

# The International Institute for Information Technology (INIIT)

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## The Ghana SCAN-ICT Pilot Project

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### The Development, Deployment and the Exploitation of ICTs in Ghana: An Empirical Study and Analysis

Summary Report of the Study and its Key Findings
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#### 1.0 The Study Methodology and the Process

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The Ghana Scan-ICT pilot project was based a comprehensive methodology defining the underlying processes, procedures and the required tools required for facilitating the implementation process – involving data collection, analysis and presentation of the study results.

The project was implemented two stages namely (i) the *design stage* involving the design of the details of the methodology and (ii) the *implementation stage* involving data collection/gathering and analysis is based on a comprehensive methodology. For each of the specific indicators under each of the Scan-ICT theme --- the methodology provided specific details in relation to:

- the relevant information to be collected/gathered;
- the possible sources of the relevant information to be gathered;
- the methods to be used for obtaining or gathering the required information;
- the relevant types of questionnaire to be used in cases where a postal survey or a face-to-face interview is required and
- the format in which the information gathered as per each indicator is to be presented or summarized.

Three main types of questionnaire have been designed as part of the detailed Methodology, these include:

- graphical-based questionnaire, these are used for face-to-face interviews;
- standard (text-based) questionnaires, which were used for both face-to-face interviews and postal questionnaires and
- electronic-based questionnaires which are transmitted to target samples via e-mail.

The graphically-based, the text-based and the electronic-based questionnaires were all field tested using a sample from each of the targeted populations. These target populations include:

- the public sector institutions and establishments (Government Ministries, Agencies and Departments; Public Sector Organizations, Local, Regional and District organizations and institutions etc)
- the private sector establishments and institutions; (small and medium scale enterprises [SMEs], large private enterprises etc)
- schools (public and private primary and secondary schools);
- universities, colleges and polytechnics;
- ICT (computer) companies, institutions and establishments including computer equipment vendor, retailers and distributors, software vendors, retailers and distributors; computer training centers and institutions, computer systems development and support companies and establishments, communications centers and Telecenters; ISPs, Telecom Operators, Gateway/Broadband Service Providers and other Internet-based Service Providers
- Hospitals, Clinics and Health Centers.

It is envisaged that the questionnaires and the other tools developed for use in the pilot project will be refined based on the outcome of the pilot project for use in the follow-up main Scan-ICT project.

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## **2.0 Project Implementational Issues**

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The implementation of the Ghana Pilot Scan-ICT project involved a number of key activities, these include:

- Developing and Customizing the Scan-ICT Methodology (the details of which are presented in Chapter One of the Report)
- Developing the Questionnaire
- Field Testing and Revising the Questionnaire
- Using the Questionnaire to carryout the postal, face-face and the online (e-mail shots and Website-direct) data gathering exercise
- Compilation of the survey data, analysis of the results, and the preparation of the Project Report and
- Project Report Submission and Dissemination

*The SCAN-ICT Research Network: [Data Collection and Research]*

To facilitate the data collection and research work, a Scan-ICT Research Network was set-up with members from the Universities, Polytechnics and Research Institutions spread all over the country. The key institutions forming part of the Network and their respective roles are described below. Also describe as per each participating institution are the areas of the country covered during the nation-wide survey exercise by the members of the Network based at these institutions. Also identified for each area is the type of survey carried out by the relevant institution.

Apart from INIIT being the *national coordinating agency*, some nodes of the network are designated as *regional coordinating nodes* each partnering with a number of *partnering nodes*. There are also a number of *collaborating nodes*.

### **International Institute for Information Technology (INIIT) – National (Project) Coordination Agency**

Regions Covered:

- All Regions (Postal Survey)
- All Regions (Online Survey)
- All Regions (Newspaper Inserts)

### **University of Ghana --- Regional Coordinating Node**

*Partnering-Nodes:*

- Accra Polytechnic
- Institute of Professional Studies

*Regions Covered:*

- Greater Accra (Face-to-Face Survey)

### **Council for Scientific and Industrial Research (CSIR) --- Collaborating Node**

*Regions Covered:*

- Greater Accra (Face-to-Face Survey)

### **Valley View University – Collaborating Node**

*Regions Covered*

- Greater Accra Region (Face-to-Face Survey)
- Eastern Region (Face-to-Face Survey)
- Volta Region (Face-to-Face Survey)

### **University of Cape – Regional Coordinating Node**

*Partnering-Nodes:*

- University College of Winneba
- Cape Coast Polytechnic

- Takoradi Polytechnic

*Regions Covered:*

- Central Region (Face-to-Face Survey)
- Western Region (Face-to-Face Survey)

