

# Embedding Information and Communications Technologies (ICT) in Nigeria Local Government System

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## ABSTRACT

Local governments are faced with a range of challenges, including social benefits, community safety, education services, waste management, and the operation of recreational facilities. In addition, local governments are under increasing pressure to deliver administrative transparency and accountability to its citizenry. Information and Communications Technology (ICT) has a key role to play in helping to meet the wide ranging responsibilities and diverse expectations of local governments.

The desire to improve citizen relationships is closely tied to the objective of improving the services provided by local government. In these areas, document management, back and front office integration, and infrastructure upgrades were identified as key points of focus. In all areas of consideration, ICT has been identified as a key enabler to help support improved citizen-centric service provision. However, it is observed that Information and Communication Technology is not currently playing a significant role in the local governments in Nigeria.

This paper presents documentation on how ICT can be implemented in a local government to enhance good and quality service delivery. The role and challenges of a local government were highlighted. A virtual bureaucracy to e-government transition is presented as well as the technical framework (Technical Model) for the ICT implementation in the local government. The Technical model has the basic components of ICT infrastructures and Information systems.

(Keywords: local government, e-government, ICT, technical model, internet)

## INTRODUCTION

Information and Communication Technologies (ICTs) and related telecommunication and other digital networks are considered to be a major driving force of building information societies and economies, and are increasingly recognized as a new factor in improving existing governance practices (ICT 2007). Local governments are faced with a huge diversity of citizens, issues, and challenges. These range from the provision of social housing and welfare benefits, to community safety, education services, waste management and the operation of recreational facilities. The purpose of Local Government is to tackle the challenge of balancing limited resources with the needs of their communities. In addition, local governments are under increasing pressure to deliver administrative transparency and accountability to its citizenry. ICT has a key role to play in helping to meet the wide ranging responsibilities and diverse expectations of local government.

The desire to improve citizen relationships is closely tied to the objective of improving the services provided by local government. In these areas, document management, back and front office integration and infrastructure upgrades were identified as key points of focus. In all areas of consideration, ICT has been identified as a key enabler to help support improved citizen-centric service provision. However, it is observed that information and communication technology is not currently playing a significant role in the local governments in Nigeria. In a study by Olabode and Agagu (2007) on the awareness and consideration for implementation of ICT in local governments, it is observed that most of the local government administrations are aware of the importance of ICT in local government but believed it could not work for them, or they do not have trust in it.

This paper presents documentation on how ICT can be implemented in a local government to enhance good and quality service delivery. The role and challenges of local government were highlighted, virtual bureaucracy to e-government is presented, and the technical framework (Technical Model) for the ICT implementation in local government is highlighted. The Technical model has the basic components of ICT infrastructures and information systems. The preconditions for ICT in local government were well presented.

## **INFORMATION AND COMMUNICATION TECHNOLOGY**

As expressed in Barbara *et al.* (2002), Information Technology (IT) has been used for many years, particularly in the United States, and refers to the electronic display, processing, and storage of information, but not necessarily the transmission of the information. The term carries strong historical associations with enterprise data processing and centralized computer services.

However, Information and Communication Technology (ICT) represents the set of activities and technologies that fall into the union of IT and communication technologies. Global industry, international media, and academics increasingly now use ICT to describe this union. The real benefit of adding "communication" does not derive from including specific technologies, such as routers or servers, but from the dynamism implicit in interconnected social, economic, and information networks. ICT is characterized by unprecedented global flows in information, products, people, capital, and ideas. These flows are enabled by ICT: their sheer scale and pace would not be possible without the ability to connect vast networks of individuals across geographic boundaries at negligible marginal cost, Barbara *et al.* (2002).

In this framework document, the term 'Information and Communication Technologies' is used in its broadest sense to refer to a variety of tools, all of which make it possible to improve the management of information and improve dialogue between individuals and groups.

These tools include office and personal computers, software and applications for word processing, data processing, and databases, networks and intranets, as well as the telephone

and electricity lines, radio, and satellite systems on which they operate. ICT also refers to the Internet and such Internet-based tools as Usenet conferences, news groups, e-mail, the World Wide Web, Web-pages, on-line forums, and e-publications.

The description of digital technology, communication tools, and/or networks is such that digital technology reflects hardware and software products, communication tools, products and services used to transmit information, and networks themselves as the pathways for this transmission. The terms are meant to be as inclusive as possible to reflect the breadth of hardware, software, and infrastructures that makeup ICT.

