

Overview of E-government Adoption and Implementation in Ghana

Isaac Kofi Mensah

Abstract—E-government has been adopted and used by many governments/countries around the world including Ghana to provide citizens and businesses with more accurate, real-time, and high quality services and information. The objective of this paper is to present an overview of the Government of Ghana's (GoG) adoption and implement of e-government and its usage by the Ministries, Departments and its agencies (MDAs) as well as other public sector institutions to deliver efficient public service to the general public i.e. citizens, business etc. Government implementation of e-government focused on facilitating effective delivery of government service to the public and ultimately to provide efficient government-wide electronic means of sharing information and knowledge through a network infrastructure developed to connect all major towns and cities, Ministries, Departments and Agencies and other public sector organizations in Ghana. One aim for the Government of Ghana use of ICT in public administration is to improve productivity in government administration and service by facilitating exchange of information to enable better interaction and coordination of work among MDAs, citizens and private businesses. The study was prepared using secondary sources of data from government policy documents, national and international published reports, journal articles, and web sources. This study indicates that through the e-government initiative, currently citizens and businesses can access and pay for services such as renewal of driving license, business registration, payment of taxes, acquisition of marriage and birth certificates as well as application for passport through the GoG electronic service (eservice) and electronic payment (epay) portal. Further, this study shows that there is enormous commitment from GoG to adopt and implement e-government as a tool not only to transform the business of government but also to bring efficiency in public services delivered by the MDAs. To ascertain this, a further study need to be carried out to determine if the use of e-government has brought about the anticipated improvements and efficiency in service delivery of MDAs and other state institutions in Ghana.

Keywords—Electronic government, electronic services, electronic payment, MDAs.

I. INTRODUCTION

GOVERNMENTS as well as countries (Developed and Developing) around the world including Ghana are increasingly using internet technologies to provide various public services. These services range from providing the most basic informational website to deploying sophisticated tools for managing interactions within government agencies and beyond. This has resulted in the development of many electronic government (e-government) initiatives that are meant to enhance the delivery of government services to citizens and improve interactions with businesses and

industry. E-government development is not only about implementing a new IT system or application but also aim to improve public service delivery, improve access to information and services and increase government's transparency and accountability [1]-[4]. It is with the above benefits that the Government of Ghana has taken the initiative to adopt and implement e-government as a tool to transform public service delivery. The adoption of e-government has the potential to enhance the relationship between the government and its citizens by facilitating easier, smoother, and more efficient interactions between citizens and government agencies [5]. It also deepens the principle of democracy by enabling the public to participate in the process of public consultations and policy making [6]. The participation creates a greater engagement which is expected to have positive impacts on good public governance: greater transparency and accountability [7].

The United Nations and American Society for Public Administration (ASPA) [8] defined e-government as utilizing the Internet and the world-wide-web for delivering government information and services to citizens. Heeks [9] also defined e-government as the use of Information and Communication Technologies (ICT) to improve the activities of public sector organizations. Similarly, [10] states that e-government "employs technology, particularly the Internet, to enhance the access to and delivery of government information and services to citizens, businesses, government employees and other agencies". It is worthy to note that the underlining concept or idea that runs through all the definitions of e-government shown above is the use of web-based tools and applications for/to enhance public service delivery. Broadly, e-government can be said to be the use and application of Information Technologies in public administration to streamline and integrate workflows and processes, to effectively manage data and information, improve public service delivery, as well as expand communication channels for engagement and empowerment of people. E-government includes electronic interactions of three types- i.e. government-to-government (G2G); government-to-business (G2B); and government-to-consumer (G2C). E-government also holds promise for improved delivery of many types of public services, including online transactions, and for disseminating information about the operations of government. It can improve communication between citizens and government through e-mail, enabling more direct participation in government decision making [11]. Further, e-government can be an emerging model involving both the citizenry and the state, where the importance of citizens input

Isaac Kofi Mensah is with the Harbin Institute of Technology, China (e-mail: 1185842364@qq.com).

into policy formulation and implementation is recognized and valued [12], [13]. Wimmer and Traunuller [14] commented that the main objectives of e-government should including the following: (i) restructuring administrative functions and processes; (ii) reducing and overcoming barriers to coordination and cooperation within the public administration; and (iii) the monitoring of government performance.

Ghana as a developing country taking the positive lessons acquired from the adoption and implementation of e-government in the developed- countries, has taken the giant step to adopt and apply e-government with a primarily focus on facilitating effective delivery of government services to the public. The government of Ghana e-government implementation strategy was developed in May, 2005 with the ultimate purpose to provide an approach to initiating, implementation, and sustaining an efficient, economic, and effective government-wide electronic means of sharing information and knowledge. Good governance and the setting up of government control systems depend largely on easy access to quality and timely information which also forms the basis of value-added decision-making at all levels of government. Leaving or limiting information and knowledge to a few levels of government opens up avenues for its manipulation and unwarranted use for exploitative purposes. To prevent this, the Government of Ghana (GoG) adopted e-government as a tool to make information and knowledge easily available, not only to all levels of government, but also to its citizens and businesses to ensure that they are empowered to become part of the governmental decision-making process-a process that affects them directly and indirectly [15]. E-government is expected to improve productivity in government administration and service by facilitating exchange of information in a standardized format, thereby enabling better interaction and coordination of work among Ministries, Departments and Agencies (MDAs), citizens, and private businesses.

The Government of Ghana is fully aware of the numerous opportunities that e-government implementation can bring to the MDAs if its embraces e-government as a tool of change in their day to day administrative work. These changes could be in areas such as joint working across and between departments to improve policy development, standardized format for collection of statistics to inform policy making, electronic communication between government (executive arm) and parliament, quicker, cheaper and more efficient public consultation, implementing an e-procurement system at governmental/departmental level to maximize leverage from bulk purchasing power and minimize delays, and implementation of cross-departmental accounting systems to support accountability for policy goals, etc.

The main objective of this paper is to examine the empirical evidence of Government of Ghana's adoption and implementation of e-government and its usage within the Ministries, Departments and its agencies as well as in other public sector institutions to deliver public service to the general public.

The study used the qualitative method to conduct this research and it was prepared using secondary sources of data from government policy documents, national and international published reports, books, journal articles and web sources.

