

## E-GOVERNMENT IN GHANA: THE BENEFITS AND CHALLENGES

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### ABSTRACT

The result of substantial investment and the formulation of impressive policies for e-government implementations has transitioned Ghana from a mediocre to a high e-government readiness in the latest United Nations Biannual E-Government Development Index (EGDI). Ghana is the only African country to achieve this feat. However, how e-government service delivers benefits to Ghanaians and the challenges this technology is encountering seems to be overlooked by researchers in extant academic discourses. As a result, important scientific knowledge about this topic in the context of Ghana is missing. This paper aims to review articles on e-government to identify its merits to the Ghanaian public and businesses and single out the challenges it faces. The narrative review method was employed to search, review, and synthesise the extant literature. The review showed that there is a paucity of e-government related literature in the context of Ghana. Among the few articles that were found and reviewed, the benefits associated with e-government are; (1) reduction of corruption prospects, (2) efficiency of government services delivery, (3) access to government services, and (4) cost reduction. Moreover, the challenges associated with e-government are; (1) digital divide and its four dimensions, (2) culture challenge, (3) sabotaging of government infrastructure, (4) power interruptions, (5) citizens trust issues, (6) security threats, and (7) low public knowledge. This article contributes to the limited body of research on e-government in developing countries, particularly Ghana, by mapping a potential field of research, synthesising the current knowledge of e-government in Ghana, and creating an agenda for further research. Also, the up-to-date knowledge provided by this paper could assist the authorities in making prudent e-government policies.

Keywords: Corruption, Culture, E-government Merits, Digital Divide, Telecommunication Infrastructure.

### INTRODUCTION

In the United Nations biannual worldwide E-Government Development Index (EGDI) survey, Ghana was ranked 120<sup>th</sup> in 2016 (Table 1). In that same year, Mauritius, Tunisia, South Africa, Morocco, and Seychelles were ranked in the higher level of e-government development in Africa. The remaining African countries were in the lower two tiers (middle-EGDI and the low-EGDI group). However, as shown in Table 1, Ghana transitioned to a higher EGDI level in 2018.

TABLE 1. United Nations E-Government Development Ranking (EGDI)  
(UN 2016; UN2018)

Country	Region	2016			2018		
		EGDI	World Rank	EGDI Level	EGDI	World Rank	EGDI Level
Mauritius	East Africa	0.6231	58	High	0.6678	66	High
Tunisia	North Africa	0.5682	72	High	0.6254	80	High
South Africa	South Africa	0.5546	76	High	0.6618	66	High
Morocco	North Africa	0.5186	85	High	0.5214	110	High
Seychelles	An-East Africa	0.5181	86	High	0.6163	83	High
Cape Verde	West Africa	0.4742	103	Medium	0.4980	112	Medium
Egypt	North Africa	0.4594	108	Medium	0.4880	114	Medium
Botswana	South Africa	0.4531	113	Medium	0.4253	127	Medium
Libya	North Africa	0.4322	118	Medium	0.3833	140	Medium
Kenya	East Africa	0.4186	119	Medium	0.4541	122	Medium
<b>Ghana</b>	<b>West Africa</b>	<b>0.4181</b>	<b>120</b>	<b>Medium</b>	<b>0.5390</b>	<b>101</b>	<b>High</b>
Central African Republic	Central Africa	0.0789	191	Low	0.1584	188	Low
Niger	West Africa	0.0593	192	Low	0.1095	192	Low
Somalia	Eastern Africa	0.0270	193	Low	0.0566	193	Low

Among the African countries, Ghana is the only country to make this transition. According to the United Nations (2018), Ghana achieved this feat by restructuring its institutions and policy frameworks to get the most out of ICT innovations. Besides, Ghana has been investing in improving online services delivery since 2017, when its GDP grew by 8.5 (UN, 2018).

The e-Ghana and e-Transform projects provided the framework and mechanisms needed by the government of Ghana to contribute towards significant ICT development. The Ghana Shared Growth and Development Agenda (GSGDA) incorporates an ICT strategy that implies increasing use of ICT across economic sectors and implementing the National Electronic Security system and the proliferation of other ICT-related mechanisms for public benefits. Various projects conducted by the National Information Technology Agency and the Ghana Investment Fund for Electronic Communication ensure stable growth in the use of ICTs and are creating a favorable environment for further development and deployment of e-government mechanisms. All these initiatives are securing Ghana's commitment towards the attainment of Sustainable Development Goals (SDGs).

