

**AN INTEGRATED ICT-LED SOCIO-ECONOMIC
DEVELOPMENT POLICY AND PLAN
DEVELOPMENT FRAMEWORK FOR GHANA**

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Dedicated to the memory of the late John Setuni Achuliwor, former Deputy Minister for Communications and Technology for his determination and conviction that Ghana should not miss the 'ICT-for-Development' Boat

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The Preamble

This Report constitutes the two volumes of the **Integrated ICT-led Socio-economic Development Policy and Plan Development Framework for Ghana** (*The Framework Document*). It provides an analysis of Ghana's socio-economic development landscape and identified the key developmental challenges facing the country. Also the potential of Ghana pursuing an ICT-led socio-economic development process is examined and analyzed. The Volume 1 of the Report is divided into two parts, --- part one consisting of Chapters 1-4 address the question: '*Where we Are as Nation*' in terms of Ghana's socio-economic performance based on a number of key social and economic indicators. The second part of the Report (Chapter 5) partly addresses the question: '*Where we want to get to as a Nation*'. --- concentrating on issues relating to Ghana embarking on an ICT for accelerated development (ICT4AD) process. This question is further taken up in Volume Two of the Framework Document which is divided into eight chapters.

Reference Technical Documents and Reports of the Two Volumes of the Framework are:

- A Survey of ICT Deployment and Exploitation in Government Ministries and Public Sector Organizations, 2003: *Prepared by the Technical Support Staff of the National ICT Policy and Plan Development Committee.*
- A Survey of On-going ICT Projects and Initiatives in Government Ministries and Public Sector Organizations, 2003: *Prepared by the Technical Support Staff of the National ICT Policy and Plan Development Committee.*
- The Analysis and Summary of the Results of the of the 'On-the-Spot' Questionnaire Compiled During the National Consultative Exercise, 2003: *Prepared by the Technical and Secretarial Support Staff of the National ICT Policy and Plan Development Committee.*
- Report of the Meetings, Dialog Sessions and the Public Fora of the National Consultative Exercise *Prepared by the Secretarial Support Staff of the National ICT Policy and Plan Development Committee.*
- Compilation of ICT-related Projects and Initiatives by Donor and UN Agencies in Ghana *Prepared by the Technical Support Staff of the National ICT Policy and Plan Development Committee.*
- A Survey of ICT Deployment and Exploitation in the Educational System *Prepared by the Technical Support Staff of the National ICT Policy and Plan Development Committee.*
- A Status Report on Ghana's Human Resource Development (HRD) and R&D Capacity: *Prepared by the Technical Support Staff of the National ICT Policy and Plan Development Committee.*
- The Ghana Scan-ICT Project Report, INIIT, 2002: *A Reference Report Prepared by the International Institute for Information Technology (INIIT) as part an IDRC & ECA Africa-wide Pilot Initiative*

VOLUME ONE

**An Analysis of Ghana's Socio-Economic Development Landscape
and Examining the Prospects for Pursuing an ICT-led Accelerated
Development Process**

A nation must have more than its needs not less than it need

A nation should not have.....

Less **food** than its needs
Less **computers** than the nation requires
Less **schools** than meets the needs of its population
Less **exports** than required for a healthy balance of trade
Less **gross national income** than its **national debt per capita**
Less **jobs** than what is required for its growing young population
Less **telephones** than it require to support its growing population
Less **good drinking water** than required to meet the needs of the country
Less **hospitals and clinics** than required to meet demand for health services
Less **good roads** than required to support the nation's economy development
Less expenditure on **social services** than it spend on servicing its **national debt**
Less **university and college places** than required for its growing young population
Less **industries and businesses** than what is required to move the economy forward
Less **books** and other **educational facilities** and **resources** than required for its schools
Less **doctors, engineers, scientists** and other critical **professionals** than the nation's needs
Less **gross national income per capita** than the average for the poorest regions of the world
Less **resources** and **facilities** than required to improve the capacities of its research institutions
Less affordable **good housing** than required to meet the needs of its rapidly growing population
Less **money** than it requires to support its current expenditure and developmental programmes
Less critical **R&D** work and output than is required to advance the nation's technological development
Less yield per hectare in **agricultural** production than required to compete effectively on the world market
Less **resources** and other critical **facilities** than required to support the advancement of its universities and colleges

"The Mountain of the Challenges of a Modern Nation"

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Where We Are as a Nation

“The rise or fall of a nation starts from the homes of its people
----- The Greatest asset any nation can ever have is its people.”
...Professor Clement K. Dzidonu

Chapter One

A Background Analysis of Key Socio-Economic Indicators

This chapter examines some of the key developmental changes facing Ghana in terms of a number of key socio-economic indicators. Some of the socio-economic indicators analyzed include: a number of demographic and economic indicators as well as those relating to employment, occupation and the educational attainment of the economically active population.

1.1 Key Demographic and Socio Economic Indicators

Ghana with a land area of 238,537 square kilometers and a population of approximately 19 million has a population growth rate of about 2.5% and a population density of 77 per km². According to the Ghana Statistical Service Summary of Findings of the 2000 Population Census [1]: 'The land area of Ghana was inhabited by 8.6 million in 1970; 12.3 million in 1984; and 18.5 million persons in 2000. --- The number of persons per square kilometer (population density) has moved from 36 persons in 1970 to 52 in 1984 and to 77 in 2000'

Statistics show that: about 44.1% of Ghana's population is below 14 years of age, while 51.3% of the population is between 15 - 64 years with 4.7% aged 60 years and above. About 60% of the Ghanaian population lives in the rural areas. Life expectancy for men is about 59 years and that for women about 60 years. Ghana's crude birth rate per 1000 people is 33 and the infant mortality rate per 1000 live births is approximately 67. Details of Ghana's basic demographic indicators are presented in the Table below.

Basic Demographic Indicators	
Indicator	Value (2000)
Total Population (million)	19
Population: Percent of Males	49%
Population: Percent of Females	51%
Annual Population Growth Rate	2.5%
Population Density (persons per sq. km)	77
Population Distribution (%)	Urban (38%): Rural (62%)

Age Distribution of Population	
Under 15 years	43.5
15 to 24	17.4
25 to 39	17.6
40 to 54	11.9
55 to 64	4.5
65 and above	5.0
Other Demographic Indicators	
Total Fertility Rate	4.6
Crude Birth Rate per 1000	33
Life Expectancy (men)	59
Life Expectancy (women)	62
Infant Mortality (per 1000 live births)	67
Maternal Mortality (per 10,000 live births)	240

Source: Ghana Statistical Service

- **On Ghana's Youthful Population**

Ghana, on the basis of the age distribution of its population has a relatively young population with close to 60% of the population under the age of 25 years and only 5% of the population over 65% years old. The relative youthfulness of the Ghanaian population has both social and economic implications. For example, a young population provides a rich resource pool from which the necessary skilled human resources can be developed and tapped to facilitate Ghana's socio-economic development. On the other hand a youthful population can translate into a heavy social expenditure budget in areas like: education, training and the provision of health and other social services.

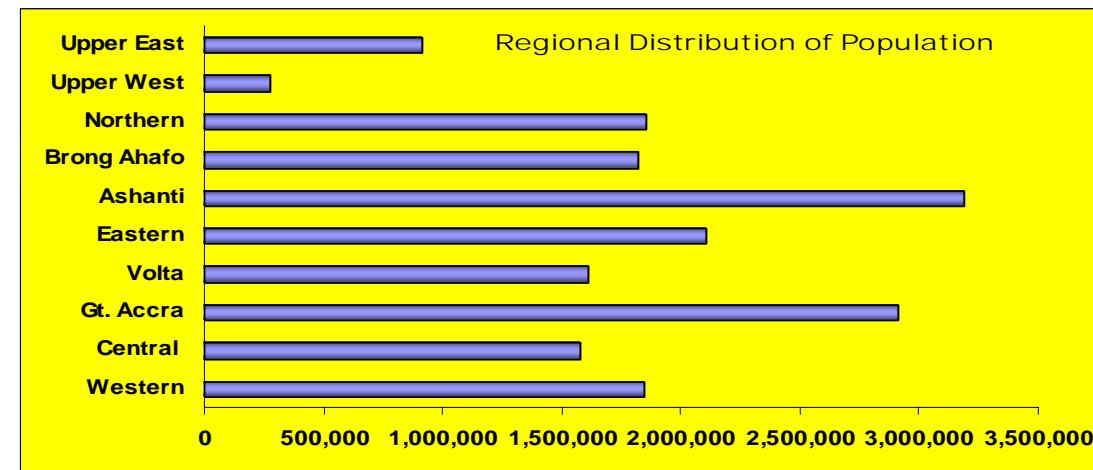
It could be argued that due to the youthful nature of the population and the increasing realization of the value of education by the population at large, Ghana's educational system is facing an increasing demand for educational places in the face of limited resources to meet these demands. In effect,

the country's educational system is operating in an environment, characterized by limited educational resources, in the face of increasing demands for educational services.

Also it could be argued that: *failure to turn the youthful population into a skilled human resource asset may translate into a high unemployed population in the years to come – this could possibly lead to serious social problems which could aggravate in situations where the economy is unable to provide adequate employment opportunities through an accelerated development fueled by high growth rates.*

- **Examining the Regional Distribution of the Population**

Ghana is made up of 10 administrative regions varying both in size and population density. The regional distribution of the population is presented below ---- Ashanti region have the largest of close to 17.3%, followed by Greater Accra region with 15.8%; the Eastern, Northern and the Western regions with 11.4%, 10.1% and 10% of the population respectively. The region with the smallest population is the Upper West region with only 3.1% of the total population. The percentages for the rest of the regions are: Upper East (5.0%), Central (8.6%), Volta (8.8%) and Brong Ahafo (9.9%)

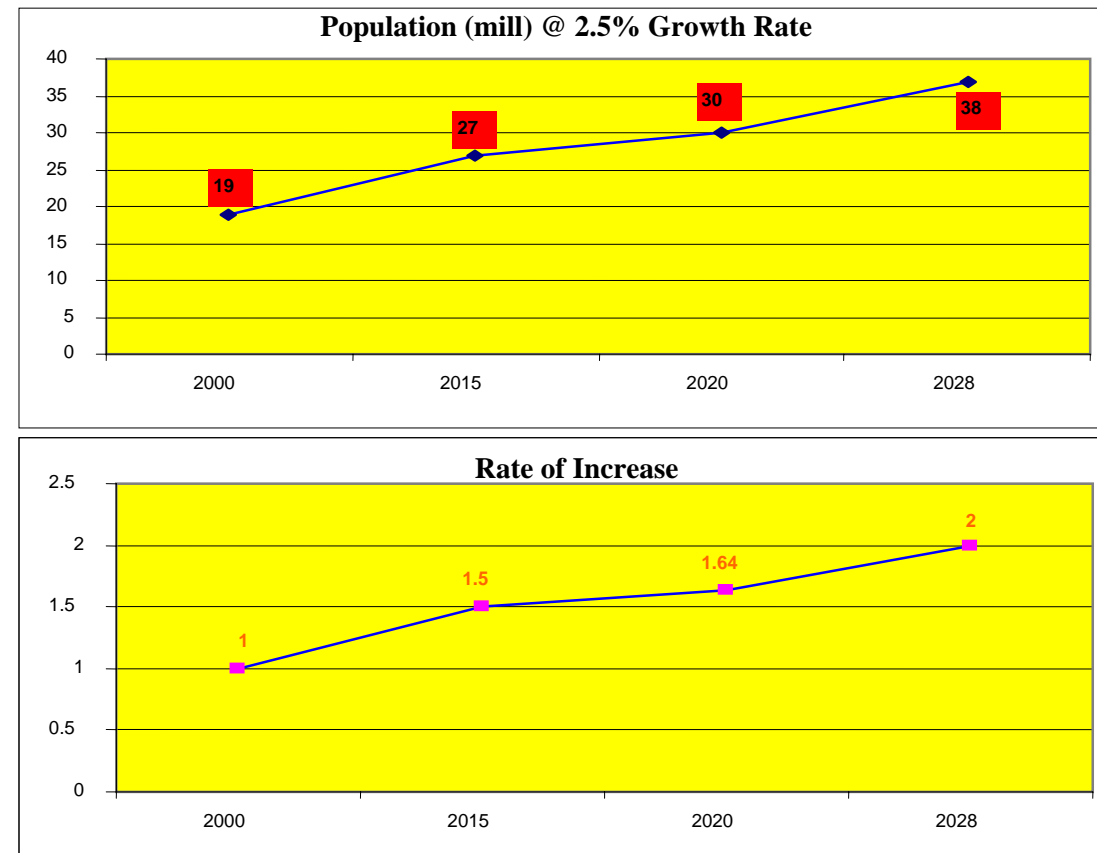


Source: Ghana Statistical Service

The regions with the highest population density are: Greater Accra and Central regions, with each having a population density of 161 per km², --- more than double the national figure of 77 per km². Next in line are: Ashanti (131 per km²), Eastern (109 per km²) and Upper East (104 per km²). The regions with population density less than the national average are: Brong Ahafo (46 per km²), Upper West (31 per km²) and Northern (26 per km²). The Volta region with a population density of 78 per km² is close to the national figure.

- **Demographic Indicators: Some Projection.**

With Ghana's current population growth rate of close to 2.5%, the country's population as illustrated below will increase by 50% within the next 12 years (by 2015). The population will reach the 30 million mark by 2020 and will almost be double the 2000 figure by 2028.



Source: Ghana Statistical Service

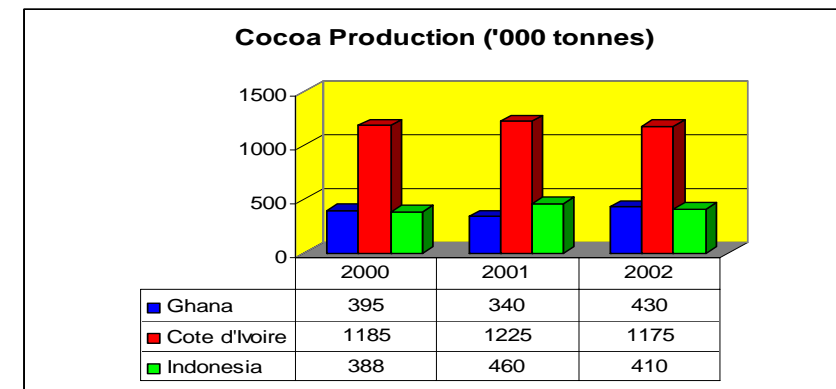
The projected rate of growth in the population can give rise to a number of socio-economic development challenges including those relating to: *pressure on social expenditure in areas like education and health; rural to urban migration which could increase dramatically if there are no amenities and jobs for rural people; and increasing competition for land for agricultural use and for shelter among others.* Furthermore with

Ghana's population likely to double within the next 25 years, the country's inability to develop fast enough economically, could mean that Ghana's already low per capita income currently below \$400 could further reduce substantially and drive more of the population below the poverty line. It is estimated that close to 40% of Ghanaians currently live below the poverty line of less than \$1 per day. According to the Ghana Poverty Reduction Strategy (2002-2004) [2], five of the 10 regions currently have more than 40% of their people living in poverty.

The argument being put forward is that: the socio-economic well-being of the majority of Ghanaian could in the years to come deteriorate further as the population grows without a corresponding substantial growth in the economy. The basic challenge facing Ghana is: *how to achieve the required rapid growth and expansion of the economy to accelerate the process of economic development and wealth creation that could ensure improvements in the socio-economic well-being of the people.*

1.2 An Analysis of Key Economic Indicators

Ghana, with a UNDP Human Development Index of 133 is reasonably endowed with natural resources, which include: forests, and mineral deposits (gold, diamond, manganese and bauxite). It is currently the second largest gold producer in Africa, after South Africa and one of the leading gold producing country in the World. Ghana in the late 1960's lost its position as the World leading producer of cocoa to Cote d'Ivoire and now competes with Indonesia for the second slot.



Source: African Development Indicators (2002), World Bank

As shown in the diagram above, Ghana is currently far behind its neighbour Cote d'Ivoire in terms of annual cocoa output figures. Given that cocoa is Ghana's key export product and foreign exchange earner, the poor performance of the cocoa industry reflects some of the socio-economic development challenges facing the country. Ghana did not only lost its World leader position to Cote d'Ivoire but also the country is now ranked a poor second or third to its close door neighbour. *The poor performance of the Ghana cocoa industry is no doubt having a negative impact on the country's socio-economic development.*

- **Examining the Key Sectors of the Economy**

The Agricultural Sector

Agriculture is currently the backbone of the Ghanaian economy --- In 2000, the sector employed 70% of the labour force, contributed 35.3% to GDP and accounted for 57% of foreign exchange earnings. This sector is also the main source of income for the majority of the population; it is made up of five sub-sectors — crops (excluding cocoa), cocoa, livestock, fisheries and forestry. The average annual growth rate of this sector in recent years is about 2.3% compared to 3.7% growth rate of the entire economy.

Gross Domestic Product (GDP) by Kind of Economic Activity (at 1993 Constant Prices (billion cedis) (2000)		
Sector	Percent Contribution to GDP	Growth Rate
Agriculture Sector	35.3%	2.3%
Services Sector	35.3%	4.8%
Industrial Sector	25.4%	4.7%
Total	100%	3.7%

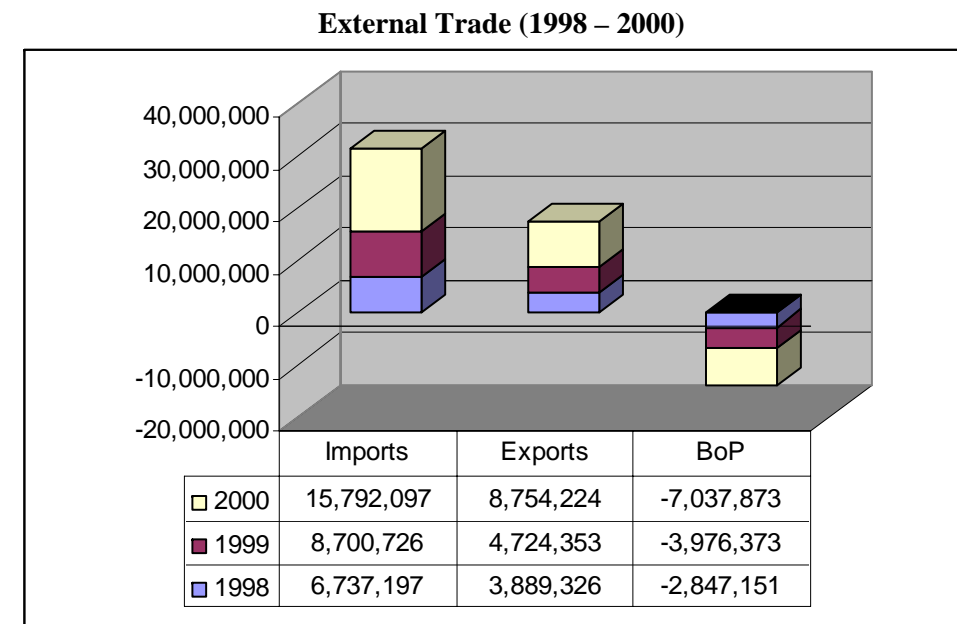
Source: Ghana Statistical Service

The Industrial and Services Sector

Ghana's industrial sector which is made up of sub-sectors like: manufacturing, mining, and construction accounts for about 25.4% of GDP and 13% of the total work force. On the other hand, the service sector consisting of sub-sectors like: trade-related services, transportation, financial and banking services, public administration, etc accounts for nearly 35.3% of the GDP and employ more than 25% of the work force. The average annual growth rate of the industrial sector is estimated at about 4.7% and that of the service sector at about 4.8%. The overall growth of the economy using 2000 figures was estimated at about 3.7%.

- **External Trade and Balance of Payment**

Ghana's trade with the outside world is import dominated with the value of imported goods and services almost doubled that of exports in most years. As illustrated below, Ghana has been registering huge annual balance of payment (BoP) deficits for a number of years.



Source: Ghana Statistical Service

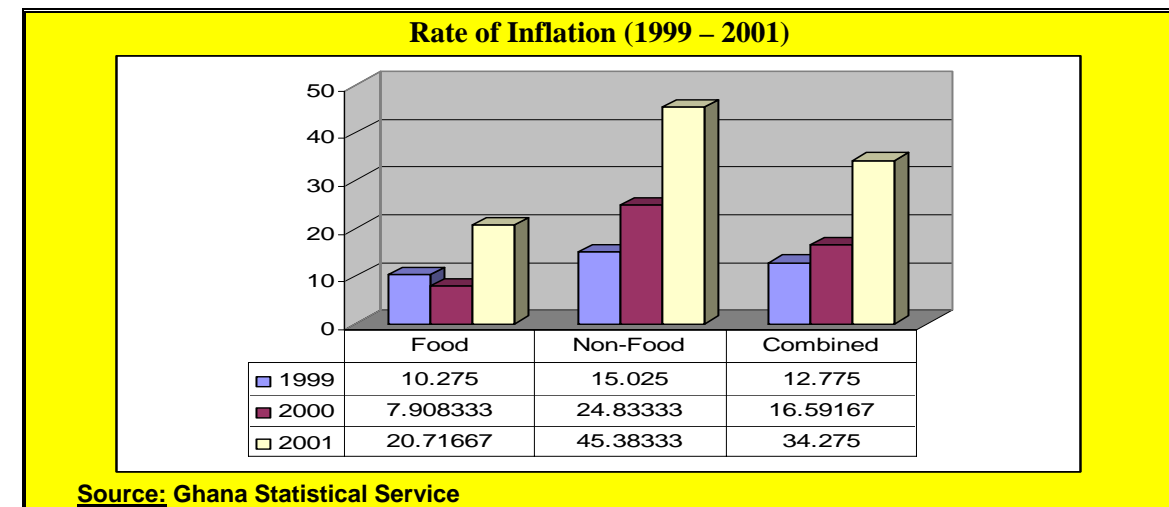
Despite the negative balance of trade, Ghana recorded an appreciable growth in its export sector during the 1980's and 1990's. As illustrated on the next page, export of goods and services as percentage of GDP improved substantially since 1980. For example, the figure for 1990 was 16.9% about double the 1980 figure. By 2000 the figure had reached almost 50% of GDP.



In effect although export figures improved dramatically in the 1980's and 1990's, the corresponding much higher increase in imports during the same period translated into Ghana recording balance of trade deficits during most of this period.

- **Ghana's Rate of Inflation – The Recent Trend**

Ghana's, inflation rate in the 1980's was at one time as high as 142%. This figure reduced over the years to around 10% in 1993. As illustrated on the next page, Ghana's annual combined inflation rate was about 13% in 1999, increasing to some 17% in 2000. The rate then shot up to approximately 34% in 2001 and went down in the second half of 2002 to about 28%.



The non-food inflation rate between 1999 and 2001 were in some cases more than double the food-related inflation rate. For example, in 2000 the non-food rate was close to 25% while that of food-related items stood at about 8%. The non-food and food related rates for 2001 were about 45% and 21% respectively.

1.3 On Other Key Socio-Economic Indicators

In order to get the true picture of the socio-economic challenges facing Ghana, it is necessary to examine other key socio-economic indicators including those relating to: the employment status and the occupational profile of the economically active population as well as the level of educational attainment and the literacy rate of the adult population.

- **Employment Status of Economically the Active Population**

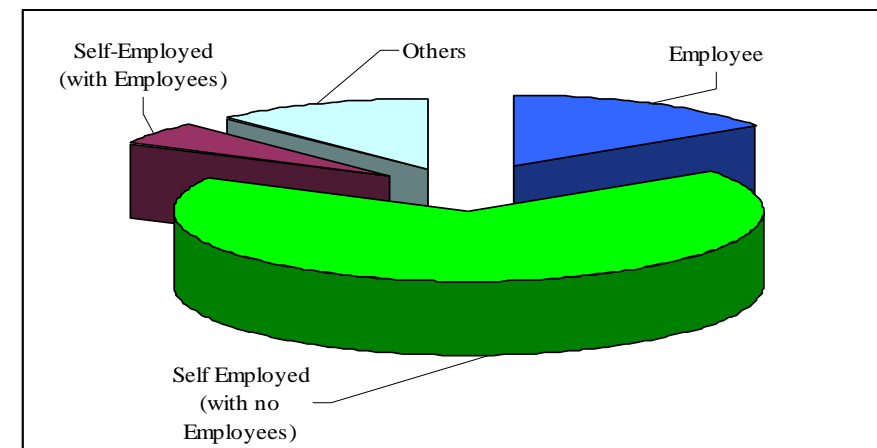
The results of the recent 2000 Population and Housing Census [3] show that: only *about 15% of the working population are employees of public and private sector organizations*. This includes the employees of Government Ministries and public sector organizations as well as private sector establishments like: the banks, financial institutions, manufacturing companies etc. Given that Government is still a major employer, the majority of those categorized as employees are in fact employed in the Government sector.

The census results also show that close to 68% of the employed population are self-employed with no employees. --- These are people who own their own enterprises, work for themselves and employ no one else. In other words, the majority of the working population, work in their own small enterprises which have no other employees apart from themselves. Most of these are involve in: farming (mainly family-based small scale subsistence farming) and fishing; distributive trade (traders, kenkey sellers, shopkeepers, corner-kiosk owners, hawkers, retailers, wholesalers etc); the cottage industry (carpenters, mechanics, barbers, hairdressers, repairers etc) and others like public transport drivers, market women etc.

Conversely, the census results show that only 5.2% of the employed population is self-employed with one or more employees. The majority of people in this category are likely to be those working in the private sector operating small to medium scale companies employing a small number of people.

Employment Status	Percentage
Employee (Public and Private Sector)	15.3%
Self Employed (with no Employees)	67.6%
Self-Employed (with Employees)	5.2%
Others (Unpaid Family Worker, Apprentice, Domestic Employee etc)	11.9%

Source: Ghana Statistical Service 2000 Population and Housing Census, 2002



Source: Ghana Statistical Service 2000 Population and Housing Census, 2002

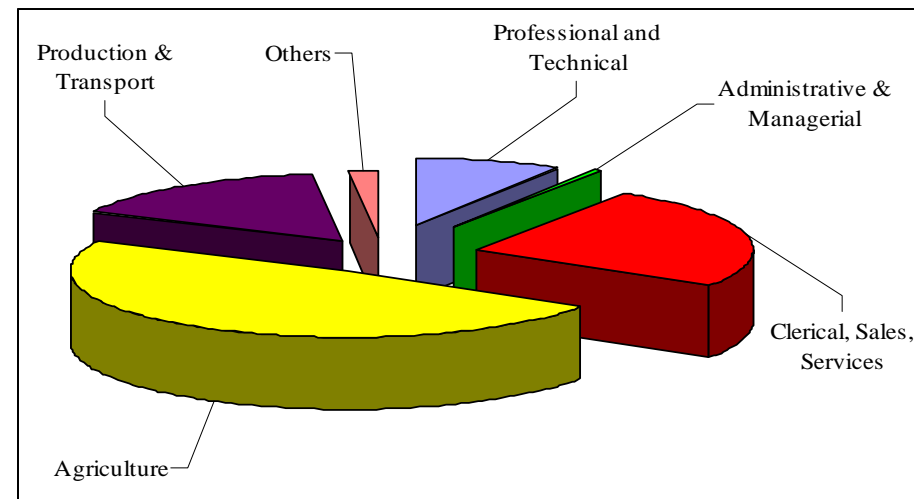
On the whole, based on the employment status of the working population, presented above, it is clear that: *the job creation potential and capacity of the Ghanaian economy is extremely low*. Most of the employed population are involved in set-ups that do not have the potential to generate additional jobs or employment opportunities. Given that new vacancies in the Government sector are declining on a yearly basis, and the fact that, the majority of the self-employed, do not have the capacity to employ others, prospects for job opportunities for what is a relatively young population are very low. This evidence no doubt present the nation with some crucial developmental challenges which need to be addressed if the country is to make an appreciable progress in its developmental efforts.

- **Occupational of the Economically Active Population (15yrs+)**

The 2000 Population and Housing Census results show that the majority (about 48%) of the economically active population are occupationally involved in agriculture. The majority of these are small-hold farmers who can be classified as self-employed with no employees. As shown below, close to a quarter of the economically active population of age 15 years and above, are engaged in occupations like clerical, sales and services. This figure include clerical level staff in the public and private sector organizations and those involved in distributive activities and service provision mainly in the private sector.

Type of Occupation	Percentage
Professional and Technical	8.6%
Administrative & Managerial	0.3%
Clerical, Sales, Services	25.2%
Agriculture	47.9%
Production & Transport	16.2%
Others	1.6%

Source: Ghana Statistical Service 2000 Population and Housing Census, 2002



Source: Ghana Statistical Service 2000 Pop. & Housing Census, 2002

Only 8.6% of the economically active population is professional and technical people with a lower percentage of 0.3 work as managers and administrators. *The low percentage of key technical and professional people like engineers, accountants, architects, doctors, lawyers, scientists etc as evident in the census figures highlights the relatively low professional and technical skill human resource capacity of the economy.* Evidence from other countries that are making progress in their socio-economic development efforts show that a reasonably large pool of professional and technical human resources is a vital requirement to facilitating a rapid socio-economic development.

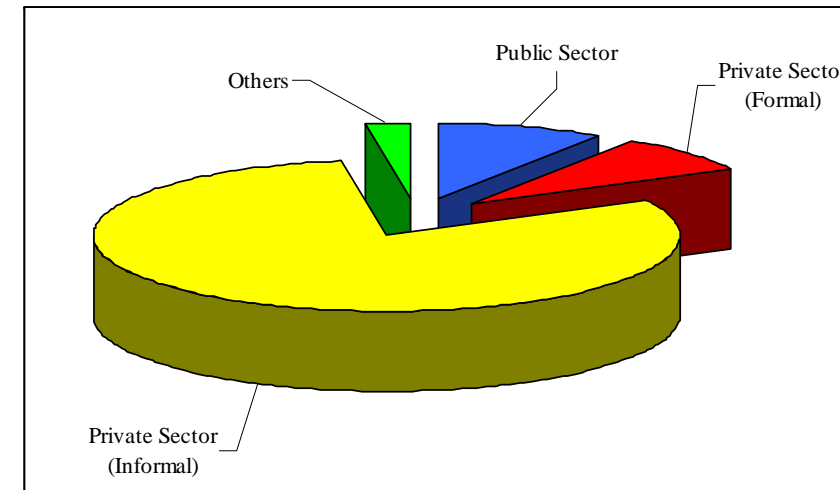
Improving on Ghana's low technical and professional skill capacity could then be regarded as a major developmental challenge that need to be addressed if the country is to make an appreciable progress in its socio-economic development. Furthermore, since the agriculture sector is traditionally dominated by unskilled manpower – given the subsistence nature of the country's agricultural sector, the indication that close to 48% of the economically active population are occupationally employed in this sector, is evidence that a high proportion of the Ghanaian workforce are unskilled --- This evidence does present Ghana with a major developmental challenge in relation to the modernization and advancement of the economy

- **Employment Sector of the Economically Active Population**

The results of the National Population and Housing Census show that: *the informal private sector is by far the largest employment sector of the Ghanaian economy.* This sector alone accounts for about 80% of the employed work force. According to the 2000 Population and Housing Census Enumerators Manual [4], the informal private sector is defined to include: establishments without established procedures for keeping records, recruitment, promotion and dismissals e.g. Kumasi Magazine Garages, Abossey Okai Spare Parts Shops, Mallam Atta Market Traders, road-side traders and kiosk owners etc. The domination of the informal private sector in terms of the employment figures confirms the evidence that the majority of the economically active populations are self-employed with no employees. The formal private sector --- defined to consist of private establishments with established procedures for keeping records, recruitment, promotion and dismissals e.g. Mobil, Accra Brewery, Darko Farms, the Banks etc, accounts for only 7.8% of the employment of the economically active population.

Employment Sector	Percentage
Public Sector (Govt. Ministries and PSOs)	5.9%
Private Sector (Formal)	7.8%
Private Sector (Informal)	80.4%
Others	5.9%

Source: Ghana Statistical Service 2000 Pop. & Housing Census, 2002



Source: Ghana Statistical Service 2000 Pop. & Housing Census, 2002

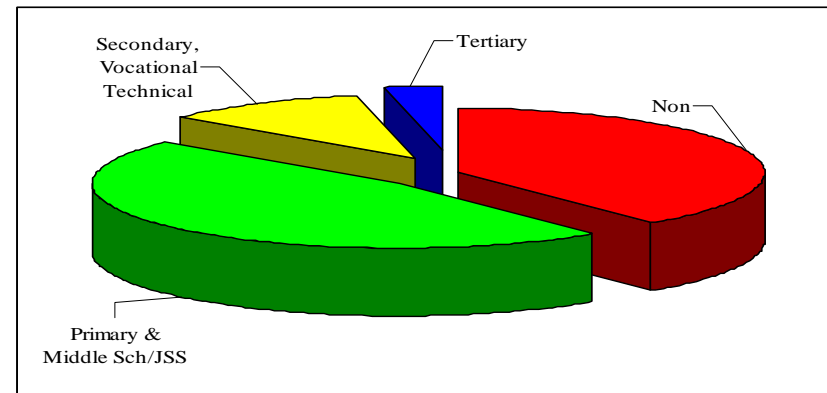
With the public sector employing only about 5.9% and the formal private sector about 7.8% of the economically active population, it is obvious that, the employment capacity of the two sectors of the Ghanaian economy is very low. Furthermore since these two sectors are more likely to be the direct taxable source of revenue than the informal private sector, the negative socio-economic development implications of the dominance of the informal private sector can be substantial employment-wise.

- **Educational Attainment (6 years +)**

The recent census results shows that close to 40% of Ghanaians (6 years+) have never been to school, in other words they have no educational attainment of any sort. This statistics coupled with the evidence that only about 3% of the population had tertiary level education do present Ghana with a major developmental challenge

Educational Attainment	Percent of Population
Non	39.3%
Primary & Middle Sch/JSS	46.7%
Secondary, Vocational Technical	10.9%
Tertiary	3.1%

Source: Ghana Statistical Service 2000 Population & Housing Census, 2002



Source: Ghana Statistical Service 2000 Pop. & Housing Census, 2002

It is obvious from the Census results that: *for Ghana to make any appreciable progress in its socio-economic development efforts, substantial resources will need to be directed at reducing the percentage of the population without any educational attainment and increasing the percentage of the population with tertiary level education.* Countries who are making substantial progress in socio-economic development terms invested a lot in reducing illiteracy and improving access to higher and further education.

**“Part of solving a problem is knowing the problem --- No nation can move forward by tip-toeing
around its problems”
... Professor Clement K. Dzidonu**

Chapter Two

A Situational Analysis of Ghana's Economic Development Process and Performance

This chapter examined Ghana's past socio-economic development process and performance as well as carried out a comparative analysis targeted at rating Ghana's performance with those of other countries in the region and beyond. To put these analyses within context, we briefly examine below key elements of the country's past socio-economic development policy frameworks and programmes.

2.1 On Ghana's Past Socio-Economic Development Policy Frameworks and Programmes

Ghana since the 1950's (and in particular after independence in 1957) developed and implemented a number of socio-economic development programmes. The major ones are examined below.

Prior to the 1980's the socio-economic development plans formulated and implemented include:

- The 1st and 2nd Development and Consolidated Plans (1951- 1959)
- The Seven-Year Development Plan (1963/64 – 1969/70)
- The 2-Year Development Plan (1968 – 1970)
- The Five-Year Development Plan (1975/76 – 1970/80)

The main goals and objective of these pre-1980 socio-economic development programmes and plans include:

- To establish a strong progressive society and economy and improve the well-being of all Ghanaians
- To reduce poverty and facilitate equitable distribution of income
- Improve access to education, health and housing and reduce the level and impact of unemployment
- Stimulate overall economic growth, improve agriculture and promote industrialization
- Enhance human, rural and urban development

The post 1980 era saw the development of the *Vision 2020: The First Steps (1996-2000)*, the Interim Ghana Poverty Reduction Strategy Paper (I-PRSP) (2000 -2004) and the *Ghana Poverty Reduction Strategy (2002 -2004)*. A national visioning consultative process under the auspices of the

National Development Planning Commission (NDPC) aimed at developing a broad-based socio-economic development framework for Ghana yielded the: *Co-ordinated Programme for Economic and Social Development of Ghana (2003-2012)*.

The Ghana Vision 2020 as a socio-economic development programme was aimed at transforming the country into a middle-income country by 2020. The programme encompasses a number of aspects including: human, rural, urban and economic development. It was also aimed at the creation of the requisite infrastructure for public and private participation in the country's development.

The key objectives of the Vision 2020 Framework were:

- to transform the country's economy by the target year 2020, from its low-income status to that of a middle-income country of the ranks of the so-called Newly Industrialized Countries;
- to create an open and liberal market economy, founded on competition, initiative and creativity;
- to employ science and technology to derive maximum productivity from the use of the nation's human and natural resources;
- to optimize the rate of economic and social development, with due regard to the protection of the environment and to equity in the distribution of the benefits of development;
- to reduce the population growth rate by one percent and increase the national income growth rate by at least 8% per annum; and
- to eventually make Ghana a country in which the people will have, among other things, a long, healthy and productive life with access to an enlarged range of choices of employment, shelter and leisure.

The Vision 2020 programme had two phases: the medium term (1996-2000), and the long term. The medium term programme (called Vision 2020 – The First Steps) which ended in 2000 was designed to consolidate the gains achieved through the Economic Recovery Programme (ERP) which Ghana embarked on in the early 1980's as part of a Structural Adjustment Economic Programme with the support of the International Monetary Fund (IMF), the World Bank and other donors.

The ERP was aimed at reversing the serious economic decline of the pre-1980's and transforming the economy to a liberalized market-driven economy. The programme had led to the liberalization of trade, an end to exchange controls, the establishment of the Ghana Stock Exchange and the privatization of a number of state owned enterprises. The Ghana Structural Adjustment Programme which in the 1990s was regarded as a model for other African countries has (as per the details presented in section 2.2 below) substantially contributed to reversing the economic crisis of the late 1970's, encouraged the development of the physical and communications infrastructure and to some extent, contributed to improving the living standards of Ghanaians.

The Ghana Poverty Reduction Strategy (GPRS) [2002 -2004] representing a policy framework to support growth and poverty reduction over a three year period has its goal as ensuring: a sustainable equitable growth, an accelerated poverty reduction and the protection of the vulnerable and excluded within a decentralized democratic environment. The broad objectives of the GPRS is to: ensure economic stability for accelerated growth, increase production and gainful employment, facilitate equitable human development and provision for the vulnerable and the excluded, ensure good governance and partner with the private sector as the main engine of growth.

The Co-ordinated Programme of Economic and Social Development of Ghana (2003-2012)

The ongoing socio-economic framework development visioning process being referred to as: *From Poverty Reduction to Wealth Creation --- Creating a Vision for Ghana*, has as its main goals: the development of the agro-based industry, pursuing an ICT-driven socio-economic development with the aspiration to transform Ghana into the IT hub of Africa; the promotion of private sector-led economy; and the development of agriculture sector through concentration on selected crops – cocoa, cassava and oil palm. The key objectives are to: ensure rule of law and good governance, provide direct support for human development and provision of basic services, sound economic management, provide special programme in support of the vulnerable and excluded, and to decentralize government operations.

The visioning process has yielded a concrete broad-based programme for development: the *Coordinated Programme of Economic and Social Development of Ghana (2003-2012)*. This programme, which is to serve as the broad socio-economic development framework for the development of Ghana in the next 10 years is designed to initiate and sustain rapid socio-economic development targeting key sectors of the economy.

The goal of the programme is to transform the Ghanaian economy through rapid industrialization. To achieve this goal, the programme identified: agro-based industrial development and information and communications technologies (ICTs) as two key drivers --- pillars of growth. To provide the necessary supporting environment to enable these two pillars to adequately drive the growth of the economy, the programme is targeting six enablers of growth, these are:

- ensuring sustained macro-economic stability in Ghana;
- ensuring food security in Ghana;
- development of a long-term savings and capital market for long term investment;
- reducing the economy and non-economic cost of doing business to enable the private sector to flourish;
- encouraging science and technology development and application
- forging a cultural framework for socio-economic development

The programme identified a number of specific strategies and initiatives for implementation under each of the two key drivers of growth and their associated six enablers of growth

Concluding....

Despite the various socio-economic development plans and plans implemented by Ghana since the 1950's, Ghana's social and economic performance measured in terms of number of key indicators has on the whole been less than satisfactorily. It could be argued that although Ghana and countries like Malaysia and Singapore started their development process on almost the same footing in the 1950's, Ghana is still classified as a low income country, while Malaysia is now considered a high middle income country aspiring to become a fully developed nation by 2020, with Singapore now

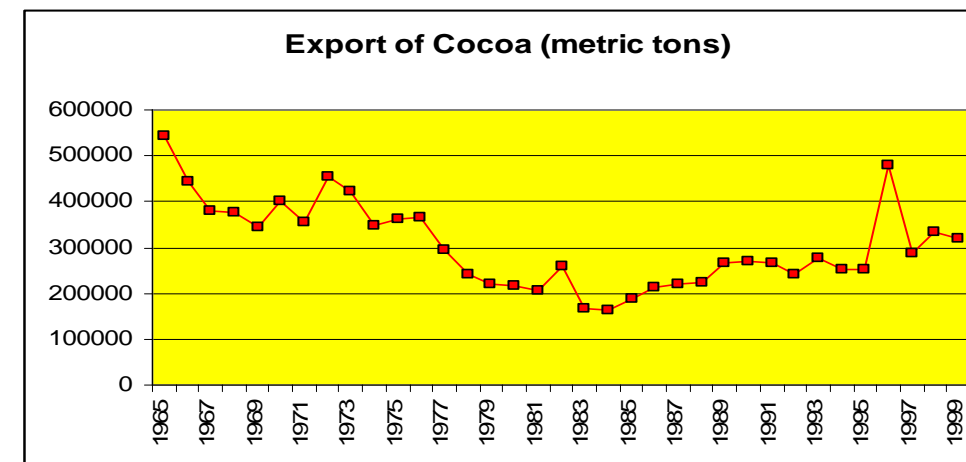
classified as one of the highest income country with income per capita of several thousand dollars. We examine below some of the evidence of Ghana's socio-economic performance since independence.

2.2 An Analysis of Ghana's Past Economic Performance

We examine below the past economic performance of Ghana within two broad periods, namely: (i) the 1960's and 1970's (1960 – 1979) and (ii) the 1980's and 1990 (1980 – 2000).

- **A Review of Ghana's Economic Performance in the 1960's and the 1970's**

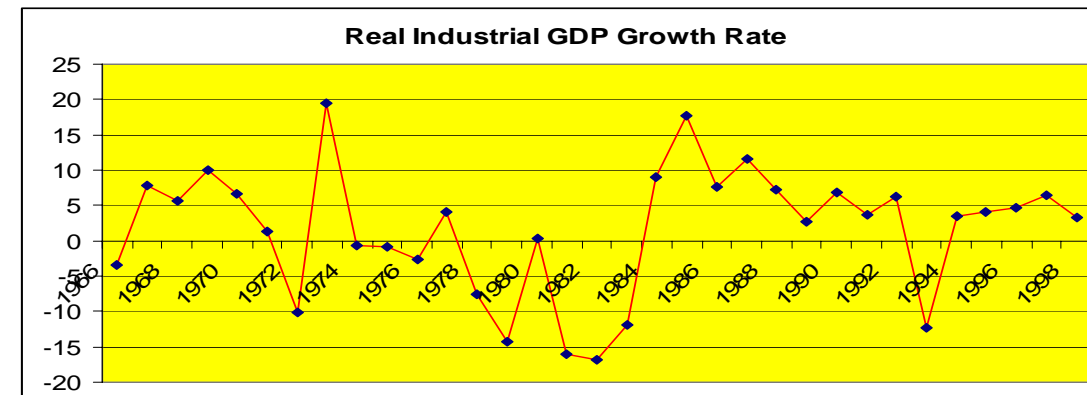
Ghana as the first independent Black African nation, no doubts started reasonably well as a developing nation in the late 1950's and early 1960's. Some progress were made during this period in developing the country's basic infrastructure, improving the educational system and school enrolment as well as the nation's human resource capacity in a number of skill areas. Ghana recorded some improvements in its economic growth rate during this period and the living standard of the people was reasonably comparable to those of other developing countries like India, Malaysia, Brazil, Singapore etc who were at that time making progress in their socio-economic development process. Taking for example, the performance of Ghana's agriculture sector, the backbone of the economy, Ghana was doing well as the World's leading producer of cocoa in the 1960's. For example as shown below, Ghana in the early 1960's was exporting close to 550,000 metric tons of cocoa by 1965 compared to just about 340,000 metric tons in 2000.



Source: African Development Indicators (2002), World Bank

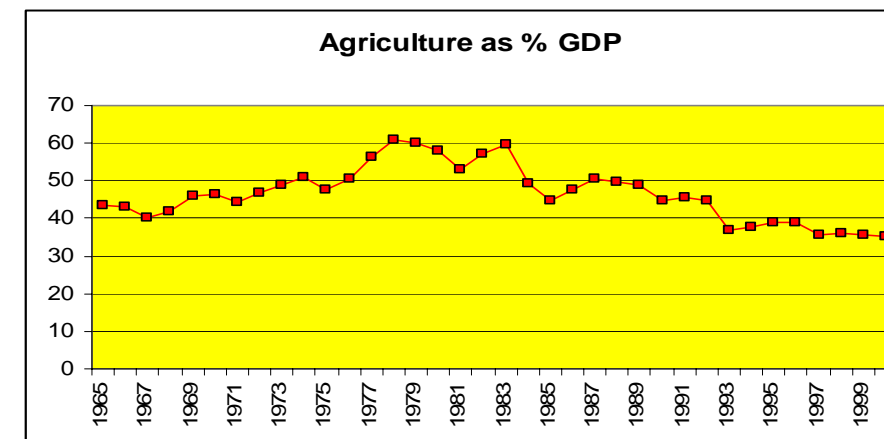
Compared to the 1960's, the country's economic performance in the 1970's was a mixed one, witnessing some progress in the early 1970's when the price of cocoa on the export market was at one of its highest. The late 1970's on the other hand saw a rapid decline in economic performance in a number of areas and sectors. For example, as shown above, Ghana for most part of the late 1970's and the early 1980's up-to 1983, experienced a

rapid drop in its cocoa exports. With cocoa being the main export product the decline of the local cocoa industry during this period is evidence of the economic crisis that Ghana experienced during the late 1970's and the early 1980's.



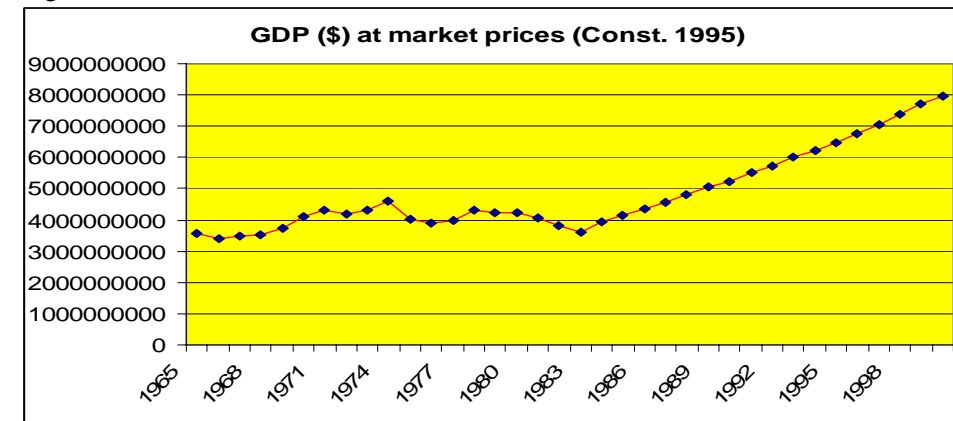
Source: African Development Indicators (2002), World Bank

Examining the performance of the economy in terms of the industrial sector as illustrated above, it is clear that while in the late 1960's and early 1970's, industrial growth rate was in most of the years positive. The late 1970's and the early 1980's up to about 1983 were however periods of negative growth rate. It is also evident from the diagram below, that the late 1970's up-to the early 1980's was the period when the percentage contribution of agriculture to the GDP was at its highest; --- an interpretation could be that, the economy in terms of other sectors like the industrial and services sector was seriously under-performing during this period.



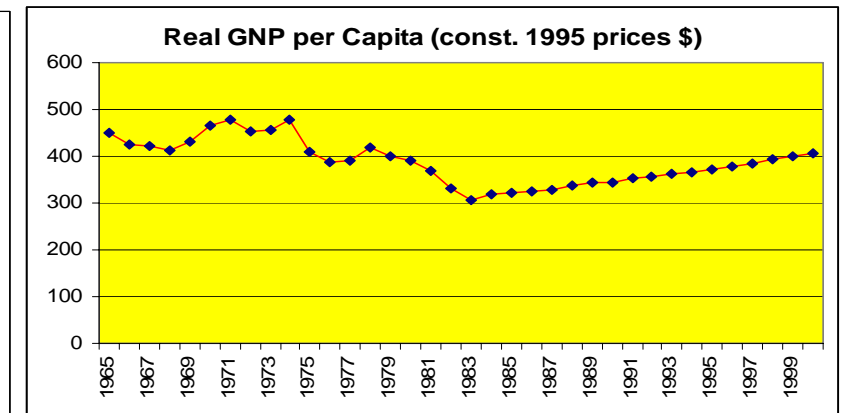
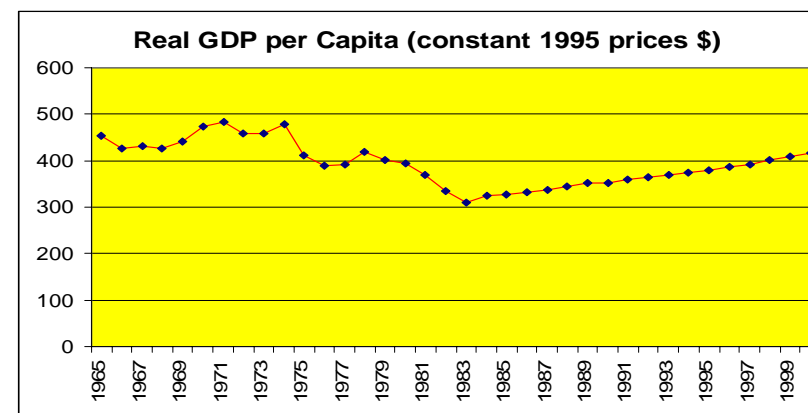
Source: African Development Indicators (2002), World Bank

On the whole, the late 1970's and the early 80's up to 1983 was a period of negative economic growth, high inflation rates and the lowering of standards of living for the majority of Ghanaians. It is obvious from the analysis that it was not until after 1983 that Ghana began to register a positive growth rate compare to the negative growth of the late 1970's.



Source: African Development Indicators (2002), World Bank

As shown above, Ghana's GDP figures which were virtually stagnant for a number of years in the 1970's; fell to its lowest level in 1983, and began to improve yearly from 1984. The 1980's (especially from 1984 onwards) and the 1990's saw a major up-turn in the economy with the country experiencing positive growth rate compared to the negative growth of the late 1970's. In fact it was during the 1980's that Ghana recorded one of the highest growth rates in the nation's history. ---- This was in 1984 when Ghana achieved a GDP growth rate of 8.8%. The following diagrams again provide an illustration of the up-turn in the Ghanaian economy after 1983, measured in terms of GDP per capita and GNP per capita at constant prices.

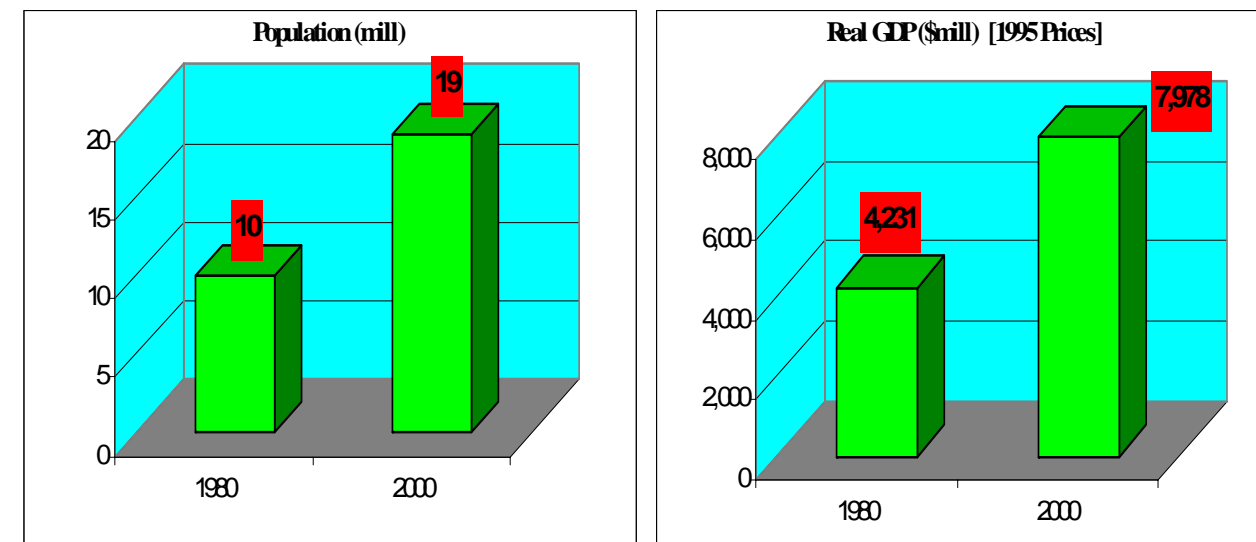


Source: African Development Indicators (2002), World Bank

There is no doubt that Ghana's economic fortunes, compared to the late 1970's began to improve after 1983 --- but although the country recovered substantially during the 1980's and the 1990's it was unable to achieve the per income capita levels of the 1960's and early 70's when the real GDP per capita and the GNP per capita reached their peak at: \$460 and \$457 respectively in 1973 (as shown above). We examine into some detail in the following section the performance of the Ghanaian economy in the 1980's and the 1990's,

- **A Review of Ghana's Socio-Economic Performance in the 1980's and the 1990's**

Ghana with a population of close to 10 million in 1980 almost doubled this figure to close to 19 million by Year 2000 In 1980, the country's real GDP (at 1995 prices) was \$4,231 million; this figure saw an improvement to about \$7,978 million by 2000. The average annual growth rate within the 20 years period, within 1980 and 2000 was estimated at about 2.8% per annum.