II. BRIEF PROFILE OF GHANA

Ghana is a country located within the Africa Continent. It is located along the Gulf of Guinea and Atlantic Ocean, a sub-region of West Africa. Ghana was formerly known as the Gold Coast. It was the first black African nation in the region to achieve independence from colonial masters. On the 6th of March 1957 Kwame Nkrumah declared the country's Independence and Dr. Kwame Nkrumah become the first President of Ghana. The flag of Ghana consists of the colors red, gold, green, and the back star. The population of Ghana is estimated at 24,658,823 as per the 2010 Population and Housing Census (PHC) conducted by the Ghana Statistical Service. Ghana has 10 Regions and the people are predominately into agriculture (farmers) which accounts for about 43 percent of GDP but the latest data indicate that the service sector has over taken the agriculture sector. The Agriculture sector now accounts for 22 % of GDP while the service sector now accounts for 49.5 % of GDP. Ghana's GDP is estimated to be \$ 38.6 billion (World Bank, 2015). In Africa, Ghana is ranked 24th by size out of 53 countries, 9th by population and 7th by population density. The life expectancy in Ghana according to the Work Bank is 60.95 years

TABLE I
SOCIO-ECONOMIC INDICATORS OF GHANA

Population	25 Million
Language	English
literacy rate (2015)	76.6 (age 15 and over)
Economic activity of GDP (2015)	Agriculture (22.0)
	Industry (28.6)
	Services (49.5)
Human Development Index	0.573 (138 out of 187 countries)
Poverty rate	26.60%
GDP Per capital income (US dollars) - 2014	\$3,952.62

Ghana was ranked third (0.2997) in the E-government Readiness Survey for the West African sub-region by the United Nations in 2008, after Nigeria (0.3063) and Caper Verde (0.4158). While in the United Nations E-government Survey 2014 Ghana has made tremendous effort by overtaking Nigeria and Cape Verde with an EGDI of 0.3753, Cape Verde and Nigeria had 0.3551 and 0.2929 respectively. This could be attributed to the massive ICT infrastructure development and expansion to cover all parts of the country.

In 2013, the World Bank indicated that the internet penetration, thus, the percentage of internet users (persons who have access to the World Wide Web) in Ghana was 12.3%. The internet penetration improved to 19.56% in 2014 which is indicative of more Ghanaians having access to the internet. Ghana's share of the World Internet users is 0.18% [16] ranking Ghana at 63 among the 198 countries in the world.

The improvement in the EGDI of Ghana shows the readiness as well as the commitment of Government through budget allocations to develop and implement e-government as a prerequisite for an innovative public sector that delivers integrated services, thereby making life easier for both citizens and business. "E-government readiness is therefore significant indicator of whether a country is prepared to harvest efficiencies gained from ICT-enabled public administrations" [17]

III. BACKGROUND TO E-GOVERNMENT DEVELOPMENT IN GHANA

The Government of Ghana (GoG) e-government development was part of the third component of the eGhana Project initiated by the Ministry of Communication with collaboration from the World Bank. In August 1, 2006, the World Bank Board of Directors approved the eGhana Project through a standard International Development Association (IDA) credit facility of US\$40 million equivalent and contribution from the Ghana Government. The eGhana Project aimed at supporting concrete initiatives to implement the Government ICT-led development strategy and more specifically at generating increased employment in the IT-Enabled Services sector, enhance efficiency, transparency and accountability in selected government agencies and departments by rolling out e-Government applications to run under public-private partnerships (PPP). The Project was implemented by the National Information Technology Agency (NITA), which is the ICT policy implementation arm of Government of Ghana and an agency under the Ministry of Communication. The eGhana project had three components: Component 1- Enabling environment (US\$ 9.6m); Component 2- Support to local ICT Businesses and ITES (US\$ 9.5m) and Component 3- e-Government Applications and Communications (US\$22.6m). The key deliverables under the Component 3-eGovernment Applications and Communications were: Enterprise Architecture, Government Interoperability Framework, Government Wide Area Network, Government Portal /Gateway, National Data Centre and ICT Training and Capacity Building.

NITA was established by an Act of Parliament (NITA Act, Act771, 2008) and it has since its inception built the foundational ICT architecture, working with some \$40million World Bank loan, \$150 million Chinese EXIM Bank loan, including a \$30 million concessionary and later another €37 million concessionary loan from the Danish Government. NITA fed on government's 30% shares in Vodafone and used part of the National Fiber Optic Backbone in the possession of Vodafone to build a Multiple Layer Switch and VIMAX networks to connect all MDAs at the national and regional levels in the first phase of the e-government project.

The network was designed to reach districts and remote communities via several different means, including direct last mile fibre optic connectivity, high capacity microwave links, VSAT access over Ministry of Finance and Economic Planning (MoFEP) VSAT network and leased terrestrial circuits from local telecoms and ISPs (internet service providers). This would enable the network to connect not just

the district/municipal assemblies, but Hospitals, Schools, Police Stations, Post Offices, Agriculture Extension Service Offices, and other public office or institutions in all the towns that are within the catchment areas of the designed networked. About 7,000 to 9,000 online portals have been earmarked for each of the 170 districts to ensure that in each district all the institutions like schools, police stations etc. have their own portals by which they can interact with other institutions and also through which citizens can also interact with those institutions.

Under the e-government project, all the three arms of government and the institutions under them are expected to be computerized and linked electronically at the National, Regional, and District levels. Other important state agencies, organizations and corporations are also to be computerized to enable them interact with and serve individual citizens and the private sector. E-government will improve productivity in government administration and service delivery by facilitating exchange of information in a standardized format, thereby enabling better interaction and coordination of work among Ministries, Departments, and Agencies (MDAs), citizens, and private businesses. E-government is intended to change the way government interacts with citizens (Government to Citizens- G2C), with businesses (Government to business – G2B) and with itself and other governments (Government to Government –G2G).

To realize the full potential of e-government, an e-government infrastructure network has been developed with the objective to standardize the connectivity between government agencies and allow them to utilize higher Bandwidths than are currently available and will also allow them to select the service levels for their various programs and initiatives. It is also expected that by providing a single connection to each government agency, the Government Network will reduce the multiple connection costs. So far, the project has covered up to 1050 sites across the country, 555 locations will be connected via wireless last mile access networks, an additional 500 locations will also be connected via other appropriate technologies. It is expected that this network will connect MDAs/MMDAs, Public Hospitals, Police Stations and other public institutions.

The e-government Network Infrastructure has so far covered 15 towns & cities, these includes Accra, Kumasi, Tema, Takoradi, Cape Coast, Koforidua, Sunyani, Obuasi, Ho, Bolgatanga, Wa, Tamale, Tarkwa, Winneba, and Nkawkaw. In addition, 22 Ministries have also been connected; Finance, Education, Health, Roads and Highways, Interior, Local Government, Works and Housing, Communications, Transport, Trade, Agriculture, Tourism, Environment, Information, Lands, Defense, Women and Children, Chieftaincy, Justice, Energy, Youth, and Sports.