Despite the substantial investment in e-government and the impressive policies formulated, there is an absence of vital scientific knowledge regarding the extent to which e-government service delivers benefits to the Ghanaians and the challenges it is encountering in the current literature. Therefore this paper aims to discuss the benefits and challenges of e-government in Ghana. The remaining sections of this paper begin by providing the definition, types, and development methods of e-government, followed by the review method, discussion, and conclusion.

## DEFINITION AND TYPES OF E-GOVERNMENT

E-government is defined as "*The use of ICT and internet to enhance the access to and delivery of all facets of government services and operations for the benefits of its stakeholder groups, including citizens, businesses, and the government itself*" (Srivastava and Teo, 2010). The purpose of e-government is to restructure the delivery of public services and implement mechanisms that enhance communication between different parties and therefore make processes simpler, easier and faster. Developing countries take part in e-government services because of the promise of superior government accountability and transparency (Almarashdeh et al., 2014; Chatfield and Alanazi, 2015; Chen et al., 2015; Jasmin and Hasan, 2018).

E-government systems are categorised into four major types that are Government to Citizens (G2C), Government to Business (G2B), Government to Government (G2G), and Government to Employees (G2E). Government to Citizens (G2C) refers to online government systems. The primary purposes of these online government systems are to provide citizens with all the necessary online resources that they require to conduct their transactions with the government and answer their routine queries and concerns. Governments expect these systems to facilitate efficient services to the citizens, promote accountability and transparency, and generally improve citizens and government relationships.

Government to Business G2B is the second most important type of e-government. This category is about dealing with various services that transpire between the private and public sectors. The services include disseminating information regarding rules, regulations, and policies, offering business services, downloading applications, obtaining permits, registering businesses, renewing licenses, and filing taxes.

The third type is Government to Government (G2G). This category is about the interaction and cooperation between administrations at the local, national and international levels. It refers to using ICT by different government departments to improve the effectiveness and reliability of available services. This category is used to collaborate with other government agencies within local, state, national, and international levels (Hamza et al., 2011). E-government services, such as G2C and G2B, depending upon the availability and services of G2G.

The fourth type, Government to Employee (G2E), focuses on building and managing the relationship between government department employees and government. Primary, it serves only the employees by providing them with electronic services such as annual leave application online, leaving balance checking, checking bonuses and allowances, and reviewing payment of salary records (Seifert, 2003). Riley (2001) has observed that Government to Employee (G2E) is the least researched category in e-government literature. Some researchers regard G2E to be a separate and independent component of e-government, while others consider it an extension of the G2G category (Riley, 2001). This study will examine the four main categories of e-governments explained above.

## DEVELOPMENT PHASES OF E-GOVERNMENT

Layne and Lee (2001) propose four stages model for e-government development to highlight the complex changes within e-government as it transits in each stage. The four stages are cataloging, transaction, vertical integration, and horizontal integration.

Cataloging is the first stage where government websites are expected to have a web presence merely. They are primarily limited and not dynamic. The functionalities at this point are limited. Some of the issues faced at this stage are the development of websites and owning and maintaining information.

The transaction is the second stage, where permission is given to citizens to interact and transact online with little or no human involvement. This stage brings about functional, organisational, and two-way communication issues. The transaction is the stage where integration starts. Moreover, integration should be done across different levels and functions of government and might be done both vertically and horizontally (Layne and Lee 2001).

Vertical integration is the third stage where the focus of service is at a local level. There is a familiarity among the citizens; hence the linkage of local government to central government and other institutions would bring additional functionalities. This stage could lead to the emergence of many technological issues.

Horizontal integration is the last stage of e-government development. This stage focuses on government service integration over diverse functional walls. This stage paves the way for the concept of a one-stop center for citizens by serving their needs in one go. Effectiveness and efficiency are the most desired functionality elements triggered by citizens' demand for service-oriented functions. Technical and managerial issues like focus in government management by citizens, privacy and confidentiality, and universal access are emerging issues in this stage. Figure 1 illustrates the phases in e-government development.