Source: African Development Indicators (2002), World Bank

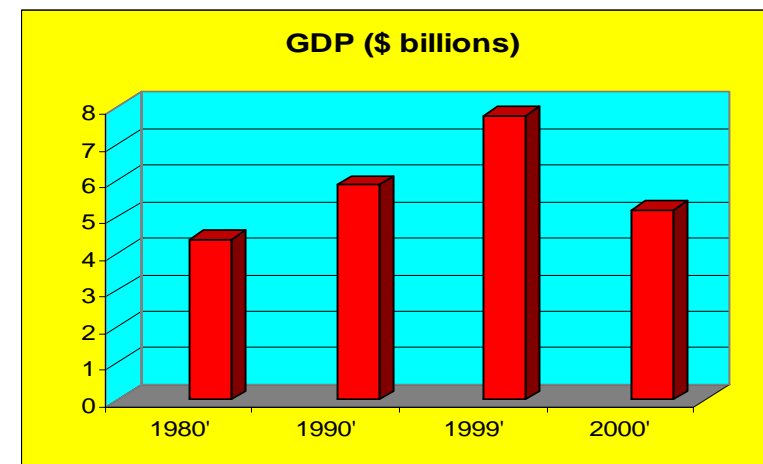
Examining Ghana's economic performance measured in terms of key indicators like the GDP shows that Ghana's real GDP/capita (at 1995 prices) estimated at \$394 in 1980 increased to \$420 by Year 2000 --- representing a 6.5% increase over the 1980 figure.

Some Economic Performance Indicators

	1980	2000	Average annual growth 1980-2000
Population (mill)	11	19	2.8
Real GDP (\$mill) [1995 prices]	4,231	7,978	2.8
Real GDP/cap	394	420	
GNI/cap (\$)	430	340	383 (annual average)

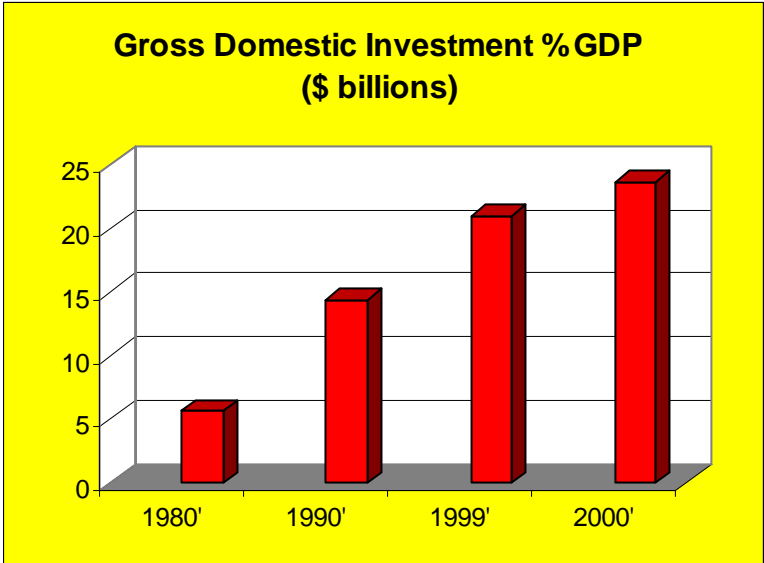
Source: World Development Indicators, 2002

As illustrated below, Ghana recorded one of its highest GDP figure of \$7.8 billion in 1999, ---- this figure fell to about \$5.2 billion in 2000. The figures for 1980 and 1990 were \$4.4 billion and 5.9 billion respectively



Source: African Development Indicators (2002), World Bank

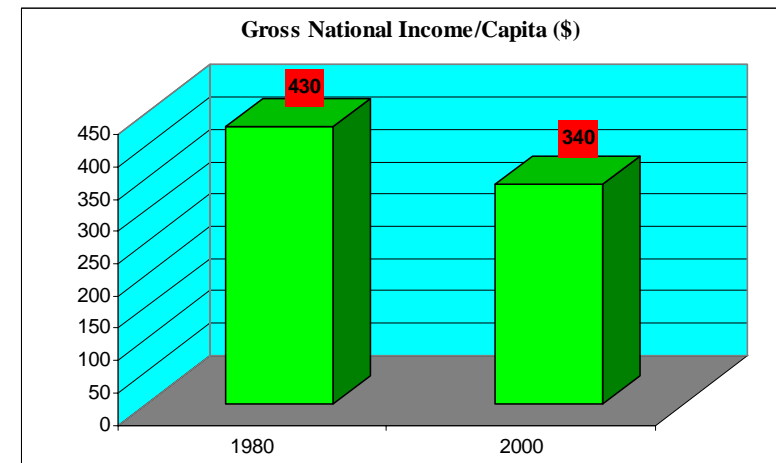
On gross domestic investment measured as a percentage of GDP, the country experienced a major growth in this area as illustrated in the diagram below. Starting from a figure of 5.6% in 1980, the rate more than doubled by 1990 to close to 15% of GDP and by year 2000 the economy was registering a gross domestic investment as a percentage of a GDP figure of about 24%; almost 300% increase over the 1980 figure.



Source: African Development Indicators (2002), World Bank

However, examining the country’s economic performance in terms of the gross national income per capita, (as shown on the next page), Ghana actually experienced a drop from \$430 in 1980 to about a \$340 per capita income in 2000. The annual average during this period was \$383 --- with the highest per capita income of \$440 being recorded in 1988. It is obvious that the doubling of the nation’s population without a corresponding major improvements in the economy during the same period, did translate into a relative reduction in the per capita income, although real GDP/capita show some improvements during this period.

Ghana’s current per capita income of close to \$340 translate into a world ranking of 173 while Cote d’Ivoire with a per capita income of \$600 is ranked high above Ghana at 148, the corresponding rankings for countries like Botswana and Mauritius with considerably higher per capita incomes are 80 and 85 respectively.



Source: World Development Indicators (2002), World Bank

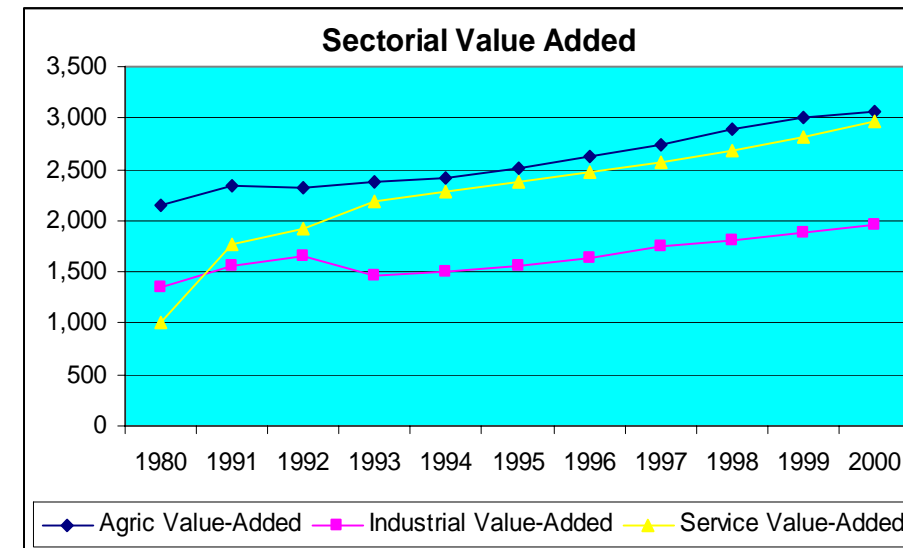
An examination of the economic performance of Ghana in terms of specific sectors like: agriculture, industry and services sector, shows that the country achieved some mix results, with some sectors doing better than others when we compare the 1980 figures with those of 2000 figures. For example, agriculture value added (net output of agric sector after adding up all outputs and subtracting intermediate inputs) calculated in real terms (using 1995 prices) which was estimated at \$1,356 million in 1980 improved marginally to \$1,962 million in 2000. --- The average annual growth was only 1.9% per annum between 1980 and 2000.

A similar examination of the country's industrial performance within the same period shows that the industry value added increase marginally from \$1,356 million in 1980 to just \$1,962 million in 2000 --- with an average annual growth between 1980 – 2000 given as 1.4% per annum. The service sector performance show that the value added in services increased appreciably from \$1,015 million in 1980 to about \$2,963 million in 2000 --- with the annual growth between 1980 and 2000 averaging at 4.6% per annum.

Sectoral Performance – Value Added

Value Added (\$mill) [1995 prices]	1980	2000	Average annual growth 1980-2000
Agriculture	2,143	3,063	1.9
Industry	1,356	1,962	1.4
Services	1,015	2,963	4.6

Source: World Development Indicators (2002), World Bank



Source: World Development Indicators (2002), World Bank

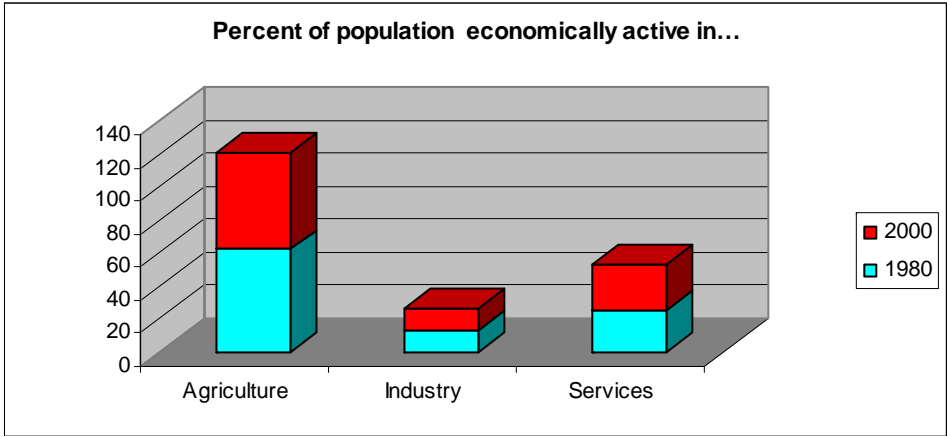
The illustration above shows that, the year-to-year increase in value-added has not been significant in all the three key sectors of the economy during the 1990's. While the service sector shows a reasonable yearly growth in terms of value added, the figures for the industrial sector and to some extent the agriculture sector were not encouraging.

On the Structural Changes in the Economy

Examining the level of economic activity of the various sectors, measured in terms of the percentage of economically active population in each of these sectors, shows that while the percentage for the agriculture sector dropped marginally to 59% in 2000 from the 1980 figure of 62%, that for the industrial sector remained the same at 13% while the service sector show a marginal increase from 25% (in 1980) to 28% (in 2000).

Percent of Population Economically Active in...		
Sector	1980	2000
Agriculture	62%	59%
Industry	13%	13%
Services	25%	28%

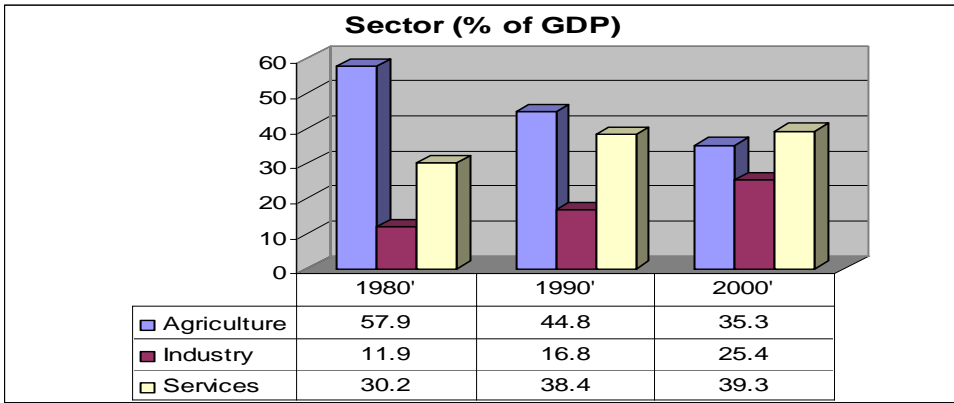
Source: World Development Indicators (2002), World Bank



Source: World Development Indicators (2002), World Bank

Traditionally as a given economy develops, the contribution of the agriculture sector measured in terms of key indicators like the percentage contribution to GDP, and the percentage of the population economically active in the agriculture sector reduces whilst that of the service sector and to some extent the industrial sector increases. The insignificant reduction in the percent of population economically active in the agriculture sector from 62% to 59% and the marginal increase in the case of the service sector and the no change in the case of the industrial sector is evident that structure of the Ghanaian economy has not change that much over the 20 year period. The economy in 2000 as compared to 1980 is still predominately agriculture-base without a substantial shift towards the service sector and industrial sector as should be expected if the economy were on a rapid growth path during that period.

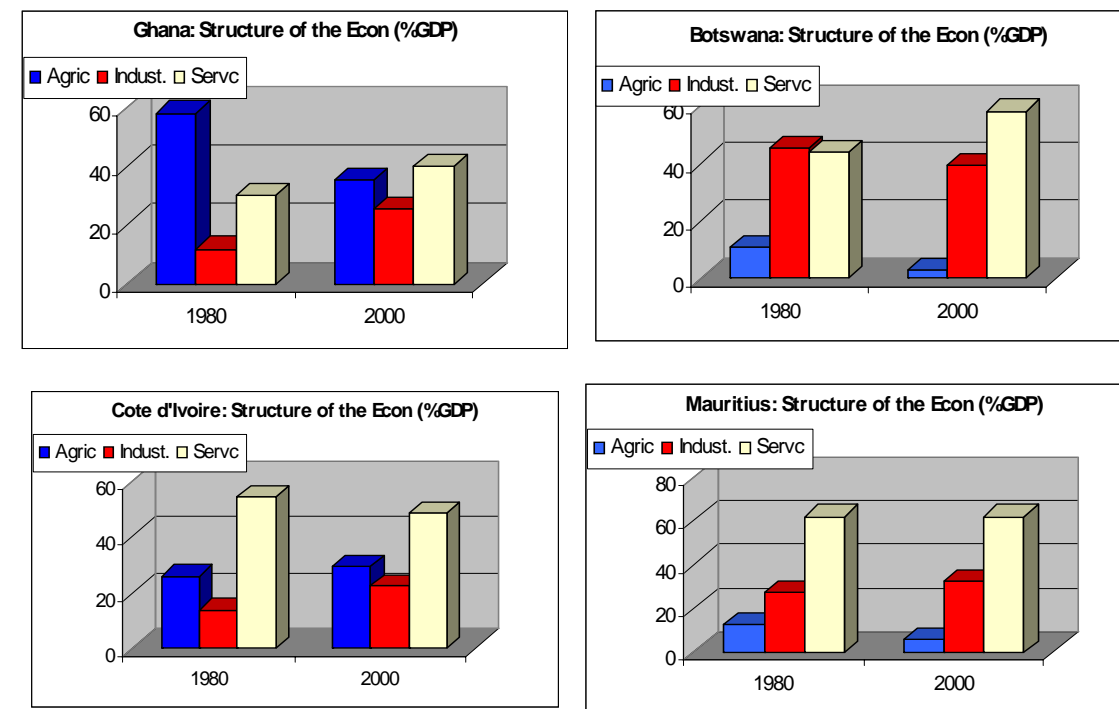
Examining the possible changes in the Ghanaian economy measured in terms of sectorial contribution to GDP, as illustrated below confirmed that the structure of the economy did not change appreciably over the years.



Source: World Development Indicators (2002), World Bank

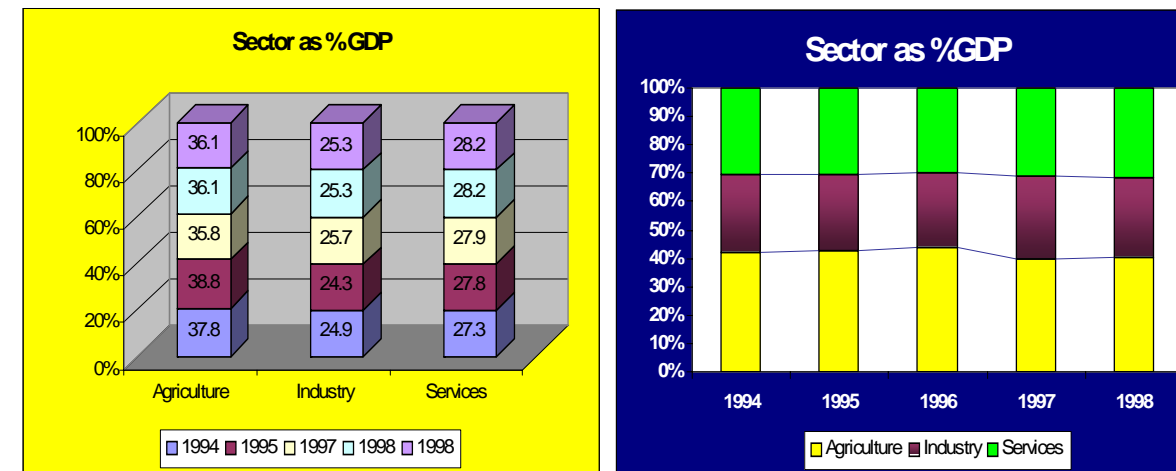
While the percentage contribution to GDP reduced from 59.9% in 1980 to 35.3% in 2000, and that of industry increased from 11.9% to 25.4%, the service sector's contribution to GDP only increase marginally from 30.2% in 1980 to 39.8% in 2000.

Comparable structural changes in the economies of selected African countries as illustrated below, do indicate that compared to Ghana, countries like, Cote d'Ivoire, Botswana and Mauritius among others have experienced over the same period a major structural shift in their respective economies towards a more services sector and industrial sector dominated economy. Compared to Ghana, these other countries are in effect exhibiting healthy signs of a growing modern economy, with considerably less contribution of the agriculture sector to the GDP.



Source: World Development Indicators (2002), World Bank

Further evidence illustrated below, confirms the observation made earlier that the structure of the Ghanaian economy did not experience appreciable change in the late 1990's. The proportional contribution of the three main sectors to the GDP remained almost the same during this period. For example, the contribution of the agriculture sector ranges between 35% and 38%, that of the industrial sector, between 24% and 25% and the service sector, between 27 and 28%.



Source: World Development Indicators (2002), World Bank

Specifically on the Agriculture Sector

Given that the agricultural sector is the backbone of the Ghanaian economy, it will be necessary to examine its performance within the economy in some detail. Focusing on a number of key indicators, it is obvious from the details presented in the Table below that although Ghana's food production index in 2000 was 167 compare to the 1980 figure of about 69, the actual annual average growth during this period was just 2.8 per annum. The corresponding annual growth rate for the non-food production index was slightly higher at 3.7%. The food production per capita index which in 2000 was about 125, was only a marginal increase over the 1980 figure of 97. The average annual growth rate during the period 1980 to 2000 was actually -0.20. On the whole the food and the non-food production index did experience a reasonably appreciable growth rate between 1980 and 2000.

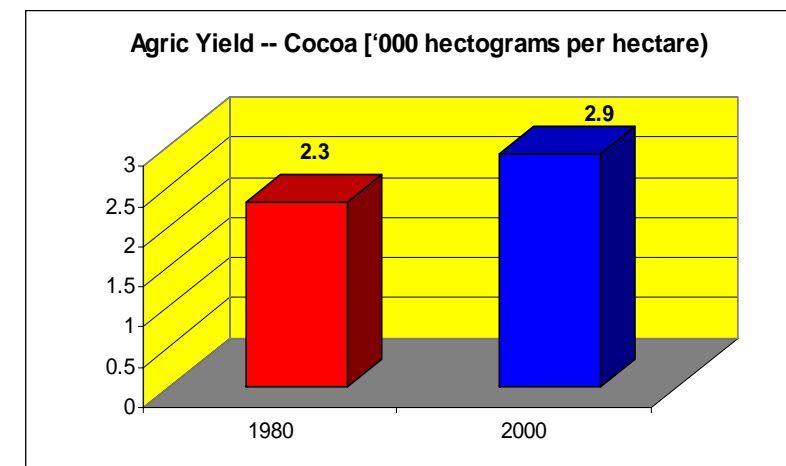
On the other hand a key agriculture indicator which actually experienced a drop in the value of agriculture exports. As shown below, in 1980 the total value of agriculture exports of Ghana was estimated at \$744 million (at current prices). ---- This value dropped to \$670 million in 2000. What this means is that: *although Ghana's agricultural output did experience some improvements, the country received less for its agricultural exports (in current prices), in the year 2000 as compared to what it received in 1980.*

Key Agriculture Sector Performance Indicators

Agriculture-related Indicators	1980	2000	Average annual growth 1980-2000
Food Production Index (average 1989-91 = 100)	69	167	2.8%
Non-Food Production Index (avrg 1989-91 = 100) [e.g cocoa etc)	86	300	3.7%
Food Production/capita Index (avrg 1989-91 = 100)	97	125	-0.20%
Value of Agriculture Exports (\$mill) (current prices)	744	670	1.1%
Area Under Permanent Crop (‘000 hectare)	1,900	3,600	2.7%
Agric Yield by Major Crop -- Cocoa [‘000 hectograms per hectare)	2.3	2.9	-2.6%

Source: World Development Indicators (2002), World Bank

Concentrating on the cocoa industry, Ghana’s performance in terms of the agriculture yield of its major export crop has not been impressive. As shown above, the agriculture yield of cocoa (expressed in ‘000 hectogram per hectare) in 1980 which was 2.3 increased marginally to 2.9 in 2000. The average annual growth rate of the yield figures between 1980 and 2000 was actually -2.6.



Source: World Development Indicators (2002), World Bank

Some Comparative Analysis...

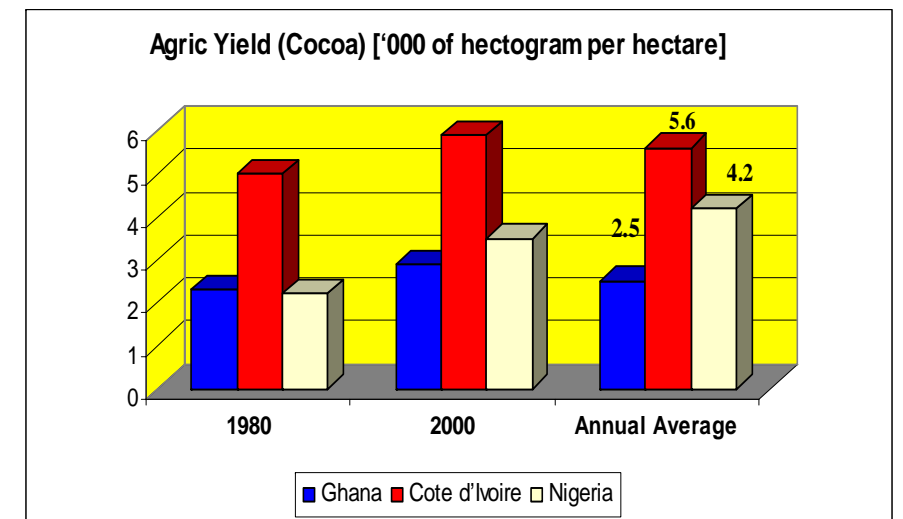
To throw some more light on the performance of the agricultural sector, we present in the Table below, some comparative statistics on agriculture yield (cocoa) for some of the main cocoa producing countries in the sub-region. Cote d'Ivoire for example registered a yield of 5.0 (estimated in '000 of hectograms per hectare) in 1980 (compared to Ghana's 2.3), and increased this figure to 5.9 in 2000 (while Ghana only managed to register 2.9). Comparable figures for Nigeria, Togo, Sierra Leone and Cameroon show that most of these countries performed better than Ghana in terms of their cocoa yields in both 1980 and 2000.

In fact while Ghana was registering an annual average of 2.5 (between 1980 and 2000), the corresponding figures for the competing countries are: Cote d'Ivoire (5.6); Nigeria (4.2); Togo (2.3), Cameroon (3.1) and Sierra Leone (3.5). In exception of Togo, all the other cocoa producing countries in the sub-region are doing better than Ghana in terms of annual yield.

Comparing Agriculture Sector Performances

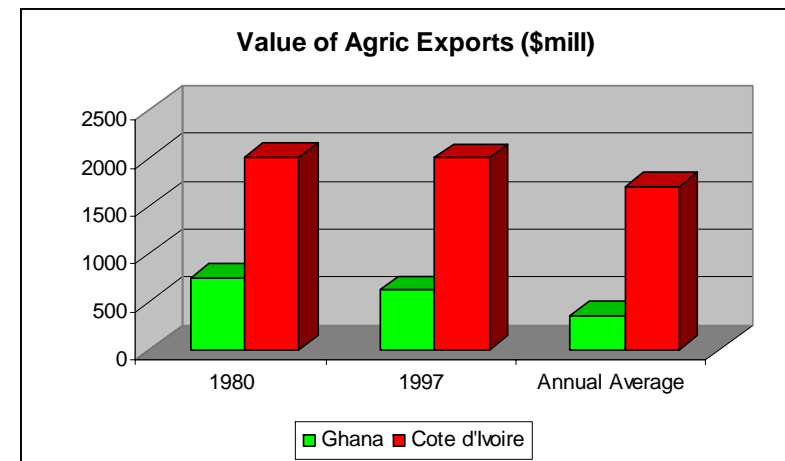
	Ghana	Cote d'Ivoire	Nigeria	Togo	Cameroon	Sierra Leone
Agric Yield (Cocoa) ['000 of hectogram per hectare] --- hectogram = 100s of kilogram						
1980	2.3	5.0	2.2	4.5	2.6	4.0
2000	2.9	5.9	3.5	3.0	3.2	3.6
Annual Average	2.5	5.6	4.2	2.3	3.1	3.5
Value of Agric Exports (\$mill, current prices)						
1980	744	2,009				
1997	616	2,001				
Annual Average	350	1,700				

Source: African Development Indicators, (2002), World Bank



Source: African Development Indicators, (2002), World Bank

Examining another key indicator, this time, the value of agriculture exports, the details in the above Table (which is illustrated below) shows that: while Ghana in 1980 was receiving about \$744 million from its agriculture exports, Cote d'Ivoire was getting close to \$2,009 million. In 1997, Ghana's receipts from agriculture exports reduced to \$616 million from the 1980 figure of \$744 million. Cote d'Ivoire on the other hand recorded as high as \$2,001 million in 1997. On the whole, the annual average for Ghana between 1980 and 1997 was \$350 million compare to that of its neighbour Cote d'Ivoire at \$1,700 million--- more than four times that of Ghana.



Source: African Development Indicators, (2002), World Bank

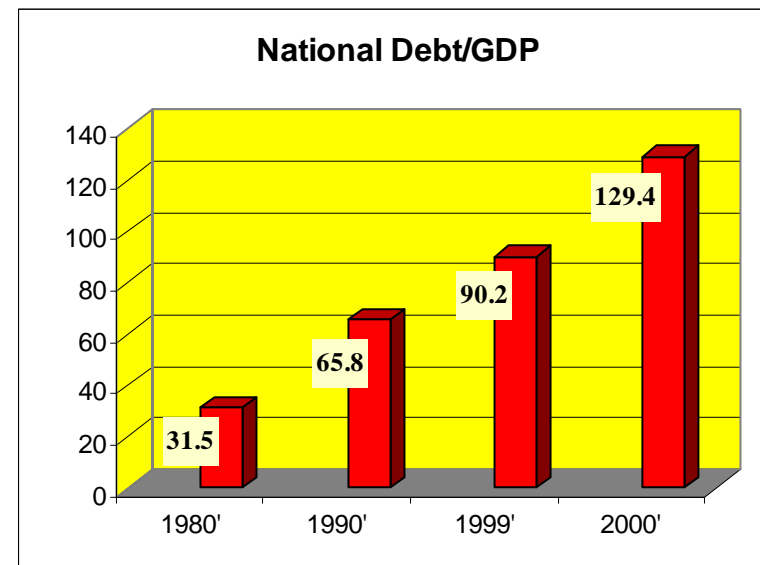
- **Analyzing Ghana's Debt-burden**

Ghana's debt burden increased substantially over the last 20 years and this has to some extent had a negative impact on the country's socio-economic development. For example, with a total external debt of close to \$1,402 million in 1980, Ghana's debt increased annually to a high figure of \$6,667 million by 2000. During this period, Ghana's external debt averaged close to \$5000 million per annum. In 1980, the total interest payments on all short-term and long-term loans including IMF credit was about \$141 million, ---- this figure increased substantially to \$486 million by 1999. The average external debt service payments between 1980 and 2000 is estimated at \$350 - \$400 million per million.

Debt-related Indicators	1980	2000	Average annual growth 1980-2000
Interest Payments: Long term loans & IMF charges (\$ million, current prices)	35	120 (1999)	98-100 (annual average)
Interest Payments: Short term loans (\$ million, current prices)	18	16	12 (annual average)
Interest Payments: Short term + Long term loans (\$ million, current prices)	53	136	115 (annual average)
Total Ext Debt Service Payments: Long term loans and IMF Credit (\$ million, current prices)	141	486 (1999)	350 – 400 (annual average)
Total External Debt (\$ million, current prices)	1,402	6,657	5000 (annual average)

Source: African Development Indicators, (2002), World Bank

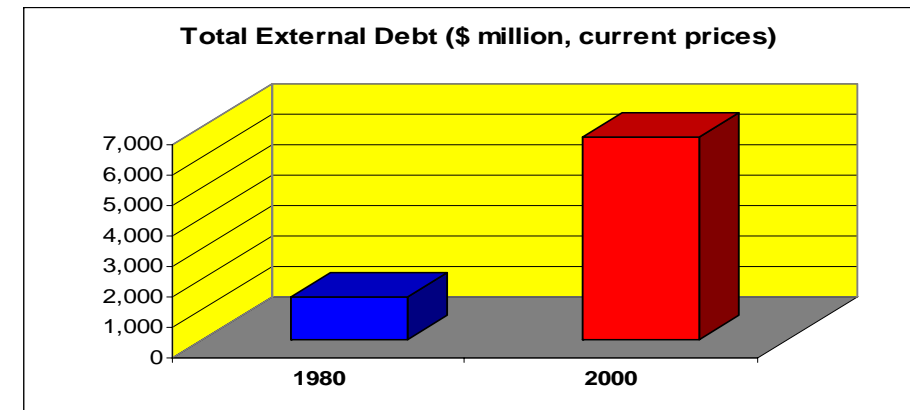
As illustrated below, Ghana's national debt as a percentage of GDP which was about 31.5% in 1980, more than doubled by 1990 to about 65.8% and rose to as high as 90.2% in 1999. In 2000 Ghana's debt as a percentage of GDP was as high as 129.4% -- meaning, the national debt was 29% more than the nation's GDP in 2000.



Source: African Development Indicators, (2002), World Bank

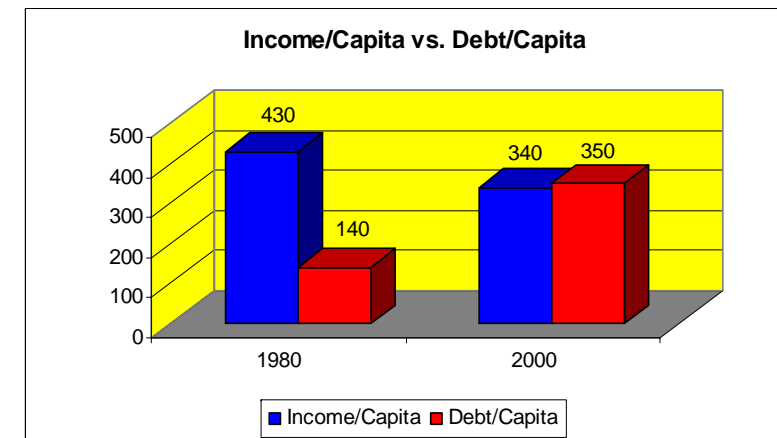
On the whole Ghana's external debt per capita in 1980 based on population of about 10 million was just about \$140 with a national income per capita of \$430. On the other hand in 2000 with a lower per capita income of \$340 (compare to the 1980 figure), Ghana's external debt per capita

based on a population figure of close to 19 million was almost \$350. In other words, whilst in 1980, Ghana's per capita income was more than doubled its debt per capita, in 2000, Ghana's per capita income was actually less than its debt per capita figure.



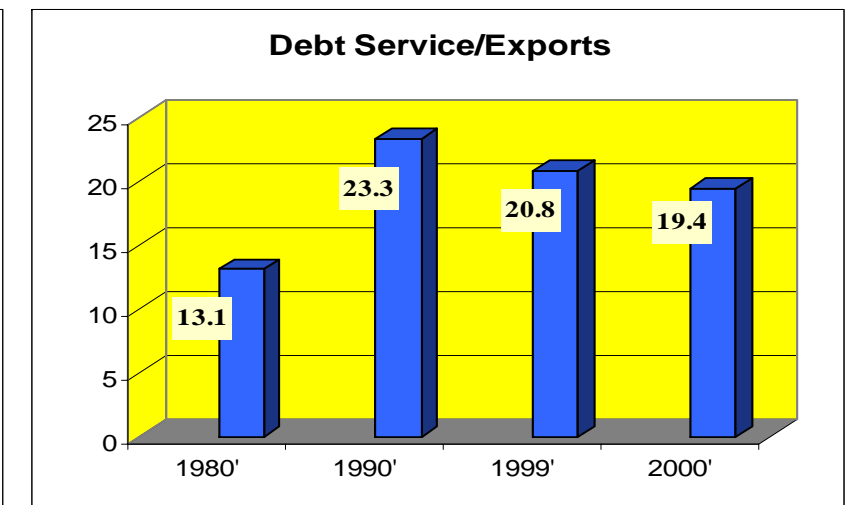
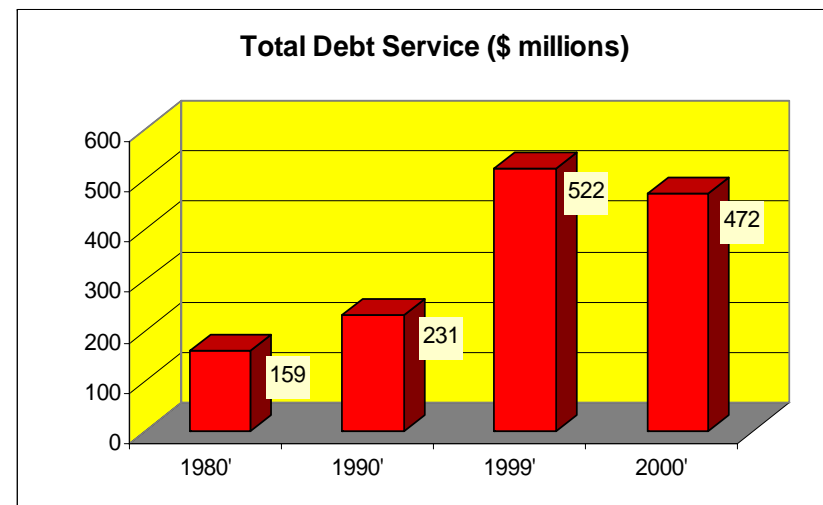
Source: World Development Indicators, (2002), World Bank

Evidently, Ghana's debt-income ratio in 1980 was about 33% -- meaning about a third of the per capita income represents debt, --- in other words for every \$100 per capita income about \$33 represents per capita debt leaving a balance of \$68 per capita income for each Ghanaian in 1980. On the other hand by 2000, the debt-income ratio was about 102% --- meaning Ghana's debt per capita represents more than 100% of its income per capita in 2000; another interpretation is that, Ghana's per capita income in 2000 account for only about 97% of its debt per capita --- implying that the per capita income of each Ghanaian in 2000 was about \$10 less than each Ghanaian's share of the national debt.



On the whole Ghana's debt burden measured in terms of its annual debt servicing payments; do present the country with a major developmental challenge. As shown below, the country's debt servicing obligations which was about \$159 million in 1980, shot up to about \$522 million in 1999

and averaged around \$472 million in 2000. Examining the debt servicing payment as a percentage of export earnings as illustrated below shows that in most years Ghana has been recording a reasonably high proportion of debt servicing to export earnings ratios.



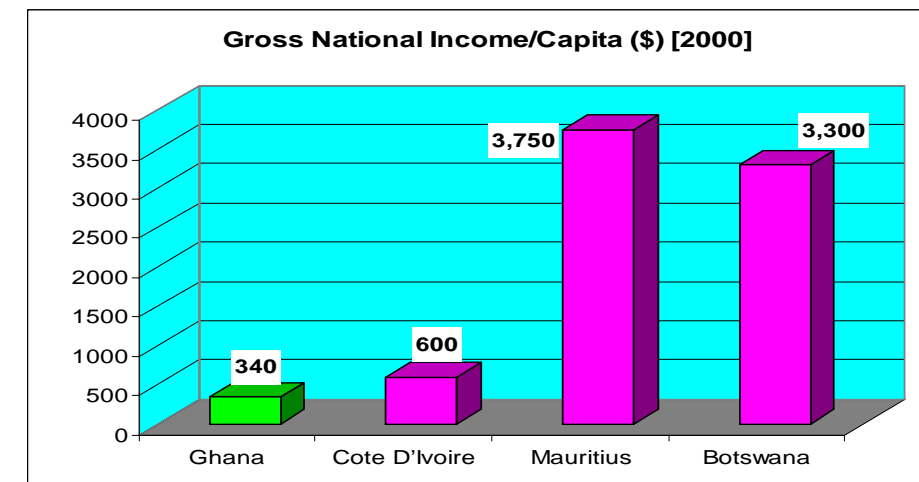
Source: African Development Indicators, (2002), World Bank

Chapter Three

A Comparative Analysis of Ghana's Economic Performance and Examining its Development Prospects

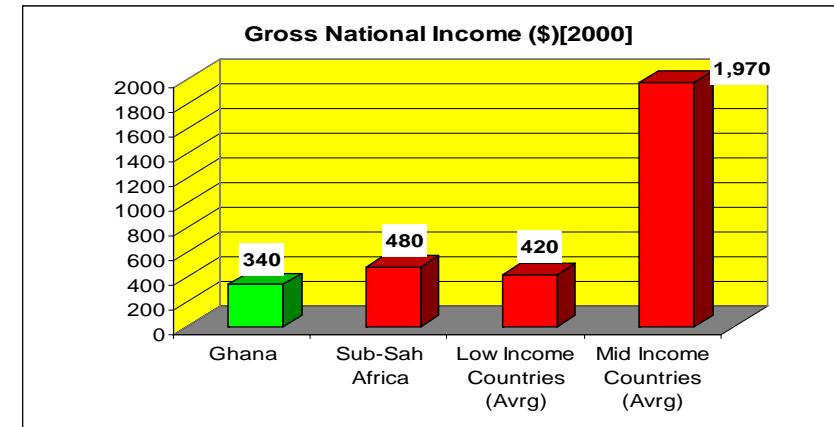
3.1 Comparing Ghana's Economic Performance with the Rest of the World

Examining Ghana's economic performance in comparison to other countries in terms of key economic development indicators like the gross national income per capita, it becomes evident that, Ghana's neighbour Cote d'Ivoire also a cocoa producing country, had a gross national income per capita (GNI/capita) figure of about \$600 which is almost double that of Ghana's \$340. Also as shown below, Ghana performed poorly when compared to other African countries like Botswana and Mauritius. In fact Botswana's per capita income in 2000 was almost 10 times that of Ghana, and the figure for Mauritius was about 11 times the per capita income for Ghana.



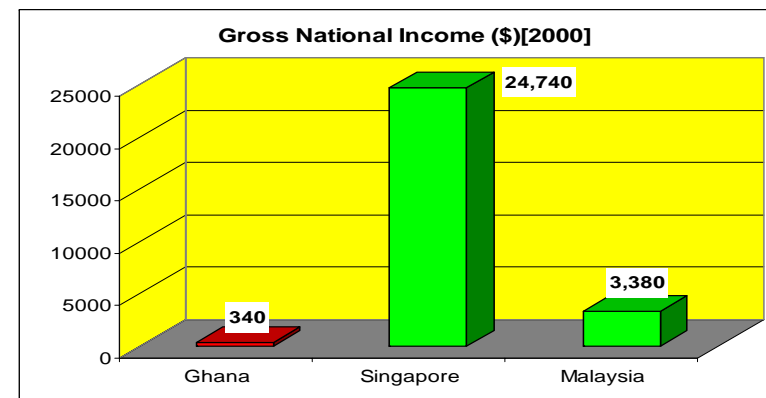
Source: African Development Indicators, (2002), World Bank

Comparing Ghana to Sub-Saharan Africa (SSA) as a whole shows that her per capita income in the year 2000 was even lower than the SSA average of \$480. It is worth noting that Sub-Saharan Africa is the poorest region of the world. As shown below, Ghana is often classified as a low income country registered in 2000 a per capita income much lower than the average of \$420 recorded for low income countries.



Source: World Development Indicators, (2002), World Bank

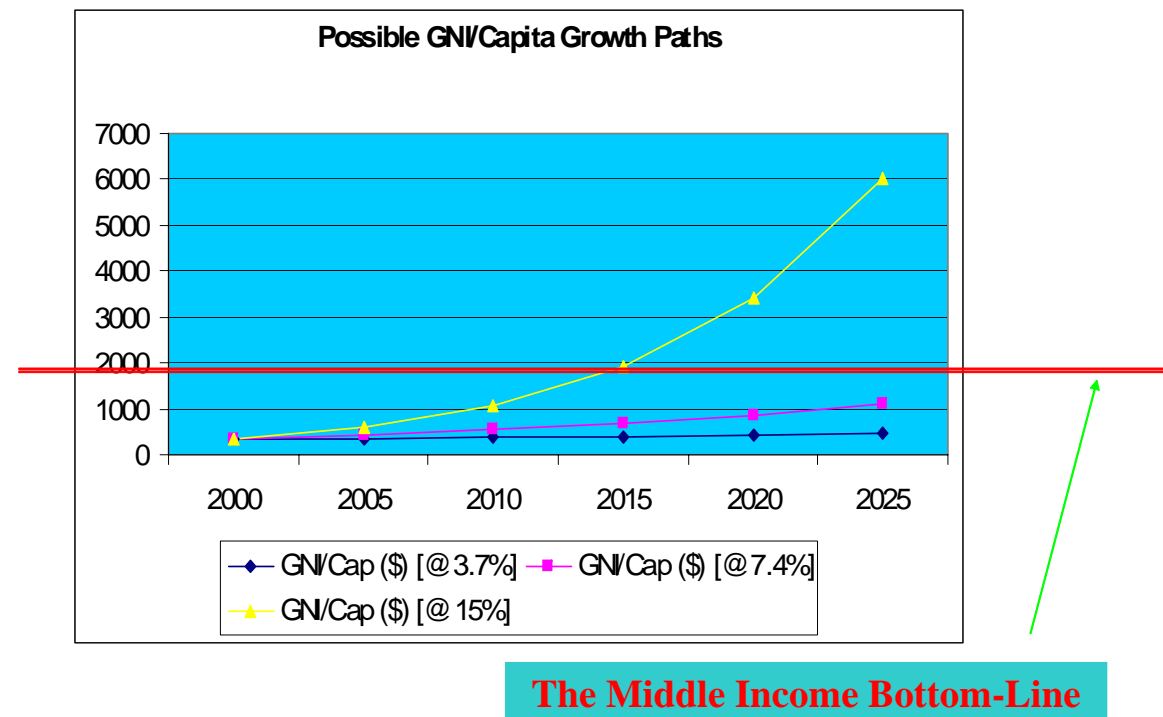
It is evident in the illustration above that: *Ghana's low per capita income figure is nowhere near the average figure for middle income countries estimated at close to about \$1,970.* The implication of this is that: *Ghana's aspiration to become a middle income country in the shortest possible time will require a double figure annual growth rate sustained at a high level for a number of years.* As illustrated below, it is evident that the task to transform Ghana into a middle income country looks extremely more challenging when Ghana's current position is compared to those of Singapore and Malaysia, --- two countries that Ghana hope to emulate.



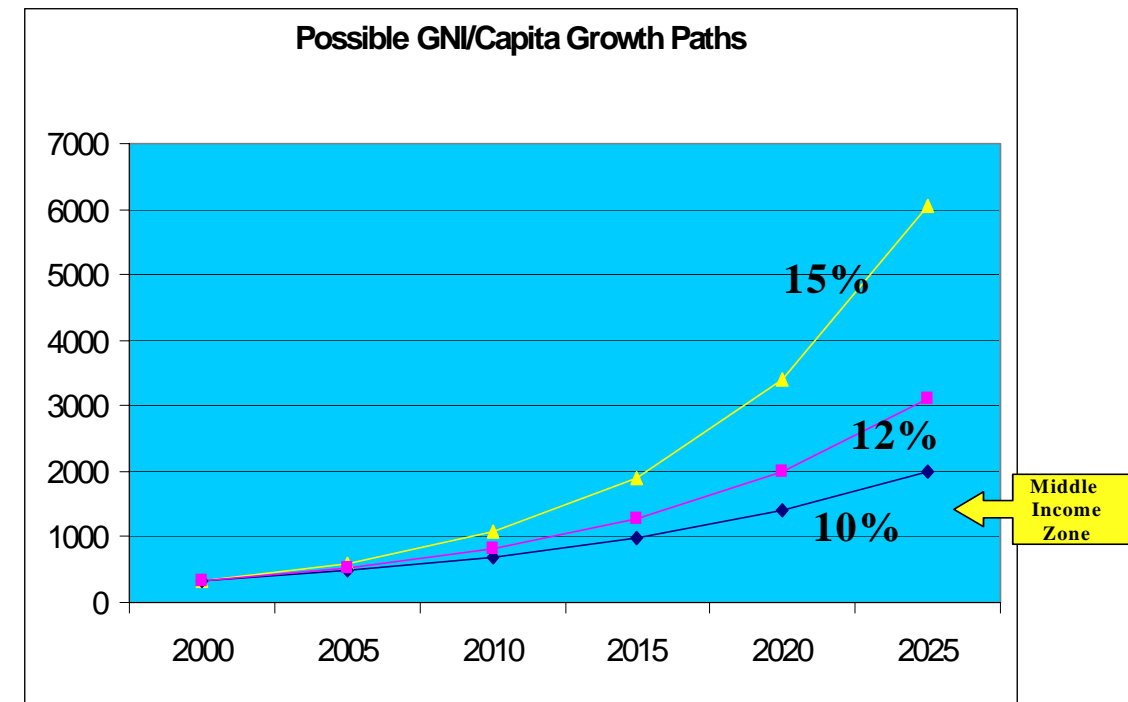
Source: World Development Indicators, (2002), World Bank

- **Ghana -- From Low Income to Middle Income: Exploring the Possibilities**

It is evident from the analysis carried out above that Ghana's aspiration to accelerate its socio-economic development process and achieve a middle income status will require achieving a considerably high growth rate well above its current growth rate. As illustrated below, growing at its current economic growth rate of 3.7% Ghana will for many years continue to register a gross national income per capita below the current Sub-Sahara Africa average of \$480 or even below the average for the low income countries currently at \$420. For example, growing at the current rate of 3.7%, the country will attain an income per capita figure of about \$382 by 2010; \$405 by 2015; \$429 by 2020 and about \$455 by 2025. At this rate, Ghana will only manage to achieve a \$500 GNI/capita by 2030



With double the current growth rate, -- that is growing at an annual rate of 7.4%, Ghana could achieve a \$500 per capita income by 2010 and a \$1,000 per capita income between 2023 and 2024. As shown above, Ghana will require a double figure growth rate of close to 15% per annum to reach the current average per capita income of middle income countries estimated at \$1,970 by about 2015. When we factor in the fact that the current middle income countries are likely to grow as well, Ghana's goal to join the middle income club becomes evidently more challenging.



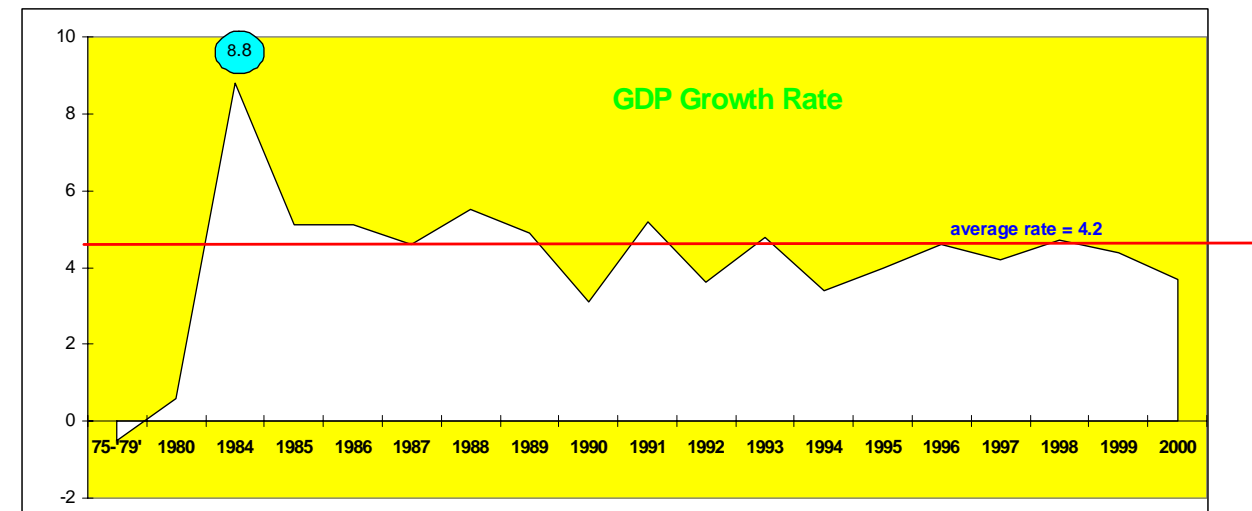
Source: World Development Indicators, (2002), World Bank

As illustrated above, Ghana will require a double figure growth rate of between 10% - 12% per annum sustainable for a number of years to be able to attain a middle income per capita level of between \$1000 and \$2000 in the next 15 years and over.

- **Examining the Evidence of the Past and Weighing the Future Prospects and Possibilities**

To assist in gauging Ghana's potential to achieve the double figure gross national income growth rate to enable it achieve the middle income status in the next 15 to 20 years, it is necessary to examine the historical evidence of Ghana's growth figures to date.

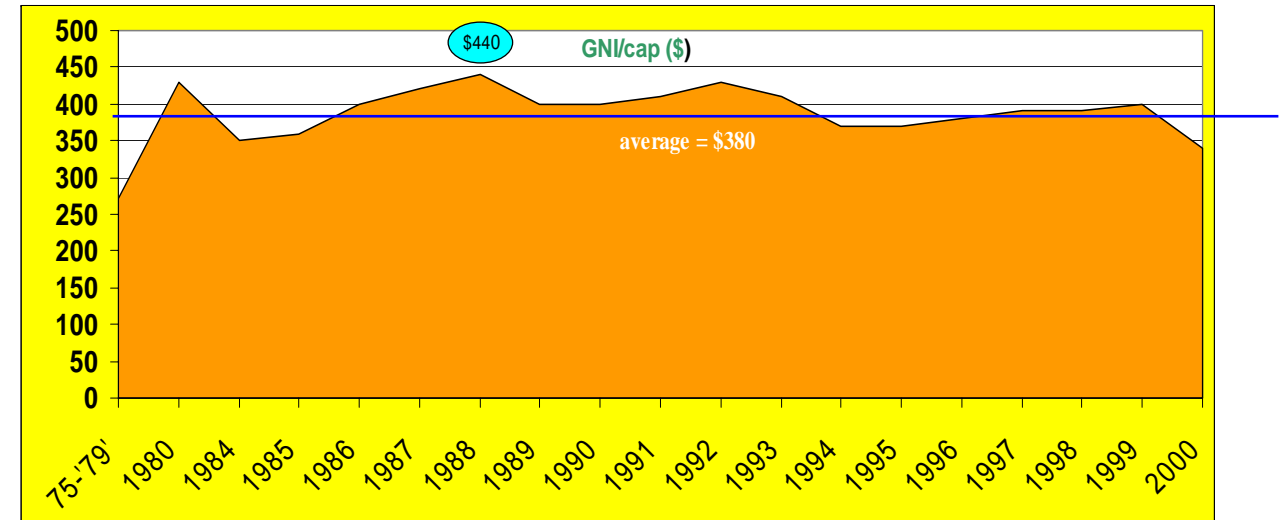
Using the GDP growth rate figures for the past 27 years (as illustrated below) shows that: while the late 1970's were the period of negative growth rate, the country's economy picked up in the early 1980's and managed to register the highest growth rate of 8.8% in the nation's history. Since that singular achievement the GDP growth rate fell and settle down at around an annual average of 4.2% --- having dipped to 3.7% by the 2000.