Twenty-one (21) Departments and Agencies have also been hooked to the network. They are: National Information Technology Agency (NITA), Ghana Judicial Service HQ, Accra Metropolitan Assembly (AMA), Fire Service, NCA, Ghana Tourist Board, Minerals Commission, National Identification Authority, DVLA, Ghana Free Zones Board,

Controller & Accountant General Department (CAGD), Ghana Education Service, Ghana Health Service, Ghana Highway Authority, Office of Head of Civil Service (OHCS), Audit Service, Parliament House, Public Services Commission, Registrar General's Department and National Security.

The connection of all these towns & cities, ministries, and agencies to the network infrastructure, it is anticipated that the traditional operation of government business will change and become more paperless, transparent and efficient, and also provide information in real time to the public through their dedicated online portals. The e-government platform has created rooms for the decentralizing of government's salary budgeting accounting and revenue collection administration.

IV. ICT POLICIES

The development of an efficient e-government system have to be based on a sound ICT policy and infrastructure which will guide the implementation of ICT related projects and programmes of Government. The government of Ghana has developed key ICT policies over the years to drive the growth and development of ICT in all sectors of the economy. The Government of Ghana placed a strong emphasis on the role of ICT in contributing to the country's economy. The country's medium-term development plan captured in the Ghana Poverty Reduction Strategy Paper (GPRS I & II) and the Education Strategic Plan 2003-2015 all indicate/suggest the use of ICT as a means to reaching out to the poor and vulnerable in Ghana. Key among these policies is the Ghana National ICT Development Policy (ICT4D) which has been developed and passed by Parliament in 2013. It is a policy statement aimed at realizing the vision to transform Ghana into an information-rich knowledge-based society and economy through the development, deployment, and exploitation of ICTs within the economy and society. The ICT policy has four year rolling plans and operational life span of between 15 to 20 years. The 14 priority area of the Policy concentrates on promoting rapid ICT physical infrastructure development, modernize agriculture and facilitate development of the private sector and government administration and service delivery. Other key priority areas are:

- Accelerating human resource development
- Promoting ICTs in education
- Developing an export oriented ICT products and service industry
- Developing a global competitive value added services sector- a regional business service and ICT hub
- Deploying and spreading ICTs in the communities
- Promoting national health
- Developing R&D, scientific and industrial research capacity
- Providing legal, regulatory and institutional frameworks
- Promoting foreign and local direct investment drive in ICTs
- Facilitating national security and law and order

Another key ICT Policy is the Ghana ICT in Education policy which was developed in 2008. The objectives of the policy are to:

- Ensure the students have ICT literacy skills before coming out of each level of education
- Provide guidelines for integrating ICT tools in all levels of education
- Provide means of standardizing ICT resources for all schools
- Facilitate training of teachers and students in ICT
- Determine the type and level of ICT needed by schools for teaching and administration purposes
- Promote ICT as learning tool in the school curriculum at all levels

Interventions to implement the ICT4D Policy led to the development of a national fiber optic network called the Voltacom Project by the nation's power hub; the Volta River Authority. A consolidated national monitoring system was installed in 2010, the system was to help accelerate the development of mobile telephone throughout Ghana and also create the environment for a competitive terrain to enhance the delivery of affordable ICT services. Also Government through NITA pursued the e-Government network infrastructure project aimed at creating a platform for the use of shared services among the MDAs/MMDAs nationwide and to facilitate communication within Government

TABLE II
ICT POLICIES GHANA

Policy Document	Year
The Ghana ICT for Accelerated Development (ICT4D) Policy	2003
Developing the Ghana Integrated ICT-led Socio-Economic Development Policy and Plan	2002
Education Strategic Plan 2003-2015	2003
Ghana Information and Communications Technology (ICT) in Education Policy	2006
ICT in Education Strategic Implementation Plan, 2011-2015	2011
Ghana e-Government Interoperability Framework	2003
Ghana e-government Implementation Strategy	2005

V. E-GOVERNMENT POLICY AND STRATEGY

The e-government policy of government was one of the 14 pillars of the ICT4D Policy which is captured as "Facilitating Government Administration and Service Delivery-Promoting Electronic Government and Governance" [18]. The policy objectives of this pillar are to:

- Reform the Civil and public services to improve its organizational system, structures and procedures as well processes
- Address the poor attitudes to work and unproductive and ineffective work ethics which would hinder the effective exploitation of ICTs to improve organizational efficiency, service delivery, productivity and reduction in operational cost within the civil and public service.
- Improve the efficiency of the civil and public service to ensure that it plays a more positive role in economic and social development at levels.

- Facilitate the establishment of an efficient intra-and inter-departmental, inter-social, national, and sub-national system of communication, for the necessary feed-back in policy formulation and programme implementation, monitoring and review.
- Modernize the operations of the Civil and Public services through the deployment of ICTs to facilitate administrative cost reduction and their effectiveness and efficiency in the delivery of its services to the public.
- Facilitate the development and implementation of a comprehensive e-government and governance strategy for Ghana.

The development of Ghana e-government implementation Strategy was developed in 2005 to ensure that the above stated objectives were achieved. The purpose of the e-government strategy is to provide an approach to initiate, implement and sustain an efficient, economic and effective government-wide electronic means of sharing information and knowledge which would facilitate GoG's delivery of services to Ghanaians.

The e-government Strategies had six strategic goals, which are:

- **Strategic Goal 1:** Establish institutional Framework to oversee the implementation of E-government
- **Strategic Goal 2:** Establish a component-based Ghana Government Enterprise Architecture to facilitate efficient and effective citizens to government, government to citizens and government to business interaction.
- **Strategic Goal 3:** Implement a secure, robust and interoperable E-government Infrastructure.
- **Strategic Goal 4:** Ensure the legal and Regulatory Framework that supports the adoption and implementation of E-government.
- **Strategic Goal 5:** Leverage the use of ICT, within an effective E-Government Environment, to meet vital socio-economic development goals (e-Services).
- **Strategic Goal 6:** Seek active and direct participation of the private sector in the implementation of E-Government.

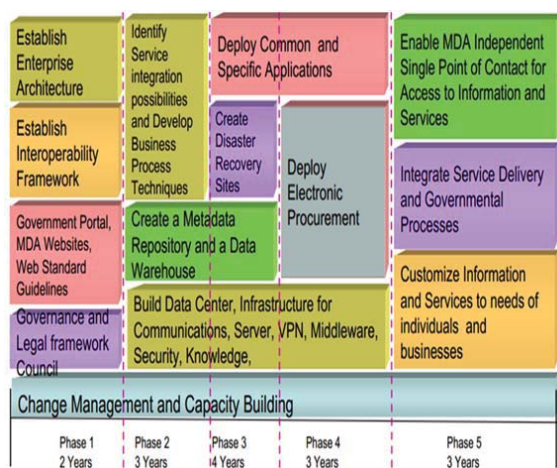


Fig. 1 E-government Implementation Timelines

The implementation timeline for the six strategic goals is expected to span for a period of 15 years with 5 Phases. Phase 1 for a period of two years, Phase 2 for three years, Phase three (3) for a period of four years, Phase 4 for three (3) years period and finally, Phase 5 for a period of five (5) years. It was envisaged that within the first two years of the implementation of the e-government strategy, each MDAs/MMDAs would have established a web presence. The detailed E-Government implementation timeline is shown in Fig. 1.