**Kwami Nkrumah University of Science and Technology** – Regional Coordinating Node

*Partnering-Nodes:*

- Kumasi Polytechnic
- Sunyani Polytechnic
- University of Development Studies

*Regions Covered:*

- Ashanti Region (Face-to-Face Survey)
- Brong Ahafo Region (Face-to-Face Survey)
- Northern Region (Postal Survey)
- Upper East Region (Postal Survey)
- Upper West Region (Postal Survey)

### ***The SCAN-ICT Respondent Network***

The Pilot project also involved the setting up of the *Scan-ICT Respondents Network* made of the respondents of most of the face-to-face survey and the postal survey. Each respondent was requested to complete a form providing contact details and most of the respondents provided these details. The database of respondents' details constitutes the details of the *respondents' network* which will be used in the future for follow-up Scan-ICT surveys and for dissemination of some of the study reports.

### ***Methods of Data Collection***

A number of methods were used to collect data on the identified indicators listed in the Scan-ICT methodology topology described in Chapter 1. Identified below for each of these methods, are the targeted institutions and the response rate for each of these institutions and establishments. Note that for each of these targets a number of data collection methods were used with varying results.

### **Postal Questionnaire**

This involved posting relevant questionnaires to a sample of each category of target institutions and establishments. Completed questionnaires were returned by post by the respondents.

*Targets:* Schools, Universities and Colleges, Private and Public Sector Establishments, ICT Service Providers and Computer Companies

*Response Rate:* Reasonable

Schools [50%], Universities and Colleges [25%], Private and Public Sector Establishments [10%], ICT Service Providers and Computer Companies [5%]

### **Face-to-Face**

This involved a face-to-face meeting with the respondent, during which the questionnaire is completed on the spot by the respondent guided by the Scan-ICT Researcher.

*Targets:* Universities and Colleges, Private and Public Sector Establishments, ICT Service Providers and Computer Companies, Hospitals, Cultural and Heritage Organizations.

*Response Rate:* Very Good

Universities and Colleges [100%], Private and Public Sector Establishments [100%], ICT Service Providers and Computer Companies [100%], Hospitals [100%], Cultural and Heritage Organizations [100%]

### **E-mail Shots**

This involve sending questionnaire embedded in an e-mail message to a sample of respondents, who completes the questionnaire and return it to INIIT again by e-mail.

*Targets:* Private and Public Sector Establishments, ICT Service Providers and Computer Companies

*Response Rate:* Good

### **Web-Site Direction**

This involve a using a newspaper advertisement directing people to a Web-site, where they complete the questionnaire and submit it automatically.

*Targets:* National (All Sectors)

*Response Rate:* Reasonable

### **Newspaper Inserts**

This involved inserting the questionnaire in a local monthly Computer Publication with a national circulation. Readers complete the questionnaire and send it by post to INIIT. It is also planned to use this Computer Publication for the dissemination of the Study results.

*Target:* National (All Sectors)

*Response Rate:* Reasonable

### **Radio Shows**

During the Scan-ICT project, INIIT staff was interviewed on a local radio station about the project. The publicity generated by this radio programme did have some impact on the response rate of some of the other data collection methods used.

*Target:* All Sectors

*Response Rate:* Reasonable

### **Lessons Learnt**

Some of the lessons learnt as part of the implementation of the project can be summarized as follows.

#### ***Postal Questionnaire – Limited Success***

[Data Gathering –Limited, Setting up Respondent Network – Successful]

#### ***Face-to-face Data Collection Exercise – Successful***

[Data Gathering, Setting Up Research Network and Building Capacity, Setting-up the Respondents Network]

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## **3.0 Some Specific Findings and Conclusions of the Study**

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### **3.1 General Profile: Demographic and Economic**

- Ghana has a land area of 238,537 square kilometers and a population of approximately 18.4 million, with a population growth rate of between 2.5% and 2.9% and a population density of 77 per km<sup>2</sup>. About 44.1% of the population is under 14 years, while 51.3% between 15 - 64 years and 4.7 % aged 60 years and above. About 60% of the population lives in the rural areas.
- 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). Ghana is the second largest gold producer in Africa, after South Africa. Ghana is ranked 10<sup>th</sup> gold producing country in the World. It is the 2nd leading producer of cocoa in the world.
- Agriculture is currently the backbone of the Ghanaian economy. In 2000, the agricultural sector employed 70% of the labour force, contributed 39.6% to GDP and accounted for 57% of foreign exchange earnings. This sector is also a key source of raw materials for the cottage and the modern industries. It is also the main source of income for majority of the population and has-five sub-sectors — crops (excluding cocoa), cocoa, livestock, fisheries and forestry
- Industry, mining, and construction account for about 32% of GDP and 13% of the total work force. Manufacturing is dominated by import-substitution industries. Trade, transportation, finances, public administration, and services account for nearly 28% of the GDP and employ more than 25% of the work force.

