



ISSN 2047-3338

Challenges of Implementing and Developing E-Government: A Case Study of the Local Government System in Ghana

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Abstract—Although Electronic Government (E-Government) is a global phenomenon, the simple transfer of Information and Communication Technology (ICT) solutions and related organizational concepts from developed to developing countries does not seem very appropriate or feasible. With the current proliferation of ICT, there is no doubt that E-Government has the potential impact of reducing administrative and development problems in a developing or developed country. Nevertheless, it is evident that compared to developed countries, additional efforts are necessary when implementing E-Government in developing countries of which Ghana is no exception. In comparison to developed countries, the different cultural, institutional and wider administrative contexts of developing countries must be considered to circumvent unpremeditated effects. Using the local government system in Ghana and relevant literature, this article outlines and addresses the cultural and different institutional contexts which must be taken into account when implementing E-Government. The paper further discusses some key research challenges and open issues involving E-Government implementation in Ghana.

Index Terms— E-Government, Ghana, ICT, Implementation and Local Government System

I. INTRODUCTION

THE dawn of the information era and its ever-increasing effect on global stage is leading countries all over the world to a fresh economic order driven by information and knowledge. Presently, in an ever-growing global world, where Information Communication Technology (ICT) has developed into one of the major indicators of growth, countries in Africa are confronted with new challenges due to the emerging information era [1], [2].

The significant role that ICTs are playing enables the possibility of helping and speeding up socio-economic

development. ICT is now being recognized as a key instrument which most African governments can use as a leap-frog towards their development agenda [2]. An increasing number of national and local governments are formulating and implementing ICT policies, making important information very easily available online, computerizing administrative procedures and interacting with citizens through online services. Nevertheless the huge prospects presented by these new innovative technologies are to a large extent not fully exploited by African countries [1], [2].

In 2003, the Republic of Ghana designed the Ghana ICT for Accelerated Development (ICT4AD) Policy, which was approved by parliament in February 2004. The Ghana ICT4AD Policy [3] characterizes the vision of Ghana in the information age. It is based on the framework document: “*An Integrated ICT-led Socio-economic Development Policy and Plan Development Framework for Ghana*”. The development of this policy was based on a nation-wide consultative process involving all key stakeholders in the public sector, private sector and civil society of Ghana [3].

E-Government is a new phenomenon which employs ICTs such as the Internet, resulting in better service delivery, better information management, better access to information and involvement of different stakeholders in the governance process. When it comes to sphere of government, ICT applications are leading the promise of enhancing the delivery of public goods and services to the citizenry not only by improving the processes and management of government, but also by giving a different definition to the conventional concepts of democracy and citizenship [4]. The resulting effect is that ICT can be used to create a more efficient and effective government, which makes government services more accessible. This enables the possibility of the larger public to easily access information and makes global governments more accountable to citizens [4], [5].

The advantages associated with E-Government are many. Some of these are: greater efficiency, improved public services and enhanced engagements with citizens of a nation. Nevertheless advancement in E-Government has been rather very slow in Africa [4], [5]. Schuppan [4] emphasized that in the case of African countries, a context-oriented approach seems to be a more promising route for the successful

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implementation of E-Government.

Notwithstanding the benefits of E-Government, developing and implementing an E-Government infrastructure introduces some inherent challenges. These include: (i) the deployment of huge ICT infrastructures and its associated financial implication, (ii) commitment of governments to genuine transformation towards a more transparent and citizen-centered governance and (iii) weak state institutional structure for formulating of new regulations and policies for the ICT sector. E-Government applications represent a security challenge as they are highly dependent on critical ICT systems, consisting of both infrastructure and services that create vulnerabilities in government institutions, businesses and can potentially harm citizens [6].

In this paper, we mainly focus on exploring and examining the challenges of developing and implementing E-Government using the local government system in Ghana as a case study. Specifically, we elaborate on the different administrative contexts and circumstances that must be taken into an account when implementing E-Government projects and strategies.

The rest of the paper is organized as follows. We present justifications, objectives and background of the study after the Introduction. Section II reviews some relevant literature in the area of E-Government and Section III discusses effects of E-Government in the context of developing countries. In Section IV, we elaborate on E-Government in Ghana. Section V elaborates on some key research challenges and discusses some open issues. The paper is finally concluded in Section V.

A. Justification and Objectives of the Study

When developed and implemented properly, E-Government can yield a number of benefits to the local government units in Ghana. In a nutshell, the apt use of E-Government will be of benefit to both central and local governments as well as citizens and businesses in a number of ways. This will enhance public policies and services at the national and local government levels notwithstanding the budgetary and other challenges that face modern governments in the third world.

