
	2	34.6	32.6
	3	50.9	60.5
	4	52.3	57.8
	5	86.7	69.4
20-24 Years	Poorest	0	2.8
	2	1.7	1.0
	3	2.5	3.6
	4	10.5	7.4
	5	15.8	19.0

Source: *Jamaica Survey of Living Conditions*, PIOJ, 2001

The use of computers in Teacher Training and Community Colleges is at the beginners or emerging stage. Their use as teaching tools is limited by several factors such as: numbers, inadequate integration

into the curriculum, and lack of trained instructors.

The output of tertiary institutions is low, with under-investment in skill training at



the middle and upper levels of the ICT skill pyramid. This will limit the development of the industry and increase reliance on external skills.

Computer training for workers and use in adult education courses are at the low to emerging stage.

Distance learning programmes with ICT components (computer literacy, hardware engineering, software use, Internet use etc.) are offered only at the tertiary level.

Non-Formal Education: Institutions and Programmes

The non-formal education system or second chance programmes have become significant in providing training opportunities for youth who failed to graduate from the formal system for a variety of reasons.

The programme is executed by the National Training Agency with the financing of the special ICT programmes undertaken by the information technology-training fund (INTEC). The changes in occupations and new skill requirements led by the growth in the ICT market has led to the standards generating body (NCTVET) reviewing its occupational categories and developing new standards. The broad job categories are being reviewed and new specific job evaluation is being developed.

The scope and approach to standards and certification is briefly outlined below.

Standards

Standards Generating Organizations

- **National Council on Technical and Vocational Education and Training**

(NCTVET) has developed for Jamaica a scheme of National Vocational Qualifications (NVQ-J).

NVQ-J incorporates industry-derived standards that form the basis for national occupational certification.

The NCTVET industry lead group (Information Technology Lead Group) is responsible for specifying and recommending the standards to be approved.

Standards have been prepared for the following skill areas:

- Information Technology - Usage and Support, Software Development, Programme Analyst, Systems Analyst, Data Base Administrator
- Information Technology - Network Administrator, System Engineer, Contractor Computer Service and Support
- Telecommunications - Installer, Repairer Call Contact Agent

In order to meet the immediate requirement for trained IT programmers funding assistance has been provided to several institutions to train 250 programmers. In addition, special courses are offered and others proposed in aspects of ICT. One of these will be offered in conjunction with Cisco, continuing a growing trend of collaboration and partnership between local training institutions and multi-national IT companies.



Special Training Programmes

There are several training programmes conducted by public sector training institutions designed to improve the literacy of the workforce, both those currently employed and others made redundant by technological change and the deteriorating economic situation. The most prominent of these institutions and programmes are:

- **Workforce Improvement Programme.** This is administered by a unit within the HEART/NTA.
- **Workforce Consortium.** Courses offered with the participation of trade unions for displaced and redundant workers.



E- LEARNING:

Human Capital and Social Infrastructure

Human Resource Situation in the IT Sector

Labour Market

The supply and demand for Information Technology skills have changed significantly over the last five years. This has resulted in changes in the IT skills base in the country. It has also had an impact on the position of IT personnel within the organizational structure of institutions in the private and public sector; compensation systems and training programmes, in-house and within secondary and tertiary institutions.

The labour market issues which impact on the country's capacity and capabilities and therefore, E-readiness status are:

- Immigration, emigration/brain drain, IT personnel compensation and retention
- Equity issues in the IT labour market including urban/rural diffusion of technology
- Resource allocation for training and education
- Occupational structures, management systems and styles
- Participation of labour, civil society, private sector, and government in ICT development and in the reorientation of the industry into a significant engine of growth, employment

creation and income generation; and development of strategies that assist the industry to become competitive in the global economy.

Based on job advertisements and interviews, the country lacks sufficient IT skills at the professional level. In fact, there was an official policy of recruitment of IT personnel from India to fill vacancies in the area of training in public institutions. The situation is also further exacerbated by the lack of adequate remuneration, tertiary level IT educational opportunities, and job opportunities at the higher educational levels.

IT professional skill retention and output is essential if the IT industry is to grow and become globally competitive with a range of innovative value-added service produced.

There is a need for training and compensation initiatives to be developed by government, academia and the private sector to address the situation. The output of graduates in computer studies from tertiary institutions must increase. In the 2001 graduating class of the University of the West Indies there were only six first degree computer studies graduates and 33 recipients of Masters' degrees in computer science, digital systems and computer-based management information systems. (Gleaner 15/11/01). The University of Technology had 379 individuals graduating with Certificates,



Diplomas, Associate and Bachelor's degrees. In these institutions, ITC students are sparse among those matriculating and graduating, perhaps reflecting the lack of recognition of the significance of IT for Jamaica's development strategies. The Tables below reveal that both compensation and the

position of IT personnel in the organizational hierarchy are currently uncompetitive.

In regard to labour market issues, Jamaica is at the developing or evolving stage on the e-readiness scale.

Table 20: Jobs in the IT Sector	
IT SKILLS DOMAIN	DESCRIPTION
Hardware & Computer Architecture	Design, selection, manufacture, installation and support of the hardware infrastructure. Major functions include ability to assemble, install, maintain, upgrade and repair information technology equipment.
Networking and Data Communications	<p>Creation and maintenance of overall network plans encompassing data, voice, text and image processing to underpin IT strategies, which have enabling and enhancing impact on organizational strategies. Management of network infrastructure for the delivery of business applications when required in the organization.</p> <p>Job functions related to the design, development, selection, manufacturing if appropriate, installation, maintenance, implementation and operation of computer networking and data communications equipment.</p>
Systems Development	Write and maintain standards for the development of IT solutions covering the following areas of competency: Business analysis, needs analysis, construction, testing and deployment, maintenance, quality assurance analysis, software configuration management and development infrastructure.