Source: African Development Indicators, (2002), World Bank

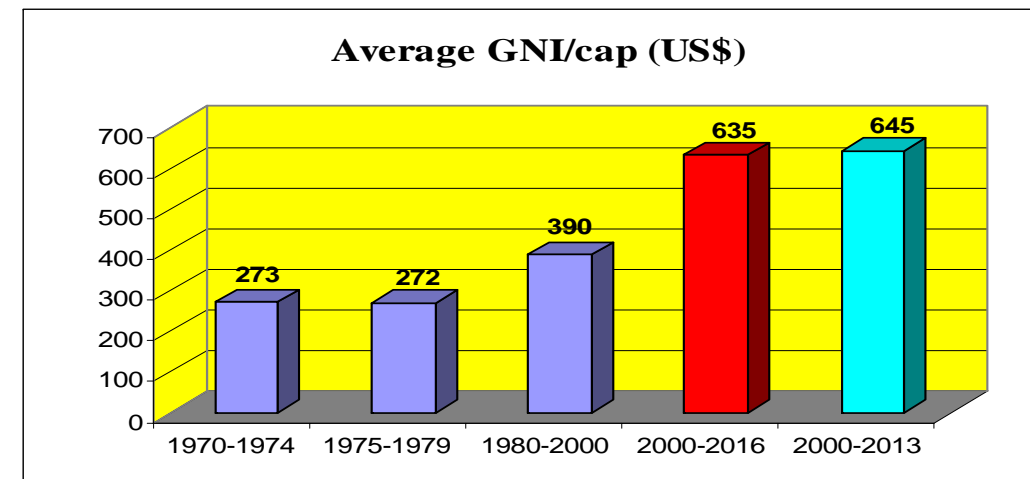
It is evident from the above analysis that historically the Ghanaian economy has not experience a double digit growth rate in the past. There is no doubt that: *a lot of efforts will be required to transform the economy from its current low single digit growth rate to a double digit growth rate. As mentioned earlier, it is clear that anything short of a growth rate between 10% and 12% sustained over a number of years will make it extremely difficult for Ghana to move into the middle income zone in the foreseeable future.*

Examining the historical evidence of Ghana's GNI/capita figures for the last 25 years as illustrated below, there is a confirmation of the fact that a major transformation of the economy will be required to lift the nation from its low average national income per capita figure of \$380 (recorded over the past 25 years) to figures comparable to those of the middle income countries now averaging about \$1,970.



Source: African Development Indicators, (2002), World Bank

Elaborating on the historical evidence of Ghana's performance to date, the illustration below shows that, between 1970-1979, Ghana's average GNI/capita was between \$272- \$273 (based on the official dollar exchange rate which was significantly lower than the un-official market exchange rate value rate at time). Between 1980-2000, Ghana was averaging a GNI/capita figure of \$390 per annum.



Source: Ghana Statistical Service and African Development Indicators, (2002), World Bank

On future prospects, it could be stated that Ghana growing at 10% per annum, will attain a \$1000 GNI/capita by 2016 which will translate into an average national income per capita of \$635 for the period 2000 to 2016. On the other hand if the country's economy grows at 12% per annum, Ghana will attain the \$1000 GNI/capita by 2013 and this will translate into an average national income per capita of \$645 for the period 2000 to 2013. It is also worth noting that taking many years to achieve the \$1000 figure will position Ghana further from the middle income zone.

Given that the current average of the middle income countries is estimated at \$1,970, the chances are that most of these countries will be improving on their gross national income figures and this will further push the middle income average way beyond the \$2000 mark in the next couple of years. In other words, Ghana achieving a \$1000 gross national income per capita say 2020 will certainly not make it a middle income country. In conclusion, the need to speed up Ghana's socio-economic development process, cannot be overemphasized. The task to transform Ghana's economy to improve the socio-economic well-being of its people is a challenging one that will require major efforts than before.

The Implications of Ghana's Poor Development Indicators

- Ghana even by the standard of low income countries is not doing well, its GNI/capita is lower than the average for SSA and even lower than that of Low Income Countries
- Ghana's aspiration to become a middle income nation is not achievable without a high level of sustained growth for over a number of years.
- To even move Ghana GNI/capita from its current level of below \$400 to \$1000 will required a high growth rate of between 10% to 12% per annum for the next 10 to 15 years
- Even a modernized agricultural sector (the backbone of the Ghana's economy) ---- cannot by itself generate the required high growth rate necessary to accelerate Ghana's development to achieve the middle income status in the shortest possible time (of say 15 to 20 years)
- Globalization of the world's economy and the impact of the emerging new information age characterized by information and communication technologies (ICTs) will present Ghana with additional challenges.
- Ghana's failure to take advantage of the new information and technological revolution to aid its socio-economic development process will further marginalize it and make it difficult if not impossible for it to achieve the high growth rates required to attain the middle income status. Ghana may never achieve this status if it hovers around the current growth rate of 3.7%
- The basic premise is that: the socio-economic development aspirations of the Vision to transform Ghana into a middle income nation will be difficult to attain without the deployment, exploitation and development of ICTs to support the process of accelerated socio-economic development of the country.

Chapter Four

An Analysis of the Critical Developmental Challenges Facing Ghana

Based on the analysis of the preceding chapters, it is clear that: despite achieving some major improvements in the economy during the 1980's and 1990's compared to the economic down-turn of the 1970's, Ghana is experiencing a number of socio-economic development problems characterized by: (i) an economy with a high dependence on the agricultural sector – which is predominately subsistence based, a narrow and weak industrial base and structures and an under-developed services sector; (ii) low growth rates, coupled with balance of payment difficulties; (iii) poor physical, communications and social infrastructure and (iv) problems associated with heavy debt burdens and huge public and social expenditure budgets. These problems and many others are likely to be compounded by the new challenges posed by globalization and the information age. We summarize below, under specific broad headings some of the critical developmental challenges facing the country based on the analysis of the previous chapters.

4.1 The Social and Economic Pressures of a Youthful Population: Ghana's relatively young population of close to 60% of the population under the age of 25 years do present the country with a number of development challenges. *Some of the developmental challenges that Ghana could face as a result of having a relatively young population include those relating to heavy social expenditure budget in areas like: education, training and provision of health and other social services.*

4.2 Turning the Youthful Population into an Asset for Development: The relatively young population presents Ghana with both developmental challenges and opportunities. For example, failure to achieve an appreciable economic development to provide job opportunities to an increasing number of young job seekers could lead to massive unemployment and its associated social and economic problems. Also the lack of policies and initiatives targeted at tuning the youthful population into a skilled human resource asset to aid the development of the country may translate into a high unemployable population in the years to come. – This could lead to serious social problems which could aggravate in situations where the economy is unable to provide adequate employment opportunities through growth. *Turning the youthful population into an asset for development and taking the necessary steps to promote economic growth to provide opportunities for a growing population of young people is therefore a key developmental challenge facing Ghana*

4.3 Rapid Population Growth and Declining Per Capita Income: The current population growth rate of 2.5% if not checked could present Ghana with a number of social and economic problems. The forecast that at the current growth rate of 2.5%, Ghana's population will increase by 50% within the next 12 years, reach the 30 million mark by 2020 and double the 2000 figure by 2028 do present Ghana with a number of developmental challenges. The key ones are: pressure on social expenditure in areas like education, health; rural to urban migration which could dramatically get worse if there are no amenities and jobs for rural people; increase in competition for land for agricultural and shelter among others.

Furthermore a rapid growth in the population without a corresponding appreciable growth in the economy could seriously undermine Ghana's development efforts. --- This could lead to a further reduction in the nation's per capita income, and consequently increase the incidence of poverty and a drastic reduction in living standards for the majority of Ghanaians. There is no doubt that if economic growth continues to lag behind population growth; Ghana's goal to achieve a middle income status will be un-attainable in a foreseeable future. The developmental challenge facing Ghana in this respect are therefore two fold: *the challenge of checking population growth while at the same time putting efforts into promoting rapid economic growth at rates that could translate into improving the national income per capita and moving Ghana into the middle income zone*

4.4 Under-performing Agricultural Sector: Ghana's agriculture sector despite some improvements in some areas is seriously underperforming in a number of critical areas. The output of cocoa – the main cash crop is relatively low, and the yield per hectare is also low in comparison to other cocoa producing countries in the sub-region. The country not only lost its World leader position to Cote d'Ivoire but is also now ranked a poor second or third to its close door neighbour. Also the nation's exports earnings from the agriculture products have been declining in recent years and this has no doubt compounded the problems faced by the sector. Given that the agricultural sector currently employs 70% of the labour force, contributes close 35% to the GDP and accounts for 57% of foreign exchange earnings, the lack of development in the sector does have a number of social and economic implications which could further compound Ghana's socio-economic problems and retard its developmental efforts. *The development and modernization of the agricultural sector to improve its productivity and contribution to the nation's development is therefore a major developmental challenge facing the country.*

4.5 An Economy Dominated by the Agricultural Sector with Weak and Under-Developed Industrial and Service Sector: The Ghana economy is still predominately agriculture-base without a substantial shift towards the service sector and industrial sector as should be expected if the economy were on a rapid growth path and modernizing. The structure of the Ghanaian economy measured in terms of sectorial contribution to GDP indicates that the structure of the economy changed very little over the last 20 years. For example while the percentage contribution to GDP reduced from about 60% in 1980 to about 36% in 2000, and that of industry increased from 12% to 26%, the service sector's contribution to GDP only increased marginally from 31% in 1980 to about 36% in 2000. *Putting in place policies and strategies that modernize the agriculture sector while at the same time targeting the development of the industrial and services sectors to increase their contribution to the GDP constitute a major developmental challenge facing the country.*

4.6 The Debt Burden: Ghana's development is being handicapped by the nation's heavy debt burden measured in terms of: the high national debt per capita, the high national debt as percentage of GDP, the debt service ratio and the debt service to export earnings ratio. The country's debt per capita in 2000 was \$350 compare to its income per capita of \$340. The national debt as percentage of GDP increased to about 129% by 2000 --- meaning Ghana's debt far exceeded its economic output in 2000. Furthermore the debt service-to-export earning ratio shows that debt servicing represents close to 20% the nation's export earnings. Ghana's heavy debt burden is compounding its numerous other economic development problems and this is constraining the nation's developmental efforts in a number of areas. For example heavy debt servicing obligations takes critical resources away from the nation's development efforts and further inhibits the development process in a number of ways. *Taking steps to reduce Ghana's debt burden without necessarily inhibiting the nation's development constitutes a major developmental challenge facing the country.*

4.7 Disproportionate Informal Private Sector: Statistics shows that the private sector, is dominated by its informal sub-sector. In other words, the formal private sector forms a very small fraction of the private sector. For example, the informal private sector is by far the largest employment sector of the Ghanaian economy – accounting for close to 81% of the economically active population, while the formal private sector accounts for

only about 8%. In other words the formal private sector of the Ghanaian economy is under-developed and its role in the economy is marginal. *The development of the private sector in general and in particular the formal private sector by putting in place policies and initiatives that in addition to promoting the development of the private sector as a whole, target a major expansion of the formal private sector in comparison to the informal sector, is one of the major developmental challenges facing Ghana.*

4.8 Low Professional, Technical and Managerial Manpower Base: Statistics relating to the occupational profile of the economically active population reveal that: only 8.6% are professional and technical people with a lower percentage of 0.3% who are managers and administrators. The low percentage of key technical and professional manpower like engineers, accountants, architects, doctors, lawyers, scientists etc highlights the relatively low professional and technical skill human resource capacity of the economy. Furthermore given that close to 48% of the economically active population are occupationally involved in agriculture and since the agriculture sector is traditionally dominated by an unskilled manpower it can be concluded that a high percentage of Ghanaian workforce are unskilled. *The development of a skilled human resource capacity to aid the process of developing the necessary professional, technical and managerial manpower to drive the country's development towards a modernized economy and society in the emerging information and knowledge age can be singled out as one of the key developmental challenges facing the country.*

4.9 Relatively High Proportion of Population with no Educational Attainment: Close to 40% of Ghanaians over 6 years of age have never been to school, in other words they have no educational attainment. This figure coupled with the fact that only about 3% of the population had tertiary level education present Ghana with a major developmental challenge. It is apparent that since the development of a given nation depends very much on the level of educational attainment of its people, Ghana's development is no doubt being constrained by the fact that a high proportion of its people have never been to school and only a small percentage of its people make it up to higher education. *The widening of access to basic education to the vast majority of the population, and increasing access to tertiary level education to a higher percentage of the adult population are therefore some of the developmental challenges facing Ghana in the area of education*

4.10 Low Job Creation Capacity of the Economy: Close to 68% of the employed population are self-employed with no employees. In other words, the majority of the working population worked in their own small enterprises which have no other employees apart from themselves. With the economy dominated by the self-employed who do not have the capacity to employ others, the prospects for generating additional jobs or employment opportunities for a growing young population are very low. *The transformation of the economy to improve on its employment generation capacity is therefore a key developmental challenge facing Ghana.*

4.11 Narrow export base dominated by traditional exports: Ghana's trade with the outside world has for many years been registering huge balance of payment (BoP) deficits. The country's small domestic market cannot support the development of the key sectors of the economy – Ghana will need to produce for export in order to grow. The nation will need to develop and diversify its export base and target the development of an export-led economy to be able to initiate and sustain an appreciable growth in the economy, generate wealth and create quality jobs for its increasing population. *The key developmental challenge facing Ghana therefore relates to the development of a diversified export-led economy targeting key sectors of the economy including the agriculture, services and industrial sectors*

4.12 Under-developed Physical Infrastructure: Ghana currently suffers from a number of physical infrastructure deficits which is putting a strain on the nation's developmental efforts. The nation's road infrastructure although, has experienced some improvements and expansions in the last decade and a half, still falls far short of the nation's requirements. The power infrastructure (including electricity) requires a major improvement if it is to cater for the huge un-met demand the sector is currently experiencing from both domestic and commercial consumers. The nation's water supply infrastructure, cannot still reach the majority of the rural community, ---- An increasing number of newly developed urban areas and centers do not have access to direct water supply source. *The developmental implications of the nation's poor physical infrastructure in the area of: roads, electricity, water and sanitation can be classified as a major developmental challenge facing the country.*

4.13 Poor and Limited Communications Infrastructure: Although Ghana's ICT landscape has in the last decade or two undergone major transformations which to some extent was facilitated by a number of institutional and regulatory initiatives including the liberalization of the communications sector to encourage competition, the country's telecommunication and communications infrastructure is still far from being developed. Most of the rural areas are to a large extent not served by the existing infrastructure. Ghana still has a low teledensity of less than 2 telephone lines per 100 people, and low teleaccessibility ---a measure of households access to telecommunication services. Despite the explosion of mobile phone services especially in the urban centers, --- the limited infrastructural capacities of the mobile networks have resulted into over-subscription and poor quality of service. Also investment in the telecommunication sector has been declining thus delaying infrastructural expansions in the sector and the slow deployment of value added advanced communication services and advanced technologies. *The development, expansion and the modernization of the nation's communications infrastructure to achieve universal service and access to basic and value added telecommunications services, support the development of the local ICT industry and aid the country's socio-economic development process is a key developmental challenge facing Ghana.*

Where do we want to get to as a Nation?

“....It can be no accident that there is today no wealthy, developed nation that is information poor...and for that matter no information rich nation that is poor and underdeveloped.....”
.... Prime Minister Mahathir Mohammed of Malaysia

Chapter Five

The Ghana ICT for Accelerated Development (ICT4AD) Process --- Moving Ghana to the Other-Side

5.1 Addressing Ghana's Developmental Challenges in the Information Age

There is no doubt that: the world economy is experiencing the impact of rapid globalization and the emerging information age --- which is bringing about a new global economic order to be dominated by information and knowledge-based economies (IKEs). As established in the earlier chapters Ghana is experiencing a number of socio-economic problems and challenges. ---- these are likely to be compounded by the new challenges posed by globalization and the information age. It could be argued that: the emerging information age characterized by ICTs and the extraordinary increase in the spread of knowledge has given birth to a new era: that of knowledge and information. These technologies are offering even less developed agricultural countries like Ghana the opportunity to transform their economies and societies.

Because of the portable nature of the underlying technologies driving the development of the information society and economy, developing countries, like Ghana are equally placed to take advantage of them to facilitate their socio-economic development process. It has now been recognized that: *in the new emerging economic order, the fundamental basis for poverty reduction, wealth creation and national prosperity is information and knowledge.* ---- Ghana cannot afford to be without either of these.

The emergence of the information age has no doubt brought to the fore, the important role that *information, knowledge and technology* can play in facilitating socio-economic development. According to a World Bank Report: all economies are knowledge-based. --- what is different today, however, is that rapidly growing economies depend more on the creation, acquisition, distribution, and use of information and knowledge. *The effective use of knowledge is becoming the most important factor for international competitiveness—and for creating wealth and improving social welfare.*

There is no doubt that: *information, knowledge and technology* are increasingly becoming the key drivers for socio-economic development world-wide. *It is now abundantly clear that a nation's capability and ability to accelerate its socio economic development process; gain competitive advantage and improve the well-being of its people depends very much on the extent to which it can **develop, use and sell,** ---- information, knowledge and technology in one form of other.* Evidence shows that: although the mere use of information, knowledge and technology to improve on services,

products and processes can transform the socio-economic development fortunes of a given nation, those nations who in addition are involved in the development as well as the sale of information (and information products), knowledge (and knowledge products) and technology (and its products), are compared to others moving faster on the socio-economic development scale.

On Information and Communication Technologies (ICTs)

Information and communications technologies (ICTs) cuts across a variety of technologies including: computer, microelectronics and related technologies including microchip and microprocessor-based technologies; multimedia and other information processing technologies and systems; telecommunications technologies and infrastructure (fixed line, wireless, satellite-based and mobile infrastructure); communications and network technologies and infrastructure (including local and wide area communications and computer networks for voice, data and video); broadcasting networks and technologies including radio and TV networks; production-based technologies including those used in computer-integrated manufacturing and production systems and operations, robotics technologies, biotechnology-related equipments and systems and ---- the Internet as a globally-based delivery platform --- incorporating elements of computers, telecommunications, communications technologies and networks and other multimedia development and delivery technologies to form an integrated multimedia transmission and communication delivery infrastructure and platform with a global reach

Relating specifically to the ICT infrastructure, apart from the communications and telecommunication infrastructure, the broader concept also takes into account the hardware and software components of the transmission and communications infrastructure and delivery platforms. For example, the concept encompasses the required telecommunications, and communications network devices, equipment and the ranges of software and application systems required for the installation, operation and management of these telecommunications, communications and computer networks. Also unlike traditional infrastructures like transport or energy which focus on the physical (e.g. road/rail networks, hydro-power plants, electricity networks), the ICT infrastructure goes beyond the physical communications network infrastructure to incorporate elements of the information infrastructure, for example: the information and database systems and the applications platforms like teleeducation, telemedicine, e-commerce, and e-government and governance types of applications.

5.2 Global Response to the Challenges of the Information Age

Governments world-wide have recognized the crucial role that ICTs can play in facilitating and accelerating the socio-economic development process. In fact, a number of countries in both the developed and developing world are responding to the developmental challenges of the information age by putting in place relevant policies and strategic plans that will enable them transform their economies into information and knowledge-based economies. For example, developed countries like: the USA, Canada and a number of European countries as well as Asian countries like: India, China, Singapore, Malaysia, Thailand, Sri Lanka, South Korea, Japan, and Vietnam, in addition to Central and South American countries like: Brazil, Chile, Costa Rica and Mexico among others are implementing policies and plans targeted at developing their respective information and knowledge-based economies and societies.

In India for example, the government see ICTs and their deployment for socio-economic development as one area where India can quickly establish global dominance and reap tremendous payoff in terms of wealth creation and generation of high quality employment. Finland on the other hand regards the development and utilization of ICTs within its economy and society as a key component of its national vision to improve quality of life, knowledge and international competitiveness.

Malaysia's Vision 2020 which envisages Malaysia as a fully developed nation by 2020 and the Singapore's vision of transforming Singapore into an 'Intelligent Island' all sees ICTs as the main engine for promoting accelerated development and growth as well as gaining global competitive advantage. Mexico, also sees ICTs as a key factor for achieving progress in social and economic development. Other countries like Costa Rica, Brazil and Ireland, have all developed policies targeting the development of their respective ICT industries as an engine for growth and global competitiveness.

On the other hand, although most African countries also recognized the crucial role that ICTs can play in accelerating their development in the new information age, the majority of them unlike countries in other regions of the world, are late-comers to the ICT for development process. Although a number of African countries have in the 1980's put in place programmes and initiatives targeted at IT (information technology) deployment within the civil service, it is not until recently that most of the these countries began looking at the broader issue of facilitating their socio-economic development process through the deployment and exploitation of ICTs.

On the whole, the 'ICT for Accelerated Development' process in Africa is being led by the Economic Commission for Africa (ECA) within the context of the *Africa Information Society Initiative (AISI)* [5]. --- This initiative serves as a framework for a radical socio-economic transformation of African countries through the deployment and the exploitation of ICTs within the context of the challenges of globalization and the information age. Like the AISI, the *Digital Opportunity Initiative (DOI)* [6] --- an initiative led by the UNDP is also aimed at guiding the 'ICT for Development' process in developing countries including those of Africa. In addition to the AISI and the DOI other initiatives like the UN-ICT Task Force launched by the UN Secretary General and the Digital Opportunities Task Force (DOT Force), and others are contributing to the development of national policies, plans and initiatives directed at ICT deployment and exploitation to facilitate the socio-economic development process in African countries.

Information and Communications Technologies as an Enabler of Developmental Goals

There is now mounting evidence that: ICTs can be used to facilitate various aspects of the socio-economic development process in both developing and developed countries. For example, research work based on a number of case studies, reported in [7] suggests that ICTs can serve as a key resource essential for achieving broad-based development goals – the principal lesson being that although the technology is not a goal in itself, it can be used as an enabler of developmental goals -- and that for ICTs to have impact on development its introduction should be fully integrated into the process of organizational and societal change and driven by real needs for economic, social and institutional development.

Some of the areas where the deployment and utilization of ICTs can have a significant impact on the developmental process of nations include:

Administration and Service Delivery within the Public Sector --- The deployment and exploitation of ICTs to facilitate government administration and service delivery has the potential for: improving administrative efficiency and service delivery; enhancing and improving government responsiveness to citizens; reducing administrative, operational and transaction costs of governments administrative activities, service delivery functions and operations through the reduction of operating inefficiencies, redundant spending and unnecessary excessive paperwork; assisting in the transformation of government into a citizen-centered government and improving productivity within the government machinery and institutions. The cumulative impact of all these on the overall developmental process of a given nation can be significant.

Production Activities and Operations --- There is no industrial process which cannot be programmed using computers. ICTs can be used to support the: scheduling of various production processes; design of products, simulating products under various conditions; actual production process using computer-aided and programmable machines & robot systems; the warehousing, distribution and delivery of the products etc. ICTs have been successfully deployed and exploited to improve productivity in all types of industrial and production set-ups and has contributed immensely to enabling a number of industrial countries to gain competitive advantage in ranges of product areas on the global market.

Agriculture operations to improve productivity – Various types of agricultural activities and operations including the production, processing, packaging and marketing of agriculture products as well as agriculture-research and extension activities of all kinds can be supported by the deployment and exploitation of ICTs. These technologies are being deployed to modernize agricultural operations, systems and processes and as well improve agriculture productivity and yield in a number of countries.

Development of the private sector especially the service sector – The private sector, -- the engine of growth in most countries, can be facilitated by the deployment and exploitation of ICTs in a number of areas. The service sector especially, the banking and

financial services sub-sectors are to a large extent ICT-driven in most developed and developing countries. Also the rapid growth in the ICT sector and industry in a number of developed and developing countries is having a major impact on the development of the private sector in these countries.

Other areas where the deployment and exploitation of ICTs have been making substantial developmental impact include areas like:

Rural development --- ICTs can play a major role in the extension of services to the rural populations. Services like health, education, social services and various types of government services can be made available to rural peoples through the deployment and exploitation of various types of ICTs. According to [7], ICTs are being used in India to enhance rural development programs and improve the delivery of public services through computerization schemes --- suggesting that the potential impact of ICTs on development can be enormous, particularly in terms of improved health, hygiene, nutrition and education

Support trade and commerce --- ICTs have been used to achieve global competitiveness in the area of trade in a number of countries. E-commerce a major growth area forecast to be a multi-billion dollar industry is an ICT-driven industry.

Information and communication technologies have also made major developmental impact in area like:

Education and Training --- ICTs are making it possible to improve access to limited educational resources to a larger population. It is now possible through the use of ICTs to provide high quality education at an affordable cost to a wider population.

Good Governance --- The use of ICTs to facilitate electronic government and governance has been contributing to the process of good governance and the strengthening of democratic institutions thus facilitating universal participation in the democratic and governance process. Governments world-wide have recognized the key role that ICTs can play in facilitating development and bringing government closer to the people. A number of countries in both the developed and developing world have been putting in place and implementing e-government and governance strategies and programmes targeted at exploiting the potentials of ICTs to facilitate government administration and service delivery as well as the governing process through good governance.

Poverty Alleviation and Wealth Creation: There is increasing evidence that access to ICTs can have a direct impact on raising living standards and improving the quality of life of the poor. The indirect impact on poverty alleviation, through growth and productivity, has long been recognized.

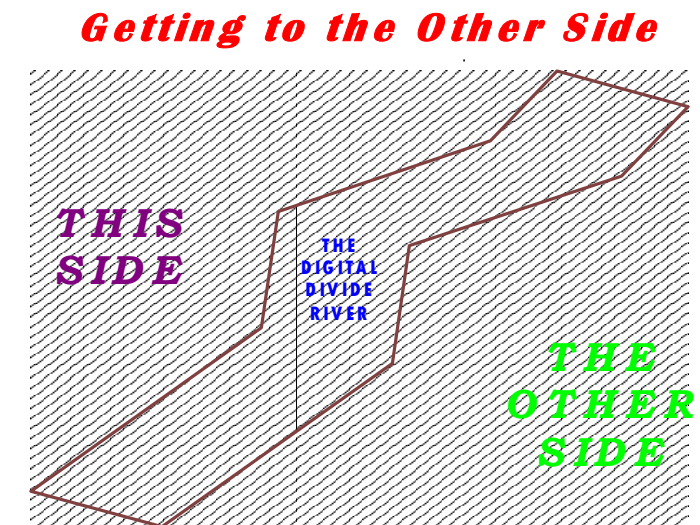
ICTs as agents of Wealth Creation and Rapid Economic Growth: There is no doubt that: countries that are making major progress in the area of wealth creation are those in the fore-front of developing, deploying and exploiting ICTs within their economy and society. Recent research in the USA has concluded that the production and use of ICTs have contributed half or more

of the acceleration in U.S. productivity growth in the second half of the 1990s. The successful experience of East Asian countries has lent support to an 'ICT-led development' thesis --- implying that poor countries can adopt 'leapfrogging' strategies. According to [8], ICTs present a 'window of opportunity' for developing countries to progress from a situation of 'zero' or 'limited' technology to widespread adoption of 'sophisticated' technologies, without going through the stages of technological adaptation and learning experienced in developed countries. According to the DOI report [6], in Costa Rica, ICTs accounts for 38 percent of exports and contributed to a major increase in gross national income – and in India, software exports have been increasing by over 50 percent per annum since the early 1990s and it has been estimated that by 2008, there will be 2.2 million additional jobs created, and FDI will rise to US\$5 billion and that software will account for 7.5 percent of India's gross domestic product.

5.3 The Information and Knowledge-based Economy and Society

There is no doubt that: *the information and knowledge-based economy is the economy of the future and the challenge facing Ghana relates to how Ghana should go about formulating and implementing appropriated ICT-led socio-economic development policies and plans that could aid the process of addressing the key socio-economic development challenges facing the country and move the economy and society to the 'other-side' of the digital divide.*

The contention is that: the threat posed by the digital divide to countries like Ghana is more of an economic development problem than a technological one. According to [9], the digital divide and its implications has more to do with the inability of some under-developed countries to deploy, harness and exploit the developmental opportunities of the emerging digital information and technological revolution to advance their socio-economic development process and move them to the 'other-side of the divide. Ghana like other under-developed countries, is at risk of being further marginalized if it fails to embrace these technologies to transform her economy and society



Although it could be argued that the opportunities of the information and knowledge-based economy facilitated by ICTs is one that both developed and under-developed could avail of; --- *these technologies will no doubt be creating new winners and losers.* The prediction is that the gap between the new winners and losers within the new world economy order to be dominated by information and knowledge-based economies will be much larger than the development gap that now exists between the advanced nations and the under-developed nations. The new winners will include both the developed as well as some developing nations, who seize the opportunity to embrace these technologies to support their socio-economic development.

- **The New Winners and Losers**

On the whole, the new winners will be those countries who move to the ‘other side’ of the digital divide and trade in *information* and *knowledge* using the power of the *technology*. They will include countries who managed to transform their economies and society into predominately information and knowledge based high income globally competitive economy dominated by the development, production and the trading in ICT products and services.

The New Losers...

The *new losers* on the other hand will include: the *big losers* and those that could be classified as ‘*not-winners but survivors*’. The big losers will be those nations who remain on ‘this-side’ of the divide and continue to operate in a predominately agricultural economy. The other group – ‘not winners-but-survivors’ will include those nations who move to the other-side but continue to trade predominately in commodities using the power of the technology. This latter group will include those countries whose economies are predominately agriculture-base but are using the technology to facilitate some aspects of their economic activities. This will include countries that have managed to deploy and exploit ICTs within their economy and society but are unable to develop the required capacity to produce and trade in information, knowledge and technology and their products and services.

It could be argued that, countries who failed to move to the ‘other-side’ will be severely marginalized as a nation. These countries will not be able to compete even in the commodity market --- since countries that move to the ‘other-side’ but trade in commodities using the power of the technology can do better than those who remain on ‘this-side’ of the divide. There is the likelihood that these countries will be unable to create quality jobs ---- and will not be able to provide quality value-added jobs for even their qualified citizens. The educational system of such countries will be out-of date and products of the system will be out of date and cannot compete on the global job market.

Furthermore, countries who remain on ‘this side’ of the divide and continue to operate as predominately agricultural economies will not be able to generate real wealth --- danger of perpetual impoverishment. In addition such countries will be unable to sell what they produce competitively --- the input cost of the commodities being produced will be high, they will be not be able to reach the market fast enough --- they will be in danger of being more marginalize as a nation. *The need for Ghana to put in place the necessary policies and plans to move its economy and society to the ‘other-side’ of the digital divide cannot be over-emphasised.*

What about the New Winners...

The prediction is that the *new winners* --- that is those countries who move to the ‘other-side’ by successfully transforming their economies and societies into a predominately information and knowledge-based economy will be able to: develop globally competitive economies, create wealth and distribute it better; generate quality jobs that can compete on the global job market; sell what the nation produces more efficiently, reach global markets faster and sell cost effectively Furthermore countries who move to the ‘other-side’ and trade in information and knowledge using the power of the technology will be able to: sell knowledge and information products multiple times --- all they require is the necessary human resources to generate knowledge and information, create value-added business faster; and source inputs on the global market more efficiently and cheaply.

5.4 The ICT for Accelerated Development (ICT4AD) Process

There is no doubt that: information and communications technologies can be a key factor for achieving progress in economic and social development in Ghana. The information and knowledge-based economy could generate opportunities across all sectors within the Ghanaian economy. --- And can be a new source for the creation of quality jobs, wealth generation and redistribution, rapid economy development and prosperity as well as a source for facilitating the global competitiveness of Ghana

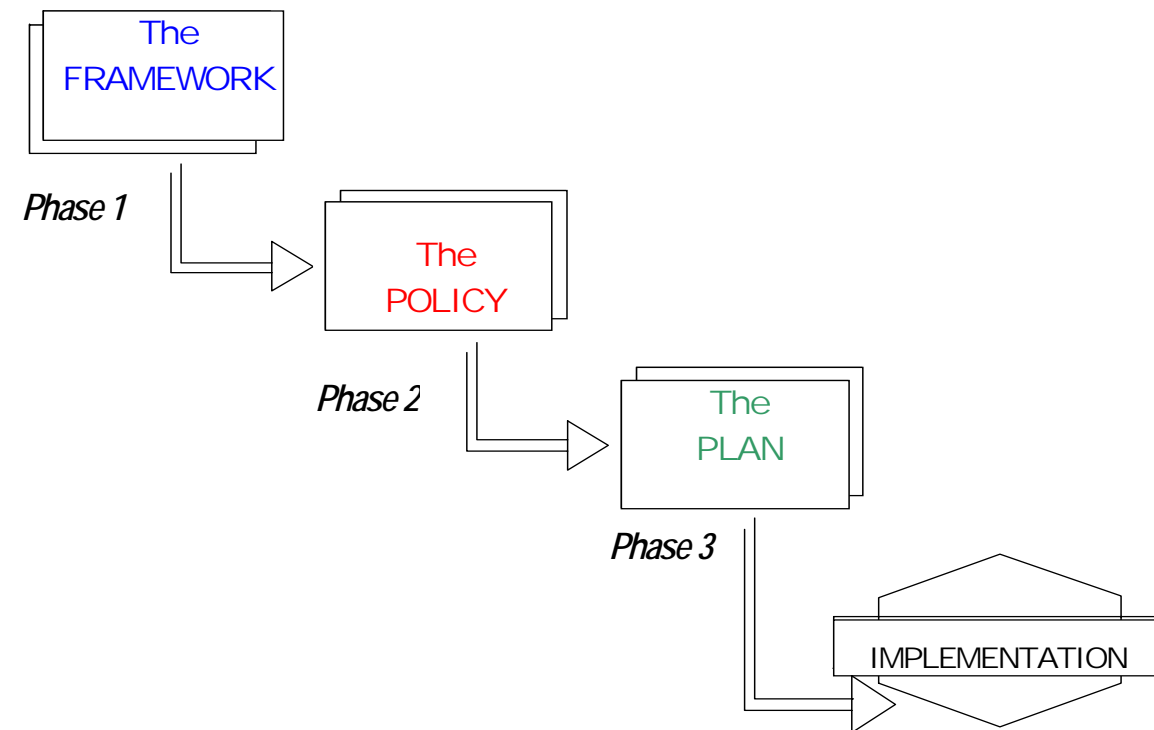
However if Ghana is to achieve a rapid and radical social and economic transformation in the new information age to be dominated by information and knowledge-based economies, she will need to put in place and implement comprehensive *ICT-led socio-economic development policies, strategies and plans*. The premise is that: *the emerging technologies underlying the information revolution are offering even under-developed agricultural countries like Ghana a window of opportunity to leap-frog the industrialization stage and transform their economies into high value-added information economies that can compete with the advanced economies on the global market.*

In other words, the opportunities offered by the emerging information revolution could make it possible for Ghana to circumvent the classical developmental path that stipulates that economies in the process of their development will need to move from agricultural to industrial and then to what is now termed the information and knowledge economy.

The basic argument is that: *by putting in place and implementing appropriate ICT-led socio-economic development policies and corresponding plans; it will be possible for Ghana, to address a number of its socio-economic challenges (identified in Chapter 4) and transform her poorly performing predominately subsistence agriculture based economy into a predominately information and knowledge economy without first being fully industrialized.*

The Process...

The Ghana ICT for accelerated development (ICT4AD) process which is being carried out under the auspices of the African Information Society Initiative (AISI) of the Economic Commission for Africa (ECA) is designed to put in place and implement the necessary policies and plans capable of addressing the developmental challenges facing Ghana to accelerate the socio-economic development process of Ghana and move it towards an information and knowledge based economy and society. The policy and plan development process is being carried out in three phases with each phase aimed at specific deliverables.



Phase 1—The Framework Document: The first phase concentrates on the development of an *Integrated ICT-led Socio-Economic Development Framework for Ghana*. This framework document is in two Volumes. Collectively the framework document among other things provides the basis for the development of the subsequent *Policy* document and the *Plan*.

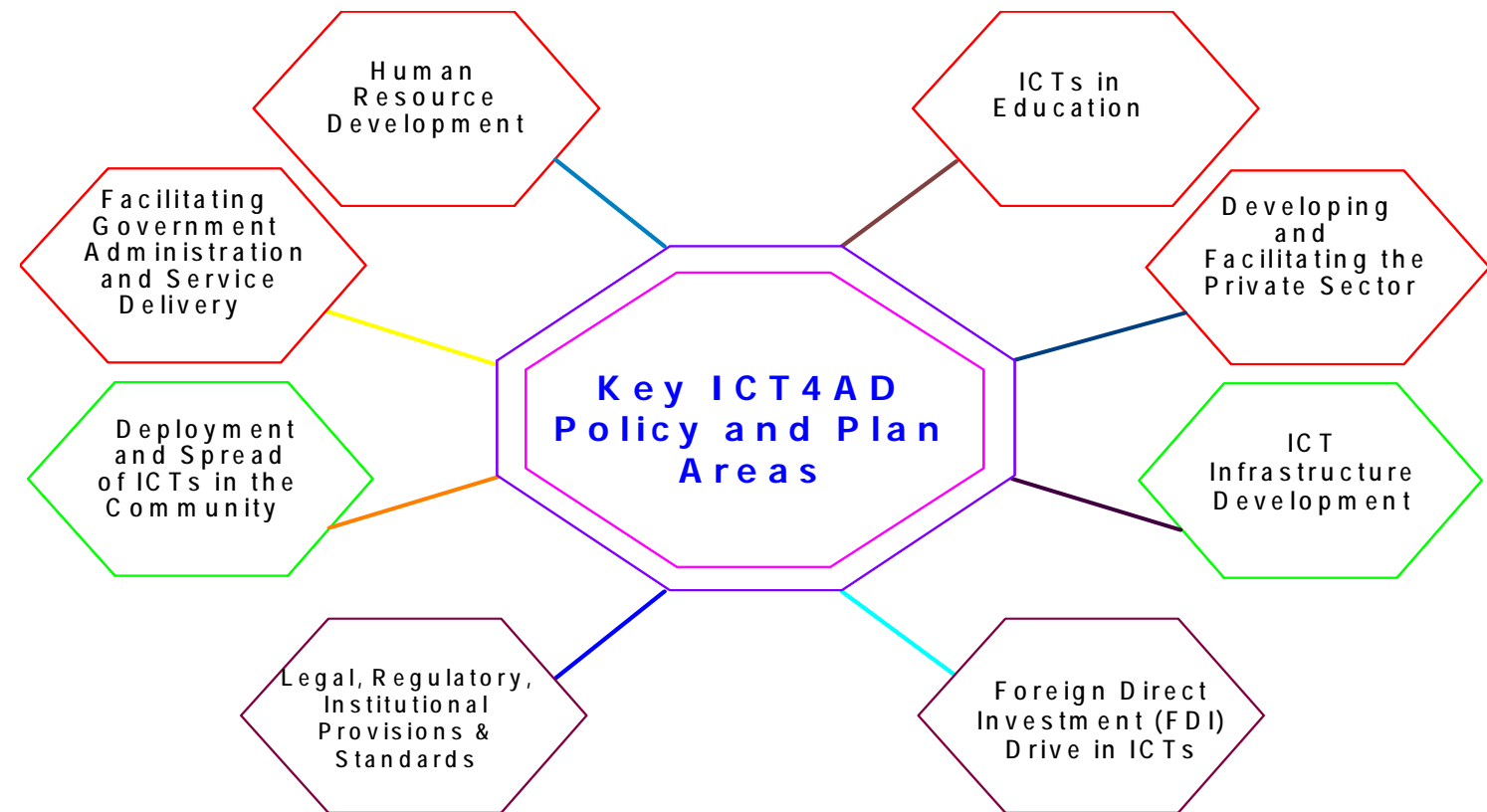
Phase 2 ---- The Policy Document: This phase of the process will concentrate on the development of an *Integrated ICT-led Socio-Economic Development Policy and Strategies for Ghana*. The Policy Document will provide details of specific policy commitments in relation to WHAT need to be done towards the realization of the vision to transform the economy and society through the development, deployment and exploitation of ICTs to support the country’s socio-economic development process. The Plan, to be developed in the 3rd Phase of the Process will provide details of HOW these policy commitments can be translated into concrete programmes and initiatives for implementation.

Phase 3 ---- The Plan: This final phase of the process will be devoted to the development of the plan guided by the policy commitments detailed in the Policy Document. This Plan, the first of 4-yearly Plans is to support the development of the necessary economic base and environment for accelerating Ghana’s development towards an information-rich and knowledge-based economy and society.

5.5 The Expectations of the Policy and Plan

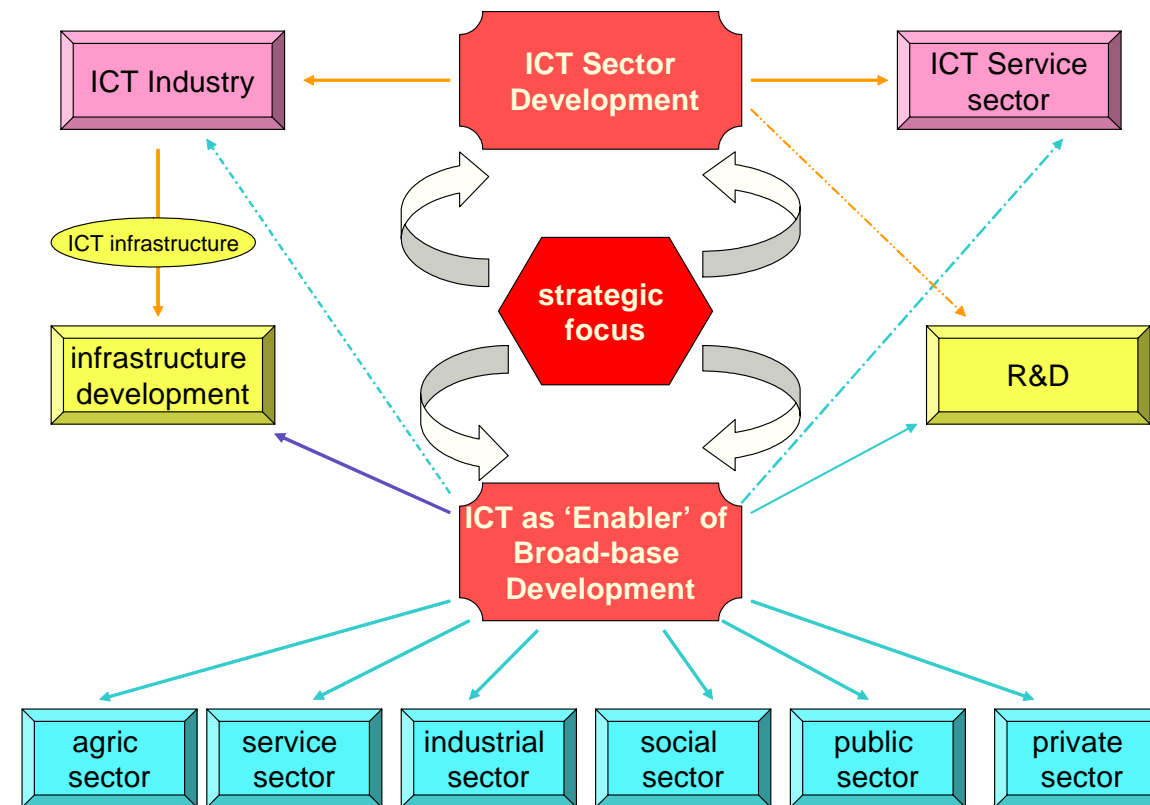
The expectation is that the Ghana ICT4AD policy and plan will among other things address issues relating to the:

- creation of the necessary enabling environment to facilitate the deployment, utilization and exploitation of ICTs within the economy and society
- development of a local ICT industry to facilitate the production, manufacturing, development, delivering, and distribution of ICT products and services
- development of the national human resource capacity to meet the changing demands of the economy
- development of the national information and communications infrastructure
- development and implementation of e-government and governance, as well as e-commerce strategies and action plans
- development of the legal, institutional and regulatory framework and structures required for supporting the deployment, utilization and the development of ICTs within the economy and society and the
- development and promotion of the necessary standards practices and guidelines to support the deployment and exploitation of ICTs within the society and economy



5.6 On the Question of Strategic Focus of the Policy and Plans

It is envisaged that the *ICT-led socio-economic development policy and plans* will strategically focus on both the *development of the local ICT industry* targeted at the export market as well as on *using ICTs as an enabler of Ghana's broad developmental goals*. In other words unlike in the case of Brazil and Ireland who focused on the development of their ICT industry, Ghana being an under-developed nation, will need to use ICTs as a broad enabler of its socio-economic development process as well as putting in place policies and programmes to develop its ICT sector and industry.



The argument is that, the spill-over or catalytic effect of developing the ICT sector on the economy as a whole will not be enough to accelerate Ghana's socio-economic development process. It is envisaged that a simultaneous focus on developing the ICT industry while at the same time using ICTs to drive other sectors of the economy can accelerate Ghana's development faster and spread the social and economic impact of the development, deployment and exploitation of ICTs much faster than a singular focus of the development of the ICT sector.

The underlying details of the Ghana ICT for accelerated development (ICT4AD) process are summarized below.

The Ghana ICT for Accelerated Development (ICT4D) Process	
The Ultimate Goal	To engineer an ICT-led Socio-economic Development Process with the potential to transform Ghana into a middle income information-rich, knowledge-based and technology driven economy and society
The Objective	To develop for implementation within a given time frame an ICT4AD Policy and Plan for Ghana set within the wider socio-economic development framework of Ghana
The General Question being Addressed	How to address Ghana's developmental challenges and accelerate the nation's socio-economic development process to improve the socio-economic well-being of the people
The Basic Premise	Ghana's development process can be accelerated through the development, deployment and exploitation ICTs within the economy and society
The Basic Motivation	Ghana's accelerated development within the emerging information and digital age will not be possible without an ICT-enabled development agenda
Key Process Outputs	<ul style="list-style-type: none"> ▪ The Framework ▪ Policy (based on a Framework) ▪ A Number of Rolling Plans
Key Drivers (Policy + Plans)	<ul style="list-style-type: none"> ▪ ICT as a Social-Enabler (Education, Health, Poverty-Reduction, Income-Distribution, etc) ▪ ICT as an Enabler of rapid Economic development ▪ ICT as an enabler of Government. Administration and Service Delivery ▪ ICT as an Engine of the Service Sector ▪ ICT as an Enabler of Industrial development ▪ ICT as an enabler of the Agriculture Sector ▪ ICT as a driver of Private Sector Development and ▪ ICT as an agent for wealth creation.

The ultimate goal and objectives of the Ghana ICT for accelerated development process are in line with the aspirations of the *Coordinated Programme of Economic and Social Development of Ghana (2003-2012)*, --- which is targeting agro-based industrial development and information and communications technologies (ICTs) as two key drivers --- pillars for accelerating Ghana's socio-economic development.

5.7 The ICT4AD Vision and Mission

The ICT4AD vision is to: *improve the quality of life of the people of Ghana by significantly enriching their social, economic and cultural well-being through the rapid development and modernization of the economy and society using ICTs as the main engine for accelerated and sustainable economic and social development.*

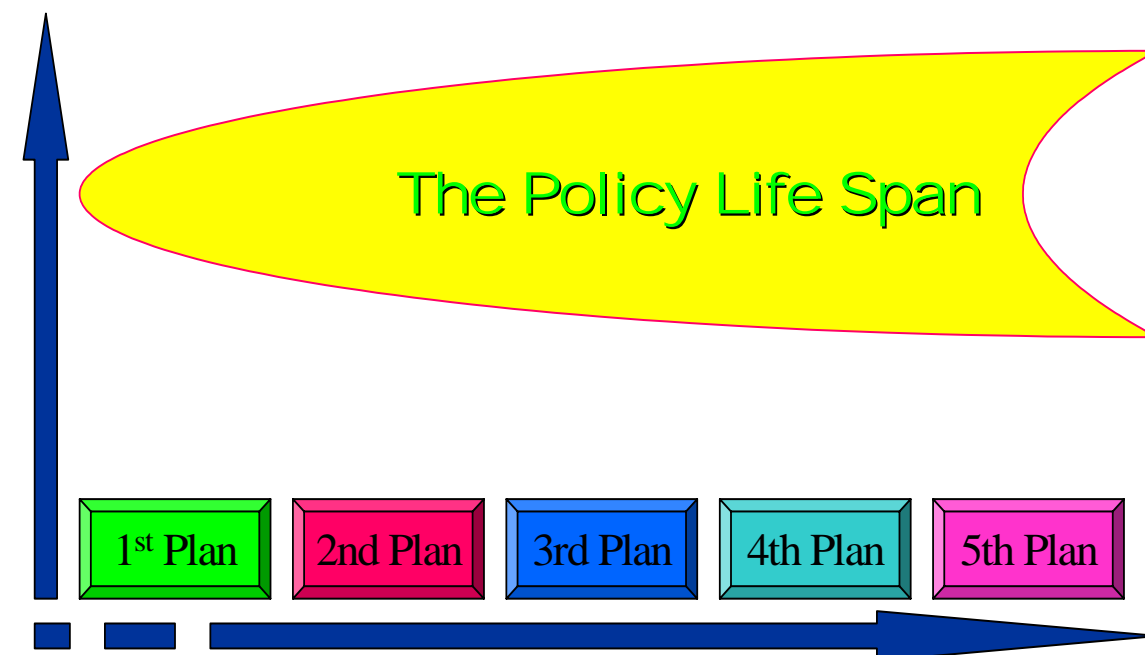
The main mission is to: *transform Ghana into an information-rich, knowledge-based and technology-driven high income economy and society.*

Some of the sub-missions for the realization of the main mission are:

- To develop Ghana's information and knowledge-based society and economy through the widespread development, deployment, and exploitation of ICTs within the society and economy
- To transform the educational system to provide the requisite educational, and training services and environment capable of producing the right types of skills and human resources required for developing and driving Ghana's information and knowledge-based economy and society
- To develop Ghana's R&D capacity and capabilities with the potential to conduct and engage in advanced and cutting-edge R&D work required for supporting the development of a globally competitive information, knowledge-based and high-tech export industry and services sector
- To transform Ghana into an attractive destination for ICT-related Foreign Direct Investment (FDI) with the potential to become a competitive regional ICT and business hub for the sub-region and beyond
- To develop a highly competitive ICT-led value-added and export-orientated services sector driven by a dynamic ICT services sub-sector
- To develop a knowledge-based, technology-driven modern industrial sector with a dynamic export-led and globally competitive ICT sub-industry and
- To modernize the agricultural sector to substantially improve agricultural value-added and productivity and develop a dynamic and vibrant export-oriented agro-business industry

5.8 On the Policy and Plan Time-Frame

It is envisaged that the: ICT-led socio-economic development policy and strategies (The Policy) will have an operational life-span of about 20 years, and that the Plans developed to implement the Policy will each be of shorter time-frame as illustrated below. For example, it is anticipated that a number of rolling plans (each with a time-frame of about 4 years) will be developed and implemented in series with each addressing (to a varying degree) specific aspects of the broad policy issues and commitments of the Policy.



Each of these plans will incorporate the necessary evaluation and monitoring mechanisms to monitor the impact of the various programmes and projects against defined targets and evaluate their overall effectiveness in achieving the stated socio-economic developments objectives aimed at transforming the Ghanaian economy and society.

5.9 Avoiding the Risk of Being Left Behind

There is no doubt that *time* is a critical factor in today's technology-driven development environment. What matters is not only the achievement of the developmental targets. Ghana will need to move faster in comparison with its neighbours and competitors on the global scene. In other words it is not only about crossing the digital river, but also a question of how fast Ghana crosses it in relation to other countries in the region and beyond. Failure to speed up the process of its developmental efforts will make it difficult for Ghana to achieve its targets, if other countries that are already ahead of Ghana increase their lead and gain competitive advantage.

In today's globalized economy and information age, catching-up will be extremely difficult and costly for countries who failed to move fast enough to develop a competitive information and knowledge economy.

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VOLUME TWO

**Transforming Ghana into a Predominantly Information and Knowledge-
base Economy: An Analysis of the Prospects and the Requirements**

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Where do we want to get to as a Nation?

**“...You see things and you say ‘Why? ---- but I dream of things that never were and I say ‘Why not?...’”,
..... George Bernard Shaw**

Chapter One

Making the Case for an ICT-led Socio-economic Development Agenda for Ghana

Introduction

An analysis of the key developmental challenges facing Ghana (as detailed in Volume 1 of the Framework document and summarized below) shows that there is need for Ghana to put in place policies and plans that apart from addressing these socio-economic development problems facing the country should also tackle the challenges of the globalization and the emerging information age.

In the chapter, we make the case that: it will be possible for Ghana to address its developmental challenges and in the process transform its economy and society provided it can pursue an ICT-led socio-economic development agenda. Although Ghana's economy is far from being industrialized we argue (in Chapter 4) that it will be possible for it to leap-frog the key stages of industrialization and transformed its subsistence agriculture based economy into an economy and society that is predominately information and knowledge-based.