VI. INTERNET PENETRATION IN GHANA

Internet penetration is the portion of a population that has access to the Internet. Internet penetration has become the most influential driver of global development, it has become the most powerful tool that facilitates dialogue and engagement among citizens and helps engender citizens' participation in governance discourse in a way that nurtures a culture of social accountability. Ghana has experienced a phenomenal growth in information and Communication Technology (ICT) penetration in every facet of the economy – business, education, governance, and agriculture. The speed with which ICT is developing and its impact on social-economic activities cannot be over emphasized as it is constantly growing in importance especially in terms of its contribution to GDP.

Ghana was the second country in sub-Saharan Africa to have full internet connectivity in 1995 [19], but population penetration did not progressed as expected until 2005. This can be attributed to the Ghana government ratified and adopted an ICT policy in 2004-Information and Communication Technology for Accelerated Development (ICT4AD). The purpose of the ICT4AD was to create the critical drive and strategies need to harness the full potential of ICT for socio-economic development of the country. The development of internet technologies is important infrastructure for supporting the activities in a number of public and private sector in various countries [20].

In 2004, the International Telecommunication Union (ITU) statistics indicated very low Internet penetration in Ghana, with a 172 Internet users per 10,000 inhabitants in 2004; it however increased higher than the African average of 123.21 [21]. As at 2003, there were more than 750 Internet cafes in Ghana, mostly using dial-up connections [22]. The Internet Society ranking of Global Internet Penetration of countries in the world as at 2015, Ghana was ranked 145th country with 12.3% of internet penetration of internet users in the world [23].

In 2015 ITU report on the Measuring the Information Society showed that the ICT Development Index for Ghana has improved as compared to the year 2012. Out of 166 countries, Ghana was ranked 113th in 2013 out of 166 with an Index of 3.46 as compared to 115th rank in 2012 with an index of 3.29. Other sub-indexes such as Access and Users show much improvement as compared to other African Countries Kenya, Nigeria, Cameroon, Senegal, and Zambia etc.

TABLE III
ICT DEVELOPMENT INDEX (IDI) [24]

Rank (out of 166 countries)		Index	
2013	2012	2013	2012
113	115	3.46	3.29
Access Sub index			
106	106	4.47	4.30
Use Sub Index			
107	107	1.76	1.55

The 113 global ranking for Ghana placed Ghana 6th on the Africa Regional Ranking of the 38 African countries who were part of the ITU report for 2015.

The drivers of the ICT industry currently are the mobile phone and internet services. According to the National Communication Authority (NCA), as at December 2014, the total cellular/mobile voice subscriber base in Ghana was at 30,360,771, which is 0.47% of the Ghana population estimated at 26 million. While total fixed line as at December 2014 also was 260,407 subscribers which represent 0.20%. However, the subscribers of internet service have been growing in leaps and bounds over time. It stood at 11 percent or 1,296,047 in 2009, rising to 16% in 2010 and by 2011 there were over four million subscribers (at rate of 21%) according to the NCA.

There are six (6) cellular network operators in Ghana. They are Scancom Ghana Limited MTN, Vodafone Ghana Limited, Milicom Ghana Limited (Tigo), Airtel Communication, Expresso and Globacom Ghana Limited (Glo). As at December 2014 (voice), MTN leads the pack with 45.63% of the market share, Vodafone with 23.29%, Airtel 12.30%, Tigo 13.62%, Glo 4.78%, and Expresso 0.39% of the market share.

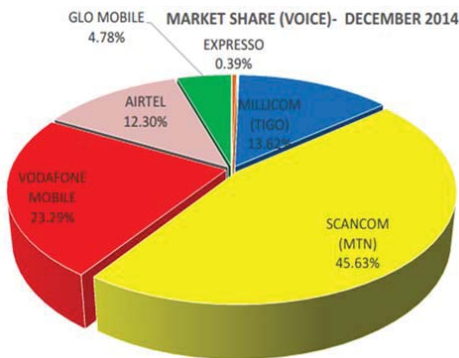


Fig. 2 Mobile operators market share- Ghana (Voice) [25]

During the same period, the mobile data penetration rate in Ghana was 59.02% which amounted to 15,805,925 people who subscribed to mobile data in Ghana. MTN still leads with mobile data penetration with a market share of 50.64% whilst Expresso has the least mobile data subscribers of 0.24%. Other operators with their respective market share are depicted in Fig. 3.

A. Mobile Broadband Penetration

The Ghana Statistical Service 2010 Housing and Population Census [27] report indicate that mobile phone subscription per

100 population as at 2010 is 22 percent. This figure is higher among males (36%) than their female counterparts (30%) and it also indicates that rural penetration (19 per 100) is far less than in urban areas (46 per 100). This is illustrated in Fig. 4.

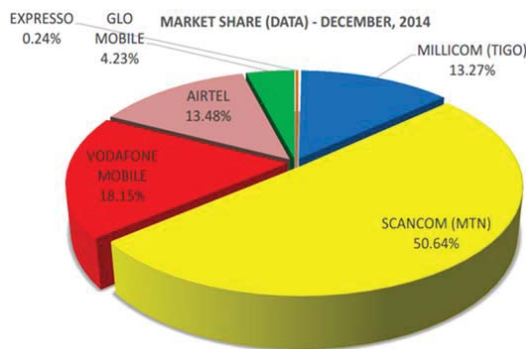


Fig. 3 Mobile operators market share (Data)-Ghana [26]

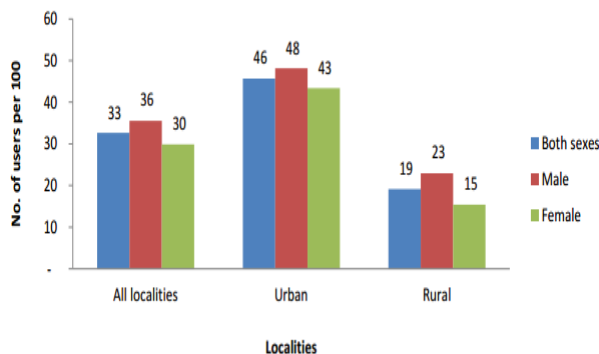


Fig. 4 Mobile Phone subscription per 100 population by sex and locality [27]