On the other hand, there are several impediments that can hold back progress towards realizing the promise of developing and implementing E-Government. Therefore, the objective of this study seeks to identify and explore key issues that can hold back the growth of E-Government and propose possible initiatives from the Ghanaian perspective to overcome them.

B. Background of the Study

The local government units in Ghana are corporate entities that were established under the local government Act No. 462 of 1993 [7]. In addition to the Act, the local government units derive their powers from the constitution of Ghana, and other Acts of Parliament, Ministerial Orders and Bye-laws. At the moment there are approximately 138 local government units in Ghana.

The local government units in Ghana are called District Assemblies. The Constitution of the Republic of Ghana [8]

grants power to the District Assemblies as the highest political authority in a district, and that the District Assembly has deliberative, legislative and executive powers. There are three categories of districts; these are districts assemblies, municipal assemblies and metropolitan assemblies [7].

The Ministry of Local Government and Rural Development (MoLGRD) is responsible and oversees all operations of the local government units in Ghana. Even though, these legal bodies constitute local government in Ghana, the local government structure in the country is broader than the local government units. It is made up of the regional coordinating councils, sub-metropolitan district councils, town councils, zonal councils, urban and area councils and unit committees [7].

Recruitment of staff is done by the Office of the Head of Civil Service. Nevertheless, as a result of enactment of the Local Government Service Act 2003 (Act 656), appointments, promotions and disciplining of local government employees now comes under the ambit of the Local Government Service Council. Inbuilt into the range of local government and local governance system in Ghana are various public and private institutions as well as civil society organizations [9].

Local government units in Ghana are charged with the mandate to deliver services such as pre and primary education, social welfare, health clinics, cemeteries, museums and libraries, water and sanitation, refuse collection, environmental protection and transport. However, the degree of authority for those service provisions varies. District Assemblies in Ghana have three (3) sources of revenue namely the District Assemblies Common Fund (DACF), ceded revenue and internal generated fund through local taxation [9].

II. LITERATURE REVIEW

As the information revolution steadily permeates the world, governments in the developing countries are accepting E-Government as an attractive instrument for improving communication, increasing efficiency for the delivery of services and improving transparency and accountability. This section of the paper review various definitions of E-Government in accordance to literature and presents the main reasons for instituting or implementing E-Government in a developed or developing nation. Furthermore, some related work pertaining to the paper are also presented in this section.

A. What is E-Government?

In a developing country such as Ghana, many companies/organizations including Ministries, Polytechnics and Universities rely on Information and Communication Technology (ICT) to provide accurate, relevant and timely information. ICTs are constantly implemented, upgraded, modified or replaced to obtain and sustain a competitive advantage. These initiatives are often managed as projects [5], [29]. While financial resources and efforts being spent on ICTs are increasing, these projects are not always perceived as successful. It is therefore important to understand the factors

that influence the outcome of ICT projects in organizations relative to their original constraints [5], [29].

ICTs are well recognized to have tremendous administrative “potentials” that help various governments in effective information and service delivery [10]. For instance, ICTs can help create a networked structure for interconnectivity [4], [5], [6], service delivery [11] decentralization and transparency [12], efficiency and effectiveness [13] and accountability [14], [15]. E-Government has emerged as a popular catch phrase in public government administrations to cover all of these functions. According to Halchin [16], there is not any universally accepted definition of the E-Government concept. In order to cover the variety of uses and the distinctions satisfactorily, several definitions are presented below.

Means and Schneider [17] defined E-Government as the relationships between governments, their customers (businesses, other governments and citizens) and their suppliers (businesses, other governments and citizens) by the use of electronic means.

In simple terms, E-Government means communication between a government and its citizens via computers and web-enabled devices. Regarding E-Government implementation, the advantages in timeliness, responsiveness, and cost containment are outstanding [6]. E-Government is a worldwide phenomenon [4], [6], [18], [19] that improves service delivery and internal efficiency of governmental organizations. It can be defined as “the use of internet ICT by a public organization to support or redefine the existing and/or future relations with ‘stakeholders’ in an internal or external environment in order to create value” [20].

The World Bank [21] emphasized that E-Government is a government utilizes ICTs for transformations related to its citizens, the private sector and other government agencies so as to promote citizen empowerment, improve service delivery, strengthen accountability, increase transparency and improve government efficiency. Furthermore, the World Bank has embraced E-Government in its efforts to modernize the public sector and improve public sector delivery.