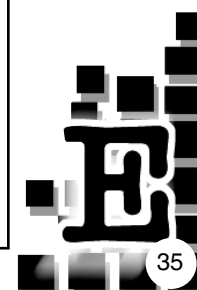


Table 20: Jobs in the IT Sector Cont'd

IT SKILLS DOMAIN	DESCRIPTION
Information Systems Management	<p>Ensuring that IT system support and synergise with the goals, objectives and strategic direction of the organization.</p> <p>Provide advice on and plan and execute information technology projects.</p>
Information Technology Training and Development	IT job skills training, IT education
Information Technology Sales and Marketing	<p>All functions and activities relate to the selling and marketing of IT products. Knowledge of the application and use of the hardware and software products and applications, provision of support services including quality customer service.</p>
Computer Operations	<p>Performance of day-to-day routine operations of computer software and hardware in support of the delivery of specific services. Route start-up, operation and close down of computer. Achievement of operating plans and schedules.</p>
End User Computing	<p>Function of equipping users with IT knowledge and skills, which enable effective job performance capabilities.</p>

Source: Allied Research Associates Ltd., *ICT Sector Survey*, October 2001



Table 21: IT-Related Jobs	
ICT DOMAIN RELATED JOBS*	
Hardware & Computer Architecture	IT Manager, Facilities Coordinator, Installation Technician
Networking and Data Communications	Network Manager, Consultant, Designer, Technical Specialist, Systems, and Network Manager, Technician
Systems Development	Project Manager, Applications Development, Systems Analyst, Webmaster, Multimedia Developer, Internet Consultant, Design Analyst
Information Systems Management	IT Director, IS Manager, Technical and Infrastructure Specialist, IS Consultant, Database Administrator.
Information Technology Training and Development	Training Manager, Training Officer, Support Officer, Technical Writer
Information Technology Sales and Marketing	Sales Manager, Sales Promotion Manager, Sales Account Supervisor, Sales Consultant
Computer Operations	Operations Manager, DRP Specialist, Analyst, Production Technician
End User Computing	Desktop Support Manager, Installations Technician, Coordinator Technical Support, Help Desk Operator, Consultant

Source: Allied Research Associates Ltd., *ICT Sector Survey*, October 2001



Occupational Title	Average Salary P.A. (J\$)
Information Technology Manager	1,467,315
Data Processing Manager	1,353,450
Technical Support Manager	1,222,627
Systems Engineer	1,106,359
Computer/Data Base Programmer	950,352
Data Base/Administrator	813,131
Systems Analyst	998,296
Systems Manager	996,519

Source: Jamaica Employers Federation, *Salary and Benefits Survey, 2000*

OCCUPATIONAL TITLE	AVERAGE SALARY P.A. (J\$)
Finance Manager	2,050,755
Human Resource Manager	1,654,065
Training Manager	1,280,158
Operations Manager	1,267,142
Maintenance Engineer	1,235,912
Project Manager	1,451,372
Plant Manager	1,195,366
Production Manager	1,751,101
Marketing Manager	1,832,543
Sales Manager	1,642,295
Administrative Manager	1,842,386

Jamaica Employers Federation, *Salary & Benefits Survey, Executive & Managerial Staff, 2000*



POSITION	MINIMUM (J\$)	MAXIMUM (J\$)
MIS/IT (8)	1,205,479	1,432,776
MIS/IT (7)	1,017,530	1,209,523
MIS/IT (6)	863,102	1,025,523
MIS/IT (5)	719,885	855,717
MIS/IT (4)	561,425	667,358
MIS/IT (3)	425,967	506,341
MIS/IT (2)	343,756	408,618
MIS/IT (1)	234,282	278,488

Source: Ministry of Finance, *Civil Service Establishment Order*, 2000

POSITION	MINIMUM (J\$)	MAXIMUM (J\$)
SEG(6)	1,307,355	1,554,034
SEG (5)	1,119,283	1,330,476
SEG (4)	1,017,530	1,209,523
SEG (3)	842,051	1,00,000
SEG (2)	686,660	976,223
SEG (1)	561,425	667,358

Source: Ministry of Finance, *Civil Service Establishment Order*, 2000

Public sector salaries are generally below private sector for all job types. The public sector IT staff constitutes 0.9% of the total public sector establishment. This number is insufficient for any effective e-government.

The salaries and classification of ICT and other technical staff require a thorough review as a main feature of the public sector modernization programme. There is a need for:

- (a) the analysis and disaggregation of the ICT skill base into functional categories: e.g. software development, hardware infrastructure, information systems development, training, sales, networking, web management;
- (b) determination of the occupations related to the categories: e.g. webmaster, computer technician, software developer, information systems manager, programmer;



- (c) preparation of job specification and description for each occupation;
- (d) evaluation, classification and pricing of the job within the framework of a competitive compensation system.

This system must address the private and public sector wage differential level of compensation as well as establish a level of compensation that is competitive in retaining ICT skills in Jamaica.

There are benefits in importing skills from outside. The range of these benefits depends mainly on the extent of technological transfer. However, long-term development requires a strong local ICT skill base.

An examination of a sample of jobs advertised in one print medium over a two-week period indicates that approximately 70 percent of the jobs advertised required computer literacy while 20% were IT jobs. The IT jobs were programmers, data analysts, Microsoft certified engineers, database administrators, applications engineers, system managers, network engineers, computer repair technicians, and call centre managers. This small sample indicates the nature of the qualifications required in the job market and the need for complementarities between the educational system and the labour market.

Table 26: IT Job Advertisements					
Date	Jobs Advertised No.	IT Jobs		Jobs Requiring Computer Literacy	
		No.	%	No.	%
18/11/01	47	9	19%	31	76%
25/11/01	14	3	21%	11	79%
Total	61	12	20%	42	69%

Source: *The Sunday Gleaner*, Careers Section , October 28, 2001; November 11, 2001



E-ECONOMY:

Private Sector Players

Sector Overview

Information Technology is defined as that branch of technology devoted to:

- the study and application of data processing i.e. the automatic acquisition, storage, manipulation (including transformation), management, control, display, switching, interchange, transmission and reception of data.
- the development and use of the hardware, software, firmware and procedures associated with processing.

The Information Technology Industry is defined by and includes the following:

- The development and application of computers and communication-based technologies for processing, presenting and managing data and information including, the wholesale and rental of computers and related equipment such as faxes.
- Computer hardware and component manufacturing, including networking equipment such as routers and modems, television transmitters and electronic components
- Computer software development and various computer related services, including computer consulting, software integration, software maintenance and provision of out-sourced ICT services.

- Communications equipment, component manufacturing and services supplied by fixed and mobile line operators.

The ICT industry's products are therefore not exclusive to itself. Information Technology and telecommunications are and can be used by almost all industries to enhance productivity, efficiency and profitability by its impact on companies' competitive capabilities in both the domestic and external markets.

The ICT activities of the user organizations and the increasing convergence between information technologies and telecommunications consequently come within the scope of the industry definition.

The increasing globalization of information has penetrated even societies in which oral communication still predominates.

The characteristics and potential impact of the industry relevant to the state of e-readiness are:

- Its propensity for technological innovation and production of new technology
- Ease of entry coupled with the emergence of large companies
- Expanding capacity in information and communications technologies



- Increasing ICT investment inflows
- Search for and development of new ways to apply existing technologies
- High employment generation, and is trained-labour intensive. It impacts on organizational structure, managerial styles and human resource planning (i.e. new occupational categories and domain names, compensation systems, migration)
- Labour market issues i.e. flexible work hours, redundancies, worker retraining etc.
- Application and use of ICT along all stages of the value chain
- Globalization of the information and communication systems and cross-border use of ICT for multiple purposes
- Globalization of companies within the industry
- Enhancement of the functional, participatory and democratic character of the society
- Impact on, and improvement in, government's transparency and service delivery capabilities and effectiveness
- Requirement for some fundamental changes in the existing legal and regulatory framework
- The information and communications industries' potential contribution to economic, social and political development in a society is immeasurable in only material terms.