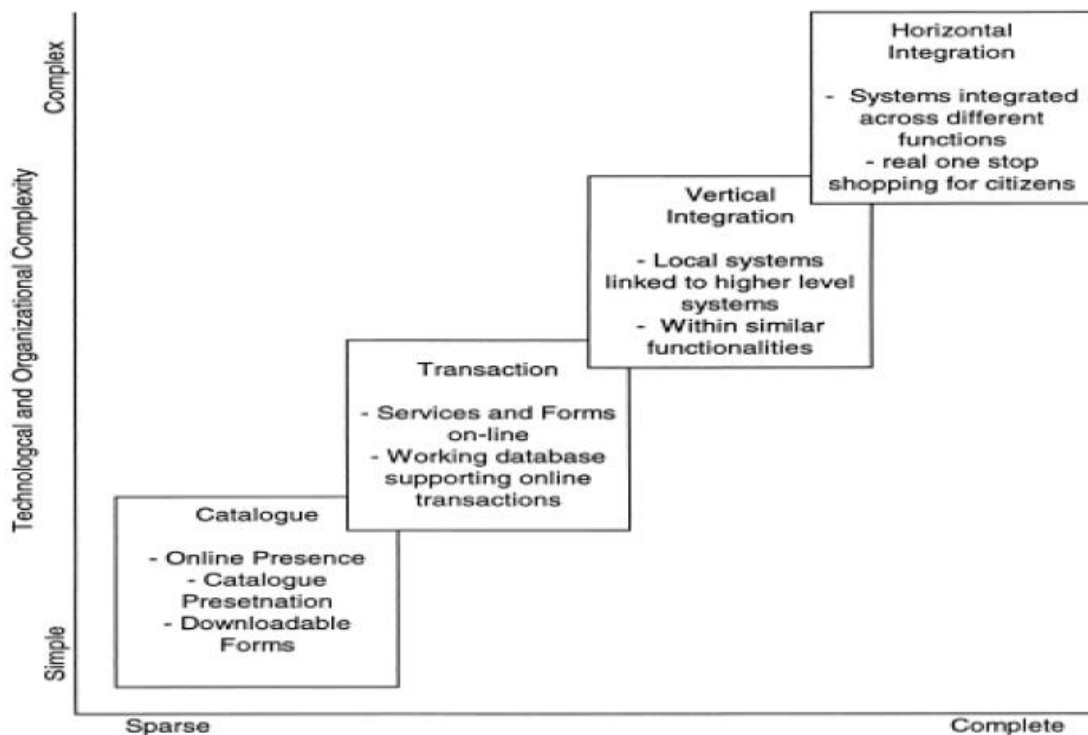


FIGURE 1. Phases of e-government development  
Source: (Layne and Lee, 2001)

## E-GOVERNMENT DEVELOPMENT IN GHANA

Ghana's Ministry of Communication, in collaboration with the World Bank, initiated an e-government development project called eGhana. eGhana initiative was a Ghanaian government project conceived to support ICT-implementation strategy. It provided strong initiatives for generating employment in ICT-related service sectors, enhancing efficiency, accountability, and transparency in government institutions, departments, and agencies by implementing online government systems under public-private partnerships (PPP). This project was implemented by the National Information Technology Agency (NITA), the ICT policy implementation arm of the Government of Ghana. One of the key deliverables expected from the eGhana project was eGovernment Applications and Communications (Mensah, 2016).

Parliament of Ghana (2008) decreed the creation of NITA, which was set up to provide policies and e-government implementation frameworks in Ghana through an act in parliament named NITA Act (Act771, 2008). NITA started by building the backbone of ICT architecture. NITA implemented VMAX and the Multiple Layer Switch networks to link all Ministries Departments and Agencies (MDA). The network enables municipal or district assemblies, schools, hospitals, police stations, agriculture service offices, and other relevant public-related sectors.

At district, regional, and national levels, the three main branches of governments and their respective institutions are connected and have an online presence. In addition to this, important corporations, organisations, and state agencies are connected with e-government systems to enable interactions and better service delivery. Improvement of service delivery productivity, exchange of information in a standardised format, better interaction and work coordination among MDAs, private sector, and citizens are some of the expected gains of e-government systems to government administration. E-government is intended to modify the method of government interactions with itself, its citizens, and businesses.

Web portals like eServices, ePay, Government E-Workspace, and One-Stop Centre were implemented to make it easier for the public to access government services and provide a one-stop source of government information (Mensah, 2016).

### GHANA TELECOMMUNICATION INFRASTRUCTURE AND ACCESS

It is important to explain the telecommunication infrastructure and access to understand the e-government implementation in Ghana.