For this reason, E-Government initiatives are present in most projects in the public sector of both developed and developing nations. E-Government is considered a key facilitator that can be used to achieve the proposed reforms supported by the rest of the core areas, from public financial management to anti-corruption, including the improvement of service delivery for citizens. Numerous projects have demonstrated that E-Government has had a remarkable impact on improving the efficiency and integration of the public sector [21].

Tapscott [22] defined E-Government as an internet-worked government which links new technology with legal systems internally and in turn links government information infrastructure externally with everything digital and with everybody i.e. the tax payer, suppliers, business customers, voters and every other institution in the society.

According to the United Nations Parliamentary Assembly (UNPA) [23], E-Government is the public sector’s use of the most innovative ICTs, such as the internet, to deliver reliable

information, greater knowledge and improved services for citizens, in order to facilitate access to the governing process and encourage deeper citizen participation. The most critical aspect of all these definitions is deploying ICT as a tool to reinvent the public sector, thereby changing its internal and external ways of doing things and relating with customers and the business community.

B. Importance, Necessity and Main Reasons for E-Government Implementation

The general idea behind the above definitions and explanations of E-Government is that it entails automating or computerizing present paper-based/manual systems that will prompt new and innovative approaches to leadership, new means of discussing and deciding strategies and new methods of information delivery and organization.

The ultimate aim is to provide enhanced access to relevant information and bringing government services to benefit citizens. Most importantly, the aim is to reinforce government’s drive towards effective governance and increased transparency to better manage a country’s social and economic resources for development [4], [5].

The main reason for instituting E-Government strategy is to put in place measures to improve government operations on constant basis with the resulting view of satisfying the needs of citizens by the transformation of internal operations such as staffing, technology, processes and work flow management. Consequently, E-Government is expected to lead to efficient and speedy conveyance of services to citizens, businesses, employees and agencies. In the case of businesses and citizens, E-Government would involve making procedures simple and processes of approval easy and straightforward. Taking the case of government employees and agencies, it would involve assisting agencies to harmonize their activities and cooperate to ensure suitable decision making in a timely fashion [4], [5], [21].

The focus of E-Government services is centered on the citizens, business community, government employees and government agencies. The prime aims of E-Government is to enable communication with citizens, businesses, government employees, government agencies and other governments in a more suitable, open, transparent, economical, and effective way. Usually, it is the individual within E-Government systems that initiate the request for a particular government service and then achieves the response to these services through the internet or some other technology driven mechanism. In some instances, the government service is conveyed through one government office, instead of many. In other instances, a government transaction is accomplished with no direct contact with any government official.

The four modes of E-Government service delivery are [10], [24]:

Government-to-Citizen (G2C): G2C involves giving out information to the public, essential citizen services such as renewal of license, making order for birth/death/marriage certificates and filing income tax returns. G2C also includes aiding essential services such as education, healthcare,

hospital information etc.

Government-to-Business (G2B): G2B involves different types of services exchanged between government and businesses. It includes giving out information on policies, memos, rules and regulations. Services accessible to businesses consist of getting up to date business information, downloading application forms, license renewals, business registrations, acquiring permits and payment of taxes. As a result of simplifying application procedures, businesses especially small and medium scale enterprises (SMEs) are encouraged to develop.

On a more advanced level, G2B services further include E-Procurement. E-Procurement is an online government-supplier exchange for the procurement of goods and services by government. Usually, E-Procurement web sites make it possible for authorized and registered users to search for buyers or sellers of goods and services. Based on the type of approach that buyers or sellers employ, they may be able to state prices or submit bids. E-Procurement makes the process of bidding more transparent and makes it possible for small businesses to submit bids for large government procurement projects. This method of procurement to a large extent helps government to make more savings, because costs from middlemen are eliminated and the overhead costs of purchasing agents are reduced considerably.

Government-to-Employee (G2E): G2E involves government to citizen services and in addition services that takes into consideration employees of government only, such as the provision of human resource training and activities that improve a government system's daily functions and transactions with citizens.

Government-to-Government (G2G): G2G involves services taking place at two levels, namely: local or domestic level and international level. G2G basically involves dealings between the central/national and local governments, and between ministries and agencies. In a similar vein, G2G are transactions between governments and can be used as tools for international relations and diplomacy.

C. Related Work

In recent years, several researches pertaining to E-Government in Africa have been discussed and presented by various researchers. Many of them were presented to: (i) address the challenges of E-Government implementation, (ii) elaborate on why there is sometimes failure in E-Government implementation and (iii) discuss how E-Government has been implemented in some countries to enhance information and service delivery.