1.1 A Review of Ghana's Developmental Challenges within the Context of the Emerging Information Age

There is no doubt that: the world economy is experiencing the impact of rapid globalization and the emerging information age --- which is bringing about a new global economic order to be dominated by information and knowledge-based economies (IKEs). As established in [1], Ghana despite achieving some major improvements in its economy during the 1980's and 1990's is experiencing a number of socio-economic development problems characterized by: (i) an economy with a high dependence on the agricultural sector – which is predominately subsistence base; a narrow and weak industrial base and structures and an under-developed service sector; (ii) low growth rates, coupled with balance of payment difficulties; (iii) poor physical, communications and social infrastructure and (iv) problems associated with heavy debt burden and huge public and social expenditure budgets.

In broad terms, some of the critical developmental challenges facing the country based on the analysis carried out in [1] can be summarized as follows:

- *The social and economic pressures of a youthful population* --- Ghana's relatively young population of close to 60% of the population under the age of 25 years do present the country with a number of developmental challenges. Some of the developmental challenges that Ghana is

facing as a result of having a relatively young population include those relating to heavy social expenditure budget in areas like: education, training and provision of health and other social services.

- *The challenges of turning the youthful population into an asset for development* --- The lack of policies and initiatives targeted at turning the youthful population into a skilled human resource asset to aid the development of the country may translate into a high unemployable population in the years to come. Turning the youthful population into an asset for development and taking necessary steps to improve the economy to provide opportunities to a growing population of young people presents Ghana with a key developmental challenge.
- *Rapid population growth and declining per capita income* --- At the current growth rate of 2.5%, Ghana's population will increase by 50% within the next 12 years; reach the 30 million mark by 2020 and will be about 38 million --- double the 2000 figure by 2028. This rapid growth in the population could present Ghana with a number of developmental challenges especially if economic growth continues to lag behind population growth.
- *An under-performing agricultural sector* --- Ghana's agricultural sector despite experiencing some improvements in some areas is seriously underperforming in a number of critical sub-sectors. Given that the agricultural sector currently employs 70% of the labour force, contributes close 35% to the GDP and accounts for 57% of foreign exchange earnings, the lack of development in the sector has a number of social and economic implications which could further compound Ghana's socio-economic problems and retard its developmental efforts
- *An economy dominated by the agricultural sector with weak under-developed industrial and service sector* --- The Ghanaian economy is still predominately agriculture-base without a substantial shift towards the service sector and industrial sector as should be expected if the economy were on a rapid growth path and modernizing. The structure of the Ghanaian economy measured in terms of sectorial contribution to GDP indicates that the structure of the economy changed very little over the last 20 years. Putting in place policies and strategies that modernize the agriculture sector while at the same time targeting the development of the industrial and the services sector to increase their contribution to the GDP constitute a major developmental challenge facing the country.
- *The heavy debt burden* --- Ghana's development is being handicapped by the nation's heavy debt burden measured in terms of: the high national debt per capita, the high national debt as percentage of GDP, the debt service ratio and the debt service to export earnings ratio. The nation's debt per capita in 2000 was \$350 compare to its income per capita of \$340; the national debt as percentage of GDP increased to about 129% by 2000. Ghana's heavy debt burden is compounding its other economic development problems and this is constraining the nation's developmental efforts in a number of areas.
- *The disproportionate informal private sector* --- Statistics shows that the private sector is dominated by its informal sub-sector. In other words, the formal private sector forms a very small fraction of the private sector. The informal private sector is also by far the largest employment sector of the Ghanaian economy – accounting for close to 81% of the economically active population, while the formal private sector accounts for only about 8%. The development of the private sector in general and in particular the formal private sector is one of the major developmental challenges facing Ghana.

- *The low professional, technical and managerial manpower base* ---- The occupational profile of the economically active population reveals that: only 8.6% are professional and technical people with a lower percentage of 0.3% are managers and administrators. The low percentage of key technical and professional manpower highlights the relatively low professional and technical skill human resource capacity of the economy. The development of a skilled human resource capacity can be singled out as one of the key developmental challenges facing the country.
- *Relatively high proportion of population with no educational attainment* --- Close to 40% of Ghanaians over 6 years of age have never been to school, in other words they have no educational attainment. This figure coupled with the fact that only about 3% of the population had tertiary level education present Ghana with a major developmental challenge.
- *Low job creation capacity of the economy* --- Close to 68% of the employed population are self-employed with no employees. In other words, the majority of the working population worked in their own small enterprises which have no other employees apart from themselves. With the economy dominated by the self-employed, who do not have the capacity to employ others, the prospects for generating additional jobs or employment opportunities for a growing young population are very low. The transformation of the economy to improve on its employment generation capacity is therefore a key developmental challenge facing Ghana.
- *Narrow export base dominated by traditional exports* ---- Ghana's trade with the outside world has for many years been registering huge balance of payment (BoP) deficits. The country's small domestic market cannot support the development of the key sectors of the economy. A key developmental challenge facing Ghana therefore relates to the development of a diversified export-led economy targeting key sectors of the economy including the agriculture, services and industrial sectors
- *Under-developed physical infrastructure.* --- Ghana currently suffers from a number of physical infrastructure development deficits which is putting a strain on the nation's developmental efforts. The developmental implications of the nation's poor physical infrastructure in the area of: roads, electricity, water and sanitation can be classified as a major developmental challenge facing the country.
- *Poor and limited communications infrastructure* --- The development, expansion and modernization of the nation's communications infrastructure to achieve universal service and access to basic and value added telecommunications services, support for the development of the local ICT industry and aid the country's socio-economic development process is a key developmental challenge facing Ghana.

There is no doubt that the socio-economic problems and challenges enumerated above are likely to be compounded by the new challenges posed by globalization and the information age. For Ghana, to make progress in its developmental efforts, the nation in addition to addressing these challenges, will have to put in place and implement policies aimed at addressing the additional challenges posed by globalization and the information revolution driven by the use of information and communications technologies.

It could in fact be argued that: the emerging information age characterized by ICTs and the extraordinary increase in the spread of knowledge has given birth to a new era: that of knowledge and information which is having an impact on the socio-economic development efforts in a number of countries. These technologies are offering even less developed agricultural countries like Ghana the opportunity to transform their economies and

societies by accelerating their socio-economic development process as part of addressing the challenges of globalization and the socio-economic implications of the widening digital divide. In other words, the development, deployment, and the exploitation of ICTs to support the process of transforming the predominately agricultural economy of Ghana and move it towards an information and knowledge economy should be regarded as central to efforts directed at addressing the identified developmental challenges facing the country.

Ghana will need to do more than just address the identified developmental challenges facing it if the nation is to make substantial progress in the emerging economic order to be dominated by information and knowledge-based economies. -- The task before the country relates more to how Ghana should go about formulating and implementing appropriated ICT-led socio-economic development policies and plans that could aid the process of addressing the key socio-economic development challenges facing the country in order to move the economy and society to the other side of the digital divide. The development of the relevant 'ICT for accelerated development' policies and plans will need to be addressed within the context of answering the needs and the developmental priorities and challenges facing the country.

1.2 Developing the Knowledge Economy --- The Key Drivers

The emergence of the information age has no doubt brought to the fore, the important role that *information, knowledge* and *technology* can play in facilitating socio-economic development. According to a World Bank Report (discussed in [2]), all economies are knowledge-based. --- What is different today, however, is that rapidly growing economies depend more on the creation, acquisition, distribution, and use of information and knowledge. The effective use of knowledge is becoming the most important factor for international competitiveness—and for creating wealth and improving social welfare.

According to [2], digitization and informatization of numerous activities within the economies of a number of countries has resulted in the reduction of transaction costs and gave rise to increase productivity across all sectors of the economy beyond the ICT sector. These trends it is argued is heralding a new era characterized by: (i) the development of a service-based economy, with activities demanding intellectual content is becoming more pervasive and decisive; (ii) increasing emphasis on higher education and life-long learning to make effective use of the rapidly expanding knowledge base; (iii) massive investments in research and development, training, education, software, branding, marketing, logistics, and similar services; (iv) intensification of competition between enterprises and nations based on new product design, marketing methods, and organizational forms; and (iv) continual restructuring of economies to cope with constant change.

There is no doubt that: *information, knowledge* and *technology* are increasingly becoming the key drivers for socio-economic development world-wide. It is now abundantly clear that: *a nation's capability to accelerate its socio economic development process and gain global competitive advantage and improve the well-being of its people depends very much on the extent to which it can develop, use and sell, ---- *information, knowledge* and *technology* in one form or other*

Although the mere use of information, knowledge and technology to improve on services, products and processes can improve the socio-economic development fortunes of a given nation, evidence shows that those nations who in addition are involved in the development as well as the sale of information (and information products), knowledge (and knowledge products), and technology (and its products), are moving faster on the socio-economic development ladder compared to others. For example, a high proportion of America's economic activities and labour force are concentrated

in the business of the development, use and the sale of information, knowledge and technology. The economic miracle of Asian countries like Malaysia, Singapore and South Korea can to a large extent be attributed to their shift in focus to economic activities that laid emphasis on the development, use and sale of information, knowledge and technology as well as their products and services. The Multimedia Corridor of Malaysia a key cornerstone of the vision to transform Malaysia into a fully developed nation by 2020 is designed, to attract a critical mass of economic activities targeted at the development, use and sale of information, knowledge and technology.

On the specific question of knowledge, the World Bank in identifying the key elements of a knowledge-based economy pointed out that: rapidly growing economies depend more on the creation, acquisition, distribution, and use of knowledge. --- the effective use of knowledge is becoming the most important factor for international competitiveness—and for creating wealth and improving social welfare. – The need for organizations and people to acquire, create, disseminate, and use knowledge more effectively for greater economic and social development is becoming a key factor for the development of a nation. The World Bank identify the four pillars of a knowledge based economy as:

- an economic and institutional regime that provides *incentives* for the efficient use of existing knowledge, the creation of new knowledge, and entrepreneurship.
- an educated and skilled populace that can create and use knowledge.
- a dynamic information infrastructure that can facilitate the effective communication, dissemination, and processing of information.
- an effective innovation system comprising a network of firms, research centers, universities, think tanks, consultants, and other organizations that can tap into the growing stock of global knowledge, assimilate and adapt it to local needs, and create new knowledge or technologies.

According to [2], countries, including developing countries will need to embrace the knowledge revolution, which, although presents considerable developmental challenges, also provides considerable opportunities for development that could be sustained by: (i) improving competitiveness of existing agriculture, industry and services—and saving jobs; (ii) developing new activities, services in particular, to create new jobs and new sources of wealth and facilitating the transition to a more sustainable and environmentally friendly economy.

It is obvious from the forgoing discussions that for nations like Ghana to make any significant progress in their development process serious efforts will need to be put into developing and implementing appropriate policies and plans to guide their development in the new information and knowledge age driven by information and communications technologies.

1.3 The Need for Pursuing an ICT-Led Development Agenda

It could be argued that because of the portable nature of the underlying technologies driving the development of the information society and economy, developing countries like Ghana are equally placed to take advantage of them to facilitate her socio-economic development process. In the new emerging economic order, the fundamental basis for poverty reduction, wealth creation and national prosperity is information and knowledge which Ghana cannot afford to be without.

Information and communications technologies can be a key factor for achieving progress in economic and social development in Ghana. There is no doubt that the information and knowledge-based economy could generate opportunities across all sectors within the Ghanaian economy. --- and can be a new source for the creation of quality jobs, wealth generation and redistribution, rapid economic development and prosperity as well as a source for facilitating global competitiveness of Ghana.

However if Ghana is to achieve rapid and radical social and economic transformation in the new information age to be dominated by information and knowledge-based economies, she will need to put in place and implement comprehensive ICT-led socio-economic development policies, strategies and plans. In other words, the nation will need to pursue an ICT-led development agenda if it is to address its numerous developmental challenges and the challenges of globalization and the emerging information age to aid the process of transformation of the economy and society.

The premise is that: the emerging information and communications technologies underlying the information revolution are offering even under-developed agricultural countries like Ghana a window of opportunity to leap-frog the industrialization stage and transform their economies into high value-added information economies that can compete with the advanced economies on the global market

The opportunities offered by the emerging information revolution can make it possible for developing countries like Ghana to circumvent the classical developmental path that stipulates that economies in the process of their development will need to move from agricultural to industrial and then to what is now termed the information and knowledge economy. The basic argument is that it will be possible for Ghana, with its predominately subsistence agriculture based economy to transform her economy and society into a predominately information and knowledge economy without first being fully industrialized.

Chapter Two

The ICT for Accelerated Development Process: Analyzing the Global Evidence

Introduction

A number of countries including those in the developed and developing world, have recognized that, the globalization process and the emerging information age presents them with both socio-economic development opportunities and challenges. Ghana like most of these countries is faced with a number of the challenges which it needs to appropriately address if the country is to take advantage of the developmental window of opportunities offered by the technologies underlying the information revolution. To serve as a basis for addressing how Ghana should tackle these challenges within the context of developing its information economy and society, we examine below the responses of other countries to these challenges

2.1 Responding to the Challenges of the Emerging Information Age: Cases of Selected Countries Outside Africa

Governments world-wide have recognized the crucial role that ICTs could play in facilitating and accelerating the socio-economic development process. In fact, a number of countries in both the developed and developing world are putting in place relevant policies and strategic plans that will enable them transform their economies into information and knowledge-based economies. For example, developed countries like: the USA, Canada and a number of European countries as well as Asian countries like: India, China, Singapore, Malaysia, Thailand, Sri Lanka, South Korea, Japan, and Vietnam Central and South American countries like: Brazil, Chile, Costa Rica and Mexico among others including Australia have in place these policies and plans that are being implemented across their respective economies and societies.

In India for example, the government see ICTs and their deployment for socio-economic development as one area where India can quickly establish global dominance and reap tremendous payoffs in terms of wealth creation and the generation of high quality employment. Finland on the other hand regards the development and utilization of ICTs within its economy and society as a key component of its national vision to improve quality of life, knowledge and international competitiveness.

Malaysia's Vision 2020 which envisages Malaysia as a fully developed nation by Year 2020 and the Singapore's vision of transforming Singapore into an 'Intelligent Island' all see ICTs as the main engine for promoting accelerated development and growth as well as gaining global competitive

advantage. Mexico, also see ICTs as a key factor for achieving progress in social and economic development. Other countries like Costa Rica, Brazil and Ireland, have all developed and implemented policies targeting the development of the ICT industry as an engine for growth.

- **The Case of Costa Rica**

According to [3] Costa Rica which pursued a strategy focusing on the development of its local ICT sector attributed much of its economic growth of 8.3% of GNP in the late 1990's, the highest in Latin America—to that strategy. Costa Rica since the 1990's, moved away from concentrating on labor-intensive industries to focus its attention on the high-tech ICT sector development as a means of generating employment and foreign exchange. Faced with declining prices of its primary source of exports and growth, Costa Rica saw the need to develop alternatives to coffee production.

Recognizing the potential of the emerging ICT sector, Costa Rica put in place policies to attract global ICT corporations such as Intel Corporation – the World's leading microprocessor producer to locate in the country. The Costa Rican factory is Intel's second largest for final assembly and testing of microprocessor chips. Through its ICT sector development policy it has succeeded in attracting substantial foreign direct investment (FDI) that has helped it develop high-tech export-based industries by providing not only an educated population and a prime geographical location, but also by demonstrating the success stories of Intel, and Microsoft. As part of its on-going programme to attract more FDI into Costa Rica, the government has taken steps to build technological skills in the population, develop strong partnerships between government and business, and further upgrade the already good telecommunications network.

- **The Case of Brazil**

In the case of Brazil, the country was one of the first developing countries to put in place in the late 1970's, policies aimed at promoting the development of its domestic ICT industry and sector. According to [3] Brazil began its pioneering approach to leveraging ICT for development in the 1980s, when it began implementing policies to promote the development of national enterprises in selected segments of the computer industry. By the end of the decade, a set of diversified IT corporations with significant presence in the local market had been built. The Brazilian ICT sector drew on a skilled population base, strong R&D networks, a relatively extensive telecommunications and communications infrastructure and a strong level of government commitment.

Brazil, in developing its local ICT industry initially focused on the production of minicomputers and later expanded its product range to include microcomputers. As part of its policy to promote the development of its local ICT industry the Brazilian Government (according to [3]) put in place policies restricting technology transfer agreements, thus encouraging companies to undertake R&D locally. The Brazilian government also restricted the importation of technology when local capabilities were available. --- This has made it possible for local firms to develop their own products based on reverse-engineering or in-house design. These policies resulted in the building of a strong technological base that brought about a rapid growth in the ICT sector in the 1990's.

- **The Case of Ireland**

Ireland often regarded as a success story in the area of implementing policies aimed at developing its local ICT sector targeted at the export market started their process of developing the ICT sector as an engine for growth from the mid-1980s. Given their membership of the European Union; a young and educated population; a national pool of highly skilled human resources and a good R&D capacity of its universities and research institutions, Ireland for years aggressively promoted itself as an ideal European location for major international computer companies.

Most of the major international ICT corporations both in the area of computer hardware production and software development have established their European headquarters in Ireland. The unprecedented growth of the Irish economy since the late 1990's can to a large extent be attributed to the rapid development of the country's local ICT sector into an internationally competitive manufacturing and equipment assembly industry with high export potentials. The country now serves as an international hub (outside the USA) for the production of computer components and systems from microchips to complete computer hardware systems. Ireland is also reputed to be a leading software exporting country after the USA.

- **The Case of Finland**

As a country in the forefront of information society development, Finland has over the years implemented policies aimed at the development of its ICT industry targeting the export sector. To facilitate the development of this sector, Finland has made a substantial investment in education, training and R&D. The country's internationally competitive ICT products have significantly contributed to the growth of Finnish exports and to GDP. For example, the export earnings of Nokia, one of the leading manufacturers of mobile equipments in the World, has been estimated to contribute substantially to Finland's GDP growth within the last decade. Finland's vision is to develop and utilize the opportunities inherent in the information society to improve the quality of life, knowledge, and international competitiveness.

According to [4], the goal in the Finnish information society initiative is designed to:

- increase welfare and offer jobs and income;
- provide equal opportunities for the acquisition and management of information and for the development of knowledge;
- improve conditions for entrepreneurship and the quality of working life and promote competitiveness;
- increase opportunities for human interaction and cooperation;
- strengthen democracy and opportunities for social influence;
- improve security and the individual's data protection and status as a consumer;
- develop services and cultural provision and increase international interaction;
- boost Finland's attractiveness as a location for innovative enterprises and to
- support the objectives of sustainable development.

- **The Case of India**

India, like a number of other Asian countries, has embraced the 'ICT for accelerated development process' by putting in place a number of programmes and initiatives to drive its ICT industry as well as using ICTs as a development enabler. India since the 1980's, has for example been aggressively promoting the development of quality ICT skills and related human resources, especially targeting the software development industry. Apart from setting up a number of specialist ICT institutions, and introducing ICT programmes into a number of the existing Indian Institute of Technologies (IITs) and Universities to train professional software developers, the Indian Government put in place a number of policies targeted at promoting the setting up of public and private software development parks. These policies and programmes are now bearing fruits and impacting on Indian's development efforts as well as contributing to the country's high tech exports and earnings.

According to [5], the Indian software industry gained recognition in the early 1980's, when thousands of Indian IT personnel especially those involved in software development were recruited on contract to work abroad in countries like the USA. A number of companies especially those involved in skill transfer to the developed world took on software development projects at customer sites and sent their professionals to carry out this task.

India no doubt now serves as a global source for outsourcing high value added ICT services including the provision of off-shore ICT services to clients in developed nations including USA, Germany, UK, and Japan among others. India is reported to be earning millions of dollars from its software industry targeted at the export market and thousands of Indian ICT professionals are now working in the software industry for leading international ICT corporations world-wide.

Due to the international recognition of India's software development industry, the industry grew from a mere US\$150 million in 1991 to a staggering US\$5.7 billion (including over US\$4 billion worth of software exports) by 2000 representing an annual growth rate of over 50 percent. India has as a key target of its ICT for development plan to increase export earnings from its software industry in the next couple of years. --- The Plan targets a yearly export in software and services of \$50 billion by 2008.

- **The Case of China**

Another Asian country, aggressively embarking on an "ICT-for-development" process is China. The Chinese government has put in place a number of policies and programmes to attract foreign direct investment (FDI) in the area of ICTs targeted at the development of the local ICT sector and industry. Also being pursued are programmes targeted at the deployment and exploitation of ICTs within the society and economy. According to [2] China's tenth five-year plan focuses on economic development and restructuring largely moving out of agriculture, upgrading industry, and moving into services. – with science, technology, and education given a prominent role for driving the change. The development and exploitation of ICTs to facilitate development in all the provinces forms a key component of this plan. A number of China's provinces like Shanghai have their own ICT plan designed to gain global competitiveness and transform their respective economies and societies into the information and knowledge-based economies.

2.2 Responding to the Challenges of the Emerging Information Age: Africa Countries

The majority of African countries unlike countries in other regions of the world, were late-comers to the “ICT-for-development” scene. Although a number of these countries have in the 1980’s put in place programmes and initiatives targeted at IT (information technology) deployment within their respective civil and public services, it was not until recently that most of the African countries began looking at the broader issue of facilitating their socio-economic development process through the deployment and exploitation of ICTs.

A number of these countries in recent years have made some efforts to facilitate the ICT infrastructure deployment, rollout and exploitation process in their respective countries. A number have also put in place and implemented policies on creating the necessary enabling regulatory framework and environment to facilitate the deployment, exploitation and the development of ICT infrastructure and services. Some of these countries have: completed the separation of Government regulatory and operator duties; put in place policies and mechanisms to facilitate universal service and access to basic and value added telecommunications services; created conditions for an investor friendly telecommunications environment and the development of a local communications industry towards competitiveness.

As pointed out in [1], the “ICT-for-development” process in Africa is being led by the United Nations Economic Commission for Africa (UNECA) within the context of the *Africa Information Society Initiative (AISI)* [6] --- This initiative serves as a framework for a radical socio-economic transformation of African countries through the deployment and the exploitation of ICTs within the context of the challenges of globalization and the information age.

The first Africa Development Forum (ADF), organized by UNECA in 1999 --- which was based on the theme: ‘The Challenges of Globalization and the Information Age’ ---- used the AISI as point of reference to re-focus the attention of African Governments on the socio-economic development implications of the digital divide. The forum examined and proposed a number of actions that need to be taken at the national and continental level within the AISI framework to accelerate Africa’s developmental efforts in the new information age. Like the AISI, the *Digital Opportunity Initiative (DOI)* --- an initiative led by the United Nations Development Programme (UNDP) is also aimed at guiding the “ICT-for-development” process in developing countries including those of Africa.

In addition to the AISI, the DOI and other initiatives like the UN-ICT Task Force and the Digital Opportunities Task Force (DOT Force) are contributing to the development of national policies, plans and initiatives directed at ICT deployment and exploitation to facilitate the socio-economic development process in developing countries including those of Africa.

Specifically in relation to the AISI, a number of African countries have in the last five years under this continental initiative, embarked on the process of developing their national information and communications policies and plans. Countries like, Rwanda, Senegal, Mozambique, Tunisia and a number of others, have respectively operationalized, adapted and refined the AISI framework to develop workable national ICT-led socio-economic development policies and corresponding national information and communications infrastructure (NICI) plans.

On the basis of work done since the adoption of the AISI in 1996, there is now in a selected number of African countries an extensive body of knowledge and accumulated experience in the area of the formulation and development of national ICT-led socio-economic development policies and corresponding plans to facilitate the process of accelerated economic development in the emerging information and technological age [7]. Also as part of the AISI experience, it is now accepted that, *African countries like other developing countries are equally placed to take advantage of the emerging information and communication technologies to facilitate and accelerate their socio-economic development process towards an information-rich and knowledge-based economy and society.*

On the whole, in the areas of developing ICT policies and plans, African countries can be divided into three broad categories: (i) those who are yet to start the process or are in the process of developing their national policies and plans (ii) those who have partially completed their policy development process and are in some cases implementing specific initiatives or sectoral projects – these include countries that are operating in a policy vacuum but implementing a number of initiatives and (iii) those who have completed their policy and plan development process and have embarked on the implementation process.

The Table below provides an overview of the status of the ICT for development process in a number of African countries.

Status of Development of ICT National Policies and Plans in African Countries	
<i>Stage of the Process</i>	<i>Countries</i>
Countries who are yet to start the process or are in the process of developing their national policies and plans	Algeria, Angola, Botswana, Burundi, Cameroon, Central Africa Republic, Chad, Comoros, Congo, Cote d'Ivoire, Djibouti, D.R Congo, Equatorial Guinea, Eritrea, Ghana, Guinea, Guinea Bissau, Lesotho, Liberia, Libya, Madagascar, Niger, Reunion, S. Tome & Principe, Sierra Leone, Seychelles, Somalia, Swaziland, Tanzania, Togo, Zambia, Zimbabwe
Countries who have partially completed their policy development process and are in some cases implementing specific initiatives or sectoral projects – these include countries that are operating in a policy vacuum but implementing a number of initiatives	Ethiopia, Kenya, Gabon, Nigeria, Cape Verde, Mali, Mauritania, Malawi, Namibia, Senegal, Sudan, Seychelles, Uganda
Countries who have completed their policy and plan development process and have embarked on the implementation process	Burkina Faso, Gambia, Egypt, Morocco, Mozambique, Mauritius, Rwanda, South Africa, Tunisia

The details presented above show that the majority of African countries including Ghana, are either yet to start their process or are in the process of developing their national policies and plans. We examined below some selected cases of countries that have either partially completed or completed their policy and plan development process.

2.3 An Overview of National ICT4AD Efforts in some Selected African Countries

- **The Case of Mauritius**

The Government of Mauritius has been active in the promotion of information and communication technologies in every socio-economic sphere and steering the country towards the information age. In fact, Mauritius in the late 1990's was one of the first African countries to develop its National Information Technology Strategy Plan (NITSP) [8] to serve as a comprehensive, dynamic and integrated strategic plan for the realization of her IT vision. This vision forms an integral part of the overall national vision of social and economic development for Mauritius. The NITSP was developed as part of the Government's strategic objectives to accelerate Mauritius' transformation into a nation where ICT will be fully exploited to improve business competitiveness, civil service efficiency and effectiveness as well as to encourage its diffusion at national level so as to help achieve an information-based economy.

The shared vision of the NITSP is to develop Mauritius into a modern nation, to enhance its competitiveness in the global market place and to improve the quality of life of the people of Mauritius. The four key strategies identified to realize the vision are:

- To move Mauritius towards an information-based economy
- To improve Civil Service efficiency and effectiveness
- To improve the education system so as to develop more skilled and trained manpower
- To grow the services sector and develop the Freeport

To realize the NITSP vision, the following six objectives were targeted for implementation:

- Enable the services sector to grow and develop into a business hub;
- Improve effectiveness and efficiency of public services;
- Bring the Government closer to the people;
- Create a fully IT literate nation;
- Use IT to enhance the education system and services; and
- Enhance competitiveness of businesses in the global market.

To assist the country in charting its course for effective and efficient exploitation of ICT for economic and social development, Mauritius based the details of its ICT plan on eight building blocks constituting what it called the SHOCKING model or framework. These eight building blocks are: Standards & Practices, Human Resources, Organization Incentives, Civil Service Computerization, Key Drivers, IT Industry, National Applications and Global Vision.

- **The Case of Rwanda**

The Rwandan ICT-led socio-economic development policy and plan development process which was supported by UNECA within the framework of the AISI began in 1998. The process yielded four main outputs: namely: the Framework, Policy, Plan and Structures [9]

The Rwandan ICT-led development policy targeted among other areas: the creation of an enabling environment for the development of the national information society and economy; implementation of special policy instruments, and incentive programmes to promote the development of the information economy; development of the necessary human resource to support the development of the country's information society and economy; deployment and exploitation of ICTs in the educational system; and the deployment of ICTs to support the operations of the civil and public services among others.

The policy and the corresponding plans also addressed issues relating to: facilitating an investment climate for the mobilization of the necessary financial and technological resources to support the deployment and exploitation of ICTs within the economy and society; the development of the nation's ICT infrastructure, and its physical infrastructure; facilitating the role of the private sector in the development and participation in the information economy; the development of a local ICT industry, the enactment of the necessary cyber laws and legislative provisions; promotion and supporting of R&D initiatives directed at the development and the exploitation of the opportunities of the information society and economy and on promoting universal access to information and communication technologies and systems.

To implement the details of its ICT-led development policy the Rwandan Government developed a comprehensive five year (NICI) Plan to serve as the first of four 5-year rolling plans that will be implemented over a 20 year time span. The individual time-span and goals of each of these NICI plans are:

- *The 1st NICI Plan (2001 to 2005)*

Goal: To support the *development* of an economic base and environment for accelerated growth and development towards transforming Rwanda into an information-rich knowledge-based society and economy.

- *The 2nd NICI Plan (2006 to 2010)*

Goal: To support the *strengthening* of the economic base and improving the economic environment to accelerate development and growth towards achieving an information-rich knowledge-based society and economy.

- *The 3rd NICI Plan (2011 to 2015)*

Goal: To facilitate the process of *sustaining* economic development and growth towards improving national prosperity and global competitiveness

- *The 4th NICI Plan (2016 to 2020)*

Goal: To *consolidate* the process towards achieving a middle income status and an information-rich knowledge-based society and economy.

The eight pillars of the Rwanda 1st NICI Plan which is based on the SUNRISE Model are:

- Human Resource Development;
- ICTs in Education;
- Facilitating Government Administration and Service Delivery;
- Developing and Facilitating the Private Sector;
- Deployment and Spread of ICTs in the Community;
- ICT Infrastructure Development, Legal Regulatory; Institutional Provisions and Standard; and
- Foreign Direct Investment Drive in ICTs Sub-Plan.

Each of these 8 pillars constitute a sub-plan of the main plan ---with each made up of a collection of programmes and initiatives which are associated to a number of plan-actions, with corresponding specific time-bound measurable targets. The Rwanda ICT4AD process has so far yielded one of the most comprehensive and integrated ICT-led development policy and plan in Africa.

- **The Case of Nigeria**

Nigeria in 2000 developed its national information technology policy, with the vision to make Nigeria an IT capable country in Africa and a key player in the information society by the year 2005, using IT as the engine for sustainable development and global competitiveness. The Government in its policy document recognizes IT as a strategic imperative for national development and has resolved to provide considerable national resources, both financial and otherwise for the realization of the National IT Vision statement.

The Nigerian IT Policy Framework [10] targeted a number of strategic areas for implementation, the key ones are: Human Resource Development; Infrastructure Development; Governance; Research and Development (R&D); Health; Agriculture; Urban and Rural Development; Trade and Commerce; Fiscal Measures; Government and Private Sector Partnerships; Arts, Culture & Tourism; National Security and Law Enforcement; Legislation; IT Popularization and Awareness.

Some of the specific strategies targeted for implementation include:

- Establishing a coordinated program for the development of a National, State and Local information infrastructure backbone by using emerging technologies, such as satellite including VSAT, fiber optic networks, high-speed gateways and broad band/multimedia
- Increasing the telephone line penetration rate by expanding the existing Telecom network and providing new networks by employing modern technologies in order to minimize the cost of expansion
- Encouraging further deregulating of the Telecom industry with a view to providing affordable, competitively priced Internet connectivity for a larger community of users
- Restructuring the educational system at all levels with a view to developing relevant IT curricula for the primary, secondary and tertiary institutions in order to respond effectively to the challenges and imagined impact of the information age and in particular the allocation of IT development fund to education.

- Developing government/private sector R & D partnerships through equitable facilities sharing and by the establishment of pilot schemes in software and hardware development within/outside designated IT Parks.
- Establishing and operation of Information technology free zones also known as IT Parks to attract IT investment.
- Encouraging massive local and global IT skills acquisitions through training in the public and private sectors as well through joint venture and alliances with a view to achieving a strategic medium-term milestone of at least 500,000 IT skilled personnel by the year 2003.
- Bringing Government to the doorsteps of the people by creating virtual forums and facilities to strengthen accessibility to government information and facilitating interaction between the governed and Government leading to transparency, accountability and strengthening of democracy.
- Establishing a National Information Technology Development Agency (NITDA) to implement, monitor, evaluate, regulate and verify IT activities on an on-going basis under the supervision and coordination of the Federal Ministry of Science and Technology

- **The Case of Uganda**

Uganda enacted its Telecommunications Act in 1996 – with the main objective of increasing the penetration and level of telecommunication services in the country through private sector investment rather than government intervention. This was followed by a rural communications development policy in 2001, designed to provide access to basic communication services within a reasonable distance to all people. Uganda can be regarded as one of the few African countries who made some progress in the development of their ICT sector in the absence of a policy framework targeting the deployment and exploitation of ICTs to facilitate its development process.

Uganda under the auspices of the AISI initiative of UNECA and with support from the UNDP, initiated its “ICT-for-development” process in 2000, which led to the development of its ICT policy document in 2002 [11]. The government as part of this policy, recognises the important role that ICTs could play in national development and is committed to the championing the development and the use of ICTs in Uganda

The policy goal is to promote the development and effective utilization of ICTs such that quantifiable impact is achieved throughout the county within the next ten years. The key objectives of the ICT policy include to:

- Sensitize and create awareness among the general public and all stakeholders about the role of ICTs in Uganda’s development;
- Increase the level of ICT functional literacy in all sectors and build human resource capacity;
- Promote and enable the building and establishment of an appropriate infrastructure that supports ICT development and at the same time meets universal ICT access goals;
- Promote fair competition and private investment in the ICT sector with particular emphasis on development and encouragement of local participation including specific incentives for investing in ICTs;
- Identify and establish innovative financing mechanism that address specific needs of ICT development; and
- Promote the use of ICTs in the stimulation of production, storage, and dissemination of in-country information and knowledge in both the public and private sector.

- **The Case of Tanzania**

Tanzania has put in place its national ICT policy framework with the vision to transform the country into information rich, knowledge based society and economy [12]. The mission identified for the realization of the vision is to: speedily achieve social – economic development of Tanzania through modernizing key sectors of the economy using ICTs and investment in the ICT sector.

The Government in adoption of the ICT policy framework intends to put in place and implement relevant initiatives that will:

- Contribute to the fight against poverty and the improvement of the conditions of life for all Tanzanians;
- Ensure for its citizens access to the benefits of worldwide knowledge;
- Raise the efficacy and efficiency of state institutions and their value to the public through the provision of services;
- Improve governance and public administration;
- Make Tanzania a producer and not a mere consumer of ICTs;
- Raise Tanzania to the level of a fitting and competitive partner in the Global Information Society.

The priority areas identified for implementation within the policy framework are:

- Education
- Human Resource Development
- Government
- Health
- Infrastructure Development
- Higher Education and Research
- Universal Access
- ICT leadership

The specific objectives of the Tanzanian ICT Policy framework are to:

- Raise the national level of knowledge as to the role and potential of ICTs in the sustainable development of Tanzania;
- Contribute to the eradication of absolute poverty and improve the conditions of life for Tanzanians;
- Provide universal access to information to all citizens in order to improve their level and performance in education, science and technology, health, culture, entertainment and in their activities in general;
- Expand and develop the teaching of Informatics in the National System of Education;
- Encourage and support Informatics training for directors, community leaders, women, young people and children;
- Contribute to the increase in efficiency and efficacy of the public and private sectors;

- Contribute to the effort to make the country a producer and not only a consumer of ICTs;
- Create a favorable climate for industry, business and investment in the areas of ICTs;
- Ensure that plans and development projects in all sectors have an ICT component;
- Contribute to the reduction and gradual elimination of regional imbalances, the differences between city and countryside, and between the various segments of society in respect of access to opportunities for development;
- Create a favorable environment for cooperation and partnership in ICTs between the public and private sectors and between all stakeholders at national, regional and international level; and to
- Empower and facilitate the integration of the country in the world economy and in the Global Information Society.

2.4 Concluding Remarks: Ghana Learning from the Global Experience

It is obvious from the details presented in this chapter that a number of developed and developing countries including a number from Africa have recognized the crucial role that ICTs could play in facilitating the accelerated development of their respective economies and societies. The majority of the developed countries most of whose economies are industrialized and service sector dominated have within the last decade put in place policies and programmes targeted at accelerating the process of transforming their economies and societies into an information and knowledge based economies. A number of the Asian as well as Latin and South America countries are also in the forefront of the development, deployment and exploitation of ICTs to further speed up their development process through the implementation of ‘ICT for development’ policies and programmes.

On the whole, countries like India, China, South Korea, Malaysia, Singapore, as well as others like Costa Rica, Brazil and Chile have all been experiencing rapid growth in their economies through the development, deployment and exploitation of ICTs within their economies and societies. African countries, the majority of which are yet to seriously embark on the ICT for development process has a lot to learn from the experiences of others in the region and beyond.

There is no doubt that: the Ghana ICT4AD policy and plan development and implementation process can benefit from a number of the country specific cases and experiences. The case has been established that for Ghana (as is the case for other developing countries) to make progress in its socio-economic development process in the new information age, it will need to put in place and implement its ICT-led development policies and plans. As pointed out in [1], Ghana’s process will strategically focus on both the *development of the local ICT industry* targeted at the export market as well as on *using ICTs as an enabler of Ghana’s broad developmental goals*. In other words (as pointed out in [1]) unlike in the case of Brazil and Ireland who focused on the development of their ICT industry, Ghana being an under-developed nation, will need to use ICTs as a broad enabler of its socio-economic development process as well as putting in place policies and programmes to develop its ICT sector and industry.

Chapter Three

The ICT for Accelerated Development Process: An Analysis of the Research Findings and Lessons

Introduction

To supplement the details presented in Chapter Two in relation to the global evidence of ICT4AD country-specific initiatives we examine in this chapter specific research findings and lessons relating to the use of ICTs to facilitate the development process. Some of the research findings touched on specific 'ICT for development' concepts which have been developed within the last decade. A number of the findings provided critical lessons that need to be taken into account within the context of developing the Ghana ICT4AD policy and the plans.

The chapter first examined a number of the relevant main research findings and drew some specific lessons from them. This is followed by other general findings and lessons that are relevant to the Ghana process. Some of these findings form part of specific research work conducted as part of the Ghana process. Others are findings of previous studies like the Digital Opportunity Initiative (DOI) study documented in [1]. The DOI study was an initiative of the UNDP, Markle Foundation and Accenture and constitutes a key source of research findings on the 'ICT for development' process in developing countries

3.1 A Review of Key 'ICT for Development' Research Findings

- **The Leap-Frogging Notion**

Research work on the developmental impact of the deployment of ICTs in East Asian countries concluded that the successful experience of these countries has lent support to an 'ICT -led' development thesis implying that poor countries can adopt 'leapfrogging' strategies. According to [13] ICTs present a 'window of opportunity' for developing countries to progress from a situation of 'zero' or 'limited' technology to widespread adoption of 'sophisticated' technologies, without going through the stages of technological adaptation and learning experienced in developed countries.

Lessons: A key lesson from this research findings is that: it will be possible for Ghana (as is the case of other developing countries) to facilitate its socio-economic development process through the deployment and exploitation of ICTs without first going through an extensive industrialization and technological adaptation process (a point elaborated on in Chapter 4). However there will be a need to put in place and implement specific ICT4AD policies and corresponding plans aimed at the development, deployment and exploitation of ICTs within the economy and society to support the country's socio-economic development process. For these policies and plans to have the desired impact on the nation's socio-economic development process, their

implementation (as we established in Chapter 6) will need to be undertaken within the context of addressing a number of key *critical success factors and conditions*. In other words, the argument being put forward is that: the development, deployment and exploitation of ICTs within the economy and society can contribute to and accelerate Ghana's socio-economic development process provided some critical success factors and conditions are addressed at the: national and organizational levels as well as at the level of individuals in the work place and in the society at large.

- **Most ICT Pilot Initiatives in Developing Countries are not Primarily Directed at Impacting on the Overall Socio-Economic Development Process**

Although case studies reported in [13] suggested the need to consider the deployment and exploitation of ICTs within the economy and society as key to achieving developmental goals; it has been established that the majority of the ICT projects and initiatives in most developing countries including those of Africa are community-based ICT initiatives. --- Most of these are typically of small-scale pilot nature and not directly targeted at achieving overall developmental policy goals and priorities of these countries.

In fact, a number of these projects are often not primarily aimed at impacting on the overall socio-economic development process of the country but rather on demonstrating the potential of ICTs to facilitate the delivery of community-based services in area like: health (telemedicine, health information systems projects); education (schoolnet, computers in school projects); public information provision and the provision of communication services (communication centers, multi-purpose community-based tele-centers etc). A number of these projects, in the case of most African countries are donor-driven and in some cases not sustainable beyond the pilot phase. A number of them are often not scalable and hence their overall impacts of the socio-economic development process in these countries are minimal.

Lessons: A key lesson is that: initiatives aimed at the development, deployment and exploitation of ICTs should as far as possible be regarded as a means to achieving the much wider developmental goals of the country. In other words, the development, deployment and exploitation ICTs in the society and economy should not be a goal in itself, but a means for achieving clearly define socio-economic development goals. The principal lesson is that technology is not a goal in itself, but a means of achieving broader developmental goals and priorities.

The argument being put forward is that: for the deployment and exploitation of ICTs to make an appreciable desirable impact on the socio-economic development process of Ghana, they will need to be integrated into the overall developmental programmes of the country. In other words, for developing countries like Ghana, there is a need to develop and implement an all-inclusive comprehensive 'ICT for development strategy' aimed at the implementation of ICTs initiatives that could contribute to addressing the developmental objectives and priorities of the nation. Another key lesson is that: although the implementation of small scale sectorial and community-based ICT projects and initiatives will be essential to speed up the process of the deployment and exploitation of ICTs in the society and economy, there is a need for Ghana to as far as possible integrate their implementation into the overall socio-economic development strategies and goals of the country. For example the implementation of community-based *village information and communications infrastructure* (VICI) initiatives at the lowest level of the administrative system of Government could be integrated into *national information and communications infrastructure* (NICI) plans to reflect the implementation of the NICI programmes and initiatives at the community-level e.g. the village.

- **The Time-Lag for ICT Initiatives to Impact on Socio-Economic Development Can be Long**

Research evidence suggests that: *a significant time lag is necessary for the ICT development, deployment and exploitation within the society and economy to have a significant impact on the developmental process.* In other words the time-lag for ICT4AD efforts to have an appreciable impact on the socio-economic development of a given country is much longer than have been originally envisaged. This time lag could span a number of years and may take two or more decades.

According to [14] a significant time-lag is necessary for the benefits of ICT initiatives and programmes to accrue – possibly spanning many years or decades. The diffusion of ICTs it was pointed out: must achieve a ‘critical mass’ in terms of coverage, organizational adaptation and ‘learning by doing’ before widespread productivity gains become observable. For example, according to [13] although India invested heavily in its ICT sector --- achieving an average growth rate in ICT-related investment of 22% per annum between 1984 and 1990, it took over a decade for it to begin to see the benefits of such high levels of technological investment in terms of increasing productivity and the creation of new ‘information-based’ industries and services.

Taking the case of Ireland, which in the late 1970s began its drive to develop a globally competitive ICT sector targeting the export market by attracting major international computer companies to set-up their European headquarters and production base in Ireland, the country only began to see the results of these efforts from the mid 1990s onwards. In other words, it took Ireland (a reasonably developed country in the 1970s) close to two decades to become an ‘ICT for development’ success story registering high economic growth rate across all key sectors of the economy including above the ICT sector.

Lessons: A key lesson from this research findings is that: irrespective of the strategic focus of a given nation’s ‘ICT for Development’ policies and programmes, it takes much longer than often anticipated for these policies and programmes to begin to have a significant impact on the socio-economic development process of the country. The lesson for the Ghana process is that: *it could take close to two decades or more before the relevant ICT4AD policies and plans will begin to make any appreciable impact on the nation’s socio-economic development landscape.* In other words, major and significant improvements in the Ghanaian economy (comparable to what countries like Ireland, India, Singapore and others are currently achieving) is not likely within the next 10 to 15 years.

For example, the development of the local ICT industry and a value-added services sector as part of the process of transforming the economy into a predominately information and knowledge-based economy will take some time and their eventual appreciable impact on economic growth and on key indicators like the gross national income per capita will take a much longer time. The prediction is that: *even with the right ICT4AD policies and plans and taking the necessary steps to address the key critical success factors and conditions required for their successful implementation, it will take Ghana close to 20 years or more for these efforts to register significant results in socio-economic development terms.*

- **ICTs can Facilitate Rural Development ... But Successes of Pilot Initiatives are not Easily Scaleable**

Projects involving the deployment and exploitation of ICTs to support rural development are being implemented in a number of developing countries including those of Africa. Evidence from India suggests that the potential impact of ICTs on rural development can be enormous, particularly in terms of improvement in health services, hygiene, nutrition and education. However, according to [13], the scaling-up of the impact of some of the pilot initiatives often proves elusive for a number of reasons. – For example, some of these pilot initiatives were discovered to have been successful in large part because of the enthusiasm and or the championship role played by the project initiators, factors which are sometimes absent when the project moves beyond the pilot stage. Other factors, which were found to contribute to limiting the scalability of some of these rural ICT initiatives include limited funding for post pilot stage implementation of the projects and bureaucratic bottlenecks and inefficiency.

Lessons: The lessons that could be drawn from these findings is that: although rural ICT deployment and exploitation initiatives can be successful and can have an impact of the social (health, education) and economic outcomes of rural people, most of these initiatives cannot have an appreciable impact on accelerating the socio-economic development process of rural communities and beyond if their success are not replicable and/or scalable. The scalability of these rural pilot initiatives cannot therefore be taken for granted; specific attentions will need to be given to addressing issue relating to: (i) local and community-level involvement and ownership of these initiatives for them to survive after the project initiators or backers have left the scene; (ii) the mobilization of the necessary financial and other resources required to implement the projects beyond the pilot stage and (iii) addressing administrative and other bottlenecks that could pose a problem for the implementation of these projects.

- **The Developmental Impact of ICTs is Limited if their Deployments are not Accompanied by Changes at the Organizational Level**

According to the research findings published in [13], organizational and management changes, including the redesigning/re-engineering of wider business processes within organizational structures in government, public sector organizations and business entities as well as the development of new business or organizational cultures, are important, if ICTs are to impact on the overall developmental process. Productivity and developmental gains it is emphasized, do not arise directly from the deployment of ICTs but from the associated improvements in skills, efficiency, service delivery, and cost reduction that comes from changes in systems, procedures, processes, attitudes and work ethics among others. For example at the level of the organization, according to [15] research findings from a US study shows that ICT investments are very effective only when coupled with complementary organizational and managerial changes. The constraints to productivity gains from ICTs have been shown to be more substantial in least developed countries.

The introduction of ICTs, it is argued should be fully integrated into the process of organizational (structural, procedures, processes), institutional, attitudinal and societal change, driven not by the technology itself, but by real needs for economic, social and institutional development. According to [16] Government-led IT projects often suffer from institutional constraints (weak planning and management commitment etc.), human resource constraints, and lack of capital and problems of technological adaptation. The deployment and exploitation of ICTs they argued, need to be integrated into wider processes of institutional reforms and organizational change.

Lessons: The lessons that can be drawn from these research findings is that: the mere deployment of ICTs within public and private sector organizations and institutions does not necessary translates into improvements in productivity, efficiency and service delivery which collectively could impact on the overall developmental process of a given country. The argument is that: the deployment of ICTs within public institutions and business organizations and entities

will have little or no impact on the nation's development process if not accompanied by a number of organizational changes as well as changes in attitude to work and work ethics. In other words: *for ICTs to have a real appreciable impact on Ghana's development there is a need to address a number of critical success factors and conditions at the institutional and organizational levels. --- Some of these include enforcing changes to unproductive organizational systems, structures, procedures and processes, as well as addressing poor attitudes to work and unproductive and inefficient work ethics which could hinder the effective exploitation of these technologies to improve organizational efficiency service/produce delivery, productivity and reduction in operational cost.*

In Ghana, a number of organizations and establishments in both the public and private sector currently do not have the required conducive environment necessary for the effective exploitation of ICTs and hence the deployment of these technologies in these set-ups are highly unlikely to lead to any appreciable productivity improvements, and efficiency gains or lead to improvements in organizational performance or cost reduction. In other words, the positive organizational impact and hence the overall socio-economic development impact of the deployment and exploitation of ICTs in such organizations and institutions cannot be assured unless the identified weakness are addressed at the organizational level in both the public and private sector.

- **For ICTs to have a Significant Impact on the Overall Developmental Process, its Diffusion within the Economy and Society must Reach a Critical Mass Level**

According to research findings documented in [17]: *the diffusion of ICTs within the society and economy must achieve a 'critical mass' level in terms of coverage, institutional adaptation and 'learning by doing' before widespread developmental gains become achievable and observable within the society and economy at large.* In poor countries, studies have highlighted the extent to which an 'enabling environment for successful ICT diffusion' is presently lacking. Areas of deficiency include local IT supply industries, domestic demand/user involvement, and technical and managerial capabilities..

According to [17], achieving this required 'critical mass' will take much longer in countries that are at their early stages of technological development and deployment process --- where their business and public institutions, systems and technology practitioners and decision makers are at an early stage of learning by doing. In effect the developmental impact of ICT deployment and diffusion are likely to take much longer in these countries. The argument being put forward is that: there is a threshold (characterized by a critical mass of ICT diffusion) beyond which the deployment and exploitation of ICTs could speed up or aid the socio-economic development process of a given country. In other words, in the absence of this minimal level of ICT development and diffusion within the economy and society; ICT4AD initiatives will not make any significant appreciable impact on the nation's socio-economic development process. A country will need to achieve a critical mass of ICT diffusion within the economy and society to be 'ICT4AD-ready' and anything short of achieving this threshold will make it difficult for the country to register any appreciable improvements in its socio-economic development process.

Lessons: The 'enabling environment for successful ICT diffusion' is presently lacking in most developing countries including Ghana. In effect the level of diffusion of ICTs in these countries, is far less than the critical mass threshold that is required before appreciable developmental gains are achievable from the deployment and exploitation of these technologies. In Ghana, as is the case of most African countries, areas of deficiency include the 'less-than-mature' nature of local ICT industry partly due to under-investment in the industry; the mis-match between domestic demand and supply; lack of critical mass of technical and managerial capabilities to develop, manage and support the implementation and exploitation of these technologies within the organizational set-ups, and the limited spread of the deployment and exploitation of ICTs within the economy and society to generate enough critical mass of economic activities that could impact on the overall developmental process.

- **On the Distribution of Benefits of the Developmental Impacts of ICTs**

While there is a consensus that the effective and efficient use of ICTs can stimulate economic growth and development, some questions still remain as to the spread of the socio-economic impact on various sections of the society especially the disadvantaged and vulnerable groups. In other words, the socio-economic development gains resulting from the implementation of ICT4AD policies and plans may not necessarily translate into improving the social and economic outcomes of all sections of the society.

For example, the job creation opportunities arising from transforming the economy through the deployment and exploitation of ICTs may not be of direct benefit to some sections of the society without the requisite qualifications for some of these jobs. Also, there is the possibility that the gains derived from the general improvements in the economy may not automatically flow to some communities unless steps are taken to specifically address their needs. In other words, although ICTs could result in wealth creation and to some extent contribute to poverty reduction; the income redistributive effects of its developmental impacts is not automatic

Lessons: The key lesson is that: *even though ICTs could advance Ghana's socio-economic development process, the benefits of that development may not necessarily spread to all sections of the society.* In other words, although it could be established that ICTs can impact on Ghana's development, efforts will still need to be made in terms of policies and special initiatives aimed at ensuring and enhancing the possible distributive effects of the developmental impacts of these technologies. This could be addressed in two ways: first, special ICT initiatives can be put in place to directly address poverty reduction within targeted communities and sections within the society and secondly, by taking corrective measures to mitigate and address specific income distributive issues arising from the developmental impacts of the deployment and exploitation of ICTs within the economy and society.

3.2 Other 'ICT for Development' Lessons: Extracts from the Digital Opportunity Initiative (DOI) Study Report

The UNDP; the Markle, Foundation and Accenture, teamed up to carry out the DOI Study [3] aimed at drawing lessons from "ICT for development" initiatives in a number of developing countries. Key findings of the study, based on a detailed analysis of the experiences of countries from around the world show that: used in the right way and for the right purposes, ICTs can have a dramatic impact on achieving specific social and economic development goals as well as play a key role in broader national development strategies. --- The real benefits, the study concluded lie not in the provision of technology per se, but rather in its application to create powerful social and economic networks by dramatically improving communication and the exchange of information advantage in the global economy and those which explicitly focus on ICT in pursuit of development goals.

A key finding of the DOI study is that: at least in the case of developing countries the various types of approaches to national ICT4AD policy strategies being put in place vary substantially in terms of their objectives, design and approach to implementation. The point is made to the effect that: while the strategies pursued by each country have unique features, the role assigned to ICTs can be broadly characterized in one of two ways:

- **ICT as a Production Sector.** --- This involves policies which focus on the development and/or strengthening of ICT-related industries such as computer hardware, software, telecommunications equipment and ICT-enabled service and

- **ICT as an Enabler of Socio-Economic Development.** ---- This involves the adoption of holistic, cross-sector strategies which aim to harness the uniqueness of ICTs to accelerate a wider development process.