ICT E-Economy

The criteria used for the assessment and ranking of a country's competitiveness and growth prospects are sound macro economic management, efficiency of government institutions, strength of local suppliers' networks and the nature of competitive practices.

The survey sample from which the information in Table 27 is extracted included 75 countries, 11 of which are included in this presentation. The Global Competitiveness Report combines existing country economic data of the 75 countries with the results of a survey of 4,600 business executives. The survey data included opinions on the efficiency of governmental institutions, the strength of local supplier networks and the nature of competitive practices. It ranks Jamaica, which is included for the first time, fifty-second; which is a commendable entry level ranking.

It is noteworthy that the overall rankings indicate that the most competitive countries with high growth prospects are those that have relatively low inequality, are pro-environment, investment friendly, facilitate innovation and place emphasis on the quality of higher education and scientific research institutions.



Table 27: Global Competitiveness Report; Growth Competitiveness Index 2000

SELECTED COUNTRIES	RATINGS 1999	RATINGS 2000
Singapore	2	4
Chile	28	27
Costa Rica	38	35
Trinidad & Tobago	–	38
Mexico	43	42
Dominican Republic	–	50
Jamaica	–	52
India	49	57
Columbia	52	65
Zimbabwe	56	75

Source: Jeffrey Sachs, *World Economic Forum*, Harvard University, 2000

The SWOT analysis cum summary of the industry indicates some of the issues that arise as the country attempts to enter the information age and to create a knowledge based economy.

It highlights the fiscal expenditure choices that have to be made and that are necessary to effect the transformation from a light manufacture and intermediate goods production economy to the new economy. It also highlights the factors, threats and opportunities that face the industry as it incorporates into the global economy through mechanisms such as the World Trade Organisation, Caribbean Community, international treaties, etc.

SWOT Analysis - Jamaica

The SWOT Analysis (Strength, Weaknesses, Opportunities, Threats) provides an

overview of the capacity, issues and problems which face the society and economy of Jamaica as policies are enacted to increase its productive capacities, enhance human development, and generate growth and employment.

Strengths

- Continuous and accelerated roll-out of the communications infrastructure
- Opening up of competition in the IT sector
- Increased training opportunities
- Increasing creativity in software development with increasing prospect and potential for value-added exports
- Government's commitment to ICT
- Increasing cooperation in Caribbean IT initiatives - Asian Pacific Economic



Cooperation (APEC) e-Commerce Steering Committee Report 2000

- English, which is still the language of IT
- Proximity to the largest ICT market
- Willingness of many citizens to embrace IT influenced by exposure to TV, cable, communication links with and friends in foreign countries
- A National IT Strategic Plan and coordinating organization

Weaknesses

- Lack of access to affordable IT hardware or reasonable cost financing
- High rate of illiteracy and poverty in rural communities
- High rates of unemployment
- Low levels of skill among the workforce
- IT phobia
- Inequitable access to services
- Government institutions and service delivery not IT ready
- Investment climate experiencing problems
- Lack of manufacturing base and production of value added goods and services
- Small domestic market
- Limitation on access to public information
- Very little opportunities for public participation in the ICT sector because only Cable & Wireless listed on the Stock Exchange.

- Urban/rural IT divide

Opportunities

- Continuous and accelerated roll-out of the communications infrastructure
- Policies initiated to facilitate competition in the ICT sector
- Policies initiated to facilitate investment and growth in the ICT sector
- Increasing public service delivery through ICT
- Increasing awareness and use of IT by public institutions
- Increasing awareness of the need for investment in infrastructure which provides access to IT and the implication for market expansion
- Increasing awareness of the role and significance of residents in the Diaspora in IT awareness, access and potential export market growth
- The Caribbean area, specifically Jamaica, is perceived as an area with the potential for sales growth as indicated by the presence of all major US IT companies.

Threats

- Increase in the internal digital divide and in inequality
- Limited IT skills depleted further by migration to provide a sustainable and investment attracting skill base
- Training opportunities at the tertiary level need expansion
- Public sector efficiency and effectiveness need significant improvement to demonstrate the efficacy of ICT investment



- Job gains relating to IT taking too long to materialise
- Economic weakness exacerbated by external shocks
- Distance education reaches a few; need for more use of radio, cable etc.
- Unreliability of electricity supply; frequency of power cuts
- Social problems exacerbated by economic crisis, crime etc. and adverse perception of social and economic stability and the investment climate
- Internal digital divide and inequality exacerbated

Table 28: Statistical Summary: Private Sector	
Activity	Output
Total No. of registered businesses in Jamaica	48,978
No. of Internet connected businesses	4458
Estimated Internet business penetration	9%
Estimated No. of businesses with web presence	1000
Estimated website penetration rate	2
Total number of ICT sector companies	96*

* Compiled by Allied Research Associates Ltd., E-readiness Assessment, December 2001
 Source: Office of the Registrar of Companies, *Business Surveys*, October/November 2001

ICT sector companies are mostly small, proprietary controlled, operating in the following areas: software distributors, consulting services, computer training, Internet service providers, export service

providers (e.g. data entry, telemarketing), customized software services, computer assisted design, computer assisted manufacturing, geographic information systems.



Table 29: Classification by Type of Company	
CLASSIFICATION	COMPANIES
Digital ICT*	<p>ICT manufacturers and services providers*</p> <p>ICT enabled product and service suppliers to consumers and businesses</p>
Service & maintenance support	<p>Internet based companies providing products and services which are digital in nature and are delivered directly over the Internet e.g. servers</p> <p>Hardware and software suppliers and service providers e.g. telecom, fibre backbones, end user networking equipment, computers, Internet service providers, distributors</p> <p>e-retailers selling music, books, apparel; manufacturers selling products direct such as computer hardware and software; online entertainment and professional services</p> <p>Consultants, software application suppliers, web development software, web design network operating systems, web hosting support services, transaction processing companies</p>
Physical ICT*	<p>ICT enabled support and e-commerce facilitators</p> <p>Internet e-commerce companies which produce physical products e.g. books that are shipped to consumers</p> <p>Online telemarketing companies e.g. travel agencies, stock brokers, real estate brokers, portals/content providers, online advertisers</p>

*No local companies participating
Source: APEC, *E-commerce Report*, 2000



Financial Services Sector

The financial services sector is the major user of IT in Jamaica. The current and planned service offering is in keeping with industry best practices. The penetration rate for basic electronic services particularly money transfer, ABM/ATM services, debit and credit cards is widespread with distribution throughout all 14 parishes of Jamaica. The coverage can be described as relatively dispersed but many rural communities are under-served and the products offered limited. Commercial banks are not bound by any type of reinvestment legislation, consequently the focus is more on deposit taking rather than on lending within a particular parish. This has implications for access to local IT projects financing.