Although E-Government is a global phenomenon, simply transferring ICT solutions and related organizational concepts from developed to developing countries seems inappropriate. E-Government undoubtedly has the potential to reduce administrative and development problems. However, it is obvious that compared to developed countries, additional effort is necessary when implementing E-Government in developing countries and Africa. To this extent, Schuppan [4] addressed the different institutional and cultural contexts

which must be considered when implementing E-Government in Sub Saharan Africa (SSA).

According to Heeks [25], E-Government is only slowly diffusing within Africa because there is lack of e-readiness for E-Government that can be charted along six dimensions. There is widespread recognition that this challenge must be met by strategic building of national infrastructures. Where E-Government projects are introduced, they mainly end in failure: either partial or total. To address this tactical challenge, Heeks [25] emphasized that stakeholders must be sensitized to the large gaps that often exist between project design and African public sector reality. These large design-reality gaps can be seen to inspire failure. They arise particularly because E-Government concepts and designs have their origins in the west, which are significantly different from African realities.

Almost all African governments now have some presence on the web/internet, including fully fledged E-Government web portals, albeit in small numbers. However, the current status of E-Government services in African countries is not well documented in detail [26]. Rorissa and Demissie [26] presented results of a comprehensive analysis of 582 African E-Government service websites with respect to the type of websites, services and features available, as well as the level of development of E-Government services. They also computed E-Government indexes, produced E-Government rankings, and compared their rankings to previous ones. A clear picture that emerges from their analysis and results is that although progress has been made, there is still a long way to go, to bridge not only the north-south divide when it comes to E-Government services but also among the various sub-regions in the African continent. In addition, recommendations for future researchers regarding E-Government services in Africa are provided in [26].

Ngulube [27] emphasized that the major ingredients of E-Government are infrastructure, human resources and information. The reality in Sub Saharan Africa (SSA) is that almost all these ingredients are insufficient. In most cases, both government officials and the people who may want to use government services online lack basic skills. The ICT infrastructure is not widely available to rural populations in Africa. Additionally, government information in Africa is not properly organized because record management systems are unfortunately collapsing. Consequently, Ngulube [27] outlined some solutions that can be used to address such challenges for the successful implementation of E-Government in Sub Saharan Africa (SSA).

Misuraca [28] focused on the context, theory and thinking around the issue of ICTs and local governance, particularly in Africa. After briefly discussing the basic concepts, from government to governance, and the role of local level authorities, presenting the benefits and limits of introducing ICTs in government operations, Misuraca [28] identified the common elements for providing proposed definitions. Furthermore, the results of four case studies involving the evaluation of E-Government in some selected projects in Senegal, Ghana, South Africa and Uganda were presented.