The report for each of the above strategic options identified a number of second tier strategic choices --- each with an example of a developing country that has adopted that strategy. The details of these choices are illustrated in the diagram below.

The Role of ICT in National Strategies: A Typology



Source: The Digital Opportunity Initiative (DOI) Report, 2002

The key relevant lessons of study in relation to the implementation each of the various types of the strategic focus of national ICT policies in a number of developing countries are summarized below:

An Export Market Focus Strategy: An export focus according to the findings of the study can produce economic growth, improve balance of payments and reduce dependence on traditional commodity exports. --- An ICT-related export focus may have a positive impact on the balance of payments and GNP of some developing countries. Also established is the fact that an export focus tends to have a limited impact on the development of national infrastructure and capacity and that export focus do not automatically translate into broader development gains.

National Capacity Focus Strategy: The report shows that a national capacity focus may fail to achieve the full potential benefits from the use of ICTs and that if a national ICT sector develops without being subject to competitive pressures, incentives for the adoption of cutting-edge technologies can be lost. In addition, lower costs typically associated with ICTs may not be passed on to users, inhibiting the expansion of ICT

demand and deployment. This, the study pointed out was the case in both Brazil and India in the first phase of their ICT sector development. The other finding in relation to the national capacity focus are:

- *A national capacity focus creates diversified producer capabilities.* Unlike the case of an ICT export sector, a national ICT capacity focus, according to the study is more likely to lead to the development of local technical capabilities, spare parts production, component supplier networks and other linkages.
- *A national capacity focus has the potential to be more adapted to local needs.* A national capacity focus leads to R&D and domestic production of ICT goods and services that are more likely to be tailored to local needs, and also to result in better user support and after sales service.
- *A national capacity focus may facilitate the achievement of development goals in the long term, but the impact is indirect and limited in scope.* ---- A strategy that is focused on developing capabilities in the national ICT sector may lead to an increase in jobs and enterprises created both directly and indirectly

A Global Positioning Focus Strategy: Another key finding of the study is that: *global positioning focus is essential to the long-term economic success of developing countries in the global network economy.* ---- It was pointed out that: as opposed to a national capacity focus, a concentration on the deployment of ICTs to improve global positioning allows countries to use ICTs to make the overall investment climate more attractive and to facilitate increased competitiveness in sectors and products in which the country may already have, or can create, a competitive advantage. Another lesson in relation to global positioning focus is that: this focus may fail to meet certain specific development goals. In other words while global positioning is essential for countries to realize opportunities in the global economy, it does not necessarily translate into gains for the population, particularly vulnerable and disadvantaged groups.

Development Goal Focus Strategy: A key lesson documented in the DOI study report is that: *a development goal focus allows countries to achieve both broad-based economic growth and specific development goals.* --- Strategies that focus on development goals typically involve the adoption of comprehensive approaches to integrate ICTs into broader development strategies, thereby gaining from the synergies between different elements of a holistic approach to development.

Another finding relating to the development goal focus shows that: *although not all countries can benefit from a focus on developing ICT as a sector, all can benefit from using ICTs as an enabler.* Also focus on development goals, it was established places development at the core of the strategy and ensures a more broad-based diffusion of the benefits of ICTs. The point was made to the effect that: *when ICTs as a sector is taken as the focus of the ICT strategy, there are some development gains, but when ICTs are used as an enabler, the gains for development are potentially higher still.*

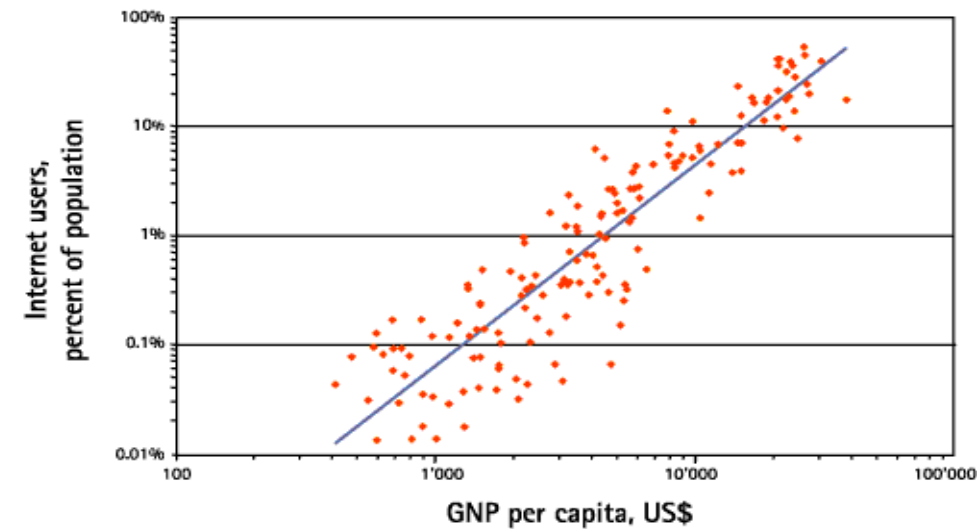
Concluding on the lessons from the development goal focus, it was emphasized that: a comprehensive and holistic approach according to [3] is the most effective way to benefit from synergies and ensure the impact of ICT deployment is optimized and that, adopting an ICT as enabler strategy often demands a more comprehensive approach because there is a need to go beyond the requirements of a single sector and to facilitate a more general deployment of ICTs.

3.3 Documenting Other Research Evidence and Findings

Research work carried out as part of the Ghana ICT4AD process yielded a number of valuable outputs that are of relevance to developing the policy and the plans. These findings, documented below are based on data compiled from various sources including the World Bank World Development Indicators (2002). A number of findings also have implications for the ICT4AD process in other developing countries including those of African embarking on their ICT for development process. These key findings are summarized below.

- ***Direct Link Between Telecommunications Infrastructure and Per Capita Growth***

A study conducted by the International Telecommunications Union (ITU), on the possible link between Internet users (as percentage of population) and the gross national income (GNP) per capita using data from a number of developed and developing countries show that there is a clear link between Internet penetration and GNP per capita, as illustrated in the diagram below. According to [2], a dynamic telecommunications and information infrastructure is critical for leapfrogging into the knowledge economy --- Such infrastructure reduces transaction costs, provides economies of scale, and overcomes some constraints of distance. Taking the Internet and its usage as key indicators of telecommunications and communication infrastructure deployment and utilization within a given country, the ITU study indicates a direct link between telecommunications infrastructure and per capita growth in a given country.

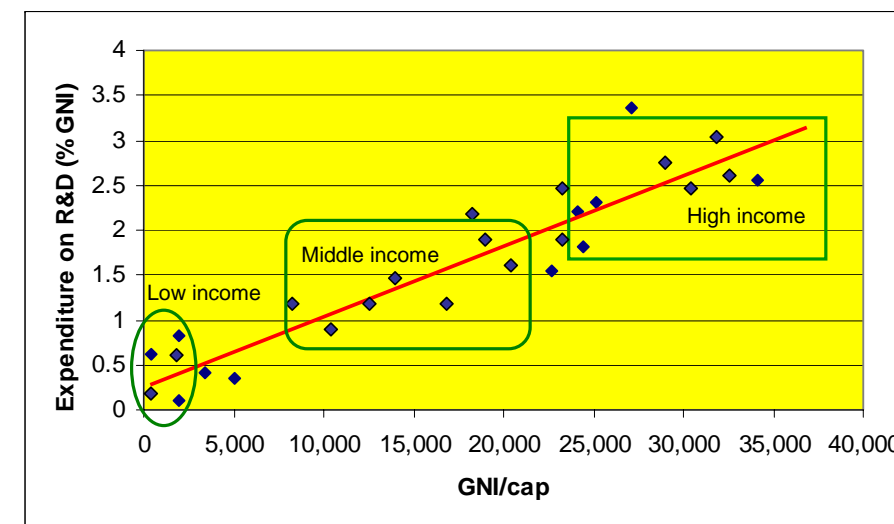


Source: International Telecommunications Union, 2000

Lessons: This finding confirms a widely accepted view that telecommunications and communications infrastructure deployment and usage is a necessary precondition for sustained economic growth. The development of a nation's communication infrastructure will be essential for speeding up the process of the deployment and exploitation of ICTs within the society and economy. Ghana's telecommunications and communications infrastructure is currently under-developed and limited in coverage. There is a need to put in place policies aimed at developing the communications infrastructure to improve universal access and service. These policies will need to be directed at creating the necessary legal, regulatory and institutional enabling environment to facilitate the development of the telecommunications infrastructure to improve the coverage of the network and its services.

- *Expenditure on R&D can have impact on the Gross National Income (GNI) of the Nation*

Using data from a number of low income, middle income as well as high income countries, research evidence illustrated in the diagram below, shows that: there is a direct correlation between, the level of expenditure on R&D (as % of GNI) and the gross national income per capita of a given nation. This relation is true for low income, middle income and high income countries as demonstrated by the high goodness of fit of the scatter diagram.

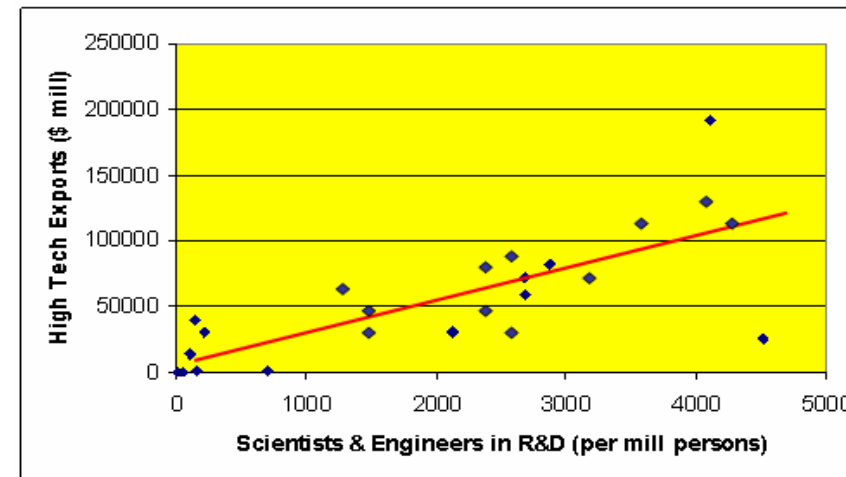


The conclusion that can be drawn from these findings is that, nations who invest substantially in R&D are more likely to achieve high GNI/capita growth rates, in other words, R&D is essential for achieving global competitiveness in the emerging technological, information and knowledge driven world economy. Some of the nations who are making major progress in their development process are those that are making huge investments in R&D to develop and improve on products and services -- efforts that are contributing to their export earnings and economic growth. Countries like Finland, USA and other developed countries who are scoring high marks on the World Economic Forum Global Competitiveness index, are spending heavily on R&D to improve the performance of the key sectors of their economies and their global competitiveness

Lessons: The lessons for developing countries like Ghana are obvious: to make progress in today's highly competitive global market, there is a need to develop and invest in the nation's R&D capacity which at present is non-existent in most of these countries. A study conducted (as part of the Ghana ICT4AD process) in all the Ghanaian universities and research institutions show that, the percentage of staff in these institutions involve in R&D is very low. Not only is very little R&D work going on, but in the few cases where some R&D work is being undertaken, they are not linked to industry. In other words, the required linkage between industry and the research institutions, that is necessary to commercially drive R&D work and its outputs is virtually not existent in Ghana. Furthermore evidence shows that very little R&D work is on-going in industry itself. On the whole the need for Ghana to invest more in R&D cannot be over-emphasized.

- ***The Number of Scientists and Engineers in R&D Can Contribute to the level of High-Tech Exports of a Given Country***

Based on evidence drawn from a number of countries, using data from the World Bank World Development Indicators (2002), the scatter diagram shown below, shows a link between the number of scientists and engineers involve in R&D (per million persons) and high-tech exports (in million dollars).



This finding means that, countries that have a high percentage of their scientists and engineers involved in R&D are those that are doing well in the area of high tech exports. In other words, developing countries like Ghana cannot hope to make any in-roads in developing high tech export products if a reasonably percentage of their scientists and engineers are not involved in R&D work.

Currently statistics on the number of scientists and engineers (per million of persons) in Ghana is hard to come by. Using the findings of a study specially conducted as part of the Ghana ICT4AD process on the number of research scientists and engineers in the universities and the number of

registered practicing engineers in the country (reproduced in the Table below), we estimated the number of scientists and engineers (per million persons) as close to 300. Of these, less than 10% are involved in R&D work in other words, in the case of Ghana as low as less than 30 scientists and engineers (per million of persons) are involved in R&D.

Scientists and Engineers (2000)			
	Registered Professional Engineers	Scientists in the Research Institutes	Scientists and Engineers in the Universities and Colleges
Total	3490	636	961
Percent involve in R&D	< 5%	7% - 12%	5% - 7%

Lessons: The lesson here is that: if Ghana is to make any progress in developing a high tech export industry, a lot of efforts will need to be directed at developing the R&D base of the nation devoting particular attention to establishing linkages between industry and the research institutions and universities involve in R&D as well as increasing the number of scientists and engineers involved in R&D work both in industry and in the universities and research institutes.

3.4 Concluding Remarks

The lessons drawn from the research findings documented in this chapter, will be crucial for the development of the details of the Ghana ICT4AD Policy and the Plans. Some of these lessons have a direct bearing on the Ghana situation and as such will form the basis for defining a number of the policy provisions and strategies of the Policy document. A number of the specific programmes and initiatives for incorporation in the Plans will also be based on some the lessons drawn from the findings of the research efforts documented in this chapter.

Chapter Four

Assessing Ghana's Potential to Develop an Information and Knowledge-base Economy and Society

Introduction

We examined in this chapter some of the issues relating to transforming the predominately subsistence agricultural based economy and society of Ghana into an information and knowledge-based economy and society. The basic argument is that it will be possible to transform the predominately agriculture economy of Ghana into a predominately information and knowledge economy without the requirement of being first fully industrialized, provided some developmental prerequisites and critical success factors are met and the necessary policies and plans are put in place.

The premise is that: the emerging technologies underlying the information revolution are offering even under-developed agricultural countries like Ghana a window of opportunity to leap-frog the industrialization stage and transform their economies into high value-added information economies that can compete with the advanced economies on the global market. In other words, the opportunities offered by the emerging information revolution can make it possible for Ghana to circumvent the classical developmental path that stipulates that economies in the process of their development will need to move from agricultural to industrial and then to the information and knowledge-based economy.

We illustrate below in terms of a number of the key characteristics of information and knowledge based economy; some of the policy initiatives and actions that Ghana need to take to facilitate the process of transforming its industrially weak subsistence agricultural based economy and society into that of a predominately information and knowledge-based economy and society without being first fully industrialized. First we examine the characteristics of what constitutes an information and knowledge economy

4.1 Characterizing the Information and Knowledge Economy

According to [18] although there is no standard accepted definition of what constitutes an information and knowledge-based economy, it could be argued that such an economy should first and foremost be a reasonable high economy dominated by the development, production and the trading in ICT products and services. Furthermore, an information and knowledge economy is likely to be:

- An economy characterize by a large commercial service sector with a reasonably large and vibrant, ICT service sub- sector and industry;
- An economy characterized by a technology-based knowledge-driven industrial sector;

- An economy in which the majority of the working population are either directly or indirectly involved in information and communications related activities;
- An economy with a modern, efficient and competitive agricultural sector;
- An economy in which a reasonable large proportion of the population has access to information and communications technology products and services;
- An economy in which the provision and delivery of goods and services of the key sectors of the economy are to a large extent facilitated by information and communications technologies
- An economy in which the provision and delivery of services by government and its administrative machinery are to a large extent facilitated by information and communications technologies;
- An economy based on an advanced and reliable national information and communications infrastructure; and
- An economy based on a literate society with a high proportion of computer literates.

Furthermore information and knowledge-based economies are often characterized by a wide-spread deployment and exploitation of ICTs within the society to support for example the delivery of educational, health and other social services. In fact, most of the emerging information and knowledge-based economies do have a modern educational system within which ICTs are widely deployed to facilitate the delivery of educational services.

Another key characteristic of information and knowledge-based economies is that: they are globally competitive with their industrial and services sector to large extent driven by cutting-edge R&D encompassing basic and applied industrial and product development – with the potential to lead to products and services that could compete on the global market. Also a common feature of information and knowledge-based economies is that they are based on a rich pool of highly skilled human resources in critical skill areas relevant for developing and maintaining a competitive edge on the global market.

It could be argued that given the above characterization of what constitute an information and knowledge-based economy and society, there is no doubt that most of industrially advanced countries will only need to put in place specific ICT deployment programmes and national information infrastructure (NII) development programmes to move their advanced and globally competitive economies into information and knowledge-based economies. Developing countries like Ghana on the other hand will however need to do more to achieve the same.

The argument is that: for countries like Ghana to be able to address the challenges of the emerging globalization and the information age it will need to develop and implement her ICT-led socio-economic development policies and plans set within the wider national socio-economic development objectives, strategies and aspirations of the country. It will therefore not be enough for Ghana to implement a number of isolated ICT projects and programmes or sectoral policies that are not tied to its overall socio-economic development and hope to transform the economy and society into information and knowledge economy and society that exhibits the characteristics outlined above.

The basic premise is that, Ghana by formulating and implementing appropriate ICT-led socio-economic development policies and corresponding plans can be able to transform its economy and society into a predominately an information and knowledge based society within a specific time-frame. We examine below issues relating to the Ghana's potential for developing its information and knowledge based economy and society.

4.2 Transforming Ghana into a high income economy dominated by the development, production and trading in ICT products and services

It will be possible to transform the predominately agricultural and industrially weak economy of Ghana into a high income economy dominated by the development, production and trading in ICT products and services, without the need for Ghana to be first fully industrialized. This can be achieved mainly through developing the services sector especially the ICT services sub-sector and promoting the development of an ICT industry by putting in place specific policies backed by sound development plans, packages and policy instruments and mobilizing the necessary financial and technological resources to support the development of these sectors. The development of the private sector through specific targeted programmes and initiatives could also transform the economy into a high income one.

Specific Policy Requirements

A number of specific policies with corresponding policy instruments and initiatives can be put in place to target the development of the ICT sector and industry including the ICT services sector to facilitate the process of transforming the economy into a high income one dominated by the trading in ICT products and services. Some of the specific policy actions that could be taken in this area include:

- *policies targeting the promotion of FDI drive in ICTs* --- This could serve as one of the key strategies for facilitating the rapid development of the local ICT industry. Within this context, specific policies can be directed at facilitating an investment climate for the mobilization of financial and technological resources to promote the development of the ICT services sector and industry.
- *policies directed at putting in place and implementing special tax packages, instruments, and incentive programmes and mechanisms to promote the development of the local ICT production industry.* --- Such policy actions could contribute to the rapid development and transformation of the key sectors of the economy to improve the prospects of developing a high income economy dominated by ICT products and services.
- *policy instruments and initiatives aimed at facilitating the development of the private sector as a whole.* Such policy initiatives can also significantly contribute to transforming the economy into a globally competitive high income economy dominated by the development, production and trading in ICT products and services.
- *policies in the area of developing the human resource based and the R&D capacity of the economy.* These policies can translate into initiatives and programmes to produce the necessary highly skilled pool of human resources and the development of the requisite R&D

capacity for supporting the development of the local ICT sector and industry. These policies and initiatives will have a long term indirect impact on the process of transforming the economy into a high income generating economy.

- *policy initiatives directed at creating the necessary legal and regulatory environment to facilitate the rapid development and expansion of the nation's information and communications infrastructure.* These policy initiatives will provide the necessary enabling environment that could aid the process of transforming the economy into a high income one dominated by the development production and trading in ICT products and services.
- *policy provisions targeted at the promotion of e-commerce and e-government types of initiatives.* This could significantly contribute to the transformation of the economy from its low income agriculture dominated status to that of a high income economy dominated by a value-added services sector and a knowledge-driven industrial sector characterized by the development, production and trading in ICT products and services.

4.3 Developing an economy characterized by a large commercial services sector with a reasonably large and vibrant, ICT services sub- sector and industry

It will be possible to transform Ghana's economy into that characterized by a large commercial services sector with a reasonably large and vibrant, ICT service sub- sector and industry by putting in place sound sectoral development policies and incentive packages. Full industrialization is therefore not a pre-requisite for developing this aspect of the Ghana information economy. For example, it will be possible to put in place specific policy instruments, initiatives, programmes and packages targeted at facilitating the rapid development of the services sector as well as the ICT service sub- sector and industry --- a process that could lead to the transformation of the economy into that characterized by a large commercial and ICT services sector and industry.

Specific Policy Requirements

To transform Ghana's economy to that characterized by a large commercial services sector with a vibrant ICT service sub-sector and industry will require putting in place and implementing a number of specific policies directed at promoting the development of sectors like: (i) banking and financial services sub-sector; (ii) commercial services sub-sector including: wholesale and retail trade services, travel and transport services, educational services, tourism services, hospitality services and the (iii) ICT services sub-sector including telecommunication services, communication services, Internet services, computer services etc.

Some of the specific policy initiatives that could be pursued to aid the process of transforming the economy into one characterized by a large commercial service sector with a reasonably large and vibrant, ICT service sub- sector and industry include:

- *policies aimed at promoting and encouraging both domestic and foreign direct investment targeting the services sector including the ICT service sub-sector.*

- *policies and strategies aimed at promoting the development of a globally competitive local ICT industry for the development, production and the sale of information, knowledge, and technology products and services.*
- *policies aimed at the development of comprehensive human resource base in critical skill areas required for facilitating the development of a vibrant value-added services sector and ICT services industry.*
- *policies targeted at promoting the development of and the use of international standards, and best practices to guide the production and the provisions of services within the economy; --- The development and enforcement of these standards will be necessary for developing a globally competitive services sector and industry.*
- *policies initiatives aimed at creating the necessary enabling regulatory framework for facilitating the deployment and exploitation and the development of ICT products, services and systems within the economy and society.*

4.4 Developing an economy characterized by a technology-based knowledge-driven industrial sector

It has been acknowledged that: in the emerging technology and knowledge-driven economic order the most efficient and competitive industrialized economies are those that are moving away from traditional industrial processes and methods of production to knowledge-driven or knowledge-programmed processes and methods within their industrial and production set-ups and systems. Although subsistence agricultural-based and industrially-weak economies like that of Ghana lack the necessary resources and know-how to develop and deploy cutting-edge knowledge-driven industrial processes and methods, it will be possible for Ghana to mobilize and train the necessary human resource capacity to facilitate the process of developing and supporting a technology-base knowledge-driven industrial sector.

In other words, although not industrialized, it will still be possible for Ghana to embark on the process of developing a technology-based knowledge-driven industrial sector with the right policies, programmes and the mobilization of the required financial and technological resources.

Specific Policy Requirements

To transform Ghana's economy from that characterized by a weak industrial base to that characterized by a technology-based knowledge-driven industrial sector, will require putting in place and implementing among other things specific policies and initiatives. Some of these include:

- *policies aimed at facilitating and supporting the development of the requisite pool of highly skilled human resources; knowledge workers and expertise capable of facilitating the process of developing and supporting a technology-base knowledge-driven industrial sector.*
- *policy initiatives targeting the development and improvement of the nation's R&D capacity. Especially in the area of cutting-edge R&D; targeting industrial and product development research with the potential to lead to products and services capable of competing on the global market.*

- *policies directed at facilitating an investment climate for the mobilization of financial and technological resources; as well as promoting FDI specifically targeting attracting investments that have knowledge and expertise transfer components.*
- *policies aimed at facilitating the development of the formal private sector.* Such policy initiatives could be targeted at providing specific incentives, policy instruments and packages that could promote industrial innovation, industrial process modernization, investment into modern equipments and in-house skill development and upgrade among others.
- *policy initiatives directed at building the capacity of the nation's technological universities, polytechnics and industrial research institutions.* These initiatives will be targeted at improving the quality of their basic research and R&D outputs as well as the quality of their human resource outputs to meet the requirements of the changing demands of a modern technological-driven industrial sector.
- *policy initiatives aimed at enacting the various legislations and laws that could promote the development of a vibrant and modern industrial sector ---* Specific policies in this area will include those relating to intellectual property laws, patent and copy-right laws, competition laws, property protection laws, among others.

4.5 Transforming Ghana's economy into that in which the majority of the working population is either directly or indirectly involved in information and communications related activities.

Ghana's predominantly agricultural economy can be transformed into an economy in which the majority of the working population are either directly or indirectly involved in information and communications related activities without the need to be first fully industrialized. The development of sectors like the services sector and ICT industry and the modernization of the agricultural sector – a process that can be facilitated and supported by the deployment and exploitation of ICTs --- can for example, substantially contribute to increasing the number of the working population involved in information and communications related activities.

Furthermore the development of these ICT-based sectors can facilitate the widespread deployment, exploitation and utilization of ICTs in other sectors of the economy which will in-turn impact on the number of the working population that are directly or indirectly involve in information and communications related activities.

Specific Policy Requirements

A number of policy initiatives and programmes can be put in place targeting the implementation of specific initiatives that could directly or indirectly increase the number of the working population involved in information and communications related activities. Some of these initiatives could be targeted at increasing the number of the working population involve in the demand-side of the industry (e.g. users of ICT services and products); while others can be targeted at the supply-side of the industry --- including producers or providers of information and communications products or services. Some of the policies initiatives that could be targeted in this area include:

- *policy initiatives directed at promoting the development of the services sector targeting in particular the development of the ICT services sub-sector and industry through the implementation of special services sector development policy initiatives, instruments, packages and incentives.* These initiatives will impact on the supply-side of the industry which could in-turn impact on the demand for ICT services and products.
- *policy to facilitate the widespread deployment and exploitation of ICTs within the economy and society* --- The deployment of ICTs in the public and private sector institutions and organizations as well as in the community at large will substantially increase the number of people involve in the demand-side of the industry --- this could contribute to increase in demand for ICT products and service which will in turn impact on the supply-side of the industry and hence increase the number of the working people involved in information and communications related activities.
- *policy initiatives targeted at promoting basic literacy and ICT literacy of the population at large through the implementation of special initiatives targeting both the formal and informational educational system from basic educational level to higher education level.* These initiatives together with other policy initiatives aimed at in-company ICT education, training and skill update within the public and private sector institutions will substantially increase the ICT awareness and know-how level of the population and this will in the long-run have impact on both the demand and supply side of the industry and eventually contribute to increasing the proportion of the working population involve in information and communications related activities
- *policies aimed at facilitating and promoting the implementation of special information economy development initiatives.* Some of these initiatives that could be targeted for implementation include: e-commerce, e-government, telemedicine applications etc that collectively can have a substantial impact on both the demand-side and supply-side activities of the ICT services sector and industry – these could translate into dramatically increasing the proportion of the working population involve in information and communications related services.
- *policies aimed at promoting universal service and access to information and communication technologies services and systems.* Some of the initiatives that could be targeted include those relating to expanding access to rural and under-served areas and communities and making access to services affordable to a larger section of the population in an equitable manner.

4.6 Developing an economy with a modern, efficient and competitive agricultural sector

It will be possible for Ghana to develop a modern efficient and competitive agricultural sector with the right policies backed by the mobilization of the necessary financial and technological resources. Ghana in her pursuit to develop her economy and society into an information and knowledge based economy and society, cannot abandon the agricultural sector which much currently depends on; it must make this sector modern, efficient and competitive. To improve agricultural yield and productivity, the agricultural sector will need to be modernized and made more efficient and competitive. With the right policies, Ghana can achieve this without being a fully industrialized nation.

Specific Policy Requirements

Specific policies can be put in place, targeting the modernization of the agriculture sector as well as making the sector globally competitive in terms of its main cash crops like: cocoa, timber etc. Some of the policy initiatives that could be put in place include:

- *policies aimed at the deployment and exploitation of ICTs to support the activities of the agriculture sector including, the production, processing, marketing and distribution of agriculture products and services.*
- *policies relating to improving the mechanization of the agriculture production process as well as improving irrigation capacity and the use of fertilizers to improve productivity and yield per hectare.*
- *policies initiatives targeting the commercialization of the key sub-sectors of the agricultural sector and industry to improve their competitiveness.*
- *special agriculture development policy instruments, and incentive programmes including special budgetary packages and investment incentives to promote the development of the agriculture sector.*
- *policies aimed at promoting and supporting agricultural research as well as cutting-edge agriculture-based R&D targeting the development of a modernize and competitive agriculture sector and an agro-business industry.*
- *policies to promote and facilitate the development of the physical and social infrastructure --- targeting the rural areas to support the development of agriculture sector. The rural areas – the agriculture production zones of the country lack the basic physical infrastructure like roads and general utilities; as well as social infrastructure like education and health facilities and social amenities. The modernization of the agriculture sector cannot take place without adequate provision of these physical and social infrastructures.*

4.7 Developing an economy in which a reasonable large proportion of the population has access to information and communications technology products and services.

Under-developed economies like that of Ghana can with the right ICT policies, plans, packages and the necessary financial and technological resources be transformed into economies in which a reasonable proportion of the population has access to information and communications technology products and services without the need to be first industrialized.

For example, the necessary legal, regulatory and institutional framework necessary for facilitating the development and the provision of ICT services to improve and spread access in the community can be put in place as part of the government's effort towards this goal. Also, sectoral development policy packages and instruments targeted at the development of the 'rapid growth' sectors of the economy could lead to the expansion of these sectors which could contribute to the rapid development and growth of the economy to facilitate increased access to ICT products and services by a large section of the population.

Specific Policy Requirements

A number of specific policy initiatives can be put in place targeted at increasing the proportion of the general population with access to information and communications technologies products and services. Some of these policies will include:

- *policies aimed at the promotion of universal service and access to information and communication technologies and systems and to basic and value added communications services* --- These types of policies will facilitate the spread of access to information and communications products and services to the under-served sections of the community especially those in rural areas
- *policy initiatives targeted at the creation of conditions for an investor friendly telecommunications environment; including those targeting the liberalization of the ICT sector and encouragement of private investment in the ICT sector.* These policy initiatives will lead to the expansion of the communications sector and facilitate improvements in the communications infrastructure to improve access to a larger section of the population in their work places, homes and in the educational institutions.
- *policy on the development of the local communications industry towards competitiveness* --- This will aid the process of expanding the ICT sector and industry as more operators, service providers and other communications product and service producers, providers and developers enter the domestic market. The net impact of promoting a competitive domestic information and communications industry will be a major improvement in product range and services; improvements in quality of services and reduction of cost of acquisition, ownership and usage of these services and products to the public at large. A key net effect will be a major improvement in the proportion of the population with access to information and communications technology products and services.
- *policy initiatives aimed at transforming Ghana into an ICT literate nation* --- Specific initiatives in this area could be targeted at the promotion of general ICT awareness within the public at large; the promotion of basic computer literacy, education and training at all levels of the educational system as well as encouraging basic computer training at the work places and at informal educational set-ups within the community at large. These types of policy initiatives will have the effect of improving the basic ICT literacy and know-how of the population at large and by so doing increase the proportion of the population who could meaningfully access and exploit ICT products and services.

- *policies targeting the implementation of national ICT applications; including multipurpose community telecenter projects; teleducation and SchoolNet projects; electronic government and governance initiatives, telemedicine projects; and e-commerce projects among others.* These initiatives will have the effect of widening the net of access to information and communications services to a larger section of the population.

4.8 Transforming the economy into one in which the provision and delivery of goods and services of key sectors of the economy are to a large extent facilitated by information and communications technologies.

It will be possible for Ghana to promote and facilitate the deployment and the exploitation of ICTs in all sectors of the economy and society to facilitate the provision of goods and services without first of all being fully industrialized. For example, this can be achieved through specific policies backed by special programmes, initiatives and incentive packages to encourage public and private sector organization and business to invest in ICTs to support their operations.

A booming economy led for example by the services sector including the ICT services sub-sector as well as the broader ICT industry will also facilitate the spread of ICTs in businesses and organizations as they take advantage of the favourable economic climate to modernize their operations through the deployment and exploitation of ICT products and services.

Specific Policy Requirements

A number of policy initiatives can be directed at the widespread deployment and exploitation of ICTs to facilitate the provision and delivery of goods and services within the economy and the society. Policy areas that could be pursued in this area include:

- *policies targeted at facilitating the deployment and exploitation of ICTs within public and private sector institutions and organizations.* Some of the policy initiatives in this area could be targeted at encouraging these organizations and establishments to invest in ICTs through specific incentive packages and programmes.
- *policy initiatives aimed at promoting the development and implementation of a globally competitive e-commerce and e-government initiatives* – Specific initiatives could target business-to-business (B2B), business to government (B2G) and business to consumer (B2C) e-commerce initiatives as well as government to government (G2G), government to business (G2B) and government to citizens (G2C) e-government initiatives. The implementation of these initiatives will significantly contribute to the delivery of goods and services within the economy through the deployment and exploitation of information and communications technologies.
- *policies targeting the promotion of international standards and best practices in the use of ICT to aid the development, provision and delivery of goods and services by key sectors of the economy.* The development and enforcement of these standards will aid the process of improving product quality and quality of service (QoS) --- a necessity for developing a globally competitive economy.

- *policies initiatives for creating the necessary enabling regulatory framework to facilitate the development, provision and delivery of ICT products, services and systems within the economy and society.* – Such policy initiatives will aid the process of the delivery of goods and services within the economy through the deployment and exploitation of information and communications technologies.

4.9 Developing an economy in which the provision and delivery of services by government and its administrative machinery are to a large extent facilitated by information and communications technologies.

The Ghanaian economy can be transformed into an economy in which the provision and delivery of services by government and its administrative machinery are to a large extent facilitated by information and communications technologies without the need to industrialized first. This can be achieved by mobilizing the required financial and technological resources to put in place a programme to modernize the civil and public service, a component of this could be the computerization of all government Ministries, and other public sector organizations.

Specific Policy Requirements

A number of specific policy initiatives can be put in place targeting the computerization of the government institutions and other public sector organizations to facilitate their operations and delivery of their services to the public at large. Some of the policies areas will include:

- *policies targeting the implementation of initiatives aimed at modernizing the civil and public service to improve its efficiency, effectiveness and service delivery through the deployment and exploitation of ICT.*
- *policies targeted at the implementation of e-government initiatives including: government to government (G2G), government to business (G2B) and government to citizens (G2C) types of e-government initiatives.*
- *policies directed at the implementation of initiatives to improve basic computer skills of civil and public servants through in-service training and skill update programmes in ICTs.*
- *policies aimed at putting in place specific initiatives to facilitate the rapid deployment and exploitation of ICTs within the civil and public services. Specific initiatives could be directed at putting in place and implementing special policy instruments and incentive packages for the procurement of ICT equipment, products and services.*
- *policy initiatives directed at the development and the enforcement of standards and best practices to guide the deployment and exploitation of ICTs within the civil and public service.*
- *special policy initiatives targeted at the implementation of specific programmes to motivate civil and public servants to get involve in ICTs to improve their productivity, efficiency and effectiveness.*
- *policy to facilitate and promote the implementation of community-based ICT initiatives.—Specific ones are: multipurpose community telecenters, public information kiosks etc that could serve as access public access points to government information and services that could be*

delivered through a government to citizens (G2C) e-government based initiatives. The implementation of some of these community-based ICT projects will form part of a village information and communications infrastructure (VICI) initiative to for example, reflect the implementation of national NICI programmes at the rural level.

4.10 Developing an economy based on an advanced and reliable information and communications infrastructure.

Without the need to industrialized first it will be possible for Ghana to mobilize the necessary financial and technological resources to build, rehabilitate and expand the information and communications infrastructure of the country to support the development of the economy towards information and knowledge-based economy. Policies could for example, be put in place to promote private sector (domestic and foreign) investment in this sector and putting in place the necessary legal, regulatory and institutional framework to encourage the development and growth of the sector.

Specific Policy Requirements

Some of the specific policies that could be aimed at facilitating the development of an efficient and reliable communications infrastructure are:

- *policies aimed at promoting and facilitating a stable and competitive investment climate to attract both domestic and foreign direct investment. --- Such policies could assist in mobilizing the necessary financial and technological resources to support the development and expansion of the local information and communications infrastructure.*
- *policies directed at promoting and facilitating the development of the private sector to generate enough demand for advanced and reliable information and communication services --- This generated demand for services could translate into the development and the expansion of the existing information and communications infrastructure to meet the demand for services.*
- *policies targeted at developing the necessary legal, institutional and regulatory framework and structures required for supporting the development of the communications infrastructure.*
- *policies and strategies aimed at promoting the development of a globally competitive local ICT industry to support and development of a reliable information and communication infrastructure.*
- *policies aimed at developing the necessary highly skilled ICT human resources required for supporting the development and maintenance of an advanced information and communications infrastructure and systems.*
- *policy initiatives targeted at promoting international standards, and best practices that could among other things aid the process of the development of an advanced and reliable information and communication infrastructure and the improvements in quality of service (QoS) within the local communication services sector.*

4.11 Developing an economy based on a literate society with a high proportion of computer literates

Ghana can achieve the goal of becoming a fully literate nation by putting in place appropriate educational policies, human resource development policies and programmes and mobilizing the necessary financial and other resources to implement them. Businesses and organizations in a growing economy will also be investing in skill development, especially in ICT skills as they train the necessary manpower for their operations. The Government could also put in special incentive packages to promote this process, which in addition to its other efforts could develop Ghana into a literate society with high proportion of ICT literate without first being fully industrialized.

Specific Policy Requirements

A number of policies initiatives that can be put in place to improve basic illiteracy and the computer literacy levels of the public at large through both the formal and the informal educational system. Some of the policy initiatives that could be implemented in this area include:

- *policies aimed at improving basic literacy through both formal and informal educational avenues.*
- *policy initiatives aimed transforming Ghana into an ICT literate nation. --- This can be accomplished through the promotion of general ICT awareness, basic computer literacy, education and training at all levels of the educational system as well as encouraging basic computer training at the work places and at informal educational set-ups within the community at large.*
- *policies directed at modernizing the educational system using ICTs to improve and expand access to educational, training and research resources and facilities.*
- *special policy initiatives targeting the improvement of the quality of education and training at all levels of the educational systems.*
- *policies targeted at facilitating the deployment, utilization and exploitation of ICTs within the educational system to support teaching and learning from primary school upwards. Some of the initiatives could be targeted at the implementation of computer-in-schools programmes, schoolnets, electronic distance education (EDE) programmes, basic and advanced ICT education and training the universities and colleges among others.*

Concluding Remarks

The case has been made that: despite Ghana's current level of under-development it will be possible with the right policies and corresponding plans, transform the nation into a predominately information and knowledge-based economy and society without the need for it to be first fully industrialized. A number of the policy areas identified and elaborated on in this chapter will form the basis for developing the details of the Ghana ICT4AD Policy and the corresponding Action Plans.

Chapter Five

Linking Ghana's Developmental Challenges with the Recommended Policy Actions and Initiatives

For each of the identified developmental challenges facing Ghana (as discussed in [1] and summarized in Chapter 1) we identified in this chapter possible areas of policy actions that can be put in place to address them. These policy initiatives are those identified in Chapter Four as necessary for facilitating the process of transforming Ghana's industrially weak subsistence agricultural based economy and society into that of a predominately information and knowledge-based economy and society.

We describe for each of the identified developmental challenges, specific policy actions and initiatives that can be targeted within the context of aiding the process to transforming the nation into a predominately information and knowledge-based society and economy.

The basic premise is that: for each of the identified developmental challenges facing Ghana, the identified policy actions will either directly or indirectly contribute to addressing these challenges while in the process move Ghana towards an information and knowledge based society and economy. In other words, the ultimate goal is to transform Ghana's industrially weak subsistence agricultural based economy and society into that of a predominately information and knowledge-based economy and society while addressing the identified developmental changes --- as a means to achieving that ultimate goal.

The Developmental Challenge	The Social and Economic Pressures of a Youthful Population
Nature of the Challenge	Ghana's relatively young population of close to 60% of the population under the age of 25 years do present the country with a number of development challenges. <i>Some of the developmental challenges that Ghana could face as a result of having a relatively young population include those relating to heavy social expenditure budget in areas like: education, training and provision of health and other social services.</i>
Possible Information and Knowledge Economy (IKE) Development Policy Actions and Initiatives to....	
Directly Address the Challenge	<ul style="list-style-type: none"> • Policy initiatives targeted at promoting basic literacy and ICT literacy of the population at large through the implementation of special initiatives targeting both the formal and informational educational system from basic educational level to higher education level. • Policies aimed at improving basic literacy through both formal and informal educational avenues
Indirectly Address the Challenge	<ul style="list-style-type: none"> • Policy initiatives aimed transforming Ghana into an ICT literate nation • Policies in the area of developing the human resource based of the economy • Policy initiatives directed at building the capacity of the nation's technological universities and polytechnics • Policies targeting the implementation of national ICT applications; including multipurpose community telecenter projects; teleducation and SchoolNet projects among others. • Policies targeting the implementation of initiatives aimed at modernizing the civil and public service to improve its efficiency, effectiveness and service delivery through the deployment and exploitation of ICTs • Policy to facilitate and promote the implementation of community-based ICT initiatives

The Developmental Challenge	Turning the Youthful Population into an Asset for Development
Nature of the Challenge	<p>Ghana's relatively young population presents the country with both developmental challenges and opportunities. For example, failure to achieve an appreciable economic development to provide job opportunities to an increasing number of young job seekers could lead to massive unemployment and its associated social and economic problems. Also the lack of policies and initiatives targeted at turning the youthful population into a skilled human resource asset to aid the development of the country may translate into a high unemployable population in the years to come. – This could lead to serious social problems which could aggravate in situations where the economy is unable to provide adequate employment opportunities through growth. <i>The turning of the youthful population into an asset for development and the taking of necessary steps to promote economic growth to provide opportunities for a growing population of young people is therefore a key developmental challenge facing Ghana</i></p>
Possible Information and Knowledge Economy (IKE) Development Policy Actions and Initiatives to....	
Directly Address the Challenge	<ul style="list-style-type: none"> • Policy initiatives targeted at promoting basic literacy and ICT literacy of the population at large through the implementation of special initiatives targeting both the formal and informational educational system from basic educational level to higher education level. • Policy initiatives aimed transforming Ghana into an ICT literate nation • Policies aimed at improving basic literacy through both formal and informal educational avenues • Policies aimed at facilitating and supporting the development of the requisite pool of highly skilled human resources; knowledge workers and expertise capable of facilitating the process of developing and supporting a technology-base knowledge-driven industrial sector. • Policy initiatives directed at building the capacity of the nation's technological universities, and polytechnics • Policies directed at modernizing the educational system using ICTs to improve and expand access to educational, training and research resources and facilities; • Policies targeted at facilitating the deployment, utilization and exploitation of ICTs within the educational system to support teaching and learning from primary school upwards. • Special policy initiatives targeting the improvement of the quality of education and training at all levels of the educational systems
	<ul style="list-style-type: none"> • Policy instruments and initiatives aimed at facilitating the development of the private sector as a whole. • Policies and strategies aimed at promoting the development of a globally competitive local ICT industry for the development, production and the sale of information, knowledge, and technology products and services • Policies aimed at the development of a comprehensive human resource base in critical skill areas required for facilitating the development of a vibrant value-added services sector and ICT services industry;

Indirectly Address the Challenge	<ul style="list-style-type: none">• Policy initiatives aimed at enacting the various legislations and laws that could promote the development of a vibrant and modern industrial sector• Policies initiatives targeting the commercialization of the key sub-sectors of the agricultural sector and industry to improve their competitiveness• Policies to promote and facilitate the development of the physical and social infrastructure --- targeting the rural areas to support the development of agriculture sector• Policies targeting the implementation of national ICT applications; including multipurpose community telecenter projects; teleducation and SchoolNet projects; electronic government and governance initiatives, telemedicine projects; and e-commerce projects among others.• Policies aimed at developing the necessary highly skilled ICT human resources required for supporting the development and maintenance of an advanced information and communications infrastructure and systems
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The Developmental Challenge	Rapid Population Growth and Declining Per Capita Income
Nature of the Challenge	<p>The current population growth rate of 2.5% if not checked could present Ghana with a number of social and economic problems. The forecast that at the current growth rate of 2.5%, Ghana's population will increase by 50% within the next 12 years, reach the 30 million mark by 2020 and will be double the 2000 figure by 2028 do present Ghana with a number of developmental challenges. The key ones are: pressure on social expenditure in areas like education, health; rural to urban migration which could dramatically get worse if there are no amenities and jobs for rural people; increase competition for land for agricultural and shelter among others.</p> <p>Furthermore a rapid growth in the population without a corresponding appreciable growth in the economy could seriously undermine Ghana's development efforts. --- This could lead to a further reduction in the nation's per capita income, and consequently increase the incidence of poverty and a drastic reduction in living standards for the majority of Ghanaians. There is no doubt if economic growth continues to lag behind population growth; Ghana's goal to achieve a middle income status will be un-attainable in a foreseeable future. The developmental challenge facing Ghana in this respect are therefore of two fold: <i>the challenge of checking population growth while at the same time putting efforts into promoting rapid economic growth at rates that could translate into improving the national income per capita and move Ghana into the middle income zone</i></p>
Possible Information and Knowledge Economy (IKE) Development Policy Actions and Initiatives to....	
Directly Address the Challenge	<ul style="list-style-type: none"> • Policies targeted at reducing the population growth rate through educational and public awareness programmes and initiatives
Indirectly Address the Challenge	<ul style="list-style-type: none"> • Policies aimed at promoting and encouraging both domestic and foreign direct investment targeting the services sector including the ICT service sub-sector • Policy initiatives aimed at enacting the various legislations and laws that could promote the development of a vibrant and modern industrial sector • Policy initiatives directed at promoting the development of the services sector targeting in particular the development of the ICT services sub-sector and industry

The Developmental Challenge	Under-performing Agricultural Sector of the Economy
Nature of the Challenge	<p>Ghana's agriculture sector despite some improvements in some areas is seriously underperforming in a number of critical areas. The output of cocoa – the main cash crop is relatively low, and the yield per hectare is also low in comparison to the yield of other cocoa producing countries in the sub-region. The country not only lost its World leader position to Cote d'Ivoire but also it is now ranked a poor second or third to its close door neighbour. Also the nation's exports earnings from the agriculture products have been declining in recent years and this has no doubt compounded the problems faced by the sector. Given that the agricultural sector currently employs 70% of the labour force, contributes close 35% to the GDP and accounts for 57% of foreign exchange earnings, the lack of development in the sector do have a number of social and economic implications which could further compound Ghana's socio-economic problems and retard its developmental efforts. <i>The development and modernization of the agricultural sector to improve its productivity and contribution to the nation's development is therefore a major developmental challenge facing the country.</i></p>
Possible Information and Knowledge Economy (IKE) Development Policy Actions and Initiatives to....	
Directly Address the Challenge	<ul style="list-style-type: none"> • Policies aimed at the deployment and exploitation of ICTs to support the activities of the agriculture sector including, the production, processing, marketing and distribution of agriculture products and services; • Policies relating to improving the mechanization of the agriculture production process as well as improving irrigation capacity and the use of fertilizers to improve productivity and yield per hectare; • Policies initiatives targeting the commercialization of the key sub-sectors of the agricultural sector and industry to improve their competitiveness; • Special agriculture development policy instruments, and incentive programmes including special budgetary packages and investment incentives to promote the development of the agriculture sector; • Policies aimed at promoting and supporting agricultural research as well as cutting-edge agriculture-based R&D targeting the development of a modernize and globally competitive agriculture sector; • Policies to promote and facilitate the development of the physical and social infrastructure --- targeting the rural areas to support the development of agriculture sector
	<ul style="list-style-type: none"> • Policies in the area of developing the human resource based and the R&D capacity of the economy. • Policy initiatives directed at creating the necessary legal and regulatory environment to facilitate the rapid development and expansion of the nation's information and communications infrastructure. • Policy provisions targeted at the promotion of e-commerce and e-government types of initiatives. • Policies targeted at promoting the development of and the use of international standards, and best practices to guide the production and the provisions of services within the economy

Indirectly Address the Challenge	<ul style="list-style-type: none">• Policies targeting the implementation of national ICT applications; including multipurpose community telecenter projects; teleducation and SchoolNet projects; electronic government and governance initiatives, telemedicine projects; and e-commerce projects among others.• Policies targeting the promotion of international standards and best practices in the use of ICT to aid the development, provision and delivery of goods and services by key sectors of the economy.• Policies targeting the implementation of initiatives aimed at modernizing the civil and public service to improve its efficiency, effectiveness and service delivery through the deployment and exploitation of ICTs;• Policy initiatives targeted at promoting international standards, and best practices that could among other things aid the process of the development of an advanced and reliable information and communication infrastructure and the improvements in quality of service (QoS) within the local communication services sector.• Policies directed at modernizing the educational system using ICTs to improve and expand access to educational, training and research resources and facilities
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The Developmental Challenge	An Economy Dominated by the Agricultural Sector with Weak and Under-Developed Industrial and Service Sector
Nature of the Challenge	<p>The Ghana economy is still predominately agriculture-base without a substantial shift towards the service sector and industrial sector as should be expected if the economy were on a rapid growth path and modernizing. The structure of the Ghanaian economy measured in terms of sectorial contribution to GDP indicates that the structure of the economy changed very little over the last 20 years. For example while the percentage contribution to GDP reduced from about 60% in 1980 to about 36% in 2000, and that of industry increase from 12% to 26%, the service sector's contribution to GDP only increase marginally from 31% in 1980 to about 36% in 2000. <i>Putting in place policies and strategies that modernize the agriculture sector while at the same time target the development of the industrial and the services sector to increase their contribution to the GDP constitute a major developmental challenge facing the country.</i></p>
Possible Information and Knowledge Economy (IKE) Development Policy Actions and Initiatives to....	
Directly Address the Challenge	<ul style="list-style-type: none"> • Policies targeting the promotion of FDI drive in ICTs • Policies directed at putting in place and implementing special tax packages, instruments, and incentive programmes and mechanisms to promote the development of the local ICT production industry. • Policy instruments and initiatives aimed at facilitating the development of the private sector as a whole • Policies aimed at promoting and encouraging both domestic and foreign direct investment targeting the services sector including the ICT service sub-sector; • Policies and strategies aimed at promoting the development of a globally competitive local ICT industry for the development, production and the sale of information, knowledge, and technology products and services; • Policies aimed at the development of comprehensive human resource base in critical skill areas required for facilitating the development of a vibrant value-added services sector and ICT services industry; • Policies targeted at promoting the development of and the use of international standards, and best practices to guide the production and the provisions of services within the economy • Policies directed at facilitating an investment climate for the mobilization of financial and technological resources; as well as promoting FDI specifically targeting attracting investments that have knowledge and expertise transfer components; • Policies aimed at facilitating the development of the formal private sector. • Policy initiatives aimed at enacting the various legislations and laws that could promote the development of a vibrant and modern industrial sector • Policy initiatives directed at promoting the development of the services sector targeting in particular the development of the ICT services sub-sector and industry • Policies directed at promoting and facilitating the development of the private sector to generate enough demand for advanced and reliable information and communication services

<p style="text-align: center;">Indirectly Address the Challenge</p>	<ul style="list-style-type: none"> • Policies in the area of developing the human resource based and the R&D capacity of the economy • Policy initiatives directed at creating the necessary legal and regulatory environment to facilitate the rapid development and expansion of the nation's information and communications infrastructure • Policy provisions targeted at the promotion of e-commerce and e-government types of initiatives. • Policy initiatives directed at building the capacity of the nation's technological universities, polytechnics & research institutions. • Policy initiatives aimed at enacting the various legislations and laws that could promote the development of a vibrant and modern industrial sector • Policies aimed at facilitating and supporting the development of the requisite pool of highly skilled human resources; knowledge workers and expertise capable of facilitating the process of developing and supporting a technology-base knowledge-driven industrial sector. • Policy initiatives targeting the development and improvement of the nation's R&D capacity • Policies initiatives aimed at creating the necessary enabling regulatory framework for facilitating the deployment and exploitation and the development of ICT products, services and systems within the economy and society • Policy provisions targeted at the promotion of e-commerce and e-government types of initiatives • Policy initiatives targeted at promoting basic and ICT literacy of the population at large through the implementation of special initiatives targeting both the formal and informational educational system from basic educational level to higher education level.. • Policies aimed at putting in place specific initiatives to facilitate the rapid deployment and exploitation of ICTs within the civil and public services. Specific initiatives could be directed at putting in place and implementing special policy instruments and incentive packages for the procurement of ICT equipment, products and services • Policies aimed at the promotion of universal service and access to information and communication technologies and systems and to basic and value added communications services • Policy initiatives targeted at the creation of conditions for an investor friendly telecommunications environment; including those targeting the liberalization of the ICT sector and encouragement of private investment in the ICT sector. • Policy initiatives aimed at promoting the development and implementation of a globally competitive e-commerce and e-government initiatives • Policies targeting the promotion of international standards and best practices in the use of ICT to aid the development, provision and delivery of goods and services by key sectors of the economy • Policies initiatives for creating the necessary enabling regulatory framework to facilitate the development, provision and delivery ICT products, services and systems within the economy and society. • Policy initiatives targeted at promoting international standards, and best practices that could among other things aid the process of the development of an advanced and reliable information and communication infrastructure and the improvements in quality of service (QoS) within the local communication services sector
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The Developmental Challenge	The Debt Burden
<p>Nature of the Challenge</p>	<p>Ghana's development is being handicapped by the nation's heavy debt burden measured in terms of: the high national debt per capita, the high national debt as percentage of GDP, the debt service ratio and the debt service to export earnings ratio. The country's debt per capita in 2000 was \$350 compare to its income per capita of \$340. The national debt as percentage of GDP increased to about 129% by 2000 --- meaning Ghana's debt far exceeds its economic output in 2000. Furthermore the debt service to export earning ratio shows that debt servicing represents close to 20% the nation's export earnings.</p> <p>Ghana's heavy debt burden is compounding its numerous other economic development problems and this is constraining the nation's developmental efforts in a number of areas. For example heavy debt servicing obligations takes critical resources away from the nation's development efforts and further inhibits the development process in a number of ways. <i>Taking steps to reduce Ghana's debt burden without necessary inhibiting the nation's development constitutes a major developmental challenge facing the country.</i></p>
<p>Possible Information and Knowledge Economy (IKE) Development Policy Actions and Initiatives to....</p>	
<p>Directly Address the Challenge</p>	<ul style="list-style-type: none"> • Policies and strategies aimed at the rapid development of all sectors of the economy to move the economy away from its un-healthy debt dependency
<p>Indirectly Address the Challenge</p>	<ul style="list-style-type: none"> • Policies aimed at promoting and encouraging both domestic and foreign direct investment targeting the services sector including the ICT service sub-sector • Policies and strategies aimed at promoting the development of a globally competitive local ICT industry for the development, production and the sale of information, knowledge, and technology products and services • Policies aimed at facilitating and supporting the development of the requisite pool of highly skilled human resources; knowledge workers and expertise capable of facilitating the process of developing and supporting a technology-base knowledge-driven industrial sector • Policies directed at facilitating an investment climate for the mobilization of financial and technological resources; as well as promoting FDI specifically targeting attracting investments that have knowledge and expertise transfer components • Policy initiatives aimed at enacting the various legislations and laws that could promote the development of a vibrant and modern industrial sector policy initiatives directed at promoting the development of the services sector targeting in particular the development of the ICT services sub-sector and industry • Policies initiatives targeting the commercialization of the key sub-sectors of the agricultural sector and industry to improve their competitiveness

	<ul style="list-style-type: none"> • Policies aimed at promoting and supporting agricultural research as well as cutting-edge agriculture-based R&D targeting the development of a modernize and competitive agriculture sector and industry to improve their competitiveness. • Policies targeting the implementation of initiatives aimed at modernizing the civil and public service to improve its efficiency, effectiveness and service delivery through the deployment and exploitation of ICTs; • Policies targeted at the implementation of e-government initiatives including: government to government (G2G), government to business (G2B) and government to citizens (G2C) types of e-government initiatives
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The Developmental Challenge	Disproportionate Informal Private Sector
Nature of the Challenge	<p>Statistics shows that the private sector, is dominated by its informal sub-sector. In other words, the formal private sector forms a very small fraction of the private sector. For example the informal private sector is by far the largest employment sector of the Ghanaian economy – accounting for close to 81% of the economically active population, while the formal private accounts for only about 8%. In other words the formal private sector of the Ghanaian economy is under-developed and its role in the economy is marginal. <i>The development of the private sector in general and in particular the formal private sector by putting in place policies and initiatives that in addition to promoting the development of the private sector as a whole, target a major expansion of the formal private sector in comparison to the informal sector, is one of the major developmental challenges facing Ghana.</i></p>
Possible Information and Knowledge Economy (IKE) Development Policy Actions and Initiatives to....	
Directly Address the Challenge	<ul style="list-style-type: none"> • Policy instruments and initiatives aimed at facilitating the development of the private sector as a whole • Policies aimed at facilitating the development of the formal private sector. • Policies and strategies aimed at promoting the development of a globally competitive local ICT industry for the development, production and the sale of information, knowledge, and technology products and services
	<ul style="list-style-type: none"> • Policies targeting the promotion of FDI drive in ICTs • Policies directed at putting in place and implementing special tax packages, instruments, and incentive programmes and mechanisms to promote the development of the local ICT production industry • Policies aimed at promoting and encouraging both domestic and foreign direct investment targeting the services sector including the ICT service sub-sector • Policies aimed at the development of comprehensive human resource base in critical skill areas required for facilitating the development of a vibrant value-added services sector and ICT services industry

<p>Indirectly Address the Challenge</p>	<ul style="list-style-type: none"> • Policies initiatives aimed at creating the necessary enabling regulatory framework for facilitating the deployment and exploitation and the development of ICT products, services and systems within the economy and society • Policies aimed at facilitating and supporting the development of the requisite pool of highly skilled human resources; knowledge workers and expertise capable of facilitating the process of developing and supporting a technology-base knowledge-driven industrial sector. • Policy initiatives targeting the development and improvement of the nation's R&D capacity. • Policies directed at facilitating an investment climate for the mobilization of financial and technological resources; as well as promoting FDI specifically targeting attracting investments that have knowledge and expertise transfer components • Policy initiatives aimed at enacting the various legislations and laws that could promote the development of a vibrant and modern industrial sector • Policy initiatives directed at promoting the development of the services sector targeting in particular the development of the ICT services sub-sector and industry
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<p>The Developmental Challenge</p>	<p>Low Professional, Technical and Managerial Manpower Base</p>
<p>Nature of the Challenge</p>	<p>Statistics relating to the occupational profile of the economically active population reveals that: only 8.6% are professional and technical people with a lower percentage of 0.3% who are managers and administrators. The low percentage of key technical and professional manpower like engineers, accountants, architects, doctors, lawyers, scientists etc highlights the relatively low professional and technical skill human resource capacity of the economy. Furthermore given that close to 48% of the economically active population are occupationally involved in agriculture and since the agriculture sector is traditionally dominated by an unskilled manpower it can be concluded that a high percentage of Ghanaian workforce are unskilled. <i>The development of a skilled human resource capacity to aid the process of developing the necessary professional, technical and managerial manpower to drive the country's development towards a modernized economy and society in the emerging information and knowledge age can be singled out as one of the key developmental challenges facing the country.</i></p>
<p>Possible Information and Knowledge Economy (IKE) Development Policy Actions and Initiatives to....</p>	
	<ul style="list-style-type: none"> • Policies aimed at facilitating and supporting the development of the requisite pool of highly skilled human resources; knowledge workers and expertise capable of facilitating the process of developing and supporting a technology-base knowledge-driven industrial sector;

Directly Address the Challenge	<ul style="list-style-type: none"> • Policies aimed at the development of comprehensive human resource base in critical skill areas required for facilitating the development of a vibrant value-added services sector and ICT services industry • Policies directed at modernizing the educational system using ICTs to improve and expand access to educational, training and research resources and facilities; • Policy initiatives targeting the development and improvement of the nation's R&D capacity. • Policy initiatives directed at building the capacity of the nation's technological universities, polytechnics and industrial research institutions. • Policies aimed at promoting and supporting agricultural research as well as cutting-edge agriculture-based R&D targeting the development of a modernize and competitive agriculture sector • Policies directed at the implementation of initiatives to improve basic computer skills of civil and public servants through in-service training and skill update programmes in ICTs
Indirectly Address the Challenge	<ul style="list-style-type: none"> • Policy initiatives targeted at promoting basic literacy and ICT literacy of the population at large through the implementation of special initiatives targeting both the formal and informational educational system from basic educational level to higher education level. • Policy initiatives aimed transforming Ghana into an ICT literate nation • Policies targeting the implementation of initiatives aimed at modernizing the civil and public service to improve its efficiency, effectiveness and service delivery through the deployment and exploitation of ICTs • Special policy initiatives targeted at the implementation of specific programmes to motivate civil and public servants to get involve in ICTs to improve their productivity, efficiency and effectiveness.