### **3.2 The ICT Sector: An Overview of National ICT Policies and Strategies**

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- Ghana's ICT sector has undergone a remarkable transformation during the past decade and half. This has brought about a number of significant changes in the sector, including the introduction of cellular phones, FM radios, cable TV and the Internet.

- Ghana deregulated the communications sector in 1994 when the government initiated the implementation of a five year comprehensive restructuring of the industry --- the *Accelerated Development Program 1994-2000 (ADP 2000)*. A National Communications Act was passed in 1995 provided for the creation of a fixed network duopoly.
- The separation of telecommunication regulatory responsibilities from operational functions was a key component of the telecommunication industry reform programme embarked on by the Government of Ghana as part of the ADP-2000. A result of this was the setting up the National Communications Authority (NCA) by an Act of Parliament in 1996

### 3.3 The ICT Sector: An Overview of Key Telecom and Communications Indicators

Basic Telecommunications Data	
Total No. of Tel. Subscribers (fixed line + mobile)	455,000
Total Fixed Line Subscribers	225,000
Mobile System Subscribers	230,000
Total Number of Subscriber (per 100 inhabitants)	2.08
Main Telephone lines	242100
Teledensity	1.16
Main Tel. Line Capacity Used	82.2%
Main Telephone Line (Residential %)	42.0%
Total Residential Main Line	99,600
Residential Main Lines (per 100 inhabitants)	2.4
Digital main lines (%)	100%
Waiting list for main lines	15,567 ('98)
Public telephones	4180
Public Telephones (per 1000 inhabitants)	0.17
Public Telephones as % of Main Lines	1.35
Mobile subscribers	19,3800
Mobile subscribers per 100 inhabitants.	0.93
Mobile Subscriber as % total Tel Subscribers	44.5

Other ICT Indicators	
PC (Per 1000 persons)	3
Internet Hosts	235
Long-Haul Internet Bandwidth	2.5 MB
Internet Users (per 1,000 persons)	40,500
Number of Daily Newspapers [1998]	14
Radios (per 1000 persons) [2000]	710

### **3.4 The Deployment and Exploitation of ICTs: An Overview of the Ghana ICT Landscape**

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- Ghana has adequate skilled manpower, trained in the use of ICT systems but very little manpower in the development of these systems. The development of the local ICT industry will depend very much on efforts being taken by the public and the private sectors to meet the shortfall in critical ICT skilled manpower.
- A nationwide SCAN-ICT survey of ICT related companies and service providers shows that 11% of the respondents cited ICT skill shortage as an inhibiting factor for growth in the sector. About 14% regarded the small size of the Ghanaian market as an inhibiting factor, while 26% regarded the low level of computer literacy/awareness in the country as a key factor that is limiting the growth of the Ghana ICT sector. Dis-incentives like taxes and import duties imposed on ICT products and services was cited by 21% of the respondents as a key inhibiting factor for the growth of their respective companies and the ICT industry as a whole.
- The growth of the ICT sector is also being inhibited by lack of infrastructure development in areas like transport, telecommunications, and electricity. For example the lack of the electricity infrastructure in some sections of the country has been identified as a bottleneck to the expansion of ICT-related services.
- The expansion of the communications sector, has in recent years led to the explosion of telecommunications and communication services; this has contributed to employment and job creation especially in the service sector.

### **3.5 Sectoral Applications: The ICT Sub-Sector**

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- The Scan-ICT survey shows that on average, ICT companies and establishments have on average 3 programmers on their staff, 4 IT trainers and 2 computer scientists on their ICT staff. On the whole the average number of personnel in each of the key ICT skill areas is about 2.5 per organization. This figure is rather low for ICT companies, and goes to confirm that the majority of ICT companies in Ghana are more involve in retailing and distribution of computer products (mostly imported --- with very little local context), activities requiring very little technical computer expertise like programmers, software developers, computer scientist among others.
- On the whole the study indirectly shows that the Corporate Sector and the Government and Public sector are the major consumers of ICTs in Ghana and hence a major source of business (client-base) for the majority of ICT companies in Ghana. Also the Study shows that the client-base of most ICT companies and establishments are multi-sectorial with a minority of companies with a high concentration of their clients (75%-100% of their clients) based in a single sector.
- The evidence shows that unlike in the more developed ICT industries of the developed countries where some of the large ICT companies concentrate their services in a given sector (e.g. the corporate sector or government sector) the Ghana ICT companies), because of their size (the

majority being small-scale operators) and the distributive nature of their operations cannot be viable having a uni-sector client base.