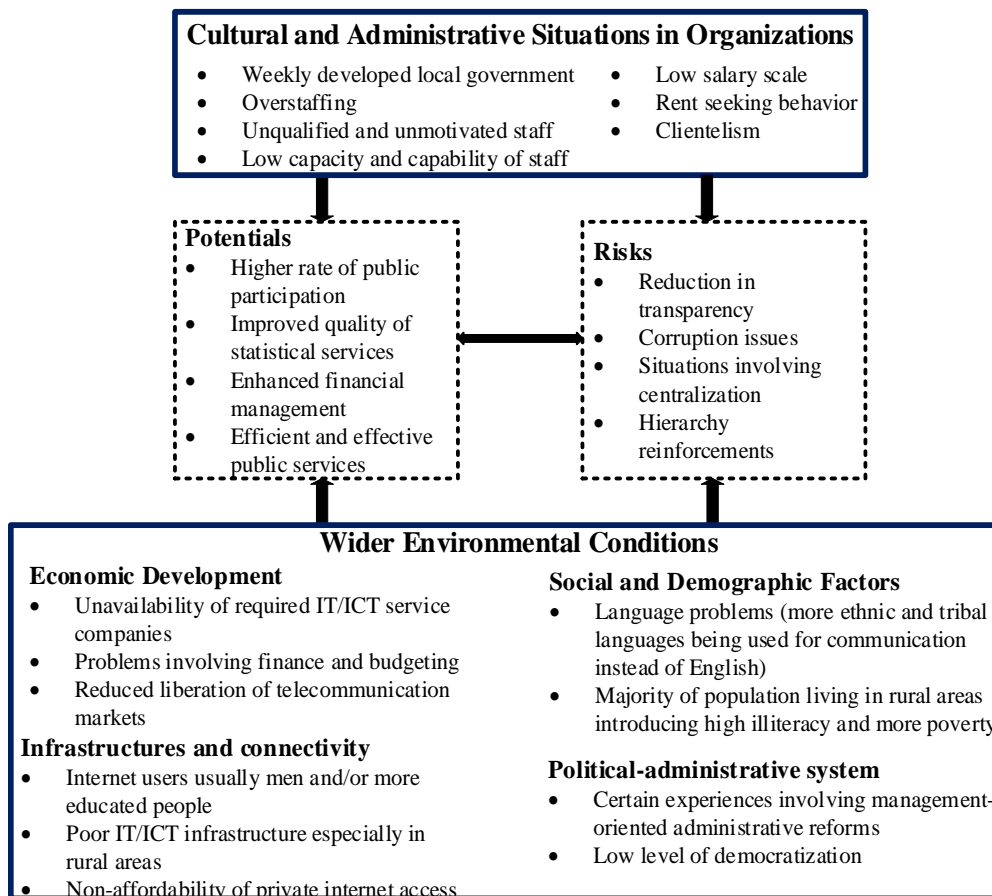


Fig. 1. Effects, Challenges and Developmental Impact of E-Government in an African Context

Based on the findings of the case studies, some conclusions and recommendation were presented in [28] regarding the way forward to make effective use of ICTs for better governance and promoting economic development at local levels.

III. EFFECTS OF E-GOVERNMENT IN THE CONTEXT OF DEVELOPING COUNTRIES

As indicated in Section II-C, in addition to existing administrative factors, non-administrative basic factors are also important. Political-administrative, infrastructural, demographic, social and economic factors are especially relevant in encouraging or hindering E-Government [30]. In the following subsections, these basic factors are outlined in depth and their relevance for the implementation of E-Government in Africa is explained.

A. Political-Administrative System

The political-administrative category includes the general functional liabilities of political-administrative systems as a whole, for example, the low level of democratization. In many African countries, military coups and civil wars make administrative reforms difficult, if not impossible [4].

Another important factor is the experience which a state has in making administrative reforms. Observations of E-Government programmes have illustrated that countries such

as Australia, New Zealand and the UK, which have especially undergone organizational changes in the direction of public management-oriented reform are better prepared to implement E-Government than countries which do not have such experience [4], [5].

This is especially relevant for African countries because administrative capacities are weakly developed in general and management liabilities cannot be compensated for by using technology. Some countries in Sub Saharan Africa, such as Ghana and Uganda, have already had some experience with public management-oriented reforms [4], [27], [28].

In Ghana, the main focus of reform efforts is the creation of semi-autonomous agencies. For example, a water authority was created which is now considered a prime example of efficient water management in the region [31]. Nevertheless, these management reforms have not reduced staff with lasting effect, decentralized the administration or changed the administrative culture.

B. ICT Infrastructures and Connectivity

This factor includes internet access and other basic infrastructure. Not only are internet access rates in many African countries below 5%, but in many rural areas electricity is not available or is only available for a few hours in a day [32]. For example, the number of internet users and available PCs per 100 inhabitants in Ghana equals 1.72 and

0.52 respectively. It is not uncommon that the costs of internet access may amount to 80–90% of average income. For instance, the monthly subscription fee for unlimited access and one email account in Ghana is about U.S. \$30 [33].

To mitigate these access problems, the Ghanaian government has developed, with the support of the Indian government, a concept for the so-called Community Information Centers (CIC) (Ministry of Communication, Ghana, 2004). The CICs are equipped with PCs connected to the internet, printers, fax machines, photocopiers, phones, televisions and radios. In addition, the CICs also serve as libraries and provide other information, such as information about prices of agricultural products for farmers; microloans for potential entrepreneurs and information about scholarships for students.

C. E-Government Potentials

There is no doubt that E-Government offers a lot of prospects that resolve some administrative problems. An analysis on the present difficulties facing many African countries suggests that, E-Government offers improvement potentials in the following areas: the general provision of public services, finance management and tax systems, statistical and information processes, public participation and formalization [4].

Schuppan [4] highlighted that the area of public service provision in the African context, initially involves setting up processes and services necessary for state activities under the rule of law in a particular country. Unfortunately, the necessary data for setting up such processes are often non-existent or completely outdated. For example, documents involving building permits, land registration and residential data in a particular district or region of an African country may be difficult to obtain, thus delaying the appropriate provision of such services. Additionally, birth certificates of citizens in rural African areas are also non-existent which consequently introduces developmental problems. Because permission processes are slow, or access to public services is non-existent, rural areas sometimes in Africa expand rapidly, with considerable consequences for the environment, public safety, and for the public budget [4].