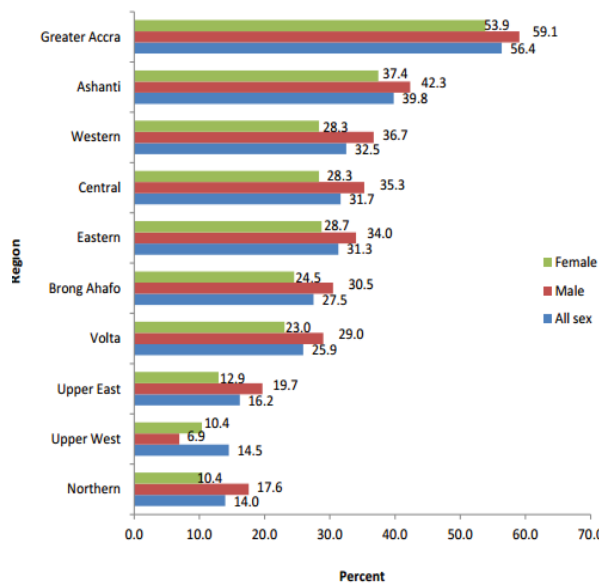


Fig. 5 Mobile phone subscription per 100 population by region and sex [27]

There are more disparities in mobile phone usage at the regional level. Where Greater Accra Region has 56 subscriptions per 100 population, the Northern Region has only 14 subscriptions per 100 inhabitants. The Upper East Region comes next to the Northern Region with only 14.5 subscription per 100 inhabitants but it is the only region where mobile penetration is higher among female (10.6 subscription per 100) than males (6.9 subscription per 100). This is shown in Fig. 5.

B. Fixed Telephone Line Penetration

Per the 2010 PHC, [27] the total number of households with fixed line is 127,694, implying that the number of fixed telephones (if we assumed that each household will have one fixed telephone line) per 100 population is 0.53. Again, according to [28], fixed line subscriptions continue to decline, reaching 270,761 in August 2012, from over 289,000 in February 2012. With an estimated population 25 million, it means fixed lines per 100 subscriptions are just 1.08. The [27] further indicates that fixed line usages are almost non-existence in the rural areas as only 0.12 of fixed lines per 100 populations are available. The declining trend can be attributed to the much more convenient and easy, if not cheaper, to own mobile phone now than fixed lines. Further, the decline could be attributed more to a replacement of fixed line in households with cellular phones which serve people's needs better than the fixed line which are fast becoming irrelevant in homes. These are illustrated through Figs. 6 and 7.

C. Internet Users per 100 Population

The 2010 PHC [27], internet subscription per 100 populations stood at 5.3 (as shown in Fig. 8). Urban usages surpasses rural usage by more than seven percentage point. Internet usage among females (3.8 subscriptions per 100) also appears to be much less than among their male counterparts (6.9 subscriptions per 100).



Fig. 6 Fixed Telephone lines per 100 population [27]

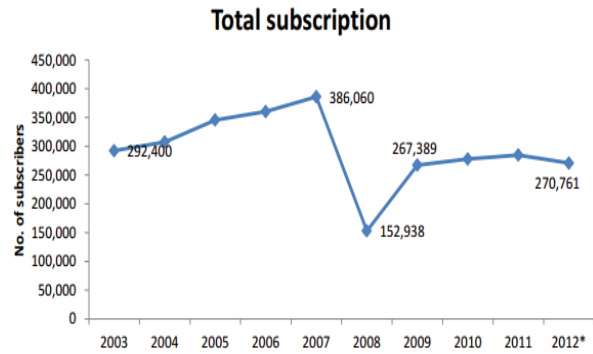


Fig. 7 Trends in National fixed lines subscriptions 2003-2012 [27]

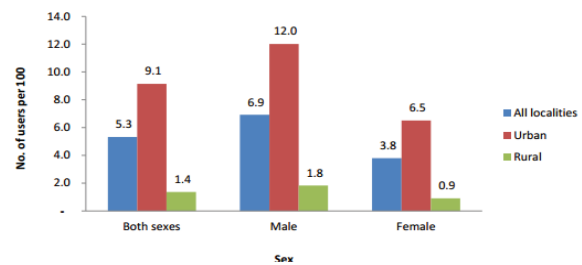


Fig. 8 Internet usage per 100 populations [26]

TABLE IV
ICT KEY INDICATORS [28]

Indicators	Quantity
Mobile Operators	6
Expresso	119,059
Millicon (Tigo)	4,133,760
SCANCOM (MTN)	13,852,398
Vodafone Mobile	7,069,516
Airtel	3,735,656
Glo Mobile	1,450,382
Fixed operators	2
Vodafone	252,669
Airtel	7,738
Penetration	2
Mobile	113.37%
Fixed	0.97%
Market share	
Mobile	99.15%
Fixed	0.85%

VII. MANIFESTATION OF E-GOVERNMENT IN GHANA

The government of Ghana's determination of making e-government visible has developed several portals aimed at bringing services and information to the doorsteps of the general public while at the same time improving the internal workings of MDAs/Public Institutions. In support of this, a National Data Centre for Ghana has been established. The Data Centre serves a centralized repository for the storage, management, and dissemination of government data and supposes to provide a common platform for MDAs, MMDAs and other public sector organizations. It is expected to make it easier for the public to access government services and also provide one-stop source of government information, including

government services directory, which citizens and the entire public can easily search and access. Key among these portals is electronic payment (epay) and electronic services (eservices) portals under the e-Services and Government e-Commerce portal infrastructure which was developed to provide a platform for online submission application services through the use of e-forms, an e-Payment interface for payment of services, postal and delivery services and Application Security for various Government Agencies. These services were piloted with 13 Agencies in Accra which was officially launched on Wednesday 17th December, 2014.

A. Electronic Services (eServices)

The online Services Portal of the Government of Ghana was put in place to serve as a one-stop window for services and information being offered by all the MDAs and other government agencies to both businesses and citizens. The one top service center was conceived following the adoption of the e-government initiative and the government's goal of providing access to government services to the general public with ease and speed. It envisaged that this will provide timely, effective, and efficient government services to the citizens to enhance and encourage their participation in governance. The services offered by the platform includes applying for birth certificate, accommodation/catering establishment, police report (application for finger print check), application for registration as food product importer and online submission of personal data for passport application. In addition, for Accra Metropolitan Assembly (AMA), registration of marriage and acquisition of marriage license could be applied by citizens and paid online. There are also downloadable forms for visitors to the site to download and complete by clients to receive any service from the Ministries, Departments, and Agencies online without traveling to the Agencies' offices for copies of the forms. For instance, passport applicants can apply online and then visit the passport office to provide their bio data including finger prints based on automated appointment scheduling process. Applicants are then notified automatically when their passports are ready for collection. While waiting for notification, citizens will be able to track their applications online to determine the status of their application.