### **3.6 Sectoral Applications: The Public Sector and the Private Sector**

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- The vast majority of public and private sector organization in Ghana are computerized. The Scan-ICT national survey of these organization shows that 92% of them have computers. Comparative analysis indicates that: 83% of the public sector organizations have computer systems in place; the corresponding figures for the private sector and the NGO sector are 99% and 100% respectively.
- In relation to the private sector; the majority of organizations are servicing companies, accounting for 55% with manufacturing/industrial companies accounting for only 15%. This distribution of type of private sector organizations do reflect the composition of the Ghanaian private sector which is dominated by distributive and servicing types of companies. The survey results also reflects composition of the Ghana public sector which is dominated by Government Administrative type of establishments.
- The Scan-ICT nationwide study on the degree of usage of computers to support the activities and operations of public and private sector organizations including the NGOs shows that: about 22% of the organizations reported having below 10% their staff that uses computers within the organization. About 28% reported that about a quarter of their staff use computers and 13% reported that about half use computers to do their work. Only 12% of the organizations have all their staff using computers.
- About 20% of the organizations involve in the Scan-ICT study do not have computer personnel while about 50% indicated that less than 10% of their staff are computer personnel. Just about 11% have about a quarter of their staff as computer personnel.
- The majority of public and private sector organizations spend less than 10% of their total budget on IT (including acquisition of hardware software, training, maintenance of IT systems etc). About 51% indicated that their IT expenditure as a percentage of their total expenditure is below 19%. Close to 36% or the public and private sector organizations reported devoting about a quarter of their total expenditure on IT. On the whole most of the organizations in all sectors spend less than half of their annual budget on information technology
- The results of the nationwide Scan-ICT survey on the home ownership of computers by employees of public and private sector organizations and establishments shows that: a high 81% of organizations have some proportion of their staff that owned and use computers at home.
- Close to 81% of the public and private sector organizations including the NGOs have access to the Internet, according the to Scan-ICT study on connectivity within these sectors. Sectorially, 69% of the public sector organization have Internet access compared to 90% of the private sector establishment and 100% in the case of the NGOs
- Of the organizations with Internet access, 44% reported that below 10% of their staff uses the Internet; whiled about 14% reported that about a quarter of their staff uses the Internet. Only 9% of the organization have half their staff using the Internet. On the whole although close to 81% of

the organizations have Internet access, the vast majority of them have less than half of their staff that uses the Internet.

- The vast majority of organization in both the public and private as per the details of the Scan-ICT national survey on e-commerce activities are not involve in trading their goods and services on the Internet. About 91% of the organizations and established that took part in the study are not involved in e-commerce.
- Close to 61% of the organizations who participated in the Scan-ICT survey indicated having in place their organizational IT policy or strategy. Sectorially, 66% of the public sector organizations have their IT policy/strategy, while a slightly less proportion of 58% or the private sector organizations indicated having their organizational IT policy/strategy. The corresponding figure for the NGOs is 64%

### **3.7 Sectoral Applications: The Educational Sector – The Schools**

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- A number of Ghanaian schools especially the secondary school have computers. About 79% of the schools reported having computers, with the average number of computers per school estimated at 19. Of the schools reporting having computers, about 13% indicated having them for less than a year. A relatively high proportion of 26% indicated a period of 1 to 2 years of ownership of computers. The corresponding figure for 2- 3 years and 3- 4 years are: 18% and 13% respectively.
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- Only about 8% of the schools reported having computers for more than five years. None of the schools they use to have computers but no more. In other words, the schools without computers never had computers in the past
- The Scan-ICT study also shows that 85% of the schools have computer literate teachers. Based on the nation-wide survey results, the average number of computer literate teachers per school in Ghana was estimated 7 per school.
- Of the schools with computers about 53% reported using computers to support school administrative work, with a high 97% reporting using the computers to support teaching and only 16% indicated using their computers to support teaching.
- Of the schools involved in the Scan-ICT study, about 11% reported that none of their pupils use the computer for learning and/or access to the Internet. About 24% indicated that below 10% of their student population use the computers with about 8% reporting that about half of their students use the computers. A relatively high proportion of the schools reported that all their pupils uses the computer for learning and/or access to the Internet.
- A high percentage of Ghanaian schools don't have access to the Internet. Of the schools surveyed nationally 81% of them reported not having connectivity to the Internet. Only about 15% reported having Internet access. About 71% of the schools reported not having a Website/Homepage on the Internet with about 19% reporting having a Web presence.
- Of the schools with access to the Internet, only 14% indicated having free access, in other words the schools does not pay for the service from its own resources. As high as 43% of the schools indicated paying for their Internet connectivity and usage from their own resources, with another 43% reporting paying for some of the cost.