Ghana has access to five submarine cables, an extensive national backbone, and the latest fixed and mobile broadband technologies. Table 2 indicates the key telecommunication and infrastructure access of Ghana. As illustrated in Table 2, the mobile phone subscription per 100 Ghanaians is 127.5, well above the mean for Africa, which stands at 74.4 and the world average of 103.6. Though the households with a computer and Internets are very low, this is compensated by the higher number of Ghanaians with mobile devices and 3G coverages. Besides, the 3G coverage per percentage of the population is 80.0, well above Africa that stands at 62.7 and a little below the world average of 87. Furthermore, it also shows that the households with Internet access are 35.5, higher than the African average of 19.4 and lower than the world average of 54.7.

TABLE 2. Ghana Telecommunication Infrastructure &amp; Access

Key indicators for Ghana (2017)		Africa	World
Fixed-telephone subscription per 100 inhabitant	1.0	0.9	13.0
Mobile-cellular subscription per 100 inhabitant	127.5	74.4	103.6
Active mobile-broadband subscription b. per 100 inhabitant	83.2	24.8	61.9
3G coverage (% of the population)	80.0	62.7	87.9
LTE/WiMAX coverage (% of population)	34.9	28.4	76.3
Individuals using the Internet (%)	37.9	22.1	48.6
Households with a computer (%)	22.6	8.9	47.1
Households with Internet access (%)	35.5	19.4	54.7
International bandwidth per Internet user (kbit/s)	10.1	11.2	76.6
Fixed-broadband subscription per 100 inhabitant	0.2	0.6	13.6
Fixed-broadband subscription by speed tiers, % distribution			
- 256 kbit/s to 2 Mbit/s	57.1	38.7	4.2
- 2 to 10 Mbit/s	22.5	37.2	13.2
- equal to or above 10 Mbit/s	20.4	24.1	82.6

Source: ITU, 2017

Most Ghanaians subscribe to mobile broadband to gain access to the Internet. The Active mobile-broadband subscription per 100 inhabitants is 83. It is higher than the African ratio of 24.8 and the World ratio of 61.9. The six major mobile operators in Ghana are MTN, Vodafone, AIRTEL, TIGO, Glo, and Expresso. MTN is a market leader which accounts for half of the mobile services market (UN, 2018). As shown in Table 2, fixed broadband subscription in Ghana is 0.2 to 100 Ghanaians, far below the world average of 13.6. The leader in the fixed telephone market in Ghana is Vodafone. It provides both postpaid and prepaid landlines. The fixed broadband is made possible by the widespread fibre optic backbone implemented by Vodafone Ghana Wholesale. It consists of a redundant ring network of both underground and buried fibre-optic cables to the North and South of the country and key border points. This infrastructure paves the way for Ghana to be chosen as the hub of choice in some West African countries, especially the landlocked countries (ITU, 2017).

Apart from the investment in infrastructure, the government of Ghana has transformed its ICT policy. Ghana's Ministry of Communications, responsible for formulating policies in the ICT sector, came out with "The 2012 National Broadband Policy and Implementation Strategy", which set out the direction for Ghana's high-speed internet. The five goals of the policies are as follows (ITU, 2017):

1. To incorporate broadband into Universal Access/Service policy.
2. To facilitate affordable access to broadband to businesses.
3. To ensure last-mile connectivity to communities and homes by 2020.
4. To promote uptake of broadband via suitable content and applications.
5. To plan towards converged infrastructure and services delivery to stimulate supply and demand. The National Communications Authority is in charge of regulating these policies.

Ghana has emerged as one of the most competitive telecommunication markets in Africa. The access to several submarine cables, the spread of national fibre backbones, utilisation of the latest mobile-broadband technologies, and rising availability of fibre changed the ICT

landscape in Ghana (ITU, 2017). However, more have to be done to transition Ghana from the current ranking of 120 to the top of the ladder and be among the top leaders of ICT in the world.

## REVIEW METHOD

Paré and Kitsiou (2017) categorised literature reviews in seven methods: narrative, descriptive or mapping; scoping, systematic, umbrella, realist, and critical review. According to Snyder (2019) and Paré and Kitsiou (2017), the research question or objective determines the review method or approach to use. As this study provides up-to-date knowledge of the benefit and challenges of e-government in Ghana, it is appropriate to use narrative review. Davies (2000) and Green et al. (2006) explained narrative review as an “*attempt to summarise or synthesise what has been written on a particular topic but does not seek generalisation or cumulative knowledge from what is reviewed.*” The narrative literature's main goal is to give the reader a thorough background for understanding existing knowledge and emphasising the importance of new research (Cronin et al., 2008). Hence, this review method correlates with the goal of this study.