E-Commerce

The OECD's broad definition is appropriate for analysis of e-commerce in Jamaica. This definition states that

"electronic transaction is the sale or purchase of goods or services, whether between businesses, households, individuals, governments and other public or private organizations, conducted over computer mediated networks. The goods and services are ordered over those networks but the payment and the ultimate delivery of the good or service may be conducted on or off-line."

Jamaica has still to enact legislation governing e-commerce, although there is an e-commerce committee reviewing these matters. The current status of e-commerce is at best basic, especially with respect to sales. There has been the limitation of facilities such as a merchant account and, more importantly, the

production base. Several new initiatives have been undertaken to promote the growth of e-commerce including the activation of an Internet merchant account by Citibank and a global e-marketplace by The Jamaica Promotions Corporation (JAMPRO).

E-commerce, using the broad definition, is becoming a regular feature of Jamaican life with the emergence of telesales outlets, business to business transactions, etc.

In the case of small enterprises, there is the initiative of USAID and the American-Jamaican Chamber of Commerce to link small and medium sized business with potentially 6000 American counterparts through the use of a free Internet based referral service. This Global Technology Network (GTN) programme should produce benefits in terms of technology transfer, e-commerce growth, licensing and franchise agreements etc. for these businesses. (*Business Observer*, 12/7/2000).

Multinationals have a visible presence in Jamaica. The interest seems to be the increasing saturation of the United States ICT economy and the perception of the country as a gateway to the Caribbean and Central America rather than the size of the ICT market. The benefits to be derived, if properly negotiated, are the establishment of partnerships, technological transfers and training. The cost is likely to be increasing import dependence of the ICT sector and technological dumping.



Company	Market Capitalization (J\$000)
CIBC (W.I.) Holdings Ltd	36,78,574
Cable & Wireless	21,985,295
Bank of Nova Scotia (BNS)	20,051,539
TCL	8,741,780
Desnoes & Geddes	8,102,241
National Commercial Bank Ltd	7,992,312
Grace Kennedy & Co. Ltd	3,887,780
Lascelles	3,441,600
Courts (Ja.)	1,917,696
CIBC (Jamaica) Ltd	1,720,667
Union Bank of Jamaica	1,590,126
Gleaner Company Ltd	1,243,854

COMPANIES	CORE BUSINESS
Sandals	Hotels
Superclubs	Hotels
Jamaica National Building Society	Housing
Victoria Mutual Building Society	Housing
Alcoa	Mining
Alpart	Mining
Windalco	Mining

Source: Allied Research Associates Ltd, October 2001

IT Industry Surveys

The telephone survey of small businesses in the Kingston Metropolitan Area registered with the Small Business Association reveals that over 40% now use computers in their businesses, 31% of those without indicate their desire and

intent to procure computers, 95% of those who have computers have Internet access and 5% have websites. The results indicate far less aversion to computer use and awareness of its value than was hitherto believed.



Research and Development Expenditure

One of the principal measures of the Science and Technology status and hence ICT readiness of any country is the expenditure on research and development and training by both the private and public sectors.

Based on the number and titles of patents applied for by Jamaicans, it is strongly surmised that the interest is in applied research undertaken by individuals in telecommunication and electronics rather than pure research focusing on the basic technology used in the ICT industry. This is true also of public sector allocations through the technology fund and INTEC programme. These allocations, although small, exceed by far the percentage of their budget that private sector companies allocate to research and development. The focus of research is on business applications and technology adaptation rather than on scientific exploration.

The academic institutions (e.g. University of Technology and the University of the West Indies) focus no less on applied research. They have established respectively a Technology Innovation Centre geared to nurturing small businesses and a Centre For Technology and Teaching And Learning designed for facilitating research into ICT technologies in order to enhance the professional development of staff and students within the university.

Currently, ICT training has received priority with several initiatives in the educational system at all levels. The purpose is to improve ICT access and basic computer literacy. Several courses are offered through the Management Institute for National Development (MIND) to public sector staff as part of the public service modernization thrust.

Technological Development and Innovations

The essence of a developed information society and a vibrant new economy is the capacity for innovation. This in turn is underlined by the extent of public and private sector expenditure on research and development as well as the quality of research institutions, higher and secondary education, access to venture capital, a culture which fosters inquiry, a system which fosters and rewards innovation and finally the extent of intellectual property protection.

The quantitative measurement of innovation is in terms of the number of new patents, copyrights, trademarks etc. or based on surveys of the factors mentioned above. Jamaica has had no registered international ICT patents as indicated in the UNDP Human Development Report 2001. It has eleven (11) registered ICT related patents since 1997 with over 50% registered by foreign-based individuals or organizations. In the field of software development, creative



initiatives have been undertaken in the area of gaming, money transfer, and bills payment software. However, these have been adaptive rather than new innovations. The country can be described in the UNDP's technological achievement parlance as a "dynamic adopter."

Jamaicans have applications for five patents out of a total of 11 filed at the Intellectual Property Office in the field of ICT. Four were filed for information technology, all of which were filed by foreigners, with the rest for telecommunication innovations. There were no originating patents filed in Jamaica. The creation of an innovative knowledge

based economy that is competitive in the global information society requires investment in research and development and provision of incentives for innovation and, most importantly, development of a culture which facilitates and supports innovation.

Academic institutions seem more involved in commercial application of ICT and skills rather than basic and exploratory research. The focus is on adapting software to local conditions rather than on developing new applications. The country has no manufacturing capability.

ICT and Society

In the area of penetration, IT is utilized, to varying degrees by many small, medium and large enterprises. Office Automation, Accounting Systems and E-mail are core applications. Micro enterprises, (e.g. informal commercial importers), are not yet utilizing IT on a large scale. The home market is also quite underdeveloped, partially due to the lack of economic means and/or electricity. Penetration may be classified as fair.

There is, however, great potential for increased penetration as computer prices decline, power distribution improves and ICT literacy and awareness continue to increase.

The effective use of IT is, to a great degree, stymied by a culture of information retention rather than information sharing. Also, in the midst of several IT training institutions, most small and medium sized companies still suffer from underdeveloped IT-based business skills. Financial management, sales analysis, information dissemination, communication and contact management are areas of particular concern.

The situation is compounded by inadequate compensation including incentives, lack of funding for research, the absence of IT industry clusters and opportunities for mobility.

Progress in the IT sector has led to the reduction of and/or the elimination of many jobs (e.g. secretaries, clerical staff etc.). Simultaneously IT has also led to the development of new positions (e.g. call centre agents, network engineers, system

analysts, programmers, computer technicians and web specialists).