The Developmental Challenge	Relatively High Proportion of the Population with no Educational Attainment
Nature of the Challenge	<p>Close to 40% of Ghanaians over 6 years of age have never been to school, in other words they have no educational attainment. This figure coupled with the fact that only about 3% of the population had tertiary level education presents Ghana with a major developmental challenge. It is apparent that since the development of a given nation depends very much on the level of educational attainment of its people, Ghana's development is no doubt being constrained by the fact that a high proportion of its people have never been to school and only a small percentage of its people have attained higher education. <i>The widening of access to basic education to the vast majority of the population, and increasing access to tertiary level education to higher percentage of the adult population are therefore some of the developmental challenges facing Ghana in the area of education</i></p>

Possible Information and Knowledge Economy (IKE) Development Policy Actions and Initiatives to....	
Directly Address the Challenge	<ul style="list-style-type: none"> • Policy initiatives targeted at promoting basic literacy and ICT literacy of the population at large through the implementation of special initiatives targeting both the formal and informational educational system from basic educational level to higher education level. • Policies aimed at improving basic literacy through both formal and informal educational avenues • Policy initiatives aimed at transforming Ghana into an ICT literate nation • Policies directed at modernizing the educational system using ICTs to improve and expand access to educational, training and research resources and facilities; • Policies targeted at facilitating the deployment, utilization and exploitation of ICTs within the educational system to support teaching and learning from primary school upwards. • Special policy initiatives targeting the improvement of the quality of education and training at all levels of the educational systems
Indirectly Address the Challenge	<ul style="list-style-type: none"> • Policies in the area of developing the human resource base and the R&D capacity of the economy • Policies aimed at facilitating and supporting the development of the requisite pool of highly skilled human resources; knowledge workers and expertise capable of facilitating the process of developing and supporting a technology-base knowledge-driven industrial sector. • Policies targeting the implementation of national ICT applications; including multipurpose community telecenter projects; teleducation and SchoolNet projects; electronic government and governance initiatives, telemedicine projects; and e-commerce projects among others. • Policies directed at the implementation of initiatives to improve basic computer skills of civil and public servants through in-service training and skill update programmes in ICTs

The Developmental Challenge	Low Job Creation Capacity of the Economy
Nature of the Challenge	Close to 68% of the employed population are self-employed with no employees. In other words, the majority of the working population, worked in their own small enterprises which have no other employees apart from themselves. With the economy dominated by the self-employed, who do not have the capacity to employ others, the prospects for generating additional jobs or employment opportunities for a growing young population are very low. <i>The transformation of the economy to improve on its employment generation capacity is therefore a key developmental challenge facing Ghana.</i>
Possible Information and Knowledge Economy (IKE) Development Policy Actions and Initiatives to....	
Directly Address the Challenge	<ul style="list-style-type: none"> • Policies aimed at facilitating the development of the formal private sector • Policies and strategies aimed at promoting the development of a globally competitive local ICT industry for the development, production and the sale of information, knowledge, and technology products and services • Policy initiatives directed at promoting the development of the services sector targeting in particular the development of the ICT services sub-sector and industry
Indirectly Address the Challenge	<ul style="list-style-type: none"> • Policies aimed at the development of comprehensive human resource base in critical skill areas required for facilitating the development of a vibrant value-added services sector and ICT services industry • Policy instruments and initiatives aimed at facilitating the development of the private sector as a whole. • Policies initiatives targeting the commercialization of the key sub-sectors of the agricultural sector and industry to improve their competitiveness • Policies targeting the implementation of initiatives aimed at modernizing the civil and public service to improve its efficiency, effectiveness and service delivery through the deployment and exploitation of ICTs; • Policies targeted at the implementation of e-government initiatives including: government to government (G2G), government to business (G2B) and government to citizens (G2C) types of e-government initiatives

The Developmental Challenge	Narrow Export base Dominated by Traditional Exports
Nature of the Challenge	Ghana's trade with the outside world has for many years been registering huge balance of payment (BoP) deficits. The country's small domestic market cannot support the development of the key sectors of the economy – Ghana will need to produce for export in order to grow. The nation will need to develop and diversify its export base and target the development of an export-led economy to be able to initiate and sustain an appreciable growth in the economy, generate wealth and create quality jobs for its increasing population. <i>A key developmental challenge facing Ghana therefore relates to the development of a diversified export-led economy targeting key sectors of the economy including the agriculture, services and industrial sectors</i>
Possible Areas of Policy Actions and Initiatives to....	
Directly Address the Challenge	<ul style="list-style-type: none"> • Policy instruments and initiatives aimed at facilitating the development of the private sector as a whole. • Policies aimed at promoting and encouraging both domestic and foreign direct investment targeting the services sector including the ICT service sub-sector • Policies and strategies aimed at promoting the development of a globally competitive local ICT industry for the development, production and the sale of information, knowledge, and technology products and services • Policies initiatives aimed at creating the necessary enabling regulatory framework for facilitating the deployment and exploitation and the development of ICT products, services and systems within the economy and society • Policies aimed at facilitating the development of the formal private sector. • Policy initiatives directed at promoting the development of the services sector targeting in particular the development of the ICT services sub-sector and industry • Policies aimed at the deployment and exploitation of ICTs to support the activities of the agriculture sector including, the production, processing, marketing and distribution of agriculture products and services; • Policies relating to improving the mechanization of the agriculture production process as well as improving irrigation capacity and the use of fertilizers to improve productivity and yield per hectare; • Policies initiatives targeting the commercialization of the key sub-sectors of the agricultural sector and industry to improve their competitiveness; • Special agriculture development policy instruments, and incentive programmes including special budgetary packages and investment incentives to promote the development of the agriculture sector;

	<ul style="list-style-type: none"> • Policies aimed at promoting and supporting agricultural research as well as cutting-edge agriculture-based R&D targeting the development of a modernize and competitive agriculture sector • Policies targeting the promotion of international standards and best practices in the use of ICT to aid the development, provision and delivery of goods and services by key sectors of the economy.
<p style="text-align: center;">Indirectly Address the Challenge</p>	<ul style="list-style-type: none"> • Policies directed at putting in place and implementing special tax packages, instruments, and incentive programmes and mechanisms to promote the development of the local ICT production industry • Policy initiatives directed at creating the necessary legal and regulatory environment to facilitate the rapid development and expansion of the nation's information and communications infrastructure. • Policy provisions targeted at the promotion of e-commerce and e-government types of initiatives. • Policies aimed at the development of comprehensive human resource base in critical skill areas required for facilitating the development of a vibrant value-added services sector and ICT services industry; • Policies aimed at promoting universal service and access to information and communication technologies services and systems. • Policies targeted at promoting the development of and the use of international standards, and best practices to guide the production and the provisions of services within the economy • Policy initiatives aimed at enacting the various legislations and laws that could promote the development of a vibrant and modern industrial sector • Policies aimed at facilitating and supporting the development of the requisite pool of highly skilled human resources; knowledge workers and expertise capable of facilitating the process of developing and supporting a technology-base knowledge-driven industrial sector. • Policies directed at facilitating an investment climate for the mobilization of financial and technological resources; as well as promoting FDI specifically targeting attracting investments that have knowledge and expertise transfer components • Policy initiatives targeted at the creation of conditions for an investor friendly telecommunications environment; including those targeting the liberalization of the ICT sector and encouragement of private investment in the ICT sector. • Policy initiatives aimed at promoting the development and implementation of a globally competitive e-commerce and e-government initiatives

The Developmental Challenge	Under-developed Physical Infrastructure
Nature of the Challenge	<p>Ghana currently suffers from a number of physical infrastructure deficits which is putting a strain on the nation's developmental efforts. The nation's road infrastructure though has experienced some improvements and expansions in the last decade and a half, but still falls far short of the nation's requirements. The electricity infrastructure required a major improvement if it is to cater for the huge un-met demand the sector is currently experiencing from both domestic and commercial consumers. The nation's water supply infrastructure, cannot still reach the majority of the rural community, ---- An increasing number of newly developed urban areas and centers do not have access to direct water supply source. <i>The developmental implications of the nation's poor physical infrastructure in the area of: roads, electricity, water and sanitation can be classified as a major developmental challenge facing the country.</i></p>
Possible Information and Knowledge Economy (IKE) Development Policy Actions and Initiatives to....	
Directly Address the Challenge	<ul style="list-style-type: none"> • Policies to promote and facilitate the development of the physical and social infrastructure --- targeting the rural areas to support the development of agriculture sector
Indirectly Address the Challenge	<ul style="list-style-type: none"> • Policies directed at facilitating an investment climate for the mobilization of financial and technological resources; as well as promoting FDI specifically targeting attracting investments that have knowledge and expertise transfer components • Policies aimed at promoting and facilitating a stable and competitive investment climate to attract both domestic and foreign direct investment. • Policies in the area of developing the human resource based and the R&D capacity of the economy.

The Developmental Challenge	Poor and Limited Communications Infrastructure
Nature of the Challenge	<p>Although Ghana's ICT landscape has in the last decade or two undergone major transformations which to some extent was facilitated by a number of institutional and regulatory initiatives including the liberalization of the communications sector to encourage competition, the country's telecommunication and communications infrastructure is still far from being developed. Most of the rural areas are to a large extent not served by the existing infrastructure. Ghana still have a low teledensity of less than 2 telephone lines per 100 people, and low tele-accessibility ---a measure of households access to telecommunication services. Despite the explosion of mobile phone services especially in the urban centers, --- the limited infrastructural capacities of the mobile networks have resulted into over-subscription and poor quality of service.</p> <p>Also investments in the telecommunication sector has been declining thus delaying infrastructural expansions in the sector and the slow deployment of value added advanced communication services and advanced technologies. <i>The development, expansion and the modernization of the nation's communications infrastructure to achieve universal service and access to basic and value added telecommunications services, support the development of the local ICT industry and aid the country's socio-economic development process is a key developmental challenge facing Ghana.</i></p>
Possible Areas of Policy Actions and Initiatives to....	
Directly Address the Challenge	<ul style="list-style-type: none"> • Policy initiatives targeted at the creation of conditions for an investor friendly telecommunications environment; including those targeting the liberalization of the ICT sector and encouragement of private investment in the ICT sector. • Policy on the development of the local communications industry towards competitiveness • Policies aimed at promoting and facilitating a stable and competitive investment climate to attract both domestic and foreign direct investment. • Policies targeted at developing the necessary legal, institutional and regulatory framework and structures required for supporting the development of the communications infrastructure • Policies aimed at developing the necessary highly skilled ICT human resources required for supporting the development and maintenance of an advanced information and communications infrastructure and systems; • Policy initiatives targeted at promoting international standards, and best practices that could among other things aid the process of the development of an advanced and reliable information and communication infrastructure and the improvements in quality of service (QoS) within the local communication services sector

**Indirectly Address
the Challenge**

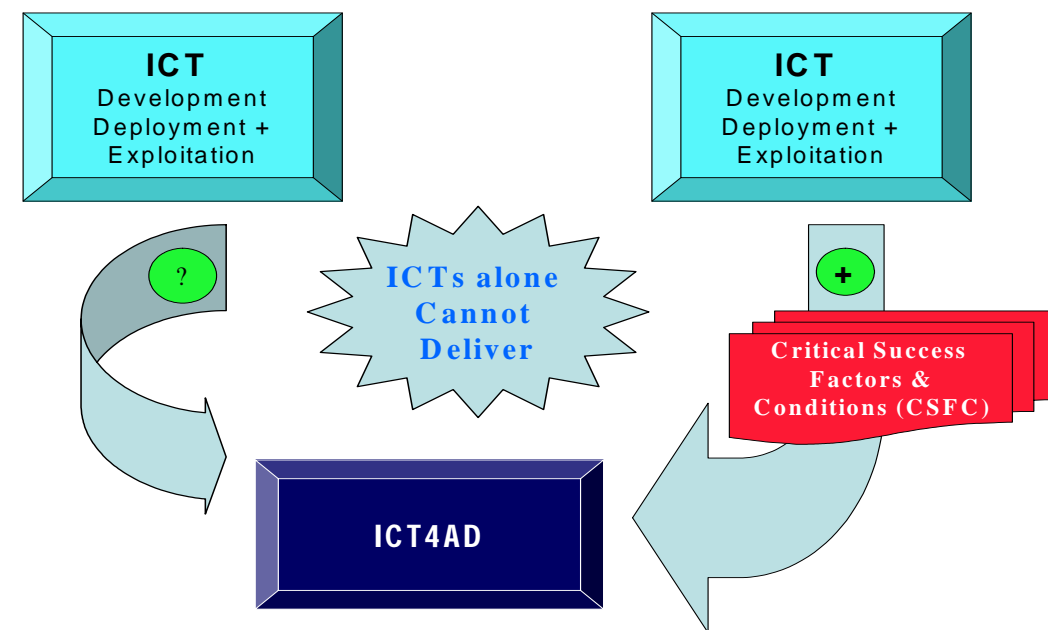
- Policies targeting the implementation of national ICT applications; including multipurpose community telecenter projects; teleducation and SchoolNet projects; electronic government and governance initiatives, telemedicine projects; and e-commerce projects among others.
- Policies directed at promoting and facilitating the development of the private sector to generate enough demand for advanced and reliable information and communication services
- Policies and strategies aimed at promoting the development of a globally competitive local ICT industry

Chapter Six

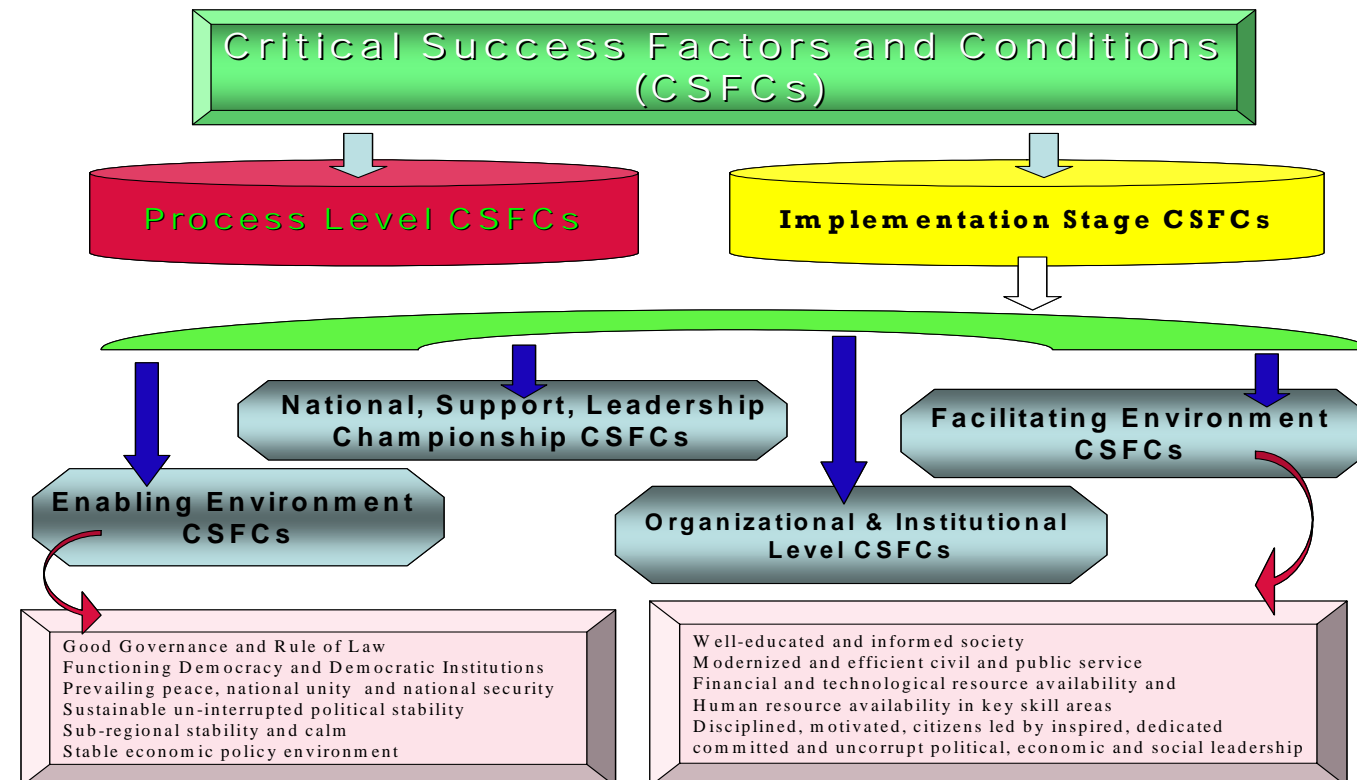
Examining the Critical Success Factors and Conditions

Although it has been established that Ghana with the right policies (like those identified and discussed in Chapters 4 and 5) can address its developmental challenges and in the process transform its industrially weak subsistence agricultural-based economy into a predominately information and knowledge-based economy and society without first being fully industrialized, it is worth pointing out that this could only be achieved provided some critical success factors and conditions are addressed.

The basic premise (as pointed out earlier) is that: the development, deployment and exploitation of ICTs within the economy and society can contribute to and accelerate Ghana's socio-economic development process provided some critical success factors and conditions (CSFCs) are addressed at the: national, organizational levels as well as at the level of individuals in the work place and in the society at large. In other words, ICTs per se cannot have an appreciable impact on the developmental process unless their development, deployment and exploitation within the society and economy are backed by addressing a number of these critical success factors and conditions.



According [19], ICTs cannot be a panacea for all socio-economic development problems of a give nation. --- Social and economic development is dependent on many factors, which should be addressed through an overall development strategy. Factors such as political stability, macroeconomic governance, transparency and accountability of national and local administrations, the rule of law, physical infrastructure and basic literacy should also be addressed in an explicit manner -- and ICT should not be seen as a substitute. In this chapter, we identify and discuss a number of the critical success factors and conditions which need to be addressed within the context of using ICTs to accelerate Ghana's socio-economic development process. We identify two broad types of critical success factors and conditions: (i) *Process Level Critical Success Factors and Conditions (P-CSFCs)* ---necessary for the success for the ICT for accelerated development (ICT4AD) policy and plan development process and (ii) *Implementation Stage Critical Success Factors and Conditions (I-CSFCs)* --- necessary for the success of the implementation of the policy and plan. The I-CSFCs provides the necessary conducive environment for the effective development, deployment and exploitation of ICTs within the society and economy to have an appreciable impact on the socio-economic development process. The basic point is that: the CSFCs should be addressed at both the policy and plan formulation/development stage and also at the actual implementation stage. The details of each of these two broad types of critical success factors are illustrated in the diagram below.



The argument being put forward is that: *a successful policy and plan development process that does not necessarily translate into an effective implementation of the policy commitments and the plan initiatives and programme cannot for example contribute to Ghana's developmental efforts.* We examine below the details of each of these two broad types of critical success factors and conditions necessary for the success of the Ghana ICT4AD policy and plan development and implementation process.

6.1 The Process Level Critical Success Factors and Conditions (P-CSFCs)

The success of Ghana's ICT4AD policy and plan development process will on the whole depend on a number of process level critical success factors and conditions (or pre-requisites). Some of the key ones are:

- Active high profile national ICT champion --- the President
- Top level political and economic leadership, support, commitment and championship of the process
- A clear national ICT4AD Vision, Missions and Strategies to guide the formulation and development of the process outputs – the policy and the initiatives and programmes of the corresponding action plans designed to implement the policy
- Government endorsement and commitment to the national ICT4AD Vision, Missions and the corresponding Strategies
- The goodwill and support of the people and their endorsement of the need for the ICT4AD Vision and stated missions and their realization
- Strategic Government Ministry to facilitate and coordinate the policy and plan development process on behalf of the Government.
- Dedicated policy decision makers, and professionals, cutting across the public and private sector committed to the process
- Adoption of a well-scheduled step-by-step approach with specific milestones and deliverables during the policy and plan development process
- The identification and the setting of realistic objectives and targets that can be achieved within a given time-frame
- A well-researched policy formulation and plan development process that made an effort to learn from experiences of other countries
- Nation-wide policy and plan development consultative exercise involving key stakeholders within the public and private sector to facilitate across the board contributions and inputs into the process and its deliverables
- Rounds of dialog sessions with key stakeholders -- Government, Private Sector & Civil Society
- Logistic support and facilitation for the process and
- Continuous push from the top for action and results.

6.2 The Implementation Stage Critical Success Factors and Conditions (I-CSFCs)

The critical success factors and conditions conducive for supporting the implementation of the relevant ICT4AD policies and plans include those relating to providing: (i) *conducive enabling environment for facilitating the implementation of the policy and plan* (ii) *national support, leadership and championship* targeted at facilitating the implementation process (iii) *suitable organizational and institutional level types of critical success factors* to support the implementation of the policy and plan at the organizational and institutional level and (iv) *facilitating environment critical*

success factors and conditions to facilitate the policy and plan implementation process. We examine each of these four categories of implementation-related CSFCs below.

Enabling Environmental Critical Success Factors and Conditions

We can distinguish between three types of Enabling Environment CSFCs namely those relating to (i) governance and socio-political enabling environment (ii) socio-economic development framework enabling environment and (iii) legal, regulatory and institutional enabling environment critical success factors and conditions.

Governance and Socio- Political Enabling Environment CSFCs

- Good Governance and Rule of Law
- Functioning Democracy and Democratic Institutions
- Prevailing peace, national unity and national security
- Sustainable un-interrupted Political Stability
- Sub-regional Stability and Peace
- Stable Economic Policy Environment

Socio-Economic Development Framework Enabling Environment CSFCs

- Sound Socio-Economic Development Policy and Priorities Setting Framework
- Stable Economic Liberalization Environment
- Stable Economic Investment Climate

Legal, Regulatory and Institutional Environment Critical Success CSFCs

- Relevant Legal and Legislative Provisions to support the ICT4AD policy and plan implementation process
- Enabling Regulatory Environment necessary for implementing specific relevant components of the ICT4AD policies and plans
- Institutional Structures and Arrangements to facilitate and support the policy and plan implementation process

National Support, Leadership and Championship Critical Success Factors and Conditions

- Top-level political leadership commitment and championship for the ICT4AD policy and plan implementation process
- A core group of dedicated senior level decision makers and professional within the public and private sector committed to providing leadership and championship to facilitate and support the ICT4AD policy and plan implementation process within their respective organizations, institutions and business establishments and entities

- Across-the-board stakeholder commitment to the practical realization of the aspirations, the goals and targets of the ICT4AD Vision and corresponding missions and strategies

Organizational and Institutional Level Critical Success Factors and Conditions

- Required and necessary changes in relevant organizational and institutional structures, processes, and procedures conducive for the effective implementation of the ICT4AD policy and plan initiatives involving the effective deployment and exploitation of ICTs within these organizations
- Changes in unproductive attitudes to work, duty and service that could hinder the effective deployment and exploitation of ICTs to improve organizational efficiency, productivity, activities, operations and service delivery
- Motivated, discipline and adequately remunerated work force committed to work and bringing about the necessary organizational changes conducive for the effective deployment and exploitation of ICTs within their organizations and institutions.

Facilitating Environment Critical Success Factors and Conditions

- Well-educated and informed society
- Modernized and efficient civil and public service
- Financial and technological resource availability
- Human resource availability in key skill areas
- Disciplined, motivated and patriotic citizens led by inspired, dedicated committed and uncorrupt political, economic and social leadership

6.3 Examining the Status of the Critical Success Factors and Conditions (CSFCs) and Recommending Actions to be Taken

We present below the Taxonomy of the critical success factors. For each of the identified CSFCs specific observations are made in relation to the extent to which they are currently being addressed. Also documented are the specific actions which need to be taken in relation to each of these critical success factors taking into account what is currently been done or has been done to address each of them.

The Process Level Critical Success Factors and Conditions		
Critical Success Factors and Conditions (CSFCs)	Comments	Actions need to be Taken
Active high profile national ICT champion --- the President	There is full commitment to championing the Ghana ICT4AD process at the highest level of Government. Evidence shows that this level of championship will be critical for the success of the process. Examples from other countries who had this level of championship for their process include: Prime Minister Mahathir Mohammed of Malaysia, Prime Minister Abdal Bihari Vajbajee of India, President Paul Kagame of Rwanda and President Wade of Senegal Also the championship provided by President Clinton and Vice President Al-Gore of the US during the Clinton administration was instrumental in the moving that country's process forward.	Continuous and sustained active championship of the Ghana process by the President required
Top level political and economic leadership, support, commitment and championship of the process	A section of the political leadership (executive and parliament) is committed to the ICT4AD process. So does some members of the economic leadership of the country. Some members of the top political and economic leadership are also in addition championing the process –but they are in the minority	The success of the Ghana ICT4AD will critically depend on the support, commitment and championship of the process by a critical mass of the top political and economic leadership of the country. This critical mass is yet to be achieved. More sensitization of this group is required to bring them on board to ensure the success of the process.
A clear national ICT4D vision, missions and strategies to guide the formulation and development of the process outputs – the policy and the details of the corresponding plans	The ICT4AD Vision and Missions has been developed, discussed and crystallized as part of the national consultative exercise forming part of the process. These have been	The corresponding strategies for achieving the mission statements have been developed and documented in Chapter 7 of this Volume.

	documented in the Volume 1 of the Framework document	
Government endorsement and commitment to the national vision, missions and the corresponding strategies designed to contribute to the realization of the Vision and the corresponding Missions	The ICT4AD Vision and Missions are in line with the overall socio-economic development vision for Ghana endorsed by the Government.	The corresponding strategies for achieving the stated missions are also in line with aspirations of the socio-economic development vision of the nation.
The goodwill and support of the people and their endorsement of the need for the Vision and stated missions and their realization	The Ghana ICT4AD policy development process is a bottom-up process involving nation-wide stakeholder consultation within the public and private sector, including civil society. There is wide ranging support for the process and the public has made significant inputs and contributions into the policy formulation process. The ICT4AD Vision and missions articulated in Volume 1 of the Framework document was based on public inputs, submissions and extensive consultations. On the whole the goodwill and support of the people for the process has been demonstrated throughout the extensive nation-wide multi-stakeholder consultative process	There is a need to continue and sustain the public's involvement in the process to ensure their continuous input, support and goodwill; as well as their commitment to the process during the policy and plan development phase of the process.
Strategic Government Ministry to facilitate and coordinate the policy and plan development process on behalf of the Government.	The Ministry of Communications and Technology is serving as the strategic Ministry for facilitating and coordinating the development of the policy and the plan. The Ghana ICT4AD process is being carried out under the auspices of the AISI initiative of the Economic Commission for Africa (ECA) who is providing the technical assistance for the process	The coordinating role of the Ministry of Communications and Technology will be critical for the success of the process and should be sustained. It is envisaged that at as part of the process a National Agency to facilitate the coordination of the implementation of the plan will be set up.

<p>Dedicated policy and decision makers, and professionals, cutting across the public and private sector committed to the process</p>	<p>There is a need to identify, sensitize and bring on board a critical mass of dedicated policy decision makers and professionals across the public and private sector that will be committed to the process. There are pockets of committed and dedicated policy and decision makers and professionals but not enough at this stage to make a significant impact on the process.</p>	<p>There is a need to devote more efforts to achieving a critical mass of policy and decision makers and professionals committed to owning and driving the Ghana ICT4AD process. Strategies to achieve this will need to be devised and put into action.</p>
<p>Adoption of a well-scheduled step-by-step approach with specific milestones and deliverables during the policy and plan development process</p>	<p>The Ghana ICT4AD process is aimed at three deliverables: <i>framework document</i>, <i>policy document</i> and the <i>plan</i>. The development of all these three deliverables is being carried out within the context of a well-scheduled step-by-step approach with specific milestones. A National Committee has been set up under the auspices of the Ministry of Communications and Technology to play an oversight and coordination role. A consultant has been engaged to develop the various deliverables and his work is supported by a full-time team of technical support staff and secretarial staff</p>	<p>Need to continue the adoption and implementation of the step-by-step approach backed by extensive research work in the development of the identified deliverables of the process</p>
<p>The identification and the setting of realistic objectives and targets that can be achieved within a given time-frame</p>	<p>The programmes and initiatives to be identified and documented as part of the plan should be realistic --- with each associated with specific time bound measurable targets to be achieved by an identified implementation agency</p>	<p>The plan should in addition incorporate a plan implementation, monitoring and evaluation mechanism to ensure that the identified targets are achieved and necessary corrective measures taken if the need arises</p>
<p>A well-researched policy formulation and plan development process that made an effort to learn from experiences of other countries</p>	<p>The development of the Ghana ICT4AD policy and plan development is being based on an extensive research work and data gathering exercise. Lessons are being learnt from the experiences of other countries within and outside Africa. Extensive baseline data and information on key aspects of the policy and the plan has been gathered from both primary and secondary sources; individual and stakeholder inputs covering ranges of relevant topics has been solicited and documented; an extensive socio-economic study and analysis has been carried out and documented in Volume 1; details of the landscape of the</p>	<p>The research work underpinning the policy and plan development process is to continue</p>

	Ghana ICT sector as well as the a study of the deployment and exploitation of the ICTs in all the key sectors of the economy has been carried out among others.	
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<p>Nation-wide stakeholder consultation within the public and private sector to facilitate across the board contribution to the process and its deliverables</p>	<p>The Ghana ICT4AD policy and plan development process is being based on an extensive bottom-up nation-wide consultative process involving key stakeholders in all sectors. This national consultative exercise involved: face-to-face meetings, dialogs and public forums across the country. Key stakeholders involved in the process include: Cabinet Ministers, senior civil servants, parliamentarians, traditional rulers, public sector organizations, private sector organizations, various constituencies within the ICT industry and sector, universities and colleges, women's groups, labour unions, political parties, civil society groups, among others.</p>	<p>The national consultative exercise is to continue to embrace all aspects and stages of the process and levels of the society</p>
<p>Rounds of dialog sessions with key stakeholders -- Government, Private Sector & Civil Society</p>	<p>The Ghana ICT4AD process since its inception has involved series of one-to-one dialogs with key stakeholders in government, public sector, private sector and civil society.</p>	<p>The one-to-one dialog process with key stakeholders is to continue to embrace all aspects and stages of the process and levels of the society</p>
<p>Logistic support and facilitation for the process and</p>	<p>Logistics support for the policy and plan development process is being provided by the Ministry of Communications and Technology under a Technical Assistant programme extended to the Government of Ghana by the ECA under the AISI initiative</p>	<p>Logistic support for the process by the Ministry of Communications and Technology is to continue. It is envisaged that at as part of the process a National Agency to facilitate the coordination of the implementation of the plan is to be set up.</p>
<p>Continuous push from the top for action and results.</p>	<p>The Ghana ICT4AD process is still at its initial stages in terms of deliverables. A lot has been achieved in mobilizing public support for the process as a result of the bottom-up consultative approach adopted. There is however a need to get a critical mass of top political and economic leadership and decision makers and professionals to get involve in the process to give it that much needed push for action and results.</p>	<p>More sensitization on the process required and this need to be intensified and targeted at all levels of the society – including the public at large and middle-level decision makers and professionals as well as the top political and economic leadership of the country</p>

The Implementation Stage Critical Success Factors and Conditions (I-CSFCs)		
Enabling Environment Critical Success Factors and Conditions		
<i>Governance and Socio- Political Enabling Environment CSFCs</i>	Comments	Actions to be Taken
Good Governance and Rule of Law	The good governance and the rule of law situation in Ghana is encouraging and improving	Ghana should continue to improve on its good governance and rule of law record
Functioning Democracy and Democratic Institutions	Ghana's democratic system and institutions are young and improving. These require strengthening	Efforts should be made to strengthen the democratic process and its institutions.
Prevailing peace, national unity and national security	Ghana is by and large a peaceful nation with no history of major political upheavals that threatened the peace and security of the country. Generally peace, national unity and security prevail in the country.	Sustainable peace and national unity and security should be re-enforced
Sustainable un-interrupted political stability	Ghana has experienced some level of political instability in the past. The country has since been enjoying an un-interrupted political stability for a number of years. There are signs that the prevailing political stability of the country is a sustainable one.	Efforts directed at improving Ghana's stable political climate should be intensified.
Sub-regional stability and calm	Sub-regional instability has been a major problem for a number of years. Starting with the war in Liberia in the 1990's, the Sierra-Leone civil war and of recent the troubles in Cote d'Ivoire. This on-going sub-regional instability issues do have the potential to negatively impact on Ghana's socio-economic development efforts	Ghana should play a leading role in promoting and championing security and stability within the sub-region. Efforts should also be directed at preventing the negative impacts of regional instability on Ghana's development and image
Stable economic policy environment	Ghana's economic policy environment has for a number of years been a stable one which to some extent is influenced by global factors and requirements set up its major development partners including the World Bank and the IMF.	Efforts should be made to ensure a stable economic policy climate and environment. Need to avoid un-necessary volatile and inconsistent economic policy decisions that could dis-stabilize or dis-organize the economy
Socio-Economic Development Framework Enabling Environment CSFCs	Comments	Actions to be Taken

<p>Sound Socio-Economic Development Policy and Priorities Setting Framework</p>	<p>The development and implementation of the Ghana ICT4AD policy and plan is being set within the wider socio-economic development policy frameworks of the country. These frameworks set out the broader social and economic development objectives and priorities for the country. Some of these socio-economic development frameworks include: the Ghana Vision 2020 socio-economic framework [20], the Ghana Poverty Reduction Strategy (2002 -2004) [21] and the Co-ordinated Programme of Economic and Social Development of Ghana (2003-2012) [22]</p> <p>The goal is to: (i) develop an ICT-led socio-economic development policy with specific policy commitments in relation to <u>WHAT</u> need to be done towards the realization of the vision to transform the economy and society through the development, deployment and exploitation ICTs to support the country's socio-economic development process and (ii) develop the corresponding plan providing details of <u>HOW</u> these policy commitments can be translated into concrete programmes and initiatives for implementation.</p>	<p>The details of the specific policy commitments, initiatives and actions and the corresponding details of the plan should be guided by the aspirations, objectives and priorities of the wider socio-economic development framework of the country.</p>
<p>Stable (non-erratic) macro-economic Policy Environment</p>	<p>The general global trend is towards economic liberalization and Ghana for close to two decades has been implementing various policy initiatives starting with Structural Adjustment Economic Programme of the early 1980's aimed at the liberalization of its economy. Some of these policy initiatives had positive impact on the economy while others were not so successful. On the whole a stable macro-economic policy environment that is not subject to dramatic changes of direction or course is critical for major investment decisions by the private sector (both local and foreign)..</p>	<p>Efforts will need to be directed at maintaining a reasonably stable macro-economic policy environment so as not to jeopardize the implementation of the ICT4AD policy and the corresponding plans. Some aspects of this plan will involve major capital resource mobilization and investments decisions --- and this will not be possible in an un-stable policy environment.</p>
<p>Stable Economic Investment Climate</p>	<p>A stable investment promotion and facilitation climate will be necessary to attract the substantial FDI that will be required for implementing some of the ICT4AD initiatives and programmes by the private sector and in some cases by the public sector. Ghana has been doing reasonably well in attracting FDI, but more will</p>	<p>Efforts will need to be targeted at providing a stable and attractive investment climate in addition to putting in place specific initiatives aimed at attracting local and foreign direct investment in ICTs.</p>

	need to be done to attract substantial investments in the area of ICTs. A stable investment climate that assures investors will be essential and critical	
Legal, Regulatory and Institutional Environment CSFCs	Comments	Actions to be Taken
Relevant Legal and Legislative Provisions to support the ICT4AD policy and plan implementation process	The implementation of the policy and plan will require the putting in place of necessary legislative provisions. For example, parliament will need to pass specific legislative instruments for setting up the relevant institutional structures and arrangements that will be necessary for supporting and facilitating the implementation of the plan. Some specific cyberlaws in areas like intellectual property laws, data protection laws etc will need to be enacted to provide the necessary legal and legislative provisions for supporting the development, deployment and exploitation of ICTs within the economy and society. Success in attracting the required substantial FDI in ICTs will depend on a conducive legal and legislative environment.	The relevant legal and legislative provisions to support the ICT4AD policy and plan implementation process will need to be identified and efforts made to put them in place.
Enabling Regulatory Environment necessary for implementing specific relevant components of the ICT4AD policies and plans	A conducive investment friendly, stable and industry responsive regulatory framework and environment is critical for the development of the ICT sector and industry in any country. Ghana has made some advances in putting in place the necessary regulatory framework and agencies --- but there is the need to occasionally examine the provisions of the framework and bring them in line with the rapid changes in the ICT industry and sector.	Need to periodically examine the regulatory provisions governing the development, deployment and exploitation of ICTs within the economy and society to bring them in line with the rapid advances in the industry. Efforts should be made to provide clear rules and procedures governing the acquisition, development and utilization of those aspects of ICTs that are subject to regulation.
Institutional Structures and Arrangements to facilitate and support the policy and plan implementation process	The implementation of the ICT4AD policy and plan will require the setting up of National coordination Agencies or Bodies. These will serve as institutional structures and arrangements to facilitate and support the policy and plan implementation process	The details of these coordinating institutional structures will need to be developed as part of the process. It is anticipated that an interim institutional plan implementation coordinating structure will be proposed and put in place before the completion of the plan development process
National Support, Leadership and Championship Requirements		

<p>Top-level political leadership commitment and championship for the ICT4AD policy and plan implementation process</p>	<p>There is evidence of top leadership commitment to the Ghana ICT4AD process. Championship of the process by the top leadership will need to be articulated. On the whole there is a demonstrated commitment to the process.</p>	<p>A sustained championship by the top political and economic leadership will be required beyond the policy and plan development process to support the implementation of the programmes and initiatives of the plan. The top leadership will need to consistently and persistently promote the implementation of the plan to sustain the nation's attention, commitment and confidence in the process. The credibility of the policy and the plan will depend very much of achieving results and this will not be possible without the top political and economic leadership sustained commitment and championship</p>
<p>A core group of dedicated senior level decision makers and professional within the public and private sector committed to providing leadership and championship to facilitate and support the ICT4AD policy and plan implementation process within their respective organizations, institutions and business establishments and entities</p>	<p>Ghana currently lack a critical mass of core group of senior and middle level decision makers and professionals that could articulate the ICT4AD vision nationally and provide the needed leadership and championship within their organizations and institutions to transform this vision into actions that could move the nation forward. There are some pockets of committed decision makers in the public and private sector that could provide the necessary leadership to facilitate the policy and plan implementation process but this falls far short of the critical mass that is required to move the process forward.</p>	<p>A lot need to be done to mobilize the required critical mass of core group of dedicated senior level decision makers and professionals within the public and private sector that will be committed to providing the necessary leadership and championship to facilitate and support the ICT4AD policy and plan implementation process within their respective organizations, institutions and business establishments and entities. Specific strategies will need to be worked out on how to achieve this critical mass.</p>
<p>Across-the-board stakeholder commitment to the practical realization of the aspirations, the goals and targets of the ICT4AD Vision and corresponding missions and strategies</p>	<p>A key aspect of the national consultative exercise of Ghana ICT4AD process involves identifying and getting a consensus on the nation's ICT4AD vision, missions and strategies. These has been achieved and articulated in Volume 1 of the Framework Document. Across-the-board stakeholder commitment to the practical realization of the aspirations, the goals and targets of the vision and the missions will be critical for the success of the</p>	<p>Need to reflect the details of ICT4AD vision, missions and strategies in the policy document and the corresponding plan. Efforts need to be made to sustain an across the board commitment towards the realization of the vision and corresponding missions and strategies</p>

	policy and plan implementation process	
Organizational and Institutional Level Critical Success Factors		
	Comments	Actions to be Taken
Changes in relevant organizational and institutional structures, processes, and procedures conducive for the effective deployment and exploitation of ICTs	<p>For the deployment and exploitation of ICTs to make appreciable impact on organizational activities and operations, the processes, and procedures of these organizations in both and public and private sector will need to be looked at to make them conducive for the effective deployment and exploitation of ICTs. Currently a vast number of Ghanaian organizations and institutions in both the public and the private sector have deployed ICTs but there is very little evidence of appreciable impact of these technologies on their productivity, service delivery and on other aspects of their operations, functions and activities.</p> <p>The organizational impact of the deployment of ICTs within the organizational set-up will be minimal without the relevant changes in organizational and institutional structures, processes, and procedures conducive for the effective deployment and exploitation of ICTs</p>	There is a need to comprehensively address issues relating to facilitating the necessary changes in organizational and institutional structures, processes, and procedures in both public and private sector organizations to provide the necessary conducive environment for the effective deployment and exploitation of ICTs within these organizations
Changes in unproductive attitudes to work, duty and service that could hinder the effective deployment and exploitation of ICTs to improve organizational activities, operations and service/product delivery	<p>Poor and unproductive attitude to work and work ethics are a major problem in number organizations in both the public and private sector. A major attitudinal change will be required across the board if the deployment and exploitation of ICTs within the organizational set-ups of both the public and private sector is to have an appreciable impact on improving organizational efficiency, effectiveness and productivity.</p> <p>Given that a number of the initiatives and programmes of the plan will be targeted at specific organizations and institutions within the public and private sector for implementation, addressing these unproductive attitudinal problems will be</p>	Major drives and efforts will be required to change the unproductive attitudes to work, duty and service of workers within the public and private sector. Without this change the deployment and exploitation of ICTs will make little or no impact on improving organizational efficiency, productivity or service delivery. Specific strategies and innovative programmes will need to be devised to tackle these attitudinal problems if a major part of the ICT4AD plan implementation is to be successful to achieve the aspirations of the stated

	crucial for the success of the policy and plan implementation process	vision, and missions of the process.
Motivated, discipline and adequately remunerated work force committed to work and bring about the necessary organizational changes conducive for the effective deployment and exploitation of ICTs within their organizations and institutions	Low remuneration, poor working conditions, poor advancement and promotion prospects in most organizations and establishments in both the public and private sector has in some way contributed to lack of motivation and initiative of workers. These problems if not addressed will seriously undermine the ICT deployment and exploitation initiatives in most organizations within the public and private sector.	Major efforts will need to be put in place directed at having motivated, discipline and adequately remunerated work force within organizations within the public and private sector. These efforts should produce workers that are committed to work and bringing about the necessary organizational changes conducive for the effective deployment and exploitation of ICTs within their organizations and institutions.
Facilitating Environment Critical Success Factors and Conditions	Comments	Actions to be Taken
Well-educated and informed society	A critical pre-condition for the development of Ghana's information and knowledge-based economy and society is a well-educated and informed society. The 2000 Housing and Population census shows that close to 40% of the Ghanaians (6 years+) have never been to school, in other words they have no educational attainment of any sort. This statistics coupled with the evidence that only about 3% of the population had tertiary level education do present Ghana with a major developmental challenge. Reversing the high illiteracy rate and providing the conditions to facilitate the development of a well-informed society will be critical for the success of the Ghana ICT4AD process.	If the implementation of Ghana's ICT4AD policy and plan is to make any appreciable impact on the country's development, there will be a need to address the problems associated with the high illiteracy rate as well as take steps to dramatically increase the proportion of the population with access to tertiary level education.
Modernized and efficient civil and public service	The civil and public services do play a key role in the socio-economic development process of Ghana. The crucial role that ICTs can play in improving the efficiency of delivery of government services; in reducing (in the long run) the operational cost of these institutions and in bringing government closer to the people has	There is a need to put in place organizational reform and renewal programmes and initiatives targeted at improving the organizational and the operational efficiency effectiveness and productivity of the civil and public service. The deployment, exploitation of

	<p>been acknowledged. A modernized and efficient civil and public service will play a crucial role in facilitating the implementation of key components of the ICT4AD policy and plans.</p>	<p>ICTs to support their operations and activities should form a key component of the process to modernize the civil and public service.</p>
<p>Financial and technological resource availability</p>	<p>The implementation of some of the key components of the Ghana ICT4AD policy and plan will require substantial financial and technological resources. The mobilization of the necessary financial and other technological resources through FDI and domestic investment will therefore be crucial for the implementation of a major component of the programmes and initiatives of the plan.</p>	<p>There is a need to put in place initiatives targeting the mobilization of the necessary financial and technological resources which will be critical for the implementation of some of the major capital intensive programmes and initiatives of the plan.</p>
<p>Human resource availability in key skill areas</p>	<p>The extent to which Ghana will be able to benefit from the advances and the opportunities of the emerging information age will depend on how it is capable of developing and harnessing the nation's human resources to initiate, support and maintain the nation's socio-economic development towards an information and knowledge economy. Ghana currently lacks human resources in critical skill areas necessary for facilitating the transformation of its economy.</p> <p>The 2000 Population and Housing Census results show that only 8.6% of the economically active population is professional and technical people with a lower percentage of 0.3% working as managers and administrators. The low percentage of key technical and professional people like engineers, accountants, architects, doctors, lawyers, scientists etc as evident in the census figures highlights the relatively low professional and technical skill human resource capacity of the economy.</p>	<p>Efforts will need to be made to target the development and implementation of a comprehensive human resource development programme to provide the necessary pool of critical human resources and skills to facilitate and drive the development and the transformation of the economy and society. Such a comprehensive human resource development programme should facilitate the implementation of those components of the ICT4AD policy and plan that have human resource requirement implications.</p>
	<p>Ghanaians by and large are patriotic and hardworking people. But the Ghanaian society can sometimes be fairly in-discipline and section of the society can sometimes have dis-regard for order</p>	

<p>Disciplined, motivated and patriotic citizens led by inspired, dedicated committed and uncorrupt political, economic and social leadership</p>	<p>and established procedures and rules. Motivation can in some cases be a problem at work places because of economic hardship and disillusionment brought about by low levels of remunerations and poor conditions of service and prospects for promotion and advancement. Petty bribing and corruption at work place can sometime lead to poor service delivery or withholding of service. Corruption has also been identified as a major problem that is retarding the nation's developmental efforts.</p>	<p>Efforts need to be put in place to promote a disciplined, motivated and patriotic citizens led by inspired, dedicated committed and uncorrupt political, economic and social leadership</p>
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Concluding Remarks

It has been established that Ghana's aspiration to transform its economy and society by way of an ICT-led socio-economic development agenda will not be possible if the nation does not address a number of critical success factors and conditions necessary for providing the required conducive and facilitating environment for the development and implementation of the required policies and plans.