E-Government provides the opportunity to improve the above described services (as well as other ones), even in areas with low literacy rates. For instance, access to public services can be facilitated by kiosk systems with voice recognition - a system which has spread quickly in rural regions of India [29].

The use of ICT also offers particular potential to improve financial and taxation systems, especially because governments in Africa often lack a well-functioning tax administration and finance administration system. The introduction of integrated tax and incorporated financial systems with suitable databases provides the possibility to better control financial flows as well as expenditures within a country. An example is the recent Tax Administration in Tanzania (ITAX) [4].

D. Development of the Economy via E-Government

In order to establish appropriate E-Government structures which are usually associated with high costs, economy levels of African countries are very relevant. For instance, at present, approximately one-third of the Ghanaian budget is financed by foreign donors [4], [28].

Furthermore, the per-capital income in most African countries is so low that the population cannot afford internet access. This trend is usually heightened through inadequately liberalized telecommunication markets [34] which barely allow competition for access to costs which are many times higher, in comparison to industrial countries.

Additionally, there are only a few private IT service providers and Internet Service Providers (ISPs). These are important requirements used to outsource and implement E-Government services. An important question which requires addressing is whether appropriate providers for application softwares are available? Or whether the capacities to develop services and softwares have to be built within government organizations themselves? Regarding the technical implementation of E-Government, the existence of external service providers and general economic liberalization are essential preconditions [4], [5].

In a nutshell, the basic conditions in most African differ fundamentally from those in industrial and developed countries. Due to favorable environmental and administrative conditions, E-Government in developed countries is better and produces intended results for the citizenry. Furthermore, a developing country such as Ghana, should additionally consider wider societal conditions during E-Government implementation [4], [5], [27], [28].

E. Social and Demographic Factors

Social and demographic factors are pertinent because they are critical in respect to the acceptance of online and IT/ICT services. Demographic features of citizens such as age, gender, education, income distribution, language diversity and the percentage of the population living in rural areas are significant factors in user behavior and the acceptance of online and IT/ICT services.

The percentage of the population living in the rural areas of most African countries is especially relevant because poverty and illiteracy rates in rural areas are higher and infrastructure in rural areas is typically less-developed. Consequently, when providing effective access to E-Government services, it is necessary and important to consider the above factors pertaining to rural areas.

Initially, specific target groups within the poor population must be identified. For example, in relation to Ghana, poor farmers require different services and information than poor urban dwellers. Typologies must then be developed for these target groups and services which fit these typologies should be offered, thereby making it possible to address the specific problems of these groups [4], [27], [28].

When setting up E-Government services, it is also important to consider the issue of language diversity currently existing in

different African countries. Tribal and ethnic languages are widespread in rural districts/regions of Africa, whereas English largely cannot be read or understood [35].

Although English is, for example, the official language of Ghana, 70% of the population speaks one of the tribal (Akan) languages. Nevertheless, the websites of the Ghanaian Government are only available in English, meaning that a large percentage of the population cannot be reached. Therefore, in E-Government projects, special consideration must be made regarding the language which is to be used when offering services to specific target groups [4]. In addition to the above discussions regarding the developmental implementation challenges involved with E-Government as well as the effects of E-Government, Fig. 1 further summarizes these effects and challenges.

IV. E-GOVERNMENT IN GHANA

In this section, we present a brief discussion on some present and incoming/future E-Government projects in Ghana. These include (i) Ghana Community Network Service (GCNet) Limited and (ii) E-Government Network Infrastructure.

A. GCNet

Since the end of the 1990s, the Ghanaian government has had a goal/aim of developing Ghana as an important transit center for the landlocked countries of West Africa. To accomplish this task, the current bureaucratic system of duty collection, which had significantly delayed goods traffic, had to be modernized [36]. Previously, bureaucratic procedures delayed imports and exports for up to four weeks. Exporting a shipment in Ghana required making thirteen copies of shipping papers which the exporter had to distribute

TABLE I
SUMMARY OF GCNET

Category	GCNet
Problem	(i) High bureaucratic import and export procedures and (ii) Delay of goods traffic.
Solution through E-Government	(i) Reduction of multiple customer interfaces and (ii) Electronic customs declaration system linking all relevant stakeholder.
Implementation	(i) Delay in implementation due to political, parliamentary and election issues (took about six years to implement). (ii) Effective support of both private and public partnership.
Benefits and Results	(i) Less bribery and corruption, (ii) Faster/quicker custom declarations, (iii) Reduction of dispatching times as the ports and other related services and (iv) Reduction of shipping papers and forms.
Impact in terms of development	(i) Enhanced economic development, (ii) Improved revenue and (iii) Trade facilitation.

personally to authorities (often 26–32 different offices) to get the required permissions [4]. Such a situation was very disadvantageous and considered as bureaucratic inefficiency. This process was not only extremely unproductive, but contributed substantially to bribery and corruption, because many of the offices involved also expected “acceleration

money” (which was usually paid).

