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

[1]O. Olabode and [2]Akingbesote Alaba
[1]Department of Computer Science, Federal University of Technology, Akure, Nigeria
[2]Department of Computer Science, Adekunle Ajasin University, Akungba Akoko, Nigeria

Abstract: Local governments are faced with a huge diversity of citizens, issues and challenges. These range from the provision of social housing and welfare benefits, through 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. Information and Communications Technology (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. This study 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 as well as the technical framework (Technical Model) for the ICT implementation in local government were presented. The Technical model has the basic components of ICT infrastructures and Information systems. The preconditions for ICT in local government were well presented.

Key words: 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, through 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. Information and Communications Technology (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 on the awareness and consideration for implementation of ICT in local government, it is observed that most of the local government administrations are aware of the importance of ICT in local government but simply believes it can not work for them and better still, they do not have trust in it. This study 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

Corresponding Author: O. Olabode, Department of Computer Science, Federal University of Technology, Akure, Nigeria

highlighted, virtual bureaucracy to e-government is presented as well as the technical framework (Technical Model) for the ICT implementation in local government were presented. 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 reflect those products and services used to transmit information and networks themselves are the pathways for this transmission. The words 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 Ogbonna (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 in it is 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 actualisation 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 are spelt out in the constitution and other statutes. Any good governance must embrace four major elements as explained in Agbakoba and Ogbonna (2004). These elements includes: Public participation, accountability and transparency, respect for the rule of law and human rights and efficient and effective public sector management.

VIRTUAL BUREAUCRACY TO E-GOVERNMENT

E-Government refers to the use by government agencies of Information and Communication Technologies (ICT) that have the ability to transform relations with citizens, businesses and government. These technologies can serve a variety of different ends: 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).

Normaly, bureaucratic process used to 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. decision is made. There are four phases of handling matters addressed to public offices according to Scheepers (1994) are the intake, investigation, decision and administrative phase.

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 institution 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)

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

- ICT-infrastructure
- Information systems

CT 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 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 the Document Management System (DMS), E-mail systems. Finance and personnel management systems, Web pages of local government and e-democracy tools, State registers.

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

Dial-up internet access: It 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 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 available almost everywhere, cheapest form of Internet access for most people and plenty of providers to choose from. The major drawback is, slowest Internet access of the lot and performance can vary considerably depending on your location.

Asymmetric Digital Subscriber Line (ADSL): It 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 256-1500 kBps, upload speeds are less impressive at 64-256 kBps. To connect, you need an ADSL modem which sends data over a different frequency spectrum on the telephone line to that used by voice traffic. These are usually included in the installation price. To be within 4 km of a specially equipped telephone exchange. Locations outside this range may be able to get ADSL if a heavy gauge wire has been installed or if optical fibre cable has been laid. It advantage includes, provides an 'always on' connection, no need to dial-up before you can check your email, no need to disconnect to use the phone, ideal for video streaming, which needs to be downloaded at high-speed. Its drawbacks includes limited availability, can have expensive set-up fees and equipment costs, Upload speeds are slower than download.

ADSL2 and ADLS2+: It 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 12 Mbps 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: It is the latest internet technology to hit most developed countries. Wireless internet is braodband 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 get link, you need a wireless modem or wireless card for computer or laptop and a service provider. Its advantage includes, provides an 'always on' connection-no need to dial-up before you can check your email. You don't need a landline phone to connect so you don't have to pay phone rental fees, a wireless service lets you access the internet and your account even if you're away from home-as long as you're within the network coverage area. It demerit is, wireless internet is in its early days. Like ADSL and cable, current services are limited and a wireless service may not be available in your local area. 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 fibre 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). It Pros include, provides an 'always on' connection-no need to dial-up before you can check your email, No need to disconnect to use the phone and Fast upload speeds make it suitable for online games or two-way video. It Cons. Only available in areas with cable TV, 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 is that it can send and receive information at the same high speed, Widely available and Provides an 'always on connection'-no need to dial up to check your email. The Cons, one of the slower forms of 'broadband' Internet access and May be made obsolete by DSL.

Satellite: It may be your only high-speed Internet option. Data is relayed via 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 and all the usual 'buts'. 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 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 is that it is available almost everywhere. It Cons, more expensive to set-up than other high-speed Internet options, only provides high speed downloading, so not great for online gaming and not much help if you can't get a dial up connection and ties up your phone line while you're online.

Consideration on setting ICT in local government: The introduction of an ICT system at local level 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:
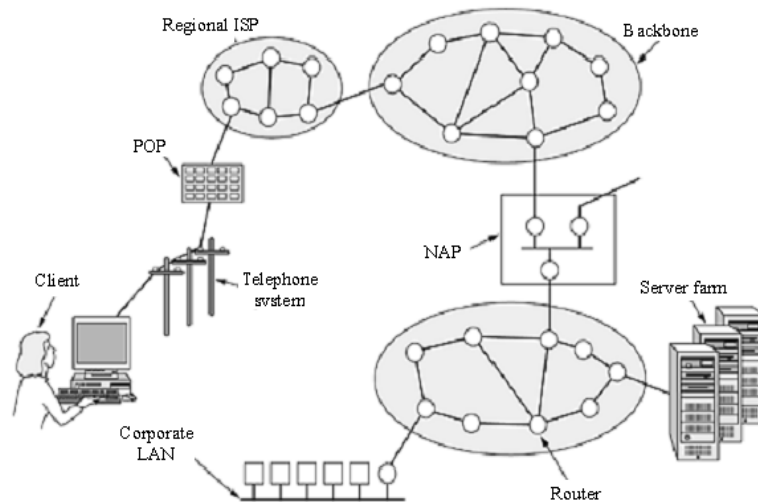
Fig. 1: Overview of the Internet (Tanenbaum, 2003)

- 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 government might use a dedicated line, providing twenty-four hour connection with Internet. Smaller local governments may only be able to afford a more limited (Fig. 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 will function as server.
- Knowledge of Windows and 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 programme management team, which will basically constitute the national resource facility.

The team will consist of a Programme Manager with the support of three main advisors.

- Internet Advisor to deal with hardware issues.
- ICT advisor to deal with software programming.
- 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 analysing the risks connected to the implemented mechanisms of information gathering and exchange. Support of an Administrative Assistant will be necessary.

MAJOR ICT CHALLENGES IN LOCAL GOVERNMENT

A number of challenges that can reduce the uptake of ICT by local government 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 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 also 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 to develop e-services in the circumstances where only a tiny fraction of people can potentially have an access to the Internet. Local government 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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