There is significant software development taking place as the larger companies and some government bodies increasingly seek to automate more of their processes. However, real innovation is minimal, as venture capital is not readily available; research and development is minimal; and salaries paid to local IT professionals are relatively low. This is occurring within a context where expatriate IT professionals are being hired locally as a priority in public policy.

It has been observed that several large international IT players are operating jointly or independently in Jamaica and others have indicated interest. The existence of so many foreign players in the Jamaican IT field constitutes a challenge rather than an obstacle to innovation and creativity, owing to the competitive vibrancy they stimulate in the market place. In addition, throughout the country, awareness of state-of-the-art IT, market trends, concepts and products is heightened by the presence of foreign IT, as well as by access to cable TV, regular foreign travel and frequent communication with the Diaspora. Indeed awareness is likely to increase significantly and attitudes are also likely to change, because of the Diaspora connections and its propensity for sending some of the latest technological consumer items to locals, irrespective of their infrastructure base. Increased awareness will also come as a result of the imminent rollout and use of a plethora of wireless technologies and their impact on cable,



Internet, computer and mobile phone connections as well as other hand held devices.

Although the IT sector and the IT-enabled companies are small or medium sized, the range of companies offering web sites, even with their inadequacies in terms of content, is significant for increasing IT awareness and changed attitudes to IT. Entertainment, sports and other popular sites can only foster IT cultural penetration and increase the interest in and desire to "Log On". Hopefully this interest will be captured by astute investment in development of much more software with local and relevant content.

E-commerce transactions over the Internet are still at an initial stage. The e-commerce activity is largely confined to purchases of raw materials, parts and consumer items from overseas suppliers. Outbound traffic is limited and is impeded by the fact of an import dependent society and an un-diversified economic base. Although there is now a

virtual e-mall (Jamaica Trade Point) mounted by JAMPRO with several companies involved and an Internet merchant account established to facilitate e-business to business by Citibank; the range of products offered is currently limited. Development initiatives are urgently required to increase investment in non-traditional export products including ICT products.

We find no reason to disagree with UNCTAD conclusion that "Jamaica's IT sector is only a few years old and consists primarily of small companies that have grown rapidly but lack specialization, scale and capabilities. High volatility characterized the development of this sector; the industry has grown in spurts, but it has failed to produce sustained growth."

– UNCTAD. *Science, Technology, Innovation Review*, 1997.



E-Policy:

Policy, Legislation, Regulations, Operations

The Internet, which is the key driver in the ICT sector, occupies a largely placeless data-sphere and is characterized by trans-border data flows, trans-border electronic transaction or e-commerce and e-mail communication. The combination of the ICT general characteristics and the specific features of the Internet, together with the continued process of liberalization of the Jamaican economy, have made it necessary for the state to develop an appropriate policy, legislative and regulatory framework to guide the ICT development process. The status of this policy and legislative framework is a most important and highly weighted e-readiness assessment category especially since confidence in e-transactions is the bedrock of e-commerce transactions.

The principal policy issues are:

- The state of competition and movement toward a market economy
- Status of electronic government transaction
- Status of e-commerce
- Extent of access to information
- The protection afforded by Intellectual Property Rights
- Impact of fiscal policy on economic activity
- Investment promotion

The specific issues to be addressed in legislation include:

- Liberalization and privatisation within the sector
- Security of transaction and communication
- Enforcement certification and certifying authorities
- Privacy
- Use of digital and electronic signatures
- Acceptance of e-documents
- Consumer protection in e-commerce transactions
- Validity of Internet contracts
- Taxation
- Jurisdiction in e-business and e-commerce disputes
- Intellectual property rights
- Information access
- Company registration

Jamaica is participating in the Regional Committee on e-commerce, Intellectual Property and Regional Committee on Collective Management of Copyright.

The Telecommunications Act was passed in 2000. In accordance with the Act, the sector was to be liberalized in three



phases, two of which have been completed. The final phase must be completed by 2003.

Government has reviewed its tax policy and taken a decision to:

- Remove all duties including the sales tax from computers although the

announcement did not mention peripherals in order to promote increased ownership.

- Amend the Export Industry Encouragement Act to grant concessions to investors in the ICT sector on the same basis as those granted to manufacturers.

Type	Status
Intellectual Property Rights Copyright Trade Marks Patents	Legislation passed by Parliament 2001 Intellectual Property Office set up Amendments made to Copyright Act 1999, Trade Mark Act 1999, and Layout Designs Act 1999 Patent and Industrial Designs Act under review
E-Commerce Privacy Security Authenticity/Certification Jurisdiction & Enforcement	Discussion stage
ICT Development Incentives Industrial Incentives Act (IIA) Export Industry Encouragement Act (EIEA)	Discussion of amendments to the various investment incentive legislation IIA amended to enable investors in office space to get the same benefits previously granted investors in factory space EIEA amended to grant concessions in the ICT sector on the same basis as those previously granted to manufacturers e.g. exemption from income and dividend taxes for up to 15 years; also exemption from import duties on machinery and equipment during the incentive period.
Competition	Telecommunications Act passed (2000)



Table 31: ICT Legislation & Regulations: Type & Status (12/2002) Cont'd

Type	Status
E-Government E- Records E-Documents E-Signatures	Report & Proposal review stage
Information Access	Legislation tabled in Parliament, currently subject of public discussion
Taxation	Removal of all duties including sales tax from computers
Labour	Changes in Labour legislation including legislation governing the flexible work week, contract work and outsourcing, dispute resolution, worker rights and working conditions are necessary to bring the labour market in line with the changes brought about by the ICT inspired changes in the economy. These changes are important in facilitating increase in economic growth and economic efficiency and in the society's capacity to solve social problems.

Observations

- It is of priority importance that legal research, investigation and external collaboration be undertaken to determine and obtain full understanding of the forms of cyber crimes including criminal behaviour linked to ICTY information and communication technologies. This will require the enactment of laws to protect the society and, in the case of crimes such as money laundering, maintain the integrity of the infant financial system. The effectiveness of such laws will require cooperation between judicial systems.
- Legislation must be drafted establishing standards and regulations related to the use of the Internet, e-commerce etc. This is especially necessary because of the fact that the Internet transcends many existing laws, nation-states and legal jurisdictions. The non-information age system of jurisprudence did not envisage borderless commerce and communications.
- Serious consideration must be given to the drafting of laws to ensure the legal acceptance of digital and electronic communications (e.g. signatures). The legal requirement



need not be for sophisticated digital certification and public-key cryptography such as PKI systems that are costly. This would perhaps be unjustified when the current and forecast level of e-commerce is taken into consideration. It may be necessary, in the absence of alternative, judicial mechanisms, that, as e-commerce grows and other ICT related disputes arise, the establishment of special local judicial centres be considered to deal with these disputes.