B. e-Payment

The E-Payment Portal (EPP) is an avenue for the payment of Government of Ghana (GoG) services by citizens and other individual or corporate entities that transacts business with GoG through the electronic services (eservices) platform. It offers payment of fixed fees, tangible goods, services payments and payment for Ad hoc services. The epay portal is intended to broaden the scope of payment options, streamline payment processes, and improve efficiency particularly with regard to payments and generally in the service provision for all Government Ministries, Departments and Agencies (MDA's) that deliver services to the general public. It is anticipated that this will shorten queues, encourage payment for government services online, increase the public

accessibility and eventually lead to the increase in volume of business between the government and citizens.

The online payment platform accept various payment types such as, both local and international debit/credit cards, mobile payments, Bank Transfer and Cash & Vouchers etc. Some of the services that citizens can pay for are marriage certificate, birth certificates, finger print analysis, change of use of commercial vehicle, renewal of driving license, passport form processing etc.

C. Government E-Workspace

To transform governance through the application of ICT the Government of Ghana initiated the implementation of a Government e-Workspace System meant for 102 Government Ministries, Departments and Agencies (MDAs), MMDAs and some selected Public Sector Organizations. The e-Workspace was rolled out with thirteen (13) MDAs such Ministry of Communications, Ministry Trade, Judicial Service, Public Services Commission, Ghana Police Service, Ghana Armed Forces, Ghana Investment Promotion Centre (GIPC), Ghana Revenue Authority (GRA), USPA, Lands Commission, NITA and PRAAP. The end result of this e-Workspace system is to compliment efforts already been carried out towards the creation of a paperless government administration through the MDAs/public sector institutions. The system is modeled to comprise Correspondence Management System, Portal Content Management System, Document Management, and Meeting Management Systems. All these systems are expected to facilitate a complete paperless working environment among the various government MDAs/Institutions. MDAs would be able to track decisions and actions taken on such decisions. Not only would the system further automate submission, processing, and approval of letters/memos but also provide the capacity to conduct meeting and track action status or outcomes of such meetings.

The key component of the Government e-Workspace is the Correspondence Management System (CMS), which has been developed to allow for preparation, processing, receipting, and management of e-letters, e-dispatch, e-minutes on letters, e-signing, data capture and e-storage of documents, e-archiving, e-attachment of files and e-disposal of letters. The CMS will aid MDAs to capture and manage their incoming correspondence e.g. paper and electronic letters, emails, faxes, etc. and outgoing correspondences as well as internal correspondence (memos, letters etc.). Additionally, it allows for retrieval of electronic documents through searching, applying document restrictions based on user roles (e.g. Minister, Chief Director, Director, Commanders etc.) so that users of the system will see only documents they are permitted to see base on their role/position within the MDAs.

D. One Stop Shop Centre

The One Stop Service Centre was developed as part of the e-government Phase 2 projects which is being implemented to extend reachability of services delivered by Government Organizations, Ministries, Departments, and Agencies (MDAs) to facilitate easy access of information and

communication to the public. The One Stop Shop Centre was a strategy conceived as a result of government's determination through the adoption of e-government and most importantly the government's goal of providing access to public services to all with ease and speed, which ultimately will lead to provision of timely, effective and efficient government services to citizens. This will enhance and encourage citizens' participation in governance.

The One Stop Service Centre is a center meant to provide integrated services and information from government to people, as part of a comprehensive strategy to ease the stress and troubles of accessing public and social services to better their lives. The Service Centre has a state of the art equipped hall with modern office equipment and almost forty (40) service counters.



Fig. 9 One Stop Service Centre



Fig. 10 One Stop Service Centre

It is anticipated that this one-stop shop services for the public will enhance the fast as well as the professional delivery of business operations of Government Organizations, MDA, MMDAs to deliver automated services such as the e-application forms (passport) and payment of utility bills etc.

VIII. CHALLENGES OF E-GOVERNMENT ADOPTION AND IMPLEMENTATION IN GHANA

The challenges encountered in the adoption and implementation of e-government in Ghana may not be exclusively related to Ghana but other countries as well. ICT infrastructure is a major challenge in implementing in e-government initiatives in Ghana. This is followed by human resources, legal framework, internet access and connectivity, language, illiteracy, awareness and the digital divide. In the context of Ghana, the challenges could be categorized into six main factors; financial, organizational, political, socio-economic, human and infrastructural factors.

Financial Factors: The source of funding in public sector organizations comes from the central government [29]. With the current economic challenges facing Ghana and the untimely release of allocated budget for MDAs/MMDAs hampers IT initiatives and e-government, "making it hard to control, and sometimes comes and goes in cycles of 'east and famine' that makes it difficult to plan sustainable IT initiative such as e-government" [30]. In Ghana the cost of internet, cost of e-government such as maintaining of MDAs website etc. pose a challenge to the successful implementation of e-government.

Infrastructure Factors: Infrastructure has been identified by as the main challenge for e-government adoption and implementation [31], [29]. Though, Ghana has benefited from some world bank funding for its ICT infrastructure, there still remains a lot gaps that must be filled. The lack of adequate ICT infrastructure in Ghana is a significant barrier to the provision of e-government services and hamper to efforts to modernize government. Issues such as security, privacy, interoperability, power supply, internet access, and connectivity are infrastructure issues in Ghana's adoption and implementation of e-government. The digital divide is part of the infrastructure challenges of e-government implementation in Ghana. The digital is described in terms of the difference in the number of telephones, internet users, or computers per head between the rich and poor countries [32]. Ownership of PCs or mobile handset and disparities in internet access are among the most important challenges faced in Ghana in implementing e-government. The digital divide in developing countries such as Ghana is closely tied to the contextual economic environment the country finds itself. This assertion is supported by [33]; countries with thriving economies are by and large associated with increased access to ICTs compared to those whose economics are doing badly.

Political Factors: In Ghana, even though there is some level of political commitment that has been demonstrated through promulgations and implementation of e-government initiatives, the show of greater commitment would enhance the implementation of Government of Ghana's e-government efforts. The support of government leadership to e-government initiatives are important [34]. Political leadership support is very critical and this is asserted by [31] "leadership is one of the main driving forces of every new and innovative project or initiative". This is because the implementation of e-government programmes demands complex and large scale changes [35], [36]. Some government appointees and officials view e-government as a challenge and threat to their position and power, hence become resistant to the notion of government going online [37]. This lack of support from politicians and high level bureaucrats poses a challenge for e-government and its sustainability which eventually leads to underdevelopment of e-government platforms [38]. In Ghana for instance even though institutions like passport office and Birth and Death registrar have been put on the e-government platform to offer passport and birth and death certificate to Ghanaians through the online eservices, the bureaucrats system prefer the human intervention due to the illegal money

they collect from applicant who apply in person. This is off course a threat to the sustainability of the good intent of government to eliminate middle men and improve the services to citizens.