## **LOCAL GOVERNMENT SYSTEMS AND ADMINISTRATION**

In Agbakoba and Obona (2004), the term governance has been variously interpreted to suit legal systems, political systems, economic systems, or ideologies. However, one string that runs through the definitions is that governance has to do with the relationship between the government and the governed. The local government is the closest tier of government to the people in Nigeria, yet the resident population represented by local government is sometimes denied the benefits of its existence. Therefore, the concern is to ensure that the local government in Nigeria is structured and administered in such ways as to further the political, socio-economic, and cultural interests of its residents. It must be run to enhance the well being and self-actualization of the resident population.

In every political system, government is established to perform some customary functions. It is the extent to which the government succeeds in discharging these duties that such a government could be said to be a successful one. The functions of government may be spelled out in a constitution, charter, or other statutes. Good governance must embrace four major elements as explained in Agbakoba and Obona (2004). These elements include:

- Public participation
- Accountability and transparency
- Respect for the rule of law and human rights
- Efficient and effective public sector management

## **VIRTUAL BUREAUCRACY TO E-GOVERNMENT**

E-Government refers to the use of ICT by government agencies to transform relations with citizens, businesses, and government. These technologies can serve a variety of different ends, including: better delivery of government services to citizens, improved interactions with business and industry, citizen empowerment through access to information, or more efficient government management (ICT 2007). The resulting benefits, in a nutshell, can be less corruption, increased transparency, greater convenience, revenue growth, and/or cost reductions (WITSA 2003).

Normally, bureaucratic processes used proceed in two places: “front office” and “back office”. While the front office is a place where information is gathered from the client and at the same time it is transmitted to him/her; the back office is a place where information is processed (i.e. decisions are made). There are four phases of handling matters addressed to public offices according to Scheepers (1994), are the intake, investigation, decision, and administrative phases.

The first two phases proceed in the front office, next two in the back office. Virtual bureaucracy means introducing electronic data processing (EDP) and networking to the back office. E-government is set up when electronic tools are introduced to the front office that practically means the integration of front office with back office. In that way, all four phases of handling clients’ matters in public institution are electronically supported. Networked databases within the institution are made public servant-able to offer a wide range of information as well as to retrieve and modify citizens’ documents, often in real time. Integration of information might be followed by integration of services or public programs in the form of one-stop shops.

## **TECHNICAL FRAMEWORK OF ICT IN LOCAL GOVERNMENT (TECHNICAL MODEL)**

The technological model for a typical local government consists of two basic parts:

- ICT- infrastructure
- Information systems

## **ICT infrastructure**

The ICT infrastructure for the local government is the physical part of the technical model for local government. The equipment and the connectivity, whether wired or wireless, are the backbone of information exchange both within a local government and between the local governments. The ICT infrastructure for a local government should consist of a personal computers, local area network(s), user identification and authorization systems, and basic software.

For the uninterrupted flow of data that is a precondition of data exchange between administrations, one needs to aim at developing a broadband Internet connection in every local government. It is strongly recommended that every person who needs to have a workstation would have it connected to Internet and equipped with a basic set of software tools. Local governments should themselves develop a fixed standardized list of necessary software for an ordinary workstation of their various domains in order to facilitate the exchange of information and keep track on proprietary issues of the software.

## **Information Systems**

A local government should normally have a Document Management System (DMS), E-mail systems, finance and personnel management systems, Web pages of local government, e-democracy tools, and the appropriate State registers.

## **Internet Connection Options**

From the available literature, typical available internet connection options include the Dial-up connection, ADSL, ADSL2/ADSL2+, Wireless, Cable, ISDN, and Satellite.

***Dial-up Internet Access*** is a type of connection whereby phone lines are designed to carry analogue (voice) data. So a dial-up modem translates information sent to your computer into ones and zeros and the digital data you send back to the Internet into an analogue signal. To establish a connection, you will need a computer with a standard modem and a phone line. It has the advantages of being available almost everywhere, it is the cheapest form of Internet access for most people, and there are a great number of providers to choose from. The major drawback is, that this type of connect is the slowest Internet access and performance can vary considerably depending on location.