With the introduction of a new ICT system: *GCNet* in Ghana – all customs affairs necessary for the import and export of goods can, to a very large extent, be performed electronically. *GCNet* was first used in October 2002 at the Kotoka International Airport (KIA), Accra, Ghana and was later implemented in Ghana’s shipping ports (Tema and Takoradi). There are two main central components in the *GCNet*, namely: the customs management system and the TradeNet. The customs management system automates the issuance of custom declarations as well as the management of import and export licenses. The TradeNet is a data exchange platform for sending messages and information concerning trade to organizations involved in the transaction [4].

Ministries including the Ministry of Trade and Industry (MoTI), as well as the Bank of Ghana (Central Bank) and the Customs Excise and Preventive Service (CEPS), are integrated into the *GCNet*, where they can all exchange relevant data. Additionally, in the private sector, the Ghana shipping council, shipping companies, cargo enterprises and banks are also incorporated into *GCNet* to enable them trade and exchange relevant data pertaining to goods and services. Table I summarizes *GCNet* with corresponding details and descriptions.

B. E-Government Network Infrastructure

In November 2008, the Parliament of Ghana approved a \$30 million concessionary loan facility that had been extended to the Government of Ghana (GoG) by the Government of China (GoC) for the construction of the initial phase of a nationwide E-Government Network Infrastructure for Ghana¹. The proposed infrastructure would extend the national backbone infrastructure to all districts in the country and provide a national data center and a secondary data center facility for disaster recovery capability, and ultimately connect all public institutions, Ministries Department and Agencies (MDAs) and Metropolitan, Municipal and District Assemblies (MMDAs) to a single shared communication and computing infrastructure to facilitate effective delivery of government services to citizens, businesses and others [37].

The local subsidiary of the leading Chinese telecommunication company and equipment manufacturer, Huawei Technologies (GH) Ltd. has been indicated as the implementing contractor for the project. The project will be delivered on a turnkey basis to GoG. The Ministry of Communications (MoC) subsequently tasked the National Information Technology Agency (NITA) with the responsibility of working with Huawei to realize the implementation of the E-Government Network Infrastructure project in Ghana [37].

Under the E-Government project proposal, the network is configured to reach up to 1050 sites around Ghana with 550 locations via wireless last mile access networks and an additional 500 locations via any other means. The target sites

¹ <http://www.nita.gov.gh/eGovernment-Network-Infrastructure>

TABLE II
SUMMARY OF E-GOVERNMENT NETWORK INFRASTRUCTURE

Category	E-Government Network Infrastructure
Problem	(i) Limited connections of all public institutions in Ghana, (ii) Unavailability of national data centers and (iii) Inappropriate measure for disaster recovery and digital preservation.
Solution through E-Government	(i) Building new infrastructure as well as deploying new equipment into the existing networks and fibre optic assets in the ground that were previously procured by the Ministry of Finance and Economic Planning (MoFEP) and (ii) Electronic system linking all relevant MDAs and MMDAs.
Implementation	(i) Not fully implemented, currently ongoing and (ii) Effective support of both private and public partnership.
Benefits and Results	(i) Less bribery and corruption, (ii) Fostering the participation of local communications network operators in the E-Government network, (iii) Achieving much higher bandwidth links to each district than MoC or GoG could otherwise afford from the commercial telecommunications service providers and (iv) Cost effective scaling as the capacity and geographical coverage requirements increase.
Impact in terms of development	(i) Improved economic development, (ii) Enhanced revenue, (iii) Facilitating of trade and (iv) Improved linkages among MDAs and MMDAs as well as other local government units.

are intended to be reached via several different means, including direct fibre optic connectivity, high capacity microwave links and Very Small Aperture Terminal (VSAT) access. This will enable the network to connect not just the District Assemblies, but Hospitals, Schools, Police stations and any other public office or institution in all the towns that are within the coverage areas of the network [37]. Table II summarizes the E-Government Network Infrastructure currently ongoing in Ghana with corresponding details and descriptions.