Organizational Factors: The efforts of government to adopt and implement e-government will be no effective if participating, MDAs/MMDAs, public and private sector organizations are not fully committed to the values and vision of e-government for their sector. To maintain the values, visions of all stakeholders in an e-government initiative, there is need for organizational skills and effective communication [39]. MMDAs/MDAs may view the e-government initiative as a threat to their operations due to some corrupt gains/practices that would be exposed by e-government applications. Considering that government agencies in developing countries may view this as a threat to their viability and power, making them reluctant to promote the true objectives of e-government [40], [41], [37]. This obviously presents a huge challenge for the successful implementation of e-government initiatives and as [42] indicates, e-government initiatives in Africa have been with total or partial failure because of the “people” factor.

Socio-Economic Factors: In Ghana, economic status of people is a challenge to implementation e-government services. People who live on less than USD 1 a day coupled with illiteracy and language barrier pose a challenge. Not everybody in Ghana can write and speak the English language so the challenge is how Ghana design e-government initiatives do such that other major local languages speakers would also benefit from the benefits of government services. This may explain he huge interest in the impact of culture on the adoption of ICT in developing countries by many researchers. The socio-culture factors have become of course important in ICT related developments in developing countries, such as Ghana. This is mostly true considering the fact that the manner in which technology is used and adopted by policy makers or citizens of a country tends to be affected by patterns of individual behavior and cultural norms [40].

Human Factors: The requisite ICT skill in the public sector is a major challenge for e-government adoption and implementation in Ghana. The various MDAs/MMDAs lack the right ICT and technology skills to handle ICT (e-government) related projects within the government sector. So mostly, this ICT services are out sourced to the private sector that have rich ICT experts to perform or deal with issues that could have been handle by agencies if they had the proper ICT training. Also the lack of computer literacy among the citizens, businesses and government sector works is a worry. In Ghana, people that have skills in ICT are limited but the majority of those who have them are young citizens thus the elderly will be left out in adopting e-government. Adequate training has to be carried out in term of ICT training especially for government employees who are the principal people to make the e-government run smoothly.

IX. OBSERVATIONS

A field visit to some of the participating MDAs in the e-government eservices and epayment portals established by

NITA. The visit to the Birth and Death Registrar, Ghana Tourism Authority, DVLA, Passport Office and Registrar General’s Department to see the extent of the implementation process. It was observed that even though the eservices and epayment have been properly deployed at the visited MDAs, they are not been fully utilized. The managers of the system still prefer to operate manually to provide service to citizens that patronize their services. Specifically, the of the visit day (September 21, 2015), the Passport Office and Birth and Death Registrar, It was observed that long queues of people waiting to process either their passport or birth certificates. This phenomenon worrying because it is this very long queue that the e-government system was put in place to prevent, particularly the unnecessary bureaucratic processes and alleged corruption at these offices. Also citizen visit to the various MDAs portal sites to apply for service online was nonexistence. The managers of the system indicate that they have not received any application through the eservice portal system. For instance, at Birth and Death even though they received some enquires from people, the actual application request processed was less than two. This can be attributed to low publicity of the e-government eservices and epayment portal available for citizens to access services from the Government through respective MDAs.

The overall observation is that Adoption and Implantation of e-government in Ghana is very young and still at its fundamental stages despite the fact that some amount of infrastructure has been put in place for the successfully take off.

X. RECOMMENDATIONS

- a. The Government through the implementation agency for the e-government in Ghana should hold a stakeholders forum for deliberation and consultation on the need for MDAs and MMDAs to fully utilize the potential of eservices and epayment platform to transform and modernize their service delivery.
- b. For the success of e-government in Ghana, utilization of eservices and epayment platform should be made part of the Performance Agreement of all Chief Directors of MDAs and MMDAs as well as other Heads of Public Sector Organizations.
- c. The implementing agency and participating MDAs/MMDAs should devote some amount of resources to effective publicity in the media and through forums to make citizens aware of the availability of the e-government platform to offer effective and efficient service delivery to the citizenry.
- d. Government should take advantage of the high level of internet and mobile phone penetration among citizens in Ghana to fully deploy e-government so that citizens can benefit from the good dividend of modernized and efficient e-government to provide better service delivery.

XI. CONCLUSION

Though e-government is young in Ghana, within the short span, the government of Ghana has shown great commitment to the adoption and implementation of e-government as a tool not only to transform the business of government but also to bring efficiency in public services delivered by the MDAs/public sector institutions to the general citizenry. Expansion of ICT (e-government) infrastructure to all major towns and cities as well as other public organizations speaks volume of the desire of government through the MDAs/public organizations to use e-government by extension the power of ICT to deliver an improved and efficient public service to both the business community and citizens as whole.

The demand for efficient service delivery by citizens has contributed to the use of e-government not only to bring efficiency but also to bring information and services closer to the doorsteps of all citizens. This has been demonstrated through the electronic services (e-services) and electronic payments (e-payment) platform that allows citizens to access government services through the MDAs and other public sector institutions. This platform provides integrated services and information from government to the public in order to ease the stress and troubles of accessing public and social services.

From all indications (ICT infrastructure, legal, policy, etc.), Government of Ghana (GoG) adoption of e-government is to bring efficiency in public service delivery to the public. To ascertain this, a further research is needed to determine if the use of e-government (use of ICT in public administration) has brought about the anticipated improvement and efficiency in service delivery of MDAs and other public sector institutions.

ACKNOWLEDGMENT

Deepest Appreciation to my Ph.D. Supervisor (Professor Mi Jianing) who is the Head, Department of Public Administration, School of Economy and Management, Harbin Institute of Technology for the encouragement and support in writing this paper.