- It is obvious that there is hardly likely to be one comprehensive piece of ICT legislation. There has to be a review and revision of several existing laws and drafting of new legislation on several subjects: the most important being privacy, security, electronic documents and consumer protection. The matter is urgent but the legislative agenda will most likely be implemented in phases with realistic timelines. The fact is that implementation of a legislative agenda in the information age requires the participation of the public.

SUMMARY:

Legislative, Regulatory and Policy Framework

Jamaica has legislated no specific laws and regulations concerning digital signatures (electronically authenticated based on public key cryptography) and electronic signatures (signatures in electronic form).

There is no published regulation, protocol or standards that would make

electronic documents admissible for evidence in a court of law in Jamaica. Consequently, current laws on private contractual agreements are unaffected by changes in the electronic environment. The use of electronic and digital signatures authentication will require amendment to the existing body of laws relating to private contracts.

E-government service delivery is still in the pre-implementation phase. There is no public body that issues digital signatures for public use. Although under discussion, there is no authentication or certification technology used in the electronic delivery of government services to citizens.

Private sector models of electronic authentication, although under discussion, are few (if they exist).

Assessment of the current legislation and regulatory framework would reveal that in terms of Intellectual Property Rights protection and ICT market liberalization, Jamaica is on stream.

In terms of e-commerce, the country is at the initial stage.

- E-government is at the proposal assessment or early development stage.
- Investment promotion and incentives policy laws have been passed in the implementation stage. Impact analysis and legal review will now become an annual exercise.
- The policy issues under consideration, regulatory framework and institutional mechanisms established by law are comparable with the 3rd or 4th quintile of developing countries.



- The Access to Information Act has been tabled in Parliament and is currently the subject of public discussion. Implementation of e-government programmes is not possible without changes in or abolition of the existing Official Secrets Act, which prohibits disclosure of even basic information.

Jurisdiction

In the borderless world of electronic communication, establishing jurisdiction and arbitrating disputes and enforcing judgments is difficult.

The most prevalent disputes in the Internet world are those regarding domain names and most of these have been resolved by negotiation. Similarly, the issue of taxable and non-taxable data has yet to be resolved at the international level. Individuals will continue to evade all taxes except custom duties on e-goods purchases.

Regulatory Institutions

Jamaica has established a number of regulatory institutions, some of which predates the introduction of ICT-related policy and regulations. The functions of these regulatory institutions are self-explanatory.

- Office of Utilities Regulation
- Spectrum Management Authority
- Telecommunications Council
- Fair Trading Commission
- Consumer Affairs Commission

The task is to avoid jurisdictional conflicts and to arrange mechanisms for collaboration and convergence in achieving the ICT and Jamaica's development objectives.

It is clear that in terms of Intellectual Property Rights protection and ICT market liberalization Jamaica is on stream. But in terms of e-commerce the country is at the initial stage. In terms of legislation, e-government should be at the assessment or early development stage.



E-Government: Central, Local, Agencies, Project Financing

In Jamaica almost all government business is conducted by paper processes. The law does not recognize digital signatures. There is a cultural resistance to electronic changes in many quarters as well as a lack of trust, which is likely to impede progress towards electronic transactions.

Information control confers status, power and, more often, pecuniary gain. However, domestic economic, political and social considerations and responses to the changing international environment provide the rationale for E-government reform. The major impacts are anticipated to be:

- Stimulated citizens' awareness and generated interest in ICT
- Improved communications to constituents and bring openness and transparency to the governmental process
- Enhanced citizen participation in decision-making and mobilize citizens with the aim of creating a functional and participatory democracy
- Provision of information online via portals, video, radio and TV
- Increase in the efficiency and effectiveness of public service delivery through government's use of technology in operations and service delivery.

- Streamlining of procurement and revenue collection mechanisms.

The use of ICT in governmental agencies is mainly administrative with service delivery limited by inadequate equipment and training. In some agencies and institutions, particularly those at the local level, there is a disjuncture between organizational and public policy goals and objectives and the organizational capacities.

The contemplated repeal of the Official Secrets Act and the promulgation of the Access to Information Act, together with the establishment of the Access to Information Unit, will go a long way in bringing Jamaica into the information age. However, the cultural barriers and the propensity for regarding public information as private property will be hard to change.

There has been movement by some agencies towards e-government transactions. The most conspicuous have been the Registrar of Companies, National Contracts Commission and the Customs Department. However, an E-Government Consultancy Assignment is currently in progress.

There is a contradiction and even confusion in the responses of some public agencies to the use of new information technologies. In some agencies surveyed



in which the new technologies have been introduced, service has indicated some improvement. In others, the cost of service to the public has increased while service has declined significantly in terms of waiting and response times, etc. In most agencies computers are used primarily or exclusively for back office automation and accounting functions; but there is little or no use of development or analytic applications and the equipment is of the older generation in terms of computing speed and power. It is also a fact that in the contemplated e-government reforms, the focus will be on the agencies engaged in revenue collection line functions rather than those institutions in which there is need for improvement in the impact and cost effectiveness of service delivery.

The fact is that there is a disjuncture between public policy on centralization of functions and limits on information dissemination and IT rollout on the other.

ICT Public Investment and Employment Creation

Public investment in physical, social and economic infrastructure is a key in achieving any level of sustainable development. Such investments if properly planned can create the type of agglomeration of economies and business and social institutional thickness that can be the catalyst for attracting foreign and local private investment. Similarly, investment that enhances the infrastructure in the ICT sector is a backbone for the sector to take-off.

Development Funding

Development project funding, specifically venture capital, is not specifically allocated in the budget of any of the ICT funding programmes, although ICT is now recognised and promoted at the policy level as not only an important instrument but the very engine for economic transformation and growth.

While funding exists for ICT investment and job creating projects which are at the low end of the value chain, financing for innovative value-added ideas, either at the research and development or investment levels, is very limited. The principal funds involved in technology venture financing would be the:

Jamaica Venture Fund

Technology Investment Fund, an affiliate of the National Science and Technology Commission; and the INTEC Project Fund, administered by the National Investment Bank of Jamaica.

The Jamaica Venture Fund has focused on areas such as tourism and has not funded IT projects, while the Technology Fund has funded two projects during eighteen months up to June 2001. These were a Microsoft Training Project and a project related to the development of a CD-ROM.



ICT: Application and Use in Society

Civil Society's ICT Awareness and Access

The extent of ICT diffusion resulting from the proliferation of information and communication technology devices, e-commerce transactions, decentralization of service delivery structures in the private and public sectors and outreach programmes determine the level of ICT awareness and the degree of inclusion of citizens in the information society loop.

This ICT diffusion process involves the extent of Public Service and Community IT Access Points e.g. post offices, community banks, libraries, public and private companies, branch offices, mobile phone systems, and community information centres etc.