It is obvious that ICTs alone cannot solve all of Ghana's social and economic development problems, --- However, the development, deployment and exploitation of these technologies within the economy and society guided by a comprehensive ICT-led socio-economic development policy and plan that acknowledges and makes provisions for addressing the identified critical success factors and conditions can aid Ghana's developmental efforts and contribute to addressing a number of the identified developmental challenges facing the country.

The details of the ICT4AD Policy and the Plans which are to be based on the details and the findings of the two Volumes of the Framework document, will in addition to defining and crystallizing policy commitments, initiatives and programmes to drive the Ghana ICT4AD process need to incorporate specific policy directives and initiatives targeted at addressing the identified critical success factors and conditions necessary for the successful implementation of the Policy and the corresponding Action Plans.

Chapter Seven

Documenting the ICT4AD Vision, Missions and Strategies

To address one of the key critical success factors and conditions identified in Chapter 6, in relation to the need for a clear national ICT4D vision, missions and strategies to guide the formulation and development of the policy and the corresponding plans, it was found necessary during the national consultative process underlying the development of the Framework document, to seek inputs and comments to shape this national vision and missions. We document below the outcome of this process in terms of the Global and ICT4AD Vision and Missions Statements and the corresponding Strategies ---- in an attempt to address the question: **‘Where do we want to go as a nation’**.

The Global Vision --- The Vision for Ghana

To improve the quality of life of the people of Ghana by enriching their social, economic and cultural well-being through the modernization of the economy and society.

The Global Vision Statement captures the aspirations of the overall Vision for Ghana ---that is to improve quality of life and enrich the socio-economic and cultural well-being of the citizens of Ghana. The *Vision for Ghana*, does not envisage the future of Ghana only in social and economic development terms; ---- It also acknowledges the need for Ghana to develop politically, socially and culturally to foster: political stability, good governance and system of government; improvement in the quality of life for of the people of Ghana; national unity and reconciliation; social interaction, cohesion and integration; social justice; environmental protection and the fostering of the cultural heritage of Ghana.

The ICT4AD Vision for Ghana

To improve the quality of life of the people of Ghana by significantly enriching their social, economic and cultural well-being through the rapid development and modernization of the economy and society using information and communication technologies as the main engine for accelerated and sustainable economic and social development

The ICT4AD Vision recognizes that if Ghana is to modernize and develop its economy and society in the emerging information and technological age, the nation will need to embrace ICTs. The achievements of the objectives of the ICT4AD Vision, will contribute immensely to the realization of the key aspirations of the Global Vision.

The Missions for the Realization of the Aspirations of the ICT4AD Vision

Main Mission

To transform Ghana into an information-rich, knowledge-based and technology-driven high income economy and society

Sub-Missions

- To develop Ghana's information and knowledge-based society and economy through the widespread development, deployment, and exploitation of ICTs within the society and economy
- To transform the educational system to provide the requisite educational, and training services and environment capable of producing the right types of skills and human resources required for developing and driving Ghana's information and knowledge-based economy and society
- To develop Ghana's research and development (R&D) capacity and capabilities with the potential to conduct and engage in advanced and cutting-edge R&D work required for supporting the development of a local globally competitive information, knowledge-base and high-tech export industry and services sector as well as a modernized and competitive agricultural sector
- To transform Ghana into an attractive destination for ICT-related Foreign Direct Investment (FDI) with the potential to become a competitive regional ICT and business hub.
- To develop a highly competitive ICT-led value-added and export-orientated services sector driven by a dynamic ICT services sub-sector and industry
- To develop a knowledge-based, technology-driven light modern industrial sector with a dynamic export-led and globally competitive ICT sub-industry
- To modernize the agricultural sector to substantially improve agricultural value-added and yield and develop a dynamic and vibrant export-oriented agro-business industry

The 11-Point Strategy for Achieving the ICT4AD Missions

Strategy A:

To transform Ghana into an information and knowledge-driven ICT literate nation

Strategy B:

To promote the deployment and exploitation of information, knowledge and technology within the economy and society as key drivers for socio-economic development

Strategy C:

To modernize the Ghana educational system using ICTs to: improve and expand access to education, training and research resources and facilities, improve the quality of education and training and make the educational system responsive to the needs and requirements of the economy and society with specific reference to the development of the information and knowledge-based economy and society

Strategy D:

To improve the human resource development capacity and the research and development (R&D) capacity of Ghana to meet the demands and requirements for developing the country's information and knowledge-based economy and society

Strategy E:

To promote the development of a globally competitive local ICT industry for the development, production and the sale of information, knowledge, and technology products and services

Strategy F:

To aggressively develop, promote and enhance Ghana's image as a competitive regional destination for ICT foreign direct investment (FDI)

Strategy G:

To promote and facilitate the development of the private sector to serve as a key driver for the development of the economy

Strategy H:

To modernize the civil and public service with the aim to improve its administrative efficiency, effectiveness and service delivery through the implementation of electronic governance and government initiatives set within the wider scope of the institutional engineering and renewal of the service

Strategy I:

To modernize and expand Ghana's information and communications infrastructure and services to improve universal access and quality of service (QoS)

Strategy J:

To expand the physical infrastructure of Ghana, including those of power and transport.

Strategy K:

To develop the necessary legal, institutional and regulatory framework and structures required for supporting the development, deployment and exploitation of ICTs within the economy and society.

Chapter 8

Guiding the ICT4AD Plan Development Process

Introduction

As indicated in Volume 1 of the Framework Document it is envisaged that the: ICT4AD policy and strategies (The Policy) will have an operational life-span of about 20 years, whilst the Rolling Plans to be developed to implement the details of the Policy will each be of shorter time-frame of 4 years. as illustrated below. These rolling plans will each be addressing (to a varying degree) specific aspects of the broad policy issues and commitments of the Policy.

We provide in this chapter some guidelines for developing these Rolling Plans. Specifically the Chapter addresses some specific guidelines for facilitating the plan development process and provides details of the SUNRISE model [23] for guiding the identification of candidate programmes for incorporation into the plans. The broad guidelines discussed in this chapter addresses the question of *how* the broad policy areas discussed in Chapters 4 and 5 could be implemented within the plans.

8.1 The Proposed Guidelines for the Plan Development and Implementation Process

We provide below some general principles to serve as guidelines for developing the details of each of the rolling plans to be implemented within the time frame of the ICT4AD Policy

1. Each Plan should recognize and contribute to the realization of the stated *Global and ICT4AD Visions* for Ghana as well as contribute to the achievement of the relevant *missions* and the *strategies* identified for the attainment of the visions.
2. Each Plan should as far as possible address where appropriate the cost, budgetary and resource requirements, allocation and mobilization implications of the programmes, and initiatives identified for implementation within each of the Plan.
3. Efforts should be made to introduce structure into each of the Plans --- by sub-dividing each Plan into sub-plans each addressing a broad area e.g. human resource development; infrastructure development; developing and facilitating the private sector etc.

4. The various programmes, initiatives and packages identified for implementation under the sub-plans of each Plan should be practical, realistic and implementable with clearly stated *time-bound measurable* (TBM) targets where appropriate.
5. Targets that are set for the various programmes and initiatives of each Plan should where appropriate be based on a Baseline Study data on the status of relevant key socio-economic and ICT-related indicators.
6. Each Plan should take into account the fact that: the Government will continue to formulate and implement its short to medium term socio-economic development and budgetary plans during the life-span of the Plan. In this respect, the Plans should not be aimed at substituting this exercise. Each Plan within its time-span should serve as a point of policy-reference and a framework for complementing and supplementing this exercise within the context of the Government's long-term goal towards the development of an information and knowledge-based economy and society.
7. Each Plan should incorporate elements of risk analysis that takes into account the socio-economic development risks involved in implementing and/or not implementing the specific details of each of the sub-plans of the Plan
8. Each Plan should incorporate a programme monitoring and evaluation mechanism that allows for appropriate intervention procedures and actions with clear guidelines (where appropriate) on how and when these can be activated and by which agency or authority.
9. Each Plan should as far as possible be flexible enough to allow for its modification, revision and adaptation as the need arises during its implementation time-frame.
10. In order to build flexibility into the implementation of each of the Plans, each Plan should as far as possible avoid going into specific implementation-details relating to its programmes and initiatives. The premise is that, for each programme or initiative, these details will be developed and worked-out during the actual implementation of the Plan to take into account specific circumstances, constraints and opportunities and developments operating at the time. This approach will also allow for the fine-tuning of the programme details as the need arise during the actual implementation of the Plan.

8.2 Relating the Rolling Plans to the Implementations of the ICT4AD Vision Strategies

The details discussed above provided some broad guidelines for guiding the Plan development process based on some general principles. In this section we develop these guidelines further to provide details on how each of the ICT4AD Strategies can be implemented across Rolling Plans by relating the implementation of each of these *strategies* to each of the rolling plans and show how each of these could be implemented over the time-frame of one or more of these Plans. This is done to guide the process of developing, identifying and selecting suitable programmes for inclusion into the various plans. In other words the plans will become the *action programmes* for implementing the *strategies* identified for achieving the missions defined for attaining the ICT4AD Vision.

The process assumed that five Rolling Action Plans will be developed each with a time frame of 4 years to be implemented over the life span of the ICT4AD Policy. It is envisaged that the Policy life-span will be about 20 years with provisions for periodic revisions during this time period as the need arises. The envisaged five rolling plans and their time spans are:

- **ICT4AD Plan-2006** [2003 - 2006]
- **ICT4AD Plan-2010** [2007 - 2010]
- **ICT4AD Plan-2014** [2011 - 2014]
- **ICT4AD Plan-2018** [2015 - 2018]
- **ICT4AD Plan-2022** [2019 - 2022]

The diagram below illustrates the implementation of the various ICT4AD strategies (discussed in Chapter 7) across the five plans. The general principle is that: the programmes of the 1st and the 2nd, and 3rd Plans should be designed to implement most of the eleven strategies while 4th and the 5th Plans should lay emphasis on the implementation of specific strategies. We also discuss below how each of the eleven strategies could be implemented over the time-frame of each of the plans. Specific indications are given as to the types of programmes to put in place to implement each of these strategies.

The Strategies	Plan-2006	Plan-2010	Plan-2014	Plan-2018	Plan-2022
<i>Strategy A:</i> To transform Ghana into an information and knowledge-driven ICT literate nation	* * *	* * *	* * *	* * *	
<i>Strategy B:</i> To promote the deployment and exploitation of information, knowledge and technology within the economy and society as key drivers for socio-economic development	* * *	* * *	* * *	* * *	* * *
<i>Strategy C:</i> To modernize the Ghana educational system using ICTs to: improve and expand access to education, training and research resources and facilities, improve the quality of education and training and make the educational system responsive to the needs and requirements of the economy and society with specific reference to the development of the information and knowledge-based economy and society.	* * *	* * *	* * *	* *	
<i>Strategy D:</i> To improve the human resource development capacity and the research and development (R&D) capacity of Ghana to meet the demands and requirements for developing the country's information and knowledge-based economy and society	* * *	* * *	* * *	* *	
<i>Strategy E:</i> To promote the development of a globally competitive local ICT industry for the development, production and the sale of information, knowledge, and technology products and services	* * *	* * *	* * *	* *	*
<i>Strategy F:</i> To aggressively develop, promote and enhance Ghana's image as a competitive regional destination for ICT foreign direct investment (FDI)	* * *	* * *	* * *	* * *	* * *
<i>Strategy G:</i> To promote and facilitate the development of the private sector to serve as a key driver for the development of the economy	* * *	* * *	* * *	* * *	* * *

1. Strategy A: To transform Ghana into an information and knowledge-driven ICT literate nation

It is envisaged that this strategy will be implemented within the 1st, 2nd and 3rd and 4th Plans. It will therefore be possible to transform Ghana into an ICT literate nation by 2018. The implementation of Strategy A will require the need for: (i) putting in place special ICT promotion packages, policy instruments and incentives; (ii) developing the necessary human resource capacity in ICTs and in other professional areas; (iii) implementing a number of national ICT applications across all sectors of the economy and society, (iv) mobilizing and deploying the necessary financial and technological resources for implementing relevant ICT programmes identified within the plans for achieving this strategy (v) developing standards, best practices and guidelines to guide the deployment, exploitation and development of ICTs in key sectors and (vi) providing the necessary legal regulatory and institutional framework to support ICT development in Ghana.

2. Strategy B: *To promote the deployment and exploitation of information, knowledge and technology within the economy and society as key drivers for socio-economic development.*

This strategy will be implemented in all Plans up to the year 2022. The continuous promotion of the deployment and utilization of ICTs within the economy and society would require the (i) putting in place special ICT promotion packages, policy instruments and incentives; (ii) development of the necessary human resources in ICTs and in other professional areas to facilitate the process of ICT deployment and exploitation within the economy and society; (iii) implementation of a number of national ICT applications across all sectors of the economy and the society, (iv) mobilization and deployment of the necessary financial and technological resources, to aid the ICT deployment and exploitation exercise within the economy and society (v) development of standards, best practices and guidelines to guide the deployment, exploitation and development of ICTs in key sectors and (vi) providing the necessary legal regulatory and institutional framework for supporting ICT development in Ghana.

3. Strategy C: *To modernize the Ghana educational system using ICTs to: improve and expand access to education, training and research resources and facilities, improve the quality of education and training and make the educational system responsive to the needs and requirements of the economy and society with specific reference to the development of the information and knowledge-based economy and society.*

It is envisaged that the bulk of the task of transforming and improving the Ghana educational system can be accomplished within 12 to 15 years. This process could be aided by the implementation of targeted ICT programmes, projects and initiatives that could be incorporated into the 1st, 2nd and 3rd plans and partly in the 4th Plan. Specifically the implementation of this strategy will require: (i) developing the necessary human resources in ICTs and in other professional areas; (ii) implementing a number of national ICT applications relevant to the educational system (iii) mobilizing and deploying the necessary financial and technological resources for implementing the necessary educational reform programmes and specific ICT programmes and initiatives targeted at improving the educational delivery system (iv) computerization of the civil and public service, especially the activities and the operations of the Ministry of Education and its organs in the Districts and Provinces (v) developing the necessary standards, best practices and guidelines to guide the deployment, exploitation of ICTs in the schools, colleges and the universities and (vi) providing the necessary institutional set-up to support ICT exploitation and development within the educational system, the ICT training provision sector and the research institutions.

4. Strategy D: *To improve the human resource development capacity and the research and development (R&D) capacity of Ghana to meet the demands and requirements for developing the country's information and knowledge-based economy and society*

It is envisaged that improvements in the human resource capacity of Ghana to such a level that it can facilitate and support all key sectors of the economy can be accomplished within 15 years. Again ICTs can play a major role in achieving the goals of this strategy. Specifically human resource development (HRD) programmes will need to be incorporated into the 1st, 2nd, 3rd Plans and possibly to 4th Plan aimed at developing and improving the pool of ICT professionals in Ghana and for developing other professional skills in science, technology and in business.

The implementation of this strategy will on the whole require:(i) putting in place special ICT promotion packages and incentives to encourage the private and public sector organization to invest in the development of human resources to meet their needs (ii) implementing on a national level a number of HRD initiatives to boost up ICT skills and other skill areas (iii) mobilizing and deploying the necessary financial and technological resources to facilitate the implementation of HRD programmes and initiatives (vi) developing the necessary standards, best practices and guidelines to

guide the process of HRD in key all sectors of the economy and (vii) providing the necessary and institutional support for facilitating HRD on a national basis.

5. Strategy E: *To promote the development of a globally competitive local ICT industry for the development, production and the sale of information, knowledge, and technology products and services*

This strategy will be implemented in the 1st, 2nd and 3rd plans and partly in the 4th plan and to some extent in the 5th Plan. The development of a globally competitive local ICT industry would require: (i) putting in place special initiatives targeted at the sector (ii) the development of the required human resource and professional skills to drive the local ICT industry, (iii) the mobilization and deployment of the necessary financial and technological through both domestic and foreign direct investment (iv) the development and enforcement of international industry and products standards to support the development of world class production and service provisions firms within the local ICT industry and (v) the promotion of R&D to support the development of a high-tech industry targeted at the export market.

6. Strategy F: *To aggressively develop, promote and enhance Ghana's image as a competitive regional destination for ICT foreign direct investment (FDI)*

It is envisaged that this strategy will be implemented across all the five rolling Plans up to 2022. Ghana will need to aggressively promote itself as a favourable and ideal destination for FDI with emphasis on investment initiatives targeting the ICT sector. Specific initiatives to promote FDI drive in ICTs during the life span of the ICT4AD Policy will need to target: (i) the creation of a competitive investment climate to attract both local and foreign investment (ii) the development of the required human resources in key skill areas --- a prerequisite for attracting FDI in general and more for attracting FDI in ICTs (iii) the development and promotion of attractive investment packages (iv) providing the necessary legal regulatory and institutional framework for supporting the development of the ICT sector and (v) the enactment of relevant cyber-laws necessary for promoting the development, and exploitation of ICTs in the society and economy and for attracting investments into the development of the local ICT sector and industry

7. Strategy G: *To promote and facilitate the development of the private sector to serve as a key driver for the development of the economy*

This strategy will be implemented across the five rolling plans. Given that the Ghana's private sector is dominated by the informal sector, initiatives targeted at the implementation of this strategy will apart from aimed at the development of the private sector as a whole will lay emphasis of the expansion of the formal private sector.

The Strategies	Plan-2006	Plan-2010	Plan-2014	Plan-2018	Plan-2022
<i>Strategy H: To modernize the civil and public service with the aim to improve its administrative efficiency, effectiveness and service delivery through the implementation of electronic governance and government initiatives set within the wider scope of the institutional engineering and renewable of the service</i>	* * *	* * *	* * *		
<i>Strategy I: To modernize and expand Ghana's information and communications infrastructure and services to improve universal access and quality of service (QoS)</i>	* * *	* * *	* * *	**	
<i>Strategy J: To expand the physical infrastructure of Ghana, including those of power and transport.</i>	* * *	* * *	* * *	* * *	* * *
<i>Strategy K: To develop the necessary legal, institutional and regulatory framework and structures required for supporting the development, deployment and exploitation of ICTs within the economy and society.</i>	* * *	* * *	*	*	*

6. Strategy H: To modernize the civil and public service with the aim to improve its administrative efficiency, effectiveness and service delivery through the implementation of electronic governance and government initiatives set within the wider scope of the institutional engineering and renewable of the service

The modernization of the civil and public service to improve efficiency and service delivery to the public can be achieved by the third plan. Specific programmes to facilitate this process will therefore need to be incorporated into the 1st, 2nd and 3rd plans. On the whole the implementation of this strategy will require the (i) development of the necessary human resources in ICTs and in other professional areas; (ii) mobilization and deployment of the necessary financial and technological resources, (iii) computerization of the civil and public service as a major civil service modernization exercise and (iv) the development of standards, best practices and guidelines to guide the deployment, exploitation and development of ICTs in the civil and public service organizations

7. Strategy I: To modernize and expand Ghana's information and communications infrastructure and services to improve universal access and quality of service (QoS)

It is envisaged that: the vast majority of the programmes needed for implementing this strategy would be implemented within 15 years. It is therefore expected that the bulk of the required national information infrastructure of Ghana would have been put in place by the completion of the implementation of the 3rd Plan. However because of the dynamic nature of the ICT landscape which is characterized by rapidly changing and

advancing technological offers, it is envisaged that some elements of the infrastructure will need to be updated, enhanced and expanded during the 4th Plan.

On the whole this strategy will require (i) putting in place special ICT promotion packages, policy instrument and incentives to facilitate the development, expansion and modernization of the national information infrastructure; (ii) developing the critical ICT human resources that will be required for supporting the rehabilitation, and expansion of the national ICT infrastructure (iii) implementing some national ICT applications specifically in the communications sector (iv) mobilizing and deploying the necessary financial and technological resources required for building the national infrastructure (v) developing the necessary standards, best practices and guidelines to guide the process of developing and improving the ICT infrastructure and (vi) providing the necessary legal regulatory and institutional framework for supporting the ICT development process in Ghana.

8. Strategy J: *To expand the physical infrastructure of Ghana, including those of power and transport.*

Ghana currently suffers from a number of physical infrastructure deficits which is putting a strain on the nation's developmental efforts. The nation's road infrastructure although has experienced some improvements and expansions in the last decade and a half, still falls far short of the nation's requirements. It is envisaged that physical infrastructure development programmes and initiatives targeted at this strategy will be implemented over the five plans during the time-frame of the ICT4AD Policy. A number of initiatives are anticipated including those relating to the expansion, upgrading and the rehabilitation of the physical infrastructure including those of power, transport and water.

11. Strategy K: *To develop the necessary legal, institutional and regulatory framework and structures required for supporting the development, deployment and exploitation of ICTs within the economy and society*

It is envisaged that the bulk of work involving the development of the legal, regulatory and institutional framework could be carried out in the first two Plan periods. It is however anticipated that some of the work will be carried over to the 3rd, 4th and possibly the 5th Plans.

General Observations

1. It is envisaged that for *strategies* whose implementation span more than one plans, specific goals or targets for each of the identified programmes, projects and initiatives will have to be set within each of the Plans. For example, taking the case of Strategy **D**, which span the 1st 2nd and 3rd Plans, and partly the 4th Plan; specific targets (time-bound measurable targets) will have to be set for each of the human resource development (HRD) programmes identified for implementation within the 1st Plan and likewise for those programmes targeted for implementation under the relevant subsequent plans

2. It is also possible that the same HRD programme implemented in the 1st plan will also be identified for implementation in the 2nd and the 3rd plan. In that case, the targets set for the 1st Plan will have to translate into those set for the 2nd Plan. For example, a programme to develop a pool of professional ICT personnel like system analysts could have a specific target in the 1st Plan as: increasing the number of system analysts in Ghana by ten folds and in the 2nd Plan as: increasing the actual number achieved by the end of the 1st Plan by five folds.

8.3 The SUNRISE Model for the Development and Implementation of Plans

Introduction

The SUNRISE model forming part of the UNECA methodology for guiding the development of national ICT plans provides a framework for identifying and guiding the implementation of suitable programmes, projects and initiatives that could be incorporated into Rolling Plans. In this section we adapted the model and use it to identify candidate programmes and initiatives which could be developed for implementation in the 1st Rolling Plan --- Plan-2006. It is envisaged that this model will be modified on the basis of the outcome of the Plan-2006 to also serve as a framework for developing subsequent rolling plans.

Components of the SUNRISE Framework

The components of the SUNRISE model, each of which corresponds to a letter in the phrase 'SUNRISE' are:

S -- Special ICT Promotion Packages, Incentive Programmes and Policy Instruments

U --- Universal Human Resource Development Programme

N ---- National ICT Applications

R ---- Resource (Financial and Technological) Mobilization and Deployment

I ----- Integrated Civil and Public Service Computerization Programme

S ---- Standards, Practices and Guidelines for ICT Deployment and Exploitation

E ---- Enabling Legal Regulatory and Institutional Framework

Demonstrating the SUNRISE Model

We demonstrate the use of the SUNRISE model below to identify some specific candidate programmes and initiatives for implementation in Plan-2006. Although the emphasis is on Plan-2006 the framework can also be used to facilitate the process of identifying suitable candidate programmes and initiatives for the other plans.

S -- Special ICT Promotion Packages, Policy Instruments, and Incentive Programmes

To facilitate the process of promoting the development and exploitation of ICTs in the economy and society, the Government will need to put in place as specific programmes within the plans, special policy packages, incentive programmes and policy instruments. It will therefore be necessary for the Government to take necessary policy and programmatic initiatives that will facilitate the process of moving Ghana towards predominately an information and knowledge-base economy in the shortest possible time. Some candidate programmes worth considering for implementation in Plan-2006 are:

- Tax incentive packages to facilitate the rapid deployment, and exploitation of ICTs in key targeted lead sectors of the economy --- the Industrial and Service Sector
- Special investment promotion programmes targeted at the development of the local ICT Industry
- Special service sector development incentive programmes
- Export Processing Zone initiatives targeted at ICT producers and service providers
- Programmes to promote the acquisition of computer equipment by the educational institutions, civil and public service organizations and NGOs
- Policy instruments within specific incentive packages to facilitate the importation of computers and other ICT equipment at special low import duty rates
- Tax incentive programmes to encourage the private sector to invest in human resource development
- Programmes to promote and encourage the deployment and the utilization of ICTs in the private sector
- Special programmes and incentive packages to promote the development of a local industry for assembling computer and peripheral equipment
- Special programme to encourage educational institutions, the civil and public services to purchase locally assembled computers to promote the development of the local industry

- Incentive packages to promote the development of Software Development/Technology Parks to tap into the world-wide multi-million dollar off-shore software development industry
- Incentive packages (grants to SMEs) to promote the development of ICT products for the export market
- Programme to encourage and increase home ownership of computers

U --- Universal Human Resource Development Programme

Human resource problem have been identified by key stakeholders during the national consultative exercise underling the development of the Framework as one of the main obstacle to Ghana's socio-economic development process. A number of national socio-economic development framework document including the *Vision 2020*, Ghana Poverty Reduction Strategy Paper (PRSP), the Science and Technology Policy and the *Co-ordinated Programme of Economic and Social Development of Ghana* among others also identify the development of the human resources in key skill areas as crucial for the socio-economic development process of Ghana. During the national consultative process most of the national leaders acknowledged the urgent need to put in place a comprehensive universal human resource development programme to develop the ICT skill and other professional skill capacity for Ghana. Most of them regarded this as an absolute prerequisite for the socio-economic development of Ghana. Some of the candidate programmes and initiative that can be considered for implementation within Plan-2006 in this area are:

- Programme for ICT Skill development and upgrade within the civil and public service.
- Programme to improve the management, policy formulation, planning, execution and monitoring skill within the civil and public service
- Programme to support professional level skill development in targeted lead sectors of the economy --- the Service and the ICT Sector
- Programme to improve the ICT human resource development capacity of the Universities and Colleges
- Programme for the development of a National Computer Curricula for Primary, Secondary, Teacher Training and Technical Schools
- Programme to promote basic computer training in all secondary school, teacher training and technical schools
- An initiative to use ICTs to facilitate professional level human resource development in areas like science, technology, and business
- Programme to provide grants to selected public and private sector organizations and businesses to participate in national HRD programmes
- Programme to encourage the private sector to take on the unemployed youth as part of national skill development programme

N ---- National ICT Applications

For ICTs to assist the developmental process and make its impact felt within the economy and society, it will not be enough for the government to put in place a number of special ICT promotion packages, policy instruments, and incentive programmes as described above. Equally important is the need to implement a number of national ICT Applications across all sectors. Some of these applications, which will be executed as projects and programmes may be targeted specifically at aiding the delivery of government services; the dissemination of information; facilitating the introduction of computers into schools; supporting the implementation of government policy and plans in areas like: rural development and decentralization as part of a *village information and communications infrastructure* (VICI) initiative, good governance and democratic participation; institutional and capacity building among others. Candidate applications for incorporation into Plan-2006 are:

- Computers in Schools programme
- Electronic Government and Governance Initiatives
- National Geographic Information System (GIS) applications project

- Pilot SchoolNet project in selected schools
- Tele-education initiatives targeted at Higher Institutions of Learning
- Multipurpose Community Telecenter initiative to facilitate the spread the use of ICT in the community
- Telemedicine project to support health delivery and Community-based Medical Education (CME)
- Programme to strengthened democratic institutions and good governance through ICTs
- Rural development initiatives through the deployment and utilization of ICTs
- Electronic commerce and electronic trade project for SMEs
- Project to set up Software Development/Technology Parks
- Project to set up a computer hardware assembly facility with private sector involvement
- National database and management information system (MIS) programme for setting up database systems and information systems to support the administrative activities and information dissemination functions of selected Government Ministries and Public Sector Organizations (PSOs)

R ----- Resource (Financial and Technological) Mobilization and Deployment

Apart from the development and mobilization of human resources, as critical factors for ICT development, deployment and exploitation to aid the socio-economic development process in Ghana, there is also the need to mobilize the necessary financial and other technological resources without which most of the programmes and initiatives identified for implementation under Plan-2006 will not be possible. For example, the implementation of the special ICT promotion packages, and incentive programmes; the development of the required human resources and the implementation of the national ICT applications will all require considerable financial and technological resources. The mobilization and deployment of the necessary financial and technological resources is therefore crucial for the implementation of the 1st and subsequent Plans. Possible resource mobilization deployment and development programmes for consideration for inclusion into Plan-2006 are:

Technological Resources

- National Information Infrastructure (NII) development
- Programme for the rehabilitation and expansion of the National Telecommunication Infrastructure
- Programme for promoting private sector (domestic investment) and foreign investment in ICT Infrastructure development
- Programme to develop and improve the Internet Delivery Infrastructure of Ghana

Financial Resources

- An initiative to mobilize Donor funding for implementing National ICT applications
- Programme to attract foreign capital, investment and joint ventures to support the rapid development of the local ICT Industry and infrastructure

- Programme to encourage local banks to provide loans to SMEs involve in the ICT service sector and Industry
- Programme to mobilize private sector funding to support ICT initiatives
- Programme to mobilize funds to support HRD capacity building in key sectors of the economy

I ---- Integrated Civil and Public Service Computerization Programme

The modernization of the civil and public service is an on-going government exercise. During the national dialogue process, it has been acknowledged that a modernize and efficient civil and public service is a prerequisite for socio-economic development in Ghana and ICTs can play a facilitating role in this area. An integrated programme to computerize the activities and operations of the civil and public service was identified by some of the stakeholders during the national dialog process as a key component of the modernization process. This will assist in improving the efficiency and service delivery operations of the civil and public service. A number of programme and initiatives can be identified within the broad computerizing programme that can serve as candidates for implementation within Plan-2006, some of these are.

- Programme to set-up a Government-wide area network
- Programme to implement ranges of e-government initiatives
- Programme to set up Management Information System (MIS) Division in all government Ministries and public service organizations
- A project to spread the use of Internet within the government Ministries and other public service organizations
- Programme to encourage all government Ministries and other public service organizations to develop a presence on the Internet through the creation of Web-sites and use it to provide information on Ghana

S ---- Standards, Best Practices and Guidelines for ICT Deployment and Exploitation

The deployment, exploitation and development of ICTs in Ghana will need to be guided by some standards, best practices and guidelines. Possible candidate programmes for consideration for implementation under Plan-2006 are:

- Programme to set up standards for ICT resource procurement within the civil and public service
- Programme to identify best practices to guide the implementation of ICTs within the civil and public service, including the academic institutions
- Programme to define standards to guide the importation of ICT products
- An initiative to formulate guidelines and standards for the provision of ICT services
- An initiative to formulate guidelines and standards for the provision of ICT training services by private computer training centers
- Programme to define standards for the certification of ICT professional skills in Ghana
- Project to define standards and best practices to guide the activities of companies and organization operating within the ICT production sector [e.g. computer assemblers, software developers, etc.]

E ---- Enabling Legal, Regulatory and Institutional Framework

The development and exploitation of ICTs in the economy and society will need to be supported and facilitated by necessary legal provisions and legislation, regulatory framework and provisions as well as institutional structures. Some of the candidates for incorporation into the Plan are:

Legal Provisions and Legislation

- Enactment of Relevant Cyber-laws including: laws relating to Intellectual Property Rights; Data Protection and Security, Freedom of Access to Information; Computer and cyber crime and other cyber-laws, necessary for facilitating Ghana's
- Legislation to facilitate electronic commerce

Regulatory Framework and Provisions aimed at

- Universal service and access to basic and value added telecommunications services
- Creation of conditions for an investor friendly telecommunications environment
- Development of local communications industry towards competitiveness
- Preparation for convergence of technologies
- Liberalization and encouragement of private investment in the sector

Institutional Structures and Provisions

Setting up a National ICT Coordinating Agency and Bodies

Setting up of the National Information Technology Council and its Working Groups

SUNRISE++: Plan Implementation Monitoring and Evaluation

Apart from the candidate programmes identified under each component of SUNRISE model for possible incorporation into Plan-2006, there is also a need to put in place a programme for the continuous monitoring and evaluation of the implementation of the Plan programmes, initiatives and projects.

This monitoring and evaluation process will facilitate the taking of corrective measures if the stated targets, goals or objectives of a given programme are not being met or achieved during the life of the Plan. It is also possible that some of the corrective measures may involve the drawing up of new programmes for implementation within the current Plan or subsequent ones.

The plan monitoring and evaluation process will also facilitate the process of amending the details of the SUNRISE model to guide the identification and development of suitable programmes for incorporation into subsequent Plans. The monitoring and evaluation framework will therefore serve as the main driving force for facilitating transition from one Plan to another.

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APPENDICES

The National ICT4AD Consultative Process:

**List of Participating Public and Private Sector Organizations,
Institutions and Establishments**

(1) **MEETING WITH THE NATIONAL DEVELOPMENT
PLANNING COMMISSION: (27/08/2002)**

Reps from the ICT Committee:

Prof. Clement Dzidonu	-	Chairman
Mr. Crosby Tekyi-Mills	-	Member
Mr. Issah Yahaya	-	Member
Ms. Victoria Aikins	-	Secretary/Support Staff

Reps from NDPC:

Hon. Ben Salifu	-	Minister
Mr. Richard Awuku Aboakye	-	Consultant
Prof. George Gyan-Baffour	-	Snr. Tech. Advisor
Mr. Asamoah Boateng	-	NED, Coordinator

(2) **PRESENTATION AT THE UNIVERSITY OF GHANA
LEGON: (12/09/2002)**

Reps from the Committee:

Prof. Clement Dzidonu	-	Chairman
Mr. Issah Yahaya	-	Member/Secretary
Mr. Mohammed Sani-Abdulai	-	Member
Ms. Yvonne Afudego	-	Tech. Support Staff

In Attendance:

Dr. Nii Narku Quaynor	-	Member UN-ICT Task Force
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Reps from the University of Ghana:

Prof. K. Ofori Sarpong	-	Pro Vice Chancellor
Prof. M. Dakubu	-	ICT Consultant for UG
Mr. Otabi Ahene-Amanquanor	-	Site Engineer UG
Mr. E. Asibey-Berko	-	Associate Professor
Mr. Isaac Odoom	-	Lecturer
Mr. Benjamin Wiredu	-	Lecturer
Mr. Joseph K. Ecklu	-	Lecturer
Mr. J. N. Ayertey	-	Professor/Dean
Ms. Paullina Cofie	-	Student
Mr. Victor Q. Apedzi	-	Student
Ms. Evelyn Ekuia Mensah	-	Student
Mr. Ohui A. Allotey	-	Student

(3) **PRESENTATION AT THE VALLEY VIEW UNIVERSITY:
(04/09/2002)**

Reps from the Committee:

Prof. Clement Dzidonu	-	Chairman
Mr. Crosby Tekyi-Mills	-	Member
Mr. Issah Yahaya	-	Member
Ms. Victoria Aikins	-	Secretarial/Support Staff

Reps from the Valley View University:

Dr. Seth Laryea	-	President
Dr. B. Owusu-Antwi	-	Vice-President, Academic
Mr. Quarshie Henry	-	Lecturer
Mr. Kwasi Okyere-Darko	-	Registry VVU
Mr. Francis K. Opoku	-	Rel./Theology Dept., VVU
Mr. Francis K. Tenortey	-	Rel. /Theology Dept. VVU
Mr. Alex Briandt-Coker	-	Rel./Theology Dept. VVU
Mr. Eden B. Adeku	-	General Education, VVU
Dr. D. Opoku-Boateng	-	Rel./Theology Dept. VVU
Prof. K. Owusu-Mensah	-	General Education Dept. VVU
Mr. Stephen Asante	-	Business Dept. VVU
Mr. Bernard Franklin Bempong	-	Business Dept. VVU
Mr. Emmanuel Harrison Takyi	-	Rel./Theology Dept.
Mr. Doufodzi Jean Elorm	-	General Education Dept.
Ms. Christiana Gyimah	-	Admin. Secretary, VVU
Mrs. Lily Dowuona	-	Registry, VVU
Mr. Isaac Dowuona	-	Rel./Theology Dept. VVU
Mr. Paul Agyare	-	Registry, VVU
Ms. Edna Adu-Ofor	-	Registry, VVU
Mr. Samuel Amankwah	-	Registry, VVU
Ms. Faustina Asare	-	VVU/Advancement
Mr. Emmanuel Tandoh	-	Daily Graphic
Oheneba Assenso-Okoko	-	Business Office VVU

(4) **MEETING WITH THE NATIONAL MEDIA COMMISSION:
(08/10/2002)**

Reps from the Committee:

Prof. Clement Dzidonu	-	Chairman
Ms. Yvonne Afudego	-	Tech. Support Staff
Ms. Akua Sakyi	-	Secretarial Support Staff

Reps from the National Media Commission:

Mr. Yao Boadu-Ayeboafu	-	Executive Sec
Joseph E. T. Dottey	-	Dep. Ex. Sec. (Fin. & Admin)
Alex Bannerman	-	Dep. Ex. Sec. (Op.)

(5) **MEETING WITH THE VOLTA RIVER AUTHORITY:
(08/10/2002)**

Reps from the Committee:

Prof. Clement Dzidonu	-	Chairman
Nana Ohene Ntow	-	Member
Ms. Yvonne Afudego	-	Tech. Support Staff
Ms. Akua Sakyi	-	Secretarial Support Staff

Reps from the Volta River Authority:

Theo Nii Okai	-	Snr. Manager MIS
Nii Amponsah Amoo	-	Principal Engineer
Kofi Mensah	-	General Manager (Voltacom)

(6) **MEETING WITH THE GHANA INVESTMENT
PROMOTION CENTRE: (09/10/2002)**

Reps from the Committee:

Prof. Clement Dzidonu	-	Chairman
Lawyer Kwame Agati	-	Member
Nana Ohene Ntow	-	Member
Ms. Yvonne Afudego	-	Tech. Support Staff
Ms. Akua Sakyi	-	Secretarial Support Staff

Reps from the Ghana Investment Promotion Center:

Kwasi Abeasi	-	Chief Executive
David Laryea	-	IS Manager

(7) **MEETING WITH THE BANK OF GHANA: (10/10/2002)**

Reps from the Committee:

Prof. Clement Dzidonu	-	Chairman
Lawyer Kwame Agati	-	Member
Ms. Yvonne Afudego	-	Tech. Support Staff
Ms. Akua Sakyi	-	Secretarial Support Staff

Reps from the Bank of Ghana

Mr. K. A. Debrah	-	Chief Mgr. (CSD)
Mr. Michael Mensah	-	DY Mgr. (CSD)
Daniel Hagan	-	Ass. Director (CSD)
Mr. James Matley	-	Officer
Mrs. Jacqueline Asamoah	-	Officer

(8) **MEETING WITH THE NATIONAL COMMUNICATION
AUTHORITY: (15/10/2002)**

Reps from the Committee:

Prof. Clement Dzidonu	-	Chairman
Mr. Oforu-Adarkwa	-	Member
Lawyer Kwame Agati	-	Member
Mr. Sani-Abdulai	-	Member
Ms. Yvonne Afudego	-	Tech. Support Staff
Ms. Rhoda Gavor	-	Tech. Support Staff
Ms. Akua Sakyi	-	Secretarial Support Staff

Reps From the National Communication Authority:

Maj. J. R. K. Tandoh (Rtd)	-	Ag. Dir. Gen.
Bernard A. Forson Jnr.	-	Dep. Dir. Gen.
Joshua Peprah	-	Dir. Reg. & Licensing
Kumi-Brobbe George	-	Dir. Fin & Admin
I. Y. Ani	-	Director F&A
Rita Abrahams	-	Legal Officer
Henry Kanor	-	Frequency Supervisor
Ben. Ankumah	-	Engineer
K. Okyere-Mensuo	-	HR Officer
Charles K. Nuoraye	-	Admin Officer

(9) **MEETING WITH THE GHANA ATOMIC ENERGY COMMISSION: (15/10/2002)**

Reps from the Committee:

Prof. Clement Dzidonu - Chairman
Ms. Rhoda Gavor - Tech. Support Staff
Ms. Yvonne Afudego - "
Ms. Akua Sakyi - Secretarial Support Staff

In Attendance:

Dr. Nii Narku Quaynor - Member UN-ICT Task Force

Reps from the Ghana Atomic Energy Commission:

Prof. E. K. Osae - Dep. Dir. General
Dr. Shilo Osae - Scientific Officer

(10) **PRESENTATION AT A MEETING WITH THE TELECOM OPERATORS: (15/10/2002)**

Reps from the Committee:

Prof. Clement Dzidonu - Chairman
Mr. Sani-Abdulai - Member
Ms. Rhoda Gavor - Tech. Support Staff
Ms. Yvonne Afudego - "
Ms. Akua Sakyi - Secretarial Support Staff

In Attendance:

Dr. Nii N. Quaynor - Member UN-ICT Task Force

Reps from Telecom Operators:

Jim Burns - Ops. Mgr Westel
Dr. J. A. M. Cobbah - DMD Westel
Bob Palite - MD Celltel
K. Mensah - GM Voltacom VRA
William M. Taylor - MD Westel
Ernest Aikins - GM/IT Ghana Telecom
Marten Nroue - IT Mgr. Scancom
Rev. Isaac Frimpong-Ampofo - CEO African Express Com. Network

(11) **MEETING WITH THE PRIVATE ENTERPRISE FOUNDATION: (18/10/2002)**

Rep from the Committee:

Prof. Clement Dzidonu - Chairman
Ms. Yvonne Afudego - Tech. Support Staff
Ms. Akua Sakyi - Secretarial Support Staff

In Attendance:

Dr. Nii N. Quaynor - Member UN-ICT Task Force

Reps from the Private Enterprise Foundation:

Dr. Ofei Boeh Ocansey - Dir. General
Mr. J. Ben Oduro - Marketing Specialist
Mr. Moses Agyemang - Economist
Rev. Yeboah-Duah - Bus. Mgt. Specialist

(12) **PRESENTATION AT A MEETING WITH THE VALUE ADDED SERVICE PROVIDERS: (16/10/2002)**

Reps from the Committee:

Prof. Clement Dzidonu - Chairman
Mr. Sani-Abdulai - Member
Lawyer Kwame Agati - Member
Mr. Kofi Benning - Tech. Support Staff
Mr. Dan Lamptey - Tech. Support Staff
Ms. Rhoda Gavor - "
Ms. Akua Sakyi - Secretarial Support Staff

In Attendance:

Dr. Nii N. Quaynor - Member UN-ICT Task Force

Reps from the Value Added Service Providers:

Kofi Tsikata - World Bank
Patrick Kpikpi - N.C.S.
Joe Abanyia - N.C.S.
Leslie Tamakloe - Internet Ghana
Phillip Engmann - GISPA
Gregg Zachary
Lydia Kpodo - Bell Computer System
Rev. Isaac Frimpong-Ampofo - African Express Com. Network
Phillip Yao Kumahor - ECTA

Acheampong Boateng	-	NEL Telecomm.
Kojo Dougan	-	Bus. Support Sys. Ltd.
Frank Ntifo	-	Trans-Link Car Rentals
Justus Avudzivi	-	INCOTECH Inst.
Kofi Yeaboah Agyemang		
Ebo Quarainie	-	Tech Solutions
Tony Achbeis	-	Tonayaa Bus. Center
Ayim Samuel	-	Accra Polytechnic
Edwin Provencal	-	KNET / GIIT

(13) **PRESENTATION AT THE GHANA ATOMIC ENERGY COMMISSION: (22/10/2002)**

Reps from the committee:

Prof. Clement Dzidonu	-	Chairman
Mr. Kofi Benning	-	Tech. Support Staff
Mr. Daniel Lamptey	-	“
Ms. Rhoda Gavor	-	“
Ms. Yvonne Afudego	-	“
Ms. Akua Sakyi	-	Secretarial Support Staff

In Attendance:

Dr. Nii N. Quaynor	-	Member UN-ICT Task Force
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Reps from the Ghana Atomic Energy Commission:

Prof. F. Allotey	-	Head Inst. Of Mathematical Studies
Prof. E. K. Osae	-	Dep. Executive Director
Christian K. Akama	-	GAEC/BNARI
Mercy A. Wayem	-	NNRI/GAEC
S. K. Debrah	-	NNRI/GAEC
F. B. Johnson	-	NNRI/GAEC
Samuel E. Timpo	-	BNARI/GAEC
B. Q. Modzinuh	-	NNRI/GAEC
S. Afful	-	GAEC/NNRI
D. F. Charles	-	RPI/GAEC
Talwin Ibrahim	-	BNARI/GAEC
Emmanuel A. Quarcoo	-	RTC/NNRI
Sarpei Addy	-	DENIC/NNRI
Joseph A. K. Nsarh	-	DENIC/NNRI
Emmanuel K. Morneh	-	DENIC/NNRI
Kwame Asare	-	PSS/BNARI

Charles Asante	-	DAS/BNARI
Samuel Asamoah	-	GAEC/RPI
Felix Adeku	-	NNRI/GAEC
Emmanuel Akolmolga	-	BNARI/GAEC
Kwame Abih	-	NNRI/GAEC
Emmanuel Ofosu	-	BNARI/GAEC
Seth Asare Bediako	-	BNARI/PSS
Torsu Mawuli John	-	BNARI/PSS
Samuel Oboobi	-	GAEC/BNARI
B. J. B. Nyarko	-	GAEC/NNRI
K. A. Danso	-	NNRI/GAEC
Prof. Cyril Schandorf	-	RPI/GAEC
Joseph K. Amoako	-	RPI/GAEC
H. Amoatey	-	BNARI/GAEC
I. K. Wilson	-	NNRI
O. C. Oppong	-	NNRI
E. Boadu	-	NNRI
P. K. Afriyie	-	NNRI
Isaac Ennison	-	NNRI
Michael K. Obeng	-	RPI/GAEC
Francis G. Ofosu	-	NNRI
Johnson Yeboah	-	RPI
J. K. Gbadaago	-	NNRI/GAEC
Patience Serwah Adu	-	NNRI/GAEC
Alex Owusu-Biney	-	BNARI/GAEC
Agnes Kodra Gyimah	-	SECRETARIAT
E. Amanor	-	NNRI
Shilo Osae	-	NNRI
B. K. Osafo	-	BDU/GAEC
E. H. K. Akaho	-	NNRI/GAEC
Vivian Oduro	-	BNARI/GAEC
Josephine Nketsia	-	BNARI/GAEC
A. Adu-Gyimah	-	BNARI/GAEC
Khalid Ahmed	-	NNRI
Dickson Adumako	-	NNRI
Charles E. Annoh	-	BNARI
S. B. Dampare	-	NNRI
William Srekumah	-	BNARI
Matthin De-Graft Mensah	-	BNARI
A. Adu-Gyamfi	-	Seminar Commencer

(14) MEETING WITH THE GHANA ACADEMY OF ARTS AND SCIENCES: (22/10/2002)

Reps From the Committee:

Prof. Clement Dzidonu - Chairman
Ms. Rhoda Gavor - Tech. Support Staff
Ms. Akua Sakyi - Secretarial Support Staff

In Attendance:

Dr. Nii N. Quaynor - Member UN-ICT Task Force

Reps from the Ghana Academy of Arts and Sciences:

Dr. S. Fiah - Administrative Secretary
Mr. D. Akati - Deputy Admin. Secretary

(15) MEETING WITH THE GHANA INTERNET SERVICE PROVIDERS ASSOCIATION: (22/10/2002)

Reps the Committee:

Prof. Clement Dzidonu - Chairman
Lawyer Kwame Agati - Member
Mr. Kofi Benning - Tech. Support Staff
Ms. Yvonne Afudego - "
Ms. Akua Sakyi - Secretarial Support Staff

In Attendance:

Dr. Nii N. Quaynor - Member UN-ICT Task Force

Reps From the Ghana Internet Service Providers Association:

Nanayaa Owusu-Prempeh - Tlnafa Gh. Ltd
Prince Owusu-Yeboah - IT Services Ltd.
Francis Quartey - IDN
Philip Engmann - GISPA

(16) MEETING WITH GHANA TELECOM: (23/10/2002)

Reps from the Committee:

Prof. Clement Dzidonu - Chairman
Mr. Sani-Abdulai - Member
Ms. Victoria - Secretarial Support Staff

Reps from Ghana Telecom:

Mr. Ernest V. A. Aikins - GM/IT
Mr. Joseph D. Obah - CM/International Dept.
Mr. E. K. Idun - GM/International Dept.

(17) PRESENTATION AT A MEETING WITH THE PARAMOUNT CHIEFS FROM THE WESTERN REGION IN CONJUNCTION WITH THE INSTITUTE OF AFRICAN STUDIES, LEGON: (24/10/2002)

Reps from the Committee:

Prof Clement Dzidonu - Chairman
Ms. Rhoda Gavor - Tech. Support Staff
Ms. Yvonne Afudego - Tech. Support Staff
Ms. Akua Sakyi - Secretarial Support Staff

In Attendance:

Dr. Nii Narku Quaynor - Member UN-ICT Task Force

Reps from the Paramount Chiefs:

Odenehu Gyapong Ababio II - Sefwi Bekwai Trad. Area.
Nana Kasapreko K. Bassanyin III - Omanahene of Wassa Amanfi Traditional Area
Nana Nkuah Okomdom II - Sefwi Wiaeso
Nana Kobina Nketesia V - Essikado Traditional Area
Nana Kwaku Akyirisuo III - Ajomoro Traditional Area
Nana Atta Kwesi Brembi II - Suaman Traditional Area
Ebenezer Ayesu - N. A. S. (Research Fellow)
Osabarima Kwaro Entsi II - Mpohor Traditional Area
Nana Yaw Gyebi II - Sefwi Anhwiaso
Nana Ewulaa Anyama Tu-Agyan II - Gwira Trad. Area, Bamianta
Nana Agyefi Kwami -
Dr. Irene Odotei - Cordinator-Chieftancy, Govt. & Dev. Project
Dr. Kofi Baku - Dept. of History, Legon

(18) **PRESENTATION AT THE ASHESI UNIVERSITY:**
(24/10/2002)

Reps from the Committee:

Mr. Sani-Abdulai	-	Member
Ms. Victoria Aikins	-	Secretarial y Support Staff
Mr. Kofi Benning	-	Tech. Support Staff
Mr. Emmanuel Ofori	-	“
Mr. Daniel Lamptey	-	Tech. Support Staff

Reps from the Ashesi University:

Mildred Wulff	-	Director, Business Operations
Linda Youg-Ribeiro	-	Dean, Students Comm. Affairs
		The Entire Student Body

(19) **MEETING WITH THE STATE ENTERPRISE**
COMMISSION: (24/10/2002)

Reps from the Committee:

Prof Clement Dzionu	-	Chairman
Ms. Yvonne Afudego	-	Tech. Support Staff
Ms. Akua Sakyi	-	Secretarial Support Staff

Reps from the State Enterprise Commission:

Mr. Frank Ocran	-	Executive Chairman
Mr. Ronny Apaloo	-	Ag. Ex. Director
Mr. David Djanie	-	Executive Director
Mr. Nicholas Yankey	-	Ag. Chief of Admin
Mr. Albert Kwami Klevator	-	Snr. Consultant
Mrs. Daisy S. Sevor	-	Consultant
Mr. Abrefa Amanampong	-	Administrators
Mr. S. A. Sarbah	-	Consultant
Mr. Yao Klinogo	-	Consultant
Mr. Abubakar Abdul-Samed	-	Consultant
Mr. Nixon Noah	-	Consultant
Mr. Charles Arthur	-	

(20) **PRESENTATION AT THE UNIVERSITY OF EDUCATION,**
WINNEBA: (25/10/2002)

Reps from the Committee:

Prof. Clement Dzionu	-	Chairman
Mr. Kofi Benning	-	Tech Support Staff
Mr. Emmanuel Ofori	-	“
Ms. Rhoda Gavor	-	“
Ms. Akua Sakyi	-	Secretarial Support Staff

Reps from University of Education, Winneba:

Prof. Anamuah-Mensah	-	Vice Chancellor
Prof. S. M. Quartey	-	Pro Vice Chancellor
Alexander Oppong	-	Lect./Dept. of SPED
Mr. Issifu Yidana	-	Lecturer, Dept of Maths
Mr. Julius Nutakor	-	Planning Officer
Dr. D. S. Y. Amuzu	-	HOD/French Educ.
Mr. P. K. Geraldo	-	HOD/Ghanaian Languages
Mr. J. N. Aryeetey	-	Registrar
Ms. Valentina Bannerman	-	Ag. Librarian
Mr. Thomas A. Q. Tawiah	-	Computer Center
Mr. Joseph Eshun-Famiyeh	-	Dept. of Maths Ed
Dr. Charles Kumsah	-	Dept. of Science Ed.
Prof. M. Caurie	-	Dept. of Home Econs.
Mr. Kafui Amenu Prebbie	-	Pres. Apples Computer Club
Mr. Kendy Owusu Kwarteng	-	Journalist GNA
Mr. Abedi-Boafu Rex	-	Ag. Dep Registrar

The entire Student Body

(21) **PRESENTATION AT A MEETING WITH THE**
PARAMOUNT CHIEFS FROM THE EASTERN REGION IN
CONJUNCTION WITH THE INSTITUTE OF AFRICAN
STUDIES, LEGON: (04/11/2002)

Rep from the Committee:

Prof Clement Dzionu	-	Chairman
Mr. Sani Abdulai	-	Member
Ms. Akua Sakyi	-	Secretarial Support Staff
In Attendance:		
Dr. Nii N. Quaynor	-	Member, UN-ICT Task Force

The Paramount Chiefs and Reps from the Institute of African Studies:

Nana Addo Dankwa	-	President of the House of Chiefs, E/R-Omanhene of Akwapim
Nana Appiah Kumi	-	Omanhene of Anum
Nana Osei Nyarko	-	Omanhene of Boso-Gua
Nene Dawutey Ologo	-	Omanhene of Yilo Krobo
Dr. A. K. Awedoba	-	Res. Fellow, IAS-Legon
Prof. R. Addo-Fening	-	Rtd Prof. Dept of History
Dr. Irene Odotei	-	Coordinator, Chieftaincy Govt.
Mr. Oforu-Mensah Ababio	-	Prin. Research Asst.
Godwin Adjei	-	Teaching Assistant/Research
Dr. Kofi Baku	-	Lecturer, Dept of History, Legon

(22) PRESENTATION AT THE CENTRAL UNIVERSITY COLLEGE: (05/11/2002)

Reps from the Committee:

Prof. Clement Dzidonu	-	Chairman
Mr. Sani-Abdulai	-	Member
Mr. Kofi Benning	-	Tech. Support Staff
Mr. Daniel Lamptey	-	“
Ms. Yvonne Afudego	-	“
Ms. Akua Sakyi	-	Secretarial Support Staff

Reps from the Central University College:

Mr. E. K. Garbi	-	Vice Chancellor
Rev. Tetteh Djanguah	-	Chaplin
Mr. Steve Agro	-	Lecturer, French
Mary Agyenkwa	-	Secretary Publications Unit
Mr. Sem Iroko	-	Lecturer HRM
Mr. C. K. Adeleha	-	Lecturer French Dept.
Rev. Andrew Ghandeh-Mitto	-	Lecturer STM
Mr. Freeman Osei Tete	-	Lecturer HRM
Mr. Kofi Baako	-	HOD, Marketing Dept.