### **3.8 Sectoral Applications: The Educational Sector - The Universities and Colleges**

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- The Scan-ICT survey relating to the exploitation of ICTs in the Universities and Colleges, shows that of all the University Departments surveyed, 35% indicated using computers to support their administrative work; 22% for supporting teaching; 22% for supporting staff research work of staff and students and 12% for accessing the Internet. The corresponding figures for Engineering, Computing and Computer Science departments are: 81% (for supporting administrative work); 81% (to support teaching); 65% (for supporting research work of staff and students); and 23% for Internet access.
- About 95% of all Departments indicated having computers with all the Engineering, Computing and Computer Science departments reported having computers. On the whole the average number of computers per department ( in the case of all departments and units within the universities and colleges) is estimated at 9. The corresponding figure for the Engineering, Computing and Computer Science departments is an average of 26 computers per department.
- About 52% of the departments within the Universities and Colleges reported making computing and/or computer studies an integral part of their diploma and degree programmes. The corresponding figure for the Engineering, Computing and Computer Science departments is much higher, about 84% indicated making computing/computer studies mandatory for all their programmes.
- On the question of the degree to which the university and college departments are involved in electronic distance education (EDE) to compliment and supplement campus-based education in their respective departments, only 3% of the departments indicated involvement in EDE. None of the Engineering, Computing and Computer Science departments surveyed as part of the Scan-ICT study are involved in any form of electronic distance education.
- A high percentage of university staff indicated having computers at home. Of all the University and College departments surveyed during the Scan-ICT study, close to 82% of the departments indicated having some percentage of their staff with computers at home. The corresponding figure for the Engineering, Computing and Computer Science departments is 74%.
- Close to about 42% of all the Department and Units within the Universities and Colleges surveyed as part of the Scan-ICT study have access to the Internet, the corresponding figure for the Engineering, Computing and Computer Science departments is slightly higher at 48%.
- Most of the department and units within the universities and colleges had access to Internet for less than 3 years. Of the departments and units surveyed during the Scan-ICT Study, about 42% had access for less than one year with 21% of them having access between 1 and 2 years, and 17% indicating that they had their Internet access between 2- 3 years.
- In relation to meeting the cost of Internet access, only 2% of the departments that participated in the Scan-ICT study, indicated that they have free access to the Internet, in other words, some other agency pay for the cost of access.

- Only 24% of all the university departments surveyed have their own Web site, the corresponding figure for the Engineering, Computing and Computer Science departments is 26%. On the whole the majority of university departments and units do not have web presence.

### **3.9 Sectoral Applications: The Health Sector**

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- Of the Health Institutions surveyed, 62% indicated having computers which they use for supporting their administrative and other operational activities including using it for accessing the Internet (as is the case in some of the Institutions). About 38% reported not having computers
- Of the Health Institutions involved in the Scan-ICT study, a high 53% reported having below 10% of their staff that use computers to support their work. Close to 29% indicated that about a quarter of their staff uses computers, while only 8% reported that about half of their staff use computers. Only 5% reporting having almost all their staff involved in using computers to support their functions within their Institutions.
- A high proportion (70%) of the Health Institutions participating in the Scan-ICT study indicated that their staff do have computers at home. Only 30% reported that none of their staff have their own computer at home
- A reasonable proportions of the Health Institutions surveyed nationwide as part of the Scan-ICT study do have access to the Internet. The Study revealed that about 46% of the Institutions have access to the Internet. The vast majority of these have dial-up access via local ISPs.
- On the issue of Web presence, the vast majority of the Institutions do not have their own Web site on the Internet. Only 17% of the Institutions indicated having web presence.
- The process of the deployment of ICTs into the Health Institutions to support the operations and activities do face a number of problems. Of the Institutions involved the Scan-ICT study, 22% indicated that computer skill shortage within their organization is a major problem area. A relatively higher proportion of 27% identified the high cost of computer products and services as a major problem area that has implications on the deployment and exploitation of ICTs within their Institutions