REFERENCES

- [1] Carter, L & Belanger, F(2004), 'Citizen Adoption of Electronic Government Initiatives' in Proceedings of the 37th Hawaii International Conference on System Sciences, Hawaii, USA, 5-8 January 2004, pp. 119-128.
- [2] Ciborra, C & Navarra, D (2005), 'Good Governance, Development Theory, and Aid Policy: Risks and Challenges of E-government in Jordan', *Information Technology for Development*, vol. 11, no.2 pp 141-159.
- [3] Huang, Z & Bwoma, P. (2003): 'An Overview of Critical Issues of E-government', *Issues of Information Systems*, vol. 4, no. 1, pp. 164-170
- [4] Tung, L & Rieck, O. 2005, 'Adoption of Electronic Government Services Among Business Organizations in Singapore', *Journal of Strategic Information Systems*, vol. 14, no 4, pp. 417-440.
- [5] Lee, S. Tan, X & Trimi, S 2005, 'Current Practices of Leading E-Government Countries', *Communications of the ACM*, Vol. 48, no. 10, pp. 99-104.
- [6] Pons, A. 2004, 'E-government for the Arab Countries', *Journal of Global Information Technology Management*, vol. 7, no. 1, pp. 30-46.
- [7] Chatfield, A & Alhujran, O, 2008: 'A Cross-Country Comparative Analysis of E-Government Services Delivery among Arab Countries', *Information Technology for Development*.
- [8] United Nations/American Society for Public Administration (UN/ASPA) 2002) 'Benchmarking E-Government: a Global Perspective', URL: <http://www.unpan.org/e-Government/Benchmarking%20E-gov%202001.pdf>
- [9] Heeks, R. (2004). E-Government for Development, Basic Definitions Page. IDPM, University of Manchester, UK. Retrieved from <http://www.egov4dev.org/egovdefn.htm>
- [10] Hernon, P., Reylea, H. C., Dugan, R. E., & Cheverie, J. F. (2002). United States government information: Policies and sources. Westport, CT: Libraries Unlimited.
- [11] Thomas, John Clayton, and Gregory Streib. 2003. The New Face of Government: Citizen-Initiated Contacts in the Era of E-Government. *Journal of Public Administration Research and Theory* 13(1): 83-102.
- [12] Navarra, D. D. and Cornford, T. (2003). A policy making view of e-government innovations in public governance. In Proceedings of the 9th Americas Conference on Information Systems, August 4-6, Tempa, Florida.
- [13] Breen, J. (2000). At the dawn of e-government: The citizens as customer, *Government Finance Review*, 16, 5, 15-20.
- [14] Wimmer, M. and R. Traunmuller (2001). Trends in electronic government: Managing distributed knowledge. In the Processing of the 11th International Workshop on Database Expert System Applications, Springer, New York.
- [15] Government of Ghana E-government Implementation Strategy 2005.
- [16] <http://www.internetlivestats.com/internet-users-by-country/>
- [17] UN E-government Survey Report (2008), Accessed 10th August 2015 http://www.unpan.org/egovkb/global_reports/08report.htm
- [18] Ghana ICT4D National Policy (2003) www.nca.org.gh/downloads/Ghana ICT4AD_Policy.pdf Retrieved 30th August 2015
- [19] Tevie, W., N.N. Quaynor, and A. Bulley. Development of the Internet in Ghana. 1996 (cited 20th July 2012); Available from: http://www.isoc.org/inet96/proceedings/g6/g6_4.htm
- [20] Shin, D.H., A critique of Korean National Information Strategy: Case of national information infrastructures. *Government Information Quarterly*, 2007, 24(3): p. 624-645.
- [21] International Telecommunication Union, World telecommunication/ICT development report 2006: Measuring ICT for social and economic development. Geneva, Switzerland: ITU. 2006.
- [22] Ngugi, C., et al., ICTs and higher education in Africa, in Status reports on information and communication technologies (ICTs) in higher education in eight African countries. 2007.
- [23] http://www.internetsociety.org/map/global-internetreport/?gclid=CInDpJD_hckCFYgKwwoddGYKOW (retrieved on 10th November 2015).
- [24] ITU, Measuring the Information Society Report (2015)<http://www.itu.int/en/ITU-D/Statistics/Pages/publications/mis2015.aspx>
- [25] http://www.nca.org.gh/downloads/Mobile_VOICE_SUB_DEC_2014.pdf
- [26] www.nca.org.gh/downloads/Mobile_Data_Subscription_DEC_2014.pdf
- [27] Ghana Statistical Service, (2010) Population and Housing Census National Analytical Report <http://www.statsghana.gov.gh/publications.html>
- [28] <http://www.nca.org.gh/40/105/Market-Share-Statistics.html>
- [29] Ebrahim Z. and Irani Z. (2005). E-government adoption: architecture and barriers. *Business process management journal*, Vol. 11, no. 5, pp. 589-611.
- [30] Heeks, R. (1999). *Reinventing Government in the Information Age: International practice in IT-enabled public sector reform*. New York: Routledge.
- [31] Ndou V. (2004). E-government for developing countries: opportunities and challenges. *Electronic journal on information systems in developing countries*, Vol. 18, no. 1, pp. 1-24.
- [32] Kenny, C. and Fink, C. (2004), "Canyon or mirage?" *The Economist*, Vol. 370 No. 8359, p. 69.
- [33] Nua (2002), "Internet survey by area", available at: www.nua.com/surveys/ (accessed October 2015)
- [34] McClure, D.L. (2001). Electronic Government: Challenges Must Be Addressed with Effective Leadership and Management. GAO-01-959T, Testimony before the Senate Committee on Governmental Affairs, on behalf of the U.S. General Accounting Office. Available: <http://www.gao.gov/new.items/d01959t.pdf>
- [35] Bonham, G., Seifert, J. and Thorson, S. (2001). The transformational potential of e-government: the role of political leadership. Paper presented at 4th Pan European International Relations Conference, University of Kent.

- [36] Burn, J. and Robins, G. (2003). Moving towards e-government: a case study of organizational change processes. *Logistics Information Management*, vol. 16, no. 1, pp. 25-35.
- [37] Sanchez, A. D., Koh, C. E., Kappelman, L. A. and Prybutok, V. R. (2003). The relationship between IT for communication and e-government barriers. In *Proceedings of 9th. Americas Conference on Information Systems*, August 4 – 6, Tampa, Florida.
- [38] Chwester, R. W. (2009). Examining the Barriers to e-Government Adoption. *Electronic Journal of e-Government* Vol. 7, no.1, pp. 113 – 122.
- [39] Sharma, S. K. and Gupta, J. D. N. (2003). Building blocks of an e-Government - A framework, *Journal of Electronic Commerce in Organizations*, Vol. 1, no. 4, pp. 1-15.
- [40] Heeks, R. (2002). e-Government in Africa: promise and practice. *Institute for Development Policy and Management*, Paper No. 13, University of Manchester, the UK.
- [41] Kaaya J (2004). Implementing e-Government Services in East Africa: Assessing Status through Content Analysis of Government Websites. *Electro. J. e-Govern.*, Vol. 2, no. 1, pp. 39-54.
- [42] West, D. M. (2004). E-Government and the transformation of service delivery and citizen attitudes. *Public Administration Review*, Vol. 64, no. 1, pp. 15-27