The entire Student Population

(23) PRESENTATION AT THE INSTITUTE OF PROFESSIONAL STUDIES: (06/11/2002)

Reps from the Committee:

Prof. Clement Dzidonu	-	Chairman
Mr. Sani Abdulai	-	Member
Mrs. Marian Tackie	-	Member
Mr. Kofi Benning	-	Technical Support Staff
Mr. Daniel Lamptey	-	Technical Support Staff
Mr. Emmanuel Ofori	-	“
Ms. Rhoda Gavor	-	“
Ms. Yvonne Afudego	-	“
Ms. Akua Sakyi	-	Secretarial Support Staff

Reps from the Institute of Professional Studies:

Rev. Fr. J. J. M. Martey	-	Director
Mr. James Tetteh Ami-Narh	-	Lecturer IPS
Mr. Thomas Kwaku Kankam	-	Snr. Lecturer, IPS
Mr. George Quartey	-	Lecturer, IPS
Mr. S. N. Amanquah	-	Librarian
Mr. Theodore Tetteh	-	Lecturer
Mrs. Elizabeth Omaboe Ward-Brew	-	Lecturer
Mr. R. Eshun-Mensah	-	Lecturer

The entire Student Population

(24) MEETING WITH THE GHANA FREE ZONES BOARD: (06/11/2002)

Reps from the Committee:

Prof. Clement Dzidonu	-	Chairman
Ms. Rhoda Gavor	-	Tech. Support Staff

Reps from the Ghana Free Zones Board:

Mr. Andy Appiah-Kube	-	Ag. Executive Director
Mr. Sampson Abenkrah Appiadu	-	Chamber
Mr. Alex L. Martey	-	Data Analyst
Mr. Bismark Larry Borteye	-	Monitoring Officer
Ms. Nana Yaa Jantuah	-	P. R. O.
Adom Boakye	-	Monitoring Officer

(25) **PRESENTATION AT A MEETING WITH SOME
WOMEN'S ORGANIZATIONS: (07/11/2002)**

Reps from the Committee:

Prof. Clement Dzidonu	-	Chairman
Mr. Issah Yahaya	-	Member/Secretary
Mrs. Marian Tackie	-	Member
Mr. Sani-Abdulai	-	Member
Mr. Emmanuel Ofori	-	Tech. Support Staff
Ms. Yvonne Afudego	-	“
Ms. Rhoda Gavor	-	“
Ms. Akua Sakyi	-	Secretarial Support Staff

In Attendance:

Dr. Nii Quaynor	-	Member UN-ICT Task Force
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Representatives from Women Organizations:

Mrs. Agnes D. Acheampong	-	Legon Ladies Club
Christian Morti	-	RWAD
Georgette C. D. Addy	-	WAMMNET-Ghana
Gloria Dumah	-	Women's Missionary Council
Theresa Agyare	-	Assemblies of God Women's Ministry
Cecilia Oye Owusu	-	S. W. R. P.
Evelyn Bekwin	-	Serious Fraud Office
Charity Kofi Avdzitor	-	
Ato Baiden	-	Pressman/Daily Guide
Grace-Gloria Arthur	-	UNIWAF
Aawrenam Amenor	-	Talents Resources Int.
G. D. Zaney	-	Information Services Dept.
Rose Amam	-	C. M. A.
Mrs. Juliana Nii-Moi	-	UNIWAF
Mary Asan	-	UNIWAF
Rebecca Laryea	-	UNIWAF
Lydia Asamoah	-	Pensioner
Isabella Datsomor	-	GAWE
Gloria Dumah	-	Women's Missionary Council
Kafui Akatu	-	Ghana Fire Service
Loretta Tandoh	-	Women's World Banking, Ghana
Theresa Agyare	-	Women's Leader, Assemblies Of God

Leticia Sarbah	-	Ghana Fire Service
Georgina Tibabia	-	Ghana Fire Service
Sarah Haywood Daddie	-	Ghana Fire Service
Comfort Owusu	-	Ghana Water Company Ltd
Anna Yawson	-	D. N. L.
Freda Lamptey	-	FISLA
Mrs. Ernestina Opare-Ayeh	-	FISLA
Anna Norteye	-	FISLA
Alice Derby	-	FISLA
Akakpo Worla	-	FISLA
Felicia Brempong	-	FISLA
Christiana Okantey	-	FISLA
Doris Tetteh	-	FISLA
Cynthia Squire	-	FISLA
Mercy Natsagah	-	FISLA
Grace Mensah	-	FISLA
Jennifer Quaye	-	FISLA
Myrie Barnor	-	FISLA
Victoria Mekann	-	FISLA
E. Osei-Owusu	-	Ghana National Fire Service
Loretta Tandoh	-	Women's World Banking, Gh.
Obeng-Adjei	-	Gemini Life Insurance Comp.
Samuel K. Enchill	-	Gemini Life Insurance Comp.
Stephen Amoako Hene	-	Gemini Life Insurance Comp.
Sylvia Ocansey	-	Women's Summit
Julie Lamptey	-	UNIWAF
Nana Afrakuma I	-	Queen Mother
Sandra Borteye-Daku	-	UNIWAF
Rose Akugne	-	Ghacoe Women's Ministry
Hajia Rabiata Abeah	-	G. M. M. W. F.
Judith M. Dzokoto	-	Gh. Immigration Serv.
Serwa-Opoku Addo	-	NCWD
Vera Kunpiel	-	Women's Dev. Agency
Anna Norteye	-	Fire Ladies
Grace I. Appaih	-	WDRC
Ernestina Opare-Ayeh	-	FISLA
Faustina Dargbe	-	SSNIT
Karen Asare	-	Castle Annex
Doris Tetteh	-	Ghana National Fire Service
Patience Owusu-Baah	-	Methodist Church
Comfort Owusu	-	Ghana Water Company Ltd.
Anna Yawson	-	DNL

Harriet Corquaye	-	Society for the Welfare of the Rural People
Evelyn Fosu	-	UNIWAF
Christiana Okyere	-	UNIWAF
Ellen Classpeter	-	UNIWAF
Evelyn Bakoe	-	Serious Fraud Office
Grace Appiah	-	NDRC
Lena Alui-Gariba	-	NCWD
Elizabeth Mensah-Attipoe	-	GRMA
Patience Owusu-Boadi	-	Methodist Church
Victoria Kai Kpakpo		
Wradi Borkor		
Christina McQuanusu	-	GIS
Love Owusu-Awuah	-	GIS
Caroline Otchere Asieduh	-	GIS
Fatima Issah	-	Ahmadiyya
Nalumnatu Karim	-	WDA
Mary M. Twum	-	CMA
Serwa Opoku-Addo	-	NCWD
Victoria Kuma-Mintah	-	31 st Dec. Women's Movement
Vida G. P. Yartey	-	UNIWAF
Alberta N. Addico	-	UNIWAF
Mrs Lorriene Ofori	-	NCWD
Nana Akua Botchway	-	United Women Front
Joyce Epton	-	United Women Front
Mrs. Gladys Newman	-	Presby Women
Sylvia Ocansey	-	Womens Summit

The Student Body of YMCA

(26) MEETING WITH THE GHANA POLICE SERVICE:
(12/11/2002)

Reps from the Committee:

Prof. Clement Dzidonu	-	Chairman
Mr. Sani-Abdulai	-	Member
Mrs. Marian Tackie	-	Member
Ms. Rhoda Gavor	-	Tech. Support Staff
Ms. Akua Sakyi	-	Secretarial Support Staff

Reps from the Ghana Police Service:

P. K. Acheampong	-	Dep. IGP Operations
Kwasi Nkansa	-	COP/Admin
F. Adu Anim	-	DSP/ASO
Nana B. Abban	-	Police Consultant
Mohammed Alhassan	-	DCOP/Operations HQ
Paul Quaye	-	COP/Research & Planning

(27) PRESENTATION AT A MEETING WITH THE
PARLIAMENTARY SELECT COMMITTEE ON
COMMUNICATION: (14/11/2002)

Reps from the National ICT Committee:

Prof. Clement Dzidonu	-	Chairman
Mr. Sani-Abdulai	-	Member
Ms. Rhoda Gavor	-	Tech. Support Staff
Ms. Yvonne Afudego	-	Tech. Support Staff
Ms. Akua Sakyi	-	Secretarial Support Staff

In Attendance:

Dr. Nii N. Quaynor	-	Member, UN-ICT Task Force
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Reps from the Parliamentary Select Committee on Communications:

Hon. Akwasi Afrifa	-	Chairman
Hon. Baidoo Ansah, Joe	-	Vice Chairman
Hon. Mahama John Dramani	-	Ranking Member
Hon. Dansua Akua Sena (Ms.)	-	Dep. Ranking Member
Hon. Donkor, Joe	-	Member
Hon. Amoah Cecilia (Mrs.)	-	Member
Hon. Amadu, Seidu (Alhaji)	-	Member
Hon. Hazel, Edith (Mrs.)	-	Member
Hon. G. Y. Anwuh	-	Member
Hon. John S. Achuliwor	-	Member
Hon. Dr. C. Y. Brempong-Yeboah	-	Member
Hon. Yaw Baah	-	Member
Hon. E. A. Boye	-	Member
Kwadwo Dankwa Aboagye	-	Office of Parliament
Frederick Nutsugah	-	SAC, Clerk to the Committee
Eric Boafo	-	Office of Parliament

(28) **MEETING WITH THE GHANA STANDARDS BOARD:**
(15/11/2002)

Reps from the Committee:

Prof. Clement Dzidonu	-	Chairman
Mr. Sani-Abdulai	-	Member
Mrs. Marian Tackie	-	Member
Ms. Rhoda Gavor	-	Tech. Support Staff
Akua Sakyi	-	Secretarial Support Staff

Reps from the Ghana Standards Board:

Mr. Nimo Ahinkorah	-	Dep. Exe. Director (Tech)
Mr. L. E. Yankey	-	Dir. Standards Certification
Mr. J. M. Odonkor	-	Director, Physical Science
Mr. Francis Kodua	-	Tech. Support Staff
Mr. Richard Hayford	-	Chief Prof. Officer
Mr. Andrews Boadi	-	Snr. Scientific Officer/ Tech. Support Staff
Mr. Anthony E. Owusu	-	Dep. Exec. Dir. (Admin)
Mrs. Elizabeth C. Nelson	-	Secretary, DED (Tech)
Mrs. Elizabeth Adetola	-	Ag. Hd Chem Sc. Dir.
Mr. Anthony K. Annan	-	Dir. (Fin & Admin) Dir.

(29) **PRESENTATION AT A MEETING WITH THE PRIVATE**
SECTOR: (26/11/2002)

Reps from the Committee:

Prof. Clement Dzidonu	-	Chairman
Ms. Rhoda Gavor	-	Tech. Support Staff
Mr. Emmanuel Ofori	-	Tech. Support Staff
Ms. Akua Sakyi	-	Secretarial Support Staff

In Attendance:

Dr. Nii N. Quaynor	-	Member, UN-ICT Task Force
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Reps from the Private Sector:

Johnson Ben Oduro	-	Private Enterprise Foundation
Agyare-Boakye	-	Private Enterprise Foundation
Moses Agyemang	-	Private Enterprise Foundation
Elizabeth Vaah	-	Private Enterprise Foundation

Richard Pobi	-	Bus & Prof. Women, Ghana
Stephen Mack	-	AIC Technologies Ghana Ltd
G. K. Ofori	-	GUTA
Ol Diogo	-	Ghanaian Telegraph
Tesa Ayemor	-	Private Enterprise Foundation
Lucia Quachey	-	Ghana Association of Women Entrepreneurs (GAWE)
Tony Kisman	-	Tinafa Gh. Limited, Member Ghana Employers Association
Michael Qwarshie	-	Persol Systems Limited, Member Ghana Employers Association
Isabella Datsomor	-	Ghana Association of Women Entrepreneurs (GAWE)
E. A. Osei	-	Microwave House Ghana Limited, IBN Business Partner
Kwasi Amoa	-	Ashanti Goldfields Company Limited
Ebenezer K. Ampiah	-	Softwarehouse International Employers Association
Briget Kyeremanten-Darko	-	Aid to Artisan Ghana
Anthony Atinyo	-	Ghana Furniture & Wood Products Association (FAGE)
Frank Nana Enos	-	Ghana Furniture & Wood Products Association (FAGE)
Aba Conduah	-	American Chamber of Commerce (Ghana)
Tina Swatson Eshun	-	Hag/FAGE
Kenneth Quartey	-	GNAPP
Kofi Agyei-Henaku	-	GNAPP
Mills-Odoi Donald	-	IT for Ghana
P. J. Nyam	-	Ghana British Chamber

(30) **PRESENTATION AT A MEETING WITH THE COUNCIL**
OF STATE: (26/11/2002)

Reps from the Committee:

Prof. Clement Dzidonu	-	Chairman
Mr. Sani-Abdulai	-	Member
Mrs. Marian Tackie	-	Member
Mr. Daniel Lamptey	-	Tech. Support Staff
Mr. Emmanuel Ofori	-	Tech. Support Staff
Ms. Akua Sakyi	-	Secretarial Support Staff

In Attendance:

Dr. Nii. N. Quaynor - Member UN-ICT Task Force

Reps from the Council of State:

Hon. A. K. Deku - Member
Hon. Kwesi Armah - Member
Hon. E. B. Sekyi-Hughes - Member
Hon. Kwaku Kyie - Member
Hon. Hajia Adisa Munkaila - Member
Hon. Prof. D. Adzei Bekoe - Member
Hon. Nana Prah Agyensaim VI - Member
Hon. Amma Bame Busia - Member
Hon. Gen. Edwin K. Sam - Member
Hon. Emma Mitchell - Member
Hon. Clement K. Tedam - Member
Hon. Michael Adusah - Member
Hon. Nana Ogyeabour Akomdi Finam II - Member
Hon. F. A. Afoko - Member

(31) **PRESENTATION AT THE NATIONAL HOUSE OF CHIEFS: (28/11/2002)**

Reps. From the Committee:

Prof. Clement Dzidonu - Chairman
Mr. Sani-Abdulai - Member
Nana Ohene Ntow - Member
Mr. Emmanuel Ofori - Technical Support Staff
Ms. Yvonne Afudego - Technical Support Staff
Ms. Akua Sakyi - Secretarial Support Staff

In Attendance:

Dr. Nii Narku Quaynor - Member UN-ICT Task Force

Reps. from the National House of Chiefs:

Odenehu Gyapong Ababio II - President, National House of Chiefs
Odenehu Oduro Numapau II - Ashanti Regional House Of Chiefs
Togbe Dagadu VII - Volta Reg. House of Chiefs
Nii Tetteh Out II - Gt. Accra Reg. Hse of Chiefs

Kasapreko K. Bassanyin - Western Regional House of Chiefs
Otumfou Amoa Sasraku III - Central Regional House of Chiefs
Nana Aburan Akpadji - Buem Traditional Area, Jasikan
Togbega Gabusu VI - President, V/R House of Chiefs
Nana Amanafa Poku II - C/R House of Chiefs
Kuoro Kyibe Mumuni Dimbie II - U/W Regional House of Chiefs
Naa Kwantema II - Ga Traditional Area
Naa Narh Dawutey Ologo VI - E/R House of Chiefs
Nene Tetteh Djan III - GA Regional House of Chiefs
Na-Shanni Hamidu II - N/R House of Chiefs
Na S. D. Gore II - U/W Regional House of Chiefs
Pe Aliua Aldam Pase II - U/E Regional House of Chiefs
Naba Ayidama S. Asabayire IV - U/E Regional House of Chiefs
Togbe Delume VII - Volta Reg. House of Chiefs
Kuoru Kuri-Butie Limann IV - U/E Regional House of Chiefs
Naba Asigri Azoka II - U/E Regional House Of Chiefs
Naa John S. Nabila-Wuluunaba - N/R House of Chiefs
Naa Alhaji I. Abu-Kumba-Na - Northern Regional House of Chiefs
Nana Kwadwo Nyarko III - President, B/A House of Chiefs
Barima Kwame Nkyi XII - C/R House of Chiefs
Nana Owusu Asiamah II - Ashanti Reg. House of Chiefs
Nana Ata Kwesi Brembi II - W/R House of Chiefs
Kuoro Gilbert Badzoe Kanton V - U/W Regional House of Chiefs
Nana Kwamina Ansah IV - C/R House of Chiefs
Naba Sigri Bewong - U/E Regional House of Chiefs
Osabarima Debo Bibi Jakyia-Ameyaw II - Brong- Ahafo Reg. House of Chiefs
Nana Boahema Agakoma II - Ashanti Queen mother's Ass.
Naba Abilba III (Bolga Naba) - U/E Regional House of Chiefs
Nii Adote Obuor II - G/A Regional House of Chiefs
Nana Tibu Asare II - Central Reg. House of Chiefs
Nana Yaw Kagsrese V- Brong - B/A Regionl House of Chiefs
R. K. K. Maaldu (Registrar) - U/E Regional House of Chiefs
J. S. Bainah (Registrar) - N/R House of Chiefs
A. A. Tuureh - U/W Reg. House of Chiefs
T. A. Donkoh - C/R House of Chiefs
M. L. K. Animley (Ag. Registrar) - G/A Regional House of Chiefs
H. Osei Owusu (Reg. Registrar) - G/A Regional House of Chiefs
Na Banamimi Sando II - National House of Chiefs
F. E. Nuawah - National House of Chiefs
David Sogbodjor - National House of Chiefs
John Domalhe (Counsel) - National House of Chiefs

**(32) PRESENTATION AT A MEETING WITH THE
COMPUTER COMPANIES, HARDWARE & SOFTWARE, SYSTEM
INTEGRATORS, & NETWORKING/MANUFACTURING/
DEVELOPING: (10/12/2002)**

Reps. From the ICT Committee:

Prof. Clement Dzionu	-	Chairman
Ms. Rhoda Gavor	-	Technical Support Staff
Ms. Yvonne Afudego	-	Technical Support Staff
Ms. Akua Sakyi	-	Secretarial Support Staff

In Attendance:

Dr. Nii Narku Quaynor	-	Member UN-ICT Task Force
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Reps from the ICT Industry:

Edward Wilson	-	Microline Computer Institute
W. A. Mensah	-	Masai Computer Services Limited
Michael Quarshie	-	Persol Systems Limited
Mordecai Quarshie	-	EM Ghana Limited
Joe Nkrumah	-	Carlink Publishing Accra
Joseph Nii Tackie Tagoe	-	Business Ghana
Leonard Allotey	-	Business Ghana
Benjamin Allotey Pappoe	-	Business Ghana
Chris Gavu	-	Giant Int.
Francis Baffoe	-	Ultimate Supplies Ltd
Fatima M. Rashid	-	Ultimate Supplies Ltd
Emmanuel Odoom	-	Network Computer Systems
Frank Amfo	-	Base-Two System
Larry Acheampong	-	Digitronix System Ltd
Theodore Quist	-	Nada Computers Ltd
Oscar Obeng	-	High Tech Marketing Ltd
K. Richardson	-	The Morning Star
Jerry M. K. Asare	-	Radix Technologies Ghana Ltd
George B. Forson	-	CEPS
Paul E. Enninful	-	Micro Accessories & Comp. Services
S. Boafu-Arko	-	B&B Co. Limited/ABB Technologies
Patrick Kpikpi	-	NCS
Hermann Chinenya Hesse	-	SOFT
Kofi Sedozo	-	SOFT
Eric Osiakwa	-	Internet Research
Laryea Emmanuel	-	Graduate Skyline, Assoc. of Comp. Teachers.

**(33) PRESENTATION AT A MEETING WITH THE STATE
OWNED ENTERPRISES: (11/12/2002)**

Reps from the ICT Committee:

Prof. Clement Dzionu	-	Chairman
Nana Ohene Ntow	-	Member
Mr. Emmanuel Ofori	-	Technical Support Staff
Ms. Yvonne Afudego	-	Technical Support Staff
Ms. Akua Sakyi	-	Secretarial Support Staff

In Attendance:

Dr. Nii Narku Quaynor	-	Member UN-ICT Task Force
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Reps from the State Owned Enterprises:

Frank Ocran	-	Exe. Chairman, SEC
Tony Mends	-	State Enterprise Commission
Opoku –Berkoh	-	A.E.S. Limited
J. N. Asante	-	A. E. S. Limited
Ben V. Y. Nyame	-	G. I. D. A.
Joseph Hagan	-	GNPA
M. R. Arthur	-	OSA Transport Limited
Ernest Ntim-Gyakari	-	OSA Transport Limited
Kofi Baffoe	-	GNA
Asomani Nyarko	-	GWCL
Ernest Cobblah	-	GPC, Assembly Press
G. Ato Botchey	-	GRC Takoradi
Enoch Awaa Quaye	-	National Theatre Of Ghana
Theophilus Asante	-	National Theatre of Ghana
Adjetey Adjei	-	Ghana Supply Limited
Mr. Ben Mensah	-	State Housing Company
Jonas Nanzoningo	-	State Housing Company
Theo Nii Okai	-	VRA
Kofi Mensah	-	VRA
N. N. Yankey	-	State Enterprise Commission
A. K. Klevor	-	State Enterprise commission
Maxwell Addico	-	Ghana Airways
Victus Kaleo-Bio	-	Ghana Airways
D. Djanie	-	State Enterprise Commission

(34) **PRESENTATION AT A MEETING WITH ICT USERS,
COMPUTER ASSOCIATIONS, IT INSTITUTIONS,
INTERNET SOCIETY & PROFESSIONAL BODIES:
(11/12/2002)**

Reps from the Committee:

Prof. Clement Dzidonu	-	Chairman
Ms. Rhoda Gavor	-	Technical Support Staff
Ms. Yvonne Afudego	-	Technical Support Staff
Ms. Akua Sakyi	-	Secretarial Support Staff

In Attendance:

Dr. Nii. Narku Quaynor	-	Member UN-ICT Task Force
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**Reps from the ICT User Community, Computer Associations, IT
Institutions, Internet Society & Professional Bodies.**

J. K. Owusu Afriyie	-	Ghana Education Service
E. A. Gyamera	-	Ghana Education Service
Martin Tawaih	-	GES
E. K. Dadebo	-	GES
S. K. Ainsoh	-	Ghana Telecom (GTTC)
Chris Gavu	-	Giant Int.
A. M. Thompson	-	UC - EAP
Jonnie Akakpo	-	CITRED Community Initiative
Nana Apraku-Yeboah	-	Aseda Data Systems
Jackie Armah	-	
Emmanuel Nannor	-	Institute of Computer Technology
Charles K. Wartey	-	TSR, Cantonments-Accra
Robert S. B. Sackeyfio	-	Micro Computer Solutions
Alex F. Erskine	-	Shadee Computers
Daniel Mensah Gala	-	Wintech Computers
Rose Neif	-	Omari Computek Systems Ltd
Emmanuel Peter Kyei	-	Vari-Tech Services Ltd
Prof. Joe Nkrumah	-	Carlink Publishing
Naa Asie Ocamsey	-	UNEP Task Force
Dramani M. Kaleem	-	
Seth Edekor	-	Ghana Library Board
Kofi Acquah	-	GES
Laryea Emmanuel	-	
S. Boafo-Arko	-	
Jerry M. K. Asare	-	Radix Technology Ghana Ltd
George Forsm	-	CEPS

(35) **PRESENTATION AT THE KWAME NKURUMAH
UNIVERSITY OF SCIENCE AND TECHNOLOGY:
(16/12/2002)**

Reps from the Committee:

Prof. Clement Dzidonu	-	Chairman
Mr. Sani-Abdulai	-	Member
Mr. Daniel Lamptey	-	Technical Support Staff
Ms. Rhoda Gavor	-	Technical Support Staff
Ms. Akua Sakyi	-	Secretarial Support Staff

In Attendance:

Dr. Nii. Narku Quaynor	-	Member UN-ICT Task Force
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Reps from the Kwame Nkrumah University of Science and Technology:

Prof. Kwesi Andam	-	Vice-Chancellor
Prof. K. K. Adarkwa	-	Pro Vice-Chancellor
Prof. E. A. Jackson	-	Dean, School of Engineering
Prof. E. Y. Safo	-	Ass. Prof. Dept. of Crop Sc.
Prof. R. T. Awuah	-	Head, Dept. of Crop Science
Dr. Imoro Braimah	-	Head, Planning Unit
Prof. Aboagyee Menyeh	-	Dean, Faculty of Science
Mrs. Vesta E. Adu-Gyanfi	-	Head, I.R.A.I. Dept
K. A. Baah	-	Lecturer, IRAI, College of Art
A. B. C. Dadson	-	Physics Dept.
Kwame Yeboah	-	KVCIT, KNUST
Dr. Rudith King	-	DHPR, KNUST
Dr. J. Wiafe-Akenten	-	Physics Dept.
Dr. K. A. Dzisi	-	Agric Engineering
Dr. S. K. Abodzo	-	Agric Engineering
Dr. Abeeku Brew-Hammond	-	Mech. Eng. Dept.
Dr. T. Nyadziehe	-	Chem. Eng. Dept.
Prof. S. A. Asaima	-	ILAND, KNUST
Dr. P. Y. Okyere	-	Dept. of Electrical Eng.
Dr. David Anipa	-	Dept. of Electrical Eng.
Mr. Yaw Senyah	-	University Library
Mr. J. K. Gyebi	-	Dept. of Comp. Science
Mr. Solomon Panford	-	Snr. Assistant Registrar, URO
Mr. J. Aning-Dei	-	Chief Admin Assistant, URO
R. Tamakloe	-	Research Fellow, KVICT

Mr. G. A. Mensah-Agboh	-	Deputy Registrar
Mr. Kwesi Adarkwa	-	Dean, FEDS
Mr. Yaw Boateng	-	Editor, Kumasi Mail
MR. Phillip Sibelko	-	Chief Editor, GNA
Mr. P. O. Kyei	-	Lecturer Social Science
Mr. A. K. Boateng	-	Assistant Registrar
Mr. R. C. Abaidoo	-	Snr. Lec., Biological Science
Mr. Joseph Koomson	-	Lecturer Faculty of Social Sc.
Harriet Takyi	-	Lect. Faculty of Social Science
Lawrence N. Odonkor	-	Sys. Prog., Planning Unit
A. K. Abaitey	-	Lecturer, Faculty of Pharmacy
I. J. Arthur	-	Lecturer, Computer Science
O. A. deGraft Johnson	-	Lecturer, Book Industry
Prof. S. E. Owusu	-	Dept. of Housing & Plan Res.
Dr. E. L. K. Osafo	-	Dept. of Animal Science
Dr. Richard Akromah	-	Lecturer, Dept of Crop Sc.
Josephine K. Djampin	-	Asst. Registrar, Personnel Registry

-The entire student body of KNUST

-Representatives from St. Louis Sec. School

-Private Organizations

-General Public

(36) **PRESENTATION AT A MEETING WITH THE BANKING AND FINANCIAL INSTITUTIONS: (19/12/2002)**

Reps from the Committee:

Mr. Sani-Abdulai	-	Member
Lawyer Kwame Agati	-	Member
Mr., Emmanuel Ofori	-	Technical Support Staff
Ms. Rhoda Gavor	-	Technical Support Staff
Ms. Yvonne Afudego	-	Technical Support Staff
Ms. Akua Sakyi	-	Secretarial Support Staff

Reps from the Banking and Financial Institutions:

Mrs. Adelaide M. Benneh	-	Principal, National Banking College
Mr. D. A. Mensah	-	Executive Secretary, Ghana Association of Bankers
Mr. Issac Quaye	-	ICT Head National Investment Bank

Mr. Isaac Owusu	-	Manager, Merchant Bank
Mr. G. K. Kloe	-	Manager, Agricultural Dev. Bank
Mr. Stephen Abban	-	ICT Head, Amalgamated Bank Limited
Mr. Emmanuel K. Martey	-	Assist. IT Officer, Stanbic Bank, Ghana
Mr. Jeffrey E. Osei Hwechieh	-	Snr. Manager, IT Head
Mr. J. Ncube	-	SSB Bank
Mr. Isaac Boye	-	Infrastructure Support Barclays Bank of Ghana
Mr. Kwame Banibensu	-	Technical Support Manager Barclays Bank of Ghana

(37) **MEETING WITH THE NATIONAL SECURITY COUNCIL: (30/12/2002)**

Reps from the Committee:

Prof. Clement Dzionu	-	Chairman
Mr. Sani-Abdulai	-	Member
Mr. Issah Yahaya	-	Member
Mrs. Marian Tackie	-	Member
Mr. Kofi Benning	-	Technical Support Staff
Mr. Daniel Lamptey	-	Technical Support Staff
Ms. Akua Sakyi	-	Secretarial Support Staff

Reps from the National Security Council

Mr. W. K. Baffoe-Mensah	-	Sectoral Head
Mr. Paul A. Kwatchey	-	Computer Center
Mr. Emmanuel Sackitey	-	

(38) **MEETING WITH THE NATIONAL ACCREDITATION BOARD: (30/12/2002)**

Reps from the Committee

Prof. Clement Dzidonu	–	Chairman
Mr. Sani-Abdulai	–	Member
Ms Akua Sakyi	–	Secretarial Support Staff

Reps from the National Accreditation Board:

Mr. N. Kotey	–	Executive Secretary
Mr. F. Y. O. Amoah	–	Deputy Executive Secretary
Mrs. Fanny Adams Quagraine	–	Assist. Secretary

(39) **PRESENTATION AT A MEETING WITH THE GHANA FREE ZONES BOARD: (08/01/2003)**

Reps from the Committee:

Prof. Clement Dzidonu	–	Chairman
Mr. Issah Yahaya	–	Member/Secretary
Mr. Sani-Abdulai	–	Member
Mrs. Marian Tackie	–	Member
Ms. Rhoda Gavor	–	Technical Support Staff
Ms. Yvonne Afudego	–	Technical Support Staff
Ms. Victoria Aikins	–	Secretarial Support Staff
Ms. Akua Sakyi	–	Secretarial Support Staff

In Attendance:

Aida Opoku-Mensah	–	ECA, Ethiopia
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Reps from the Ghana Free Zones Board and some Reps from the

Media:

Andy Appiah Kubi	–	Ag. Director, GFZB
Patience Agbleze Acorlor	–	Mkt Promotion, GFZB
Rosemary Yankey	–	WAMCO, Takoradi
Leslie McCarty	–	Peace FM
Abigail Quayay	–	Secretary, GFZB
Kafui Nyaku	–	TV3 Network Ltd

Ama Amankwah	–	Metro TV
Ebenezer Hanson	–	The Daily Dispatch
Frederick Avornyo	–	JOY FM
F. Asnate-Boakye	–	Officer, GFZB
Bismark Larry Borteye	–	Officer, GFZB
Nana Yaa Jantuah	–	Officer, GFZB
Martin Gyekye	–	Clerk, GFZB
Ben Amoah	–	Resource and Operations Officer, GFZB
Christian Akorlie	–	Ghana News Agency
Gideon Sackitey	–	Ghana News Agency
Baaba Anquandah	–	GFZB
Florence Bonney	–	GFZB
Kwame Antwi	–	GFZB
Fred Lawson	–	GFZB

(40) **PRESENTATION AT THE METHODIST UNIVERSITY: (16/01/2002)**

Reps from the Committee:

Prof. Clement Dzidonu	–	Chairman
Mr. Sani-Abdulai	–	Member
Mr. Emmanuel Ofori	–	Technical Support Staff
Mr. Daniel Lamptey	–	Technical Support Staff
Ms. Rhoda Gavor	–	Technical Support Staff
Ms. Akua Sakyi	–	Secretarial Support Staff

Reps from the Methodist University:

Prof. N. K. Pecku	–	Principal
Prof. S. I. K. Odom	–	Dean of Social Studies
G. Owusu-Sekyere	–	Lecturer
Prof. A. H. O. Mensah	–	Dean of Business Admin.
Prof. Joshua Kudadjie	–	Dean of Students/Gen. Studies
Mrs. Eunice Ametor William	–	Warden, Female Hostel
A. P. Acheampong	–	Lecturer
Samuel Kwabi	–	Officer
Gideon K. Foh	–	Officer
Ekow Essilfie –Quaye	–	Officer
Theresa Yawson	–	Officer
Akua K. Asante	–	Teaching Assistant

Franklin K. Ocran	-	Lecturer
Terry Amuzu	-	Lecturer
Alfred Agbah	-	Lecturer
Biggles E. Petershie	-	Lecturer
Thomas Asamoah Manu	-	Teaching Assistant
Edward N. Tetteh	-	Teaching Assistant
The Entire Student Body		

**(41) MEETING WITH THE GHANA PRISON SERVICE:
(06/02/2002)**

Reps from the Committee:

Prof. Clement Dzidonu	-	Chairman
Mr. Sani-Abdulai	-	Member
Ms. Rhoda Gavor	-	Technical Support Staff
Ms. Akua Sakyi	-	Secretarial Support Staff

Reps from the Ghana Prison Service:

Mr. Richard Kwuire	-	Director-General of Prisons
Mr. B. T. Baba	-	Dir., Admin. & Finance
Mr. D. C. A. Dommie	-	Dep. Director – Logistics
Mrs. Matilda Baffuor-Awuah	-	Dep. Dir. – Women’s Affairs
Mr. Alhaji I. A. Nai	-	Dep. Director – Operations
Mr. H. O. Korney	-	Dep. Director – Chief Legal Officer / Welfare
Mr. E. C. Adjei-Koreeh	-	Dep. Director – Financial Controller
Mr. I. K. Tsegah	-	Dep. Director – Industries / Vocational Training
Rev. J. K. B. Appiah – Acheampong	-	Dep. Director – Chief Religious Affairs
Mr. G. B. Kuupiel – Asst. Director	-	Chief Logistics Supply
Mr. Fred Totimeh	-	Information Tech. Officer

(42) PRESENTATION WITH THE CENTER FOR INDUSTRIAL & SCIENTIFIC RESEARCH: (13/02/2002)

Reps from the Committee:

Prof. Clement Dzidonu	-	Chairman
Mr. Sani-Abdulai	-	Member
Mr. Kofi Benning	-	Technical Support Staff
Ms. Rhoda Gavor	-	Technical Support Staff
Ms. Victoria Aikins	-	Secretarial Support Staff
Ms. Akua Sakyi	-	Secretarial Support Staff

In Attendance:

Dr. Nii Narku Quaynor	-	Executive Director of Enterprise Africa and a Member UN-ICT Task Force
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Reps from the CSIR:

Prof. E. Owusu Bennoah	-	CSIR
Mrs. Eileen Odartei-Laryea	-	CSIR
Prof. A. A. Oteng Yeboah	-	CSIR
Kwabena A. Nketia	-	CSIR
Dr. Joseph O. Gogo	-	CSIR - STEPRI
Dr. K. G. Aning - CSIR	-	Animal Research Inst.
Dr. S. O. Bennet-Lartey	-	CSIR – Plant Genetic Resources Center, Bunso
Dr. A. B. Salifu - CSIR	-	Savanna Agric Research Inst.
Dr. R. D. Asiamah	-	CSIR – Soil Research Institute - Kumasi
Mr. K. Amua-Mensah	-	BRI – Kumasi
Dr. R. B. Lartey	-	IIR
Dr. T. E. O. Asamah	-	CSIR – Oil Palm
Dr. Charles A. Biney	-	CSIR – Water Research Inst.
Dr. W. K. Amoa-Awua	-	CSIR – Food Research Inst.
Mr. C. Entsua-Mensah	-	CSIR – INSTI
Dr. J. R. Cobbinah	-	CSIR – FORIG
Dr. J. A. Otto	-	CSIR
Armah Blay	-	CSIR
K. A. Darko	-	CSIR
J. B. Darkwa	-	CSIR

(43) **PRESENTATION AT THE UNIVERSITY OF CAPE
COAST: (26/03/2003)**

Reps from the ICT Committee

Prof. Clement Dzionu	-	Chairman
Mr. Kofi Benning	-	Technical Support Staff
Ms. Rhoda Gavor	-	Technical Support Staff
Ms. Akua Sakyi	-	Secretarial Support Staff

Representatives from the UCC

Rev. Prof. E. Addo-Obeng	-	Vice Chancellor
Prof. Kobina Yankson	-	Pro Vice Chancellor
Prof. Victor Gadgekpo	-	Dean of Science
		Director AVU Center
Prof. Haruna Yakubu	-	Chairman Computer Board
		Chairman ICT Project
		Prof. of Physics.
		Registrar
Mr. Kofi Ohene	-	Computer Center, UCC
Mr. Daniel Obuobi	-	Dept. of Gh. Languages
Comfort Asante	-	Dept. of Gh. Languages
Okofe Asenso	-	Data Processing Unit
Mr. Gideon E. Abbeyquaye	-	IEPA, UCC
Mr. J. S. K. Owusu	-	P/R Section, UCC
Mr. Jeff Onyame	-	Academic Section
Mr. Jones Addai-Marfo	-	Computer Science
Mr. John K. E. Edumadze	-	Academic Section
Mr. Isaac Ohene	-	Dept. of French
Mr. O. Addo-Danquah	-	Agic/Econs/Extension Dept
Mr. F. K. Annor-Frempong	-	Data Processing Unit
Mr. Alex Asante	-	UCC Library
Mr. Kwame Boohene	-	UCC History Dept.
Mr. Yaw Agyemang	-	R. S. Dept.
Mr. S. Y. Mensah	-	Physics Dept.
Mr. J. S. A. Akumbuno	-	Central Admin.
Mr. L. K. Sam-Amoah	-	Agric. Engineering
Mr. Clement Agezo	-	Dept. of Primary Education

Entire Student Body of the University of Cape Coast

(44) **MEETING WITH THE GHANA IMMIGRATION SERVICE:
(27/03/2003)**

Reps from the ICT Committee

Prof. Clement Dzionu	-	Chairman
Mr. Kofi Benning	-	Technical Support Staff
Ms. Akua Sakyi	-	Secretarial Support Staff

Representatives from the Ghana Immigration Service

Elizabeth Adjei	-	Director
J. G. G. Kartey	-	Dep. Dir. Finance & Admin
K. O. Ansu Gyeabourh	-	Dep. Dir. Operations
Moses K. Gyamfi	-	Asst. Dir. Enforcement
Odoi-Laryea	-	Asst. Dir. Passports
Kwame A. Takyi	-	Ag. Head, Legal
Baaba Asare	-	Staff Officer
Annor Quarshie	-	Asst. Dir. Communications
Emmanuel Yirenyeki	-	Controller (Issuing RM)
Judith Dzokoto	-	OIC/Africa Section
Kofi Owusu	-	ASI/Admin
Daniel Tagoe	-	ASI/Asst. Staff Officer
Love Owusu-Awuah	-	ASI/America Section
Kwasi Apau	-	ASI/Issuing Room
Augustine Dzineku	-	ASI/Quota Section
Iddrisu Aminu	-	ASI/Europe
Jacob Offroceng	-	ASI/Data Unit
Joseph Owusu-Sarpong	-	ASI/Permanent Res.
Joshua Krakue	-	ASI/GAR Office
Korlety K. Fosu	-	Legal Dept.
Gershong Dovie	-	Snr. Insp. / Radio Command Base
Michael Ampomah	-	Insp./Accounts
Titus Nyarko	-	Asst. Insp./Per Res.
Martin Dordze	-	ASI/Finance
Baffuor Bonnie K.	-	Insp./P. R.

(45) **PRESENTATION AT THE TAKORADI POLYTECHNIC**
(24/04/2003)

Reps from the ICT Committee

Prof. Clement Dzionu	-	Chairman
Mr. Emmanuel Ofori	-	Technical Support Staff
Mr. Daniel Lamptey	-	Technical Support Staff
Ms. Yvonne Afudego	-	Technical Support Staff
Ms. Victoria Aikins	-	Secretarial Support Staff
Ms. Akua Sakyi	-	Secretarial Support Staff

Representatives form the Takoradi Polytechnic

Dr. Aidoo Taylor	-	Principal
Rev. Daniel Nyarko	-	Vice Principal
Mr. Manukure-Henaku	-	Polytechnic Secretary
Mr. Norbert Adjei	-	Ind. Liaison Officer
Mr. Ahlijah	-	HOD, Accountancy Dept.
Mr. Joseph Danso	-	HOD, Computer Unit
Mr. John Dakudzie	-	Computer Unit
Mrs. Dorothy Owusu-Asare	-	Computer Unit
Mr. Abboah	-	Electrical Dept.
Mr. Kenneth Boateng	-	Fashion Dept.
Naa Sackiokor Sackey	-	PRO

The entire Student Body of the University of Cape Coast

(46) **MEETING WITH THE REGIONAL DIRECTORATE AT**
THE WESTERN REGIONAL COORDINATING COUNCIL
(24/04/2003)

Reps from the ICT Committee

Prof. Clement Dzionu	-	Chairman
Mr. Emmanuel Ofori	-	Technical Support Staff
Mr. Daniel Lamptey	-	Technical Support Staff
Ms. Yvonne Afudego	-	Technical Support Staff
Ms. Victoria Aikins	-	Secretarial Support Staff
Ms. Akua Sakyi	-	Secretarial Support Staff

Representatives from the Western Regional Coordinating Council

Nancy L. Dzah	-	Director (F&A)
Mathias Atsu Kudafia	-	Regional Mgr. NBSSI
A. S. Nai-Kwade	-	Direction, GHSA

Ruth Quansah	-	Asst. Land Officer
Ralph Wann-Tamakloe	-	Dep. Reg. Valier
Patrick Amoah	-	Reg. Stool Lands Officer
Olivia Opoku-Adomah	-	Rep. Reg. Econ. Plan Officer
Emmanuel Opoku	-	Reg. Director, Comm. Dev.
N. Popku-Brookman	-	DD. Reg. Dir. Meteo. Services
L. Danso-Amoako	-	Regional Engineer, PWD
K. Owusu-Ansah	-	Reg. Env. Health Officer
Alexander Addo	-	Dep. Director, MOFA
E. K. Moses	-	NCS, Sports Coach
Abdulai Kurah	-	Reg. Director, T&C
Ellen Osei Tutu	-	Rep. (Admin Director)
Efo Kodjo Mawugbe	-	Reg. Director, C. N. C.
G. A. Danquah	-	
Marcellus Botsio	-	National Service Personnel
Samuel R. O. Larbi	-	Reg. Budget Officer
J. a. Boffie	-	Rep. Reg. Engineer, DFR
Daniel Ayindingo	-	Reg. Accountant
Ernest Adjei	-	Dep. Reg. Coord., NADMO
C. A. N. Martin	-	Reg. Info. Officer
B. A. Whyte	-	Reg. Population Officer
G. B. Mettle	-	Reg. Statistician
J. G. Koomson	-	Project Officer, NBSSI
Irene Heathcote	-	Environmental Prot. Agency

(47) **MEETING WITH THE REGIONAL DIRECTORATE AT**
THE UPPER EAST REGIONAL COORDINATING COUNCIL
(22/05/2003)

Reps from the ICT Committee

Prof. Clement Dzionu	-	Chairman
Mr. Mohammed Sani Abdulai	-	Member
Mr. Daniel Lamptey	-	Technical Support Staff
Ms. Yvonne Afudego	-	Technical Support Staff
Ms. Victoria Aikins	-	Secretarial Support Staff
Ms. Akua Sakyi	-	Secretarial Support Staff

Representatives from the Upper East Regional Coordination Council

Mahami Salifu	-	Regional Minister
George Anaba	-	Regnal. Coordinating Director

B. S. Tampuri	-	DRCD
Anthony Yirkyio	-	RCC
B. J. L. Shumasi	-	Rep. (Regional Director-GES)
George Yanore	-	Rep. Police
Supki E. Y. Domie	-	Rep. Ghana Police
W. Naab	-	Reg. Co-op Officer
Anthony Awiah	-	Rep. Dept. of Social Welfare
Damma Mumuni	-	DPO, Bongo Dist. Assembly
T. T. Wubonto	-	Rep. Regional Director, VRA Radio
S. Anderson Anaphor-Nabia	-	Regional Co-Ordinator, NADMO
George Apolala	-	Regional Director, GMMB
Mohammed Akalifa	-	Bawku East Dist. Assembly
Eric Quartey	-	Rep. Immigration Service
Alexis S. A. Akurugu	-	Rep. Survey Dept.
Martui Osei-Owusu	-	Rep. MOTI
Daniel Agorisega	-	Rep. Dept. of Rural Housing
Mohammed Nurideen Issahaq	-	Ghana News Agency
Joseph Annan	-	Reg. Budget Officer-RCC
Steven Kandue	-	Reg. Fire Officer – Bolga
Alhaji A. Bawa	-	Reg. Sec. TUC
Zenabu Wascii	-	Reg. Director-EPA
M. J. Awuku	-	Reg. Head – Ghana Telecom
Miriam Koyiri	-	Ag. Reg. Head – Gh. Post Co.
Daniel Ayirie	-	Reg. Head, Town & Country Planning
N. K. Afunyah	-	Reg. Head, Meteo Services
W. K. Anaglate	-	Reg. Engineer-PWD
Boya Abdulai	-	Ag. Reg. Director
Anamboya Samuel	-	Ag. Reg. Librarian-GLB
Abraham Durimie	-	Reporter-GBC
Sabiru Zibrim	-	Reporter-GBC
Paul S. Ayagiba	-	Rep. of RDA, MOFA
Abba Offie Akoto	-	Reg. Manager, NBSSI
Abu Shaibu	-	Rep. of Community Dev.
Aylvester Ayangmikre	-	Reg. Pop. Officer, Nat. Pop. Council
Mike Dolie	-	Deputy Director-CEPS

(48) **PRESENTATION AT A MEETING WITH THE STAFF AND STUDENTS OF THE BOLGATANGA SENIOR SECONDARY SCHOOL (22/05/2003)**

Reps from the ICT Committee

Prof. Clement Dzionu	-	Chairman
Mr. Mohammed Abdulai	-	Member
Mr. Daniel Lamptey	-	Technical Support Staff
Ms. Yvonne Afudego	-	Technical Support Staff
Ms. Victoria Aikins	-	Secretarial Support Staff
Ms. Akua Sakyi	-	Secretarial Support Staff

Representatives from the Bolgatanga Senior Secondary School

Margaret Akparibo	-	Asst. Headmistress (Academic)
Rev. Fr. George Asigre	-	Chaplain
Beatrice Issaka	-	Snr. Housemistress 'B'
Arah Matteaw	-	Tutor
Apana Thomas	-	Tutor
Majeed Saeed F.	-	Head of IT Dept.
Akungo Nelson	-	Geography Tutor
Galywon Raymond	-	Agriculture/Dispensary Tutor
Ayimore Abonuusum	-	Chemistry Tutor
Joseph K. Oteng	-	National Service Personnel
Agyei Bonsu	-	National Service Personnel (Physics Tutor)

The entire Student Body of the Bolgatanga Senior Secondary School.

(50) PRESENTATION AT A MEETING WITH THE STAFF AND STUDENTS OF THE UNIVERSITY OF DEVELOPMENT STUDIES
(23/05/2003)

Reps from the ICT Committee

Prof. Clement Dzionu	-	Chairman
Mr. Mohammed Abdulai	-	Member
Mr. Daniel Lamptey	-	Technical Support Staff
Ms. Yvonne Afudego	-	Technical Support Staff
Ms. Victoria Aikins	-	Secretarial Support Staff
Ms. Akua Sakyi	-	Secretarial Support Staff

Representatives From The University Of Development Studies

Prof. Saa Ditto	-	Pro Vice Chancellor
Mr. Emmanuel Banu	-	Ag. Finance Officer
Dr. Ismail Bin Yahya	-	Ag. Director, CIR
Mr. Ahmed M. Rufai	-	Lecturer
Dr. Walter M. Kpikpi	-	Dean FAS
Nina Adimazoga	-	Secretary
Feseini Abdulai	-	Security
Poreka Godwin	-	Teaching Assistant
Lolig Victor	-	Snr. Research Asst.
Obed K Owusu	-	Technician, Quantity Surveying
Hubert K. Zoure	-	Admin Asst.
Gideon K. Helegbe	-	Lecturer
Dr. Richard Adu-Asamoah	-	Snr. Lecturer
Oscar I. Aalangdond	-	Lecturer
Gabriel Kofi Adu	-	Asst. Archivist/Librarian
Paschal A. Akamfewon	-	Snr. Accounts Clerk
Kpieta B. Alfred	-	Snr. Research Asst.
Elsie Amina Gombilla	-	Asst. Registrar
Dr. Thomas Bayorbor	-	Dean, Faculty of Agric/Snr. Lecturer
William B. Nsiah-Asare	-	Program Analyst
Stephen Mintah	-	Admin Asst.
Rose A. Ayam	-	Admin Asst.
Mercy Don Touleg	-	Typist
Caesar Abagali	-	Journalist
Abdul-Kadiri Ibrahim	-	Asst. Librarian
George Debrice	-	Asst. Registrar
Nurudeen I. Abubakar	-	Asst. Registrar
Mary Zumenir	-	Accounts Clerk
Fulera Nabie	-	Animal Ser. Dept.

Emmanuel Abugre	-	Audit
Charles M. Ackah	-	Prin. Accounts Asst.
Thomas Opoku	-	Auditing Asst.
Mark Yamoah	-	Snr. Accounts Asst.
Sulemana Abdul-Majeed	-	Audit Clerk
Edward Charles	-	Porter
Joseph Doggu	-	Snr. Auditing Asst.
Alice Tizie	-	Secretary
Fia John Elorm Jnr.	-	NSP, FOA, DAMIT
Joseph Asense	-	Library Dept.
Mahama Inusah	-	Registry/Transport Unit

The entire Student Body of the University of Development Studies.

(51) PRESENTATION AT A MEETING WITH THE STAFF AND STUDENTS OF THE GHANA SECONDARY SCHOOL-TAMALE
(23/05/2003)

Reps from the ICT Committee

Prof. Clement Dzionu	-	Chairman
Mr. Mohammed Abdulai	-	Member
Mr. Daniel Lamptey	-	Technical Support Staff
Ms. Yvonne Afudego	-	Technical Support Staff
Ms. Victoria Aikins	-	Secretarial Support Staff
Ms. Akua Sakyi	-	Secretarial Support Staff

Representatives From The Ghana Secondary School

M. S. Andul-Rahamana	-	Headmaster
Iddrisu Neindow	-	Asst. Headmaster – Academic
P. C. Naah	-	Head of the Business Dept.
W. w. Zakari	-	Head of Dept. – Languages
Salifu Hamza	-	GBC/RST
Anthony Tawiah	-	Diamond FM
Paul Mensah	-	GNA
Nelson Adanuti	-	Diamond Fm
Wienwaah Michael	-	NSP
E. A. Yakubu	-	Head of Science Dept.
Kwame Safo-Adu	-	Head of Computer Dept.
Salamu Ganiyu	-	Head of Social Science Dept.
Iddi Wumi	-	Asst. Headmaster – General
J. K. Kumah	-	Head of Agric. Dept.

Iddrisu Sulemana - Asst. Admin Officer
Alhaji S. Y. Bukari - Snr. Housemaster
Madam W. A. Lansah - Snr. Housemistress
Mohammed Bashir Saani - Form Master
Tugbog Lucio - French Master/Housemaster
Mohammed Hussein - Admin Officer
Abdul-Majeeb Yakubu - The Daily Graphic
Atiimden A. Caesar - Accountant

The entire Student Body of the Ghana Secondary School