**Asymmetric digital subscriber line (ADSL)** is a type of high speed broadband Internet access that's increasing in popularity as prices drop. Digital subscriber line (DSL) allows digital information to be sent at high speed over ordinary telephone lines and can carry data and voice signals simultaneously. Even if you only have one phone line, you can call someone without having to disconnect from the Internet. There are many variations of DSL technology. The A in ADSL stands for asymmetric or asynchronous, meaning downstream speed is different from upstream speed. Download speeds range from 256 to 1500 kbps, upload speeds are less impressive at 64 to 256 kbps. To connect, you need an ADSL modem which sends data over a different frequency spectrum on the telephone line than that used by voice traffic. A requirement of use is to be within 4 km of a specially equipped telephone exchange. Locations outside of this range may be able to get ADSL if a heavy gauge wire has been installed or if optical fiber cable has been laid. Its advantage includes, an 'always on' connection (no need to dial-up before you can check your email); no need to disconnect to use the phone; and it is ideal for video streaming, which needs to be downloaded at high-speed. Its drawbacks includes limited availability, expensive set-up fees and equipment costs, and upload speeds are slower than download.

**ADSL2 and ADSL2+** also use the copper phone line but transfer data faster and further than standard ADSL. For example, people who live within 1.5 km of an ADSL2-enabled exchange may experience download speeds up to 12Mbps and those living out to 5.5 km from the exchange may get speeds equivalent to standard ADSL (256/64kbps). ADSL2+ is expected to offer 24Mbps to people within 1.5 km of the exchange, up to 12Mbps out to 2.5 km and up to 256kbps out to 6.5 km. Faster internet access improves the quality of internet services such as video streaming and phone calls made over the internet. It also reduces the time it takes web pages to load.

**Wireless broadband** is the latest internet technology to hit most developed countries. Wireless internet is broadband internet access that doesn't use a telephone line or cable network. You connect to the internet using radio frequency bands. There are several different types of wireless internet services available. To establish a link, you need a wireless modem or wireless card for the computer or laptop and a

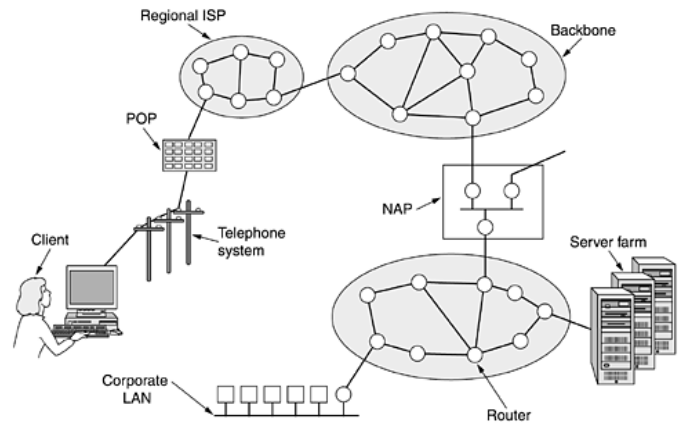
service provider. Its advantage includes, an 'always on' connection; no need for a landline phone to connect (so you don't have to pay phone rental fees); and mobile access to the internet - as long as you're within the network coverage area. Its demerit is that wireless internet is still in its early days. Like ADSL and cable, current services are limited and a wireless service may not be available all local areas. There are some specialist wireless ISPs that only offer wireless broadband using their own wireless networks. You may need to buy proprietary equipment that won't work with other providers.

**Cable** some organization offer broadband Internet access via the hybrid fiber coaxial cable that delivers pay TV. Theoretically, coaxial cable can download information at up to 27 MBps, but this bandwidth is shared by everyone else using the same cable. To get connected, you need a cable modem, which connects your computer to the cable network (usually provided with installation, with the purchase price spread over the period of the contract). Its Pros include, an 'always on' connection; no need to disconnect to use the phone; and Fast upload speeds make it suitable for online games or two-way video. Its Cons include the fact that it is only available in areas with cable TV and bandwidth is shared with other users, so access slows considerably during peak periods.

**ISDN**, the precursor to DSL, integrated services digital network (ISDN), also uses ordinary copper telephone lines to transmit digital data. An ISDN adapter integrates analogue or voice data with digital data, allowing them to be sent simultaneously over the same line at up to 128 kbps. To connect, you need an ISDN adapter at your end (and your ISP needs one too). The Pros of this technology is that it can send and receive information at the same high speed; it is widely available; and it provides an 'always on connection'. The Cons are that it is one of the slower forms of 'broadband' Internet access and the technology may be made obsolete by DSL.