The government, through the Minister of Industry, Commerce and Technology, has stated that, using the Post Office as the vehicle, it intends to establish a networked society by linking the postal network across the country and placing automated counters in every community. Taking into consideration the unreliability and limitation geographically of the power company, he intends to enter into a joint venture with the Jamaica Lottery Company and its IT associates to roll out a wireless digital technology backbone. (Budget Speech 2001-2002, April 2001.)

It is reasonable to conclude that the majority of Jamaicans are in touch with, aware of and have access to or use some type of electronic services. This takes several forms: payment of bills by debit/credit cards, retail purchases, banking through use of ATM/ABM cards, gaming and betting through electronic enabled lottery and horse racing outlets, mobile phones, fixed line telephones, use of e-equipment in the mass appeal music industry etc. The proposals for use of smart access cards on the public transport, electronic meter reading, electronic voting systems and e-government revenue enhancement and information service delivery would further increase awareness and readiness.

There is a need for caution in the introduction of some of the new e-services as the society's capacity for absorption is limited by the income and employment status of the population and the economic environment

Overall there is a reasonable access to and awareness of some form of e-services throughout the society. There is reasonable access to Internet services in the urban areas as the majority of service providers cover the Kingston Metropolitan Area. There is reasonable access to and coverage of the country by telecommunication services, fair access to computers and Internet in rural towns and poor access to computer and Internet in rural areas.



Although there are over 5000 Community-based organizations and 200-300 non-governmental organizations in Jamaica of various nomenclature and programmatic focus, there is no evidence of ICT usage except as support for routine office functions. The use of IT in service delivery or as a mobilising and development tool has so far not been a

central feature of these organizations. It is mainly the environmental groups (such as the Jamaica Conservation Development Trust and the National Environment Societies Trust) and, of course, the health services organizations, which have incorporated information technology in their service delivery efforts.

PARISH	INTERNET KIOSK LOCATIONS	CONDITIONS	USERS
St. Catherine	Greater Portmore	Initially free Access cards \$100-400,	Not many users; access cards available; Frequent use before access cards & charges were imposed.
	Linstead	\$100 per 15 minutes	10 per day when first introduced; No users currently, complaints of lack of privacy
	Waterford	\$460 per hour \$115 per 15 minutes	Hardly ever used; Complaints about price
Kingston	General Post Office	\$100 per 15 minutes \$400 per hour	12 per day; Out of cards; Cards available at C&W
	Windward Road	\$100 per 15 minutes \$400 per hour	Not many; Out of cards for last two weeks
St. Andrew	Western District	\$115 for 15 minutes	Computer out of service

Source: Postal Corporation, *Report* June 2001



Community E-Services Points: Local Socio-Economic Institutions

	People's Cooperative Banks	Credit Unions	Commercial Banks & Institutions	Postal Service	Library Services
Parish Distribution	13 parishes (18 clusters)	14 parishes			14
No. of Main Banks	12	59			923 (main parish libraries, branch libraries plus Bookmobiles) 700 (all public schools)
No. Rural Branches (Rural Towns & Capital)	65 branches				
Client served directly					
Estimate of population reached indirectly*	58,000	600,000			
INFRASTRUCTURE	*Computers all branches *Communication network clusters in all by fax, telephone				minimum 10 computers in all main libraries with some in other branches
Local Access Network Wide Access Network					
SERVICES OFFERED					
Internet Access/www (Kiosk) Café etc.)				11 functional 9 non-functional 20 requested (1/10)	14 parish libraries & some branches
Credit Card Automatic Teller Machines/multilink network		22 all main unions in each parish			
Bill payments	✓		24 (01/10/01)		
Money transfer services/remittance	✓	✓	50 (26/02/01) 21 (16/11/01)		

Table 33 Local Population Access to E-Services: All-Island Cont'd					
	People's Cooperative Banks	Credit Unions	Commercial Banks & Institutions	Postal Service	Library Services
SERVICES OFFERED					
Commercial products e.g. lottery				21(01/10) 42 (16/11)	
Fax Machines	✓				
Telephone	✓				
Word processing	Microsoft, Word perfect				✓ ✓
E-mail					
Accounts/ record keeping	Micro banker Lotus				
Partners/Sponsor Price	Paymaster				Western Union Access Open Fees- free, some charges. Fees in some cases paid by service clubs or community groups

* Based on household size.

Source: Allied Research Associates Ltd, *Survey*- September 2001

Recommendations

The observations and findings from the e-readiness assessment together with a review of the issues that arise from those findings provide the basis for the framework for the recommendations and development of an Action Plan. The recommendations are as follows:

- Address the problems and issues that constrain the development of the ITC sector
- Close or reduce the internal digital gap, promote broad-based participation and equity by:
 - establishing partnerships and promoting awareness between the state, civil society and private sectors;
 - increasing opportunities for access and connectivity to ICT infrastructure;
 - increasing the competence, skills and literacy level of the marginalized majority to allow for active participation in the emerging knowledge-based economy and information society.
- Strengthen the ICT sector's capabilities and its capacity to enable other sectors to increase their use of ICT, thereby accelerating and enhancing their own growth and, equally important, the society's capacity to solve social problems
- Increase opportunities for social, political and economic development by:
 - the accelerated roll-out of ICT throughout the formal and non-formal educational systems
 - thereby investing in the future;
 - increasing the pool of ICT knowledge and application;
 - accelerating technical innovation and promoting the concept and practice of life-long learning;
 - increasing access by developing and commissioning an integrated community development and outreach programme with ICT as its core.
- Encourage, support and facilitate the use of information and communication technologies in business by implementing initiatives to improve the investment climate and business environment, thereby creating ever expanding employment opportunities in the services, content and (hopefully) hardware sub-sectors
- Promote ICT innovation by providing access to research, development and venture capital and by increasing the quality and quantity of databases, archives and libraries
- Mandate the use of information and communication technologies in the public sector modernization programme and extend the programme to all levels of government
- *Appraise the legal and public policy implications of the rapidly spreading information society and develop an effective policy, regulatory and legal framework to provide guidance in the development of the information society*



- Strengthen (if it exists) or to establish (if it does not) a coordinating, monitoring and standards generating authority, independent of any department or ministry to review and integrate the respective ICT plans; provide guidance in negotiations in international fora; develop projects; and conduct the community outreach and public awareness conferences, seminars, meetings etc.