V. DISCUSSION, KEY RESEARCH CHALLENGES AND OPEN ISSUES

Although E-Government and ICTs are generally the controlling drivers for creating wealth and growth, there are several challenges which impede the investigation and exploitation of the many promises associated. The complex and multifaceted nature of E-Government initiatives means that different types of challenges exist, which serve as a barrier to developing and implementing E-Government successfully.

IT/ICT infrastructure is identified as one of the key challenges for implementing E-Government. It is therefore imperative for researchers to direct their attention on how to solve such problems to improve E-Government implementation. It must be noted that, IT/ICT infrastructure does not only involve telecommunications and computer equipment. Other important factors such as e-readiness and ICT literacy is compulsory for people to utilize in order to achieve the full benefit of E-Government. Acquiring the right education, research opportunities, liberty and desire to get access to information is very vital for the usefulness of E-

Government. Most probably, when the level of human development such as lifelong learning, internet access for all, legal frameworks, enabling environments and political will are high in Ghana, there will be the utmost opportunity for citizens to accept and use E-Government services.

Although Ghana has made a headway to introduce E-Government, there are various tasks that still need to be accomplished. The main stakeholders for E-Government in Ghana, namely: MoC, MoLGRD, NITA as well as other relevant agencies/organizations should address issues pertaining to E-Government implementation. This can be done by analyzing, identifying and exploring the challenges involved in implementing E-Government in Ghana focusing on the local government system and proposing organizational, technical and legal solutions to overcome these challenges (which are enumerated in this paper).

In order to achieve this objective, GoG needs to focus on the following key issues:

- Examine and analyze the context of local government units and concentrate on factors that hinder the development and implementation of E-Government. These factors include:
 - The socio-economic status of Ghana.
 - National IT/ICT infrastructure penetration in the local government units in Ghana, including public access to IT/ICT facilities.
 - Policy/Regulatory framework in terms of IT/ICT usage in the local government system of Ghana.
 - A Standard definition of governance structures in Ghana.
 - Citizen participation in terms of cultural and work relations towards using IT/ICT and the internet.
- Identify potential challenges for developing and implementing E-Government within the local government units in Ghana and create awareness of these challenges.
- Define and develop clear views on possible productive initiatives and solutions using a Ghanaian dimension to overcome challenges in developing and implementing E-Government.
- Examine and analyze the scope, usage, successes and challenges of the automation of the financial management function and operational processes in the local government units in Ghana.
- Collect relevant E-Government cases and use them to assess and develop a set of recommendations to tackle and overcome the enumerated challenges.

In addition to the involvement of the various stakeholders mentioned above, GoG should further develop innovative research towards E-Government by involving researchers in the ICT/IT/Computer Science Departments of Universities and Polytechnics in Ghana. This will enable the formulation and development of critical research questions by University and Polytechnic Lecturers/Researchers in the field of E-Government which will eventually introduce more open research issues that require addressing in terms of E-

Government implementation. There should also be effective collaborations between University and Polytechnic Lecturers/Researchers and the main industry stakeholders of E-Government implementation and development in Ghana.

Specific research questions which are open and will aid the issue of addressing E-Government implementation in the local government system of Ghana include:

- In relation to the current E-Government services implemented or in the implementation stage in Ghana:
 - What is their current states?
 - Are there any implementation or usage problems?
 - How can they be improved for better services?
- What is the current level of ICT infrastructure penetration in Ghana at the national and local government system?
- What is the current level of linkage between central government, ministries, departments, agencies, and local government units in Ghana?
- Is the political will in Ghana strong enough to develop and implement E-Government in the local government system?
- How will E-Government in Ghana help in digitally preserving important data in the local government units and various ministries?

VI. CONCLUSION

Using a scope involving the local government system in Ghana, this paper described how the development implementation of E-Government is beneficial to Ghana and Africa a whole. Additionally, the paper outlined relevant challenges that need to be tackled in order to ensure successful implementation of E-Government in Ghana. Through an African context, the paper also identified various effects and challenges of E-Government implementation and development. Some of the identified challenges include: political-administrative system, economic development, social and demographic factors as well as IT/ICT infrastructure and connectivity.

Furthermore, after elaborating on some E-Government projects in Ghana, the paper discussed some key research challenges pertaining to E-Government implementation in Ghana with a focus on the local government system. In order to successfully implement E-Government in the local government system or improve existing E-Government projects in Ghana, the key research challenges enumerated in the paper have to be tackled effectively and efficiently.

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