**Satellite** is a system where data is relayed via a satellite to a local dish (usually positioned on the roof of your house) and from there to your computer at up to 400 kbps. It does, however, generally cost more than other broadband services to set up, especially when you consider it's most attractive to people in remote areas, where installation costs are higher. The satellite dish is only used to download data. Any

information you upload, including requests for a new web page, for example is transmitted via a standard dial-up Internet connection with a maximum speed of 56 kbps. This means you'll pay standard dial-up costs in addition to the satellite connection and you'll need an extra phone line if you want to be able to make calls while you're on the net. To connect, you need a satellite dish and a high open place to install it and a phone line and dial-up Internet connection for uploading information to the Internet. Its Pros include the fact that it is available almost everywhere. Its Cons center on the fact that it is more expensive to set-up than other high-speed Internet options, it only provides high speed downloading, and it ties up your phone line while you're online.



**Figure 1:** Overview of the Internet (Tanenbaum, 2003).

### **Consideration on Setting ICT in Local Government**

The introduction of an ICT system at the local level of government must typically go through the following steps:

- Systemic analysis of processes and procedures of local self government
- Feasibility analysis of the information system
- Design of the network
- Installation of the information system
- Training of users
- Implementation of a monitoring system for model usage

### **ICT Precondition on Technical Support**

In order to have a fully functioning information system, the following basic technical preconditions should be met:

- *Local network* - all the computers in the local administration should be networked, or at least one computer in each department or office should be in the network
- *Central server* - is required to host the model and supporting software
- *Internet connection* - according to the needs of the local government network and its financial capacity. Large local governments might use a dedicated line, providing twenty-four hour connection to the Internet. Smaller local governments may only be able to afford a more limited connection (see connection. Figure 1).

### **ICT Precondition on Infrastructural Support**

For the implementation of the local information system, the following infrastructure is needed:

- Minimum informatics equipment of the local government is one computer in each Department or office. One high quality computer can function as server.
- Knowledge of common operating systems and the Internet by employees who will perform the interactive work with clients.
- An appropriate software package including users' manual
- A team of experts to conduct the basic systemic analysis, install the model, and train the users.

### **Implementation Management**

Implementation will be managed by a program management team, which will basically constitute the national resource facility.

The team will consist of a **Program Manager** with the support of three main advisors:

- i. Internet Advisor to deal with hardware issues
- ii. ICT advisor to deal with software programming and
- iii. Governance Advisor to deal with institutional and governance issues.

The team should also consist of data protection officer called Data Security Officer who

implements organizational, physical and technical data protection measures after analyzing the risks connected to the implemented mechanisms of information gathering and exchange. Support of an Administrative Assistant will also be necessary.

## MAJOR ICT CHALLENGES IN LOCAL GOVERNMENT

A number of challenges that can reduce the uptake of ICT by local governments have been identified worldwide. These includes: a lack of training and capital, limited understanding of the potential of technology, and a lack of clear business strategies (Buhalis 1996; Hull and Milne 2001). Other barriers may include: higher costs of ICT introduction due to the scale of public organizations; paper documents required for approval processing; security and concerns; confidentiality of information; obsolete regulations and laws; lack of technical understanding and computer skills; difficulties of carrying out organizational change; and the nature of public sector financing and procurement practices. More work is needed to better understand these and other factors, and how to address them.

The digital divide is a barrier to e-government in that people who do not have access to the Internet will be unable to benefit from online services. E-government can improve services to citizens through other channels (notably by improving back office procedures), the inability to provide online services to all citizens can hold back e-government projects.

## PUBLIC INTERNET ACCESS POINTS (PIAPS)

When planning and reviewing the ICT infrastructure of a local government, one should keep in mind not only the needs of the administration but also the question of access for the citizens. In larger towns one can at least partly rely on private sector solutions, but in small communities these might not be economically sustainable, at least in the current level of development. However, there is no sense in developing e-services in the circumstances where only a tiny fraction of people can potentially have access to the Internet. Local governments should create PIAPS in public places for internet access and other ICT resources to her citizenry to

improve interaction and communication with local government.

## CONCLUSION

E-government provides an opportunity to develop a new relationship between local governments, citizens, service users, and businesses, by using new ICTs, which enable the dissemination and collection of information, and services both within and outside of government (government to citizen; government to business; government to government) for the purposes of service delivery, decision-making and accountability.

At the local level, e-governance and the appropriate use of ICT can enhance and support economic and social development, particularly in empowering officials of local government and representatives, ensuring linkages, networking, timely, efficient, transparent and accountable services. E-local governance means exploiting the power of ICT to help transform the accessibility, quality and cost-effectiveness of public service, and to help revitalize the relationship between customers and citizens and the public bodies who work on their benefit.

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