ACTION PROGRAMME

Objectives	Activities/Development Initiatives	Support Strategies
<p>Establish a framework for a sustainable ICT sector, build ICT capacity to facilitate diffusion, awareness and for use as a business development and growth-promoting too</p>	<ul style="list-style-type: none"> • Promotion of sector linkages and convergence, more employment <p>Create an enabling environment through policy and regulatory review</p> <ul style="list-style-type: none"> • Increase IT awareness by adopting various measures: Inter & intra-sector experience: publicize success stories • Promote sector collaboration • Strengthen role of CITO in coordinating development • Design and implementation of an outreach programme. 	<ul style="list-style-type: none"> • Explore incentives for investment in ICT in rural areas. Thereby creating conditions for these areas to attract IT and non-IT investments. • Support the establishment of ICT clusters that can create a critical mass of activities to yield agglomeration economies and attract significant investment flows.
<p>Develop plans to penetrate the export market</p>	<ul style="list-style-type: none"> • Marketing research • Lobbying for access • Product development • Expand local production base • Increase efforts to obtain ISO, HACCEP quality certification • Market information • Market support mechanisms - JAMPRO 	<ul style="list-style-type: none"> • Design and implement a project to improve competitiveness of Jamaican companies • Explore a range of markets, diversify product line • Develop new product • Use state of the art production techniques to improve not just efficiency but create value added products and services



Objectives	Activities/Development Initiatives	Support Strategies
<p>Expand the role of ICT as an enabler for increased productivity and employment in other sectors</p>	<ul style="list-style-type: none"> • Strengthen ICT support infrastructure including financing, research and development • Promote sector linkages and convergence – more employment • Establish linkages between local and foreign enterprises • Promote intra & inter sector collaboration • Promote community development through use of IT • Develop programmes for inclusion of: gender balance, socially disadvantaged, physically disabled etc. 	<ul style="list-style-type: none"> • Increase market size by promoting sector growth- new consumers & players • Cross sector linkages and increase product demand with outsourcing • Increase community awareness, access, usage increase demand • Highlight achievement of a model IT enabled company in a depressed economic sub sector e.g. sugar • Develop community information, & management systems; obtain enhanced service delivery systems and targeting efficiencies • Establish a framework for promoting e-commerce transactions by implementing initiatives to expand investment in increasing productivity, diversifying the goods and services producing sectors and enacting legislation to regulate e-commerce in a society where trust based transactions and social capital is almost at point of exhaustion.



Objectives	Activities/Development Initiatives	Support Strategies
		<p>Build on the steps taken so far including:</p> <ul style="list-style-type: none"> - Initiative undertaken by the American/Jamaican Chamber of Commerce and USAID to establish connections between Jamaican small business and businesses in the USA. - JAMPRO's Trade point or e-commerce mall - Citi-Bank's new merchant account.
<p>Accelerate ICT infrastructure roll out</p>	<p>Increase computer and Internet penetration and access</p>	<ul style="list-style-type: none"> • Implement proposal to establish wireless digital technology backbone linking postal network to facilitate build out of automated information and service counters coordinate the disparate efforts to activate interest in ICT and establish disconnected access points. • Proper coordination is needed to avoid the waste that historically attends otherwise meaningful community interventions.
<p>Re-orient government policy to facilitate the ICT sector and ICT enabled sectors' development</p>	<p>Promote community development through use of IT</p> <ul style="list-style-type: none"> • Develop programmes and undertake social investment to enable inclusion- gender, socially disadvantaged, physically disabled- in ICT development. 	<ul style="list-style-type: none"> • Guarantee transparency in ICT contracting process • Encourage and facilitate the development of projects for government use

Objectives	Activities/Development Initiatives	Support Strategies
	<p>This is both a social and economic asset Take immediate action to improve the investment climate now tarnished by crime and unceremonious uses of the new technologies</p>	<ul style="list-style-type: none"> • Widen and deepen ICT markets, skill base and strengthen society by fostering inclusion, equity, and social justice. • Actively use government procurement as a vehicle for encouraging IT economic and social investments
<p>Promote the development of an ICT skills' base</p>	<p>Design and implement initiatives to increase collaboration in ICT education between school and community, address the issue of worker literacy, provide information to students on the community residents on the social, economic and psychological benefits of computer literacy and skills.</p> <ul style="list-style-type: none"> • Develop critical mass ICT skills. <p>Conduct intensive research into the ICT and wider labour market. The market has changed as old jobs disappear and new jobs emerge both in content and name and qualification requirements. There is a lot of uncertainty</p>	<p>Introductory courses on the radio</p> <ul style="list-style-type: none"> • Distance learning courses on the radio and by use of cassettes. Every Jamaican who so chooses has access to a radio. • Accelerate and increase access to workforce improvement programmes. • Develop a selective policy of recruitment from abroad, retention policy • Design a programme to impart new skills to retrenched workers to enable participation in the new economy. Such a programme must be made on the bases of solid labour and commercial market data.
<p>Stimulate and foster development of an entrepreneurial culture</p>	<ul style="list-style-type: none"> • Support innovative practices • Circulate information on activities taking place locally and abroad 	<ul style="list-style-type: none"> • Ensure protection and compliance with global rules on Intellectual property rights



Objectives	Activities/Development Initiatives	Support Strategies
	<ul style="list-style-type: none"> • Establish links with research institutions overseas • Support R& D at the Universities • Support collaborative private and public sector research and establish mechanism for results to be transferred from basic research to commercialisation 	<ul style="list-style-type: none"> • Enact enabling legislation to reinforce confidence in trust based transactions; e-documents, e-signatures • Establish immediately a budget for IT research and development and a venture capital fund to establish a project to take innovations from discovery to commercialisation, support existing innovative ventures • Provide assistance to improve the productivity, diversity and competitiveness of commercial enterprises
<p>Introduce initiatives to stimulate competition to improve efficiency and production of value added services</p>	<p>Institute action and measures to promote competition</p>	<ul style="list-style-type: none"> • Expedite issuing of licenses • Reduce the barriers to entry of the sector by providing access to development finance, reduce duties on inputs • Accelerate the output of all types of IT skills • Facilitate partnership and exchanges with foreign companies and institutions. • Provide market for ICT products- goods and services with local content
<p>Introduce measures to engage the Diaspora in ICT development</p>	<p>Establish online contact with the Diaspora as a matter of policy and provide incentives for its members to participate and seize opportunities in their homeland</p>	<p>Actively solicit investment from returning residents and encourage those planning to retire in Jamaica to invest for the future</p>



Objectives	Activities/Development Initiatives	Support Strategies
<p>Introduce measures to engage the residents of Jamaican communities meaningfully in ICT and national development</p>	<p>Accelerate development of multi media application and diffusion of the Jamaican culture</p> <p>Make ICT a vehicle for real community empowerment and a catalyst for sustainable rural & community development rather than just being supportive of recycled initiatives with transient impact</p>	<p>Computers must be utilized instead of being locked up in community centres and local public agencies' facilities. The latter has no developmental value.</p> <p>Accelerate new local entrants into the ICT sector</p> <p>Provision of basic electronic services and information for fees e.g. maintenance, repairs, document preparation etc.</p>
<p>Develop strategies to bring rural communities into the development loop</p>	<p>Develop community projects that integrate IT in their design and implementation.</p>	<p>Establish a model of IT as a catalyst for tangible community development, reflected in quality of life and living standard indicators</p>

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