Besides, Snyder (2019) posited that a potential contribution of the narrative review method is mapping a particular field of research, synthesising the state of knowledge, and creating agendas for further research or historical overview or timeline of a specific topic provision. Also, it can be used as educational articles to keep practitioners up to date on specific topics or issues of concern (Green et al., 2006).

This study reviews the benefits and challenges of e-government in Ghana's context, attempting to identify current literature so that academicians and practitioners could be provided with up-to-date and relevant research. In this study, researchers used the narrative review framework proposed by Levy and Ellis (2006) for Information System researches. The narrative review method proposed by Levy and Ellis (2006) consisted of (a) Literature search and screening, (b) Extracting of Data and Analysis, and (c) Writing of Literature Review. The stages are illustrated in Figure 2.

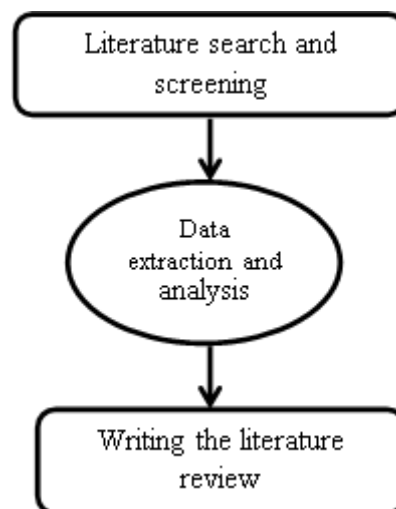


FIGURE 2. Levy and Ellis Literature Review Method

## LITERATURE SEARCH STRATEGY

Based on the approach recommended by Levy and Lewis (2006), the following steps were followed to determine the source of material relevant to this study: The first step was to search literature in top journals. Since e-government research is across many disciplines, authors sought articles from information systems (IS), public administration, and management. The top journals that authors included in this research are *MIS Quarterly*, *Communication of the ACM and Information System Research*, *Information & Management*, *Management Science*, *Information Technology and People*, and *Government Information Quarterly*.

The second step was to conduct a keyword search of the literature. The libraries included in this step were Elsevier (Science Direct), IEEE, Thomson Web of Science, ACM, SAGE, Wiley Online Library, Springer, Emerald, Taylor and Francis Online, IGI Global (IGI Global Journal & Database), and university libraries. The keywords and terms used in the search include; *e-government in developing countries*, *merits/benefits and challenges of e-government in Ghana*, *merits/benefits and challenges/disadvantages of e-government in Sub-Saharan Africa*, *merits/benefits and challenges of e-government in developing countries*, and *factors affecting the success of e-government in Ghana/Sub-Saharan Africa/developing countries*. Following the keyword search, *backward referencing* was conducted on all articles yielded from the keyword search. Also, a *backward authors search* was conducted to review what authors had published before those articles that were found from the keyword search. *Forward references search* too was conducted to gain information from additional researches that have cited the articles selected by the authors. In addition, *forward authors search* was conducted to review what other authors published following the articles.

The final step was to look for working papers and reports in major newspaper articles on e-government, such as United Nations E-government Readiness Survey (2016, 2018), and International Telecommunication Union (2017), Ghanaweb Graphic Online, and Ghanaweb. The number of articles found to relate to the aim of this study was 62. After conducting an abstract review of the selected articles, only 26 articles were found to be relevant. A full-text review was conducted on the chosen 26 articles. The articles' exclusion methods included non-English articles and articles written before the year 2005.

## RESULTS AND DISCUSSION

The review of the extant literature indicated that there is a paucity of e-government related literature in the context of Ghana. The findings relating to the benefit theme are; (1) reduction of corruption prospects, (2) efficiency of government services delivery, (3) access to government services, and (4) cost reduction. The findings linked to the challenge theme are; (1) digital divide and its four dimensions, (2) culture challenge, (3) sabotaging of government infrastructure, (4) power interruptions, (5) citizens trust issues, (6) security threats, and (7) low public knowledge. A detailed explanation of both benefit and challenge themes and sub-themes follows in the next section.

### BENEFIT OF E-GOVERNMENT

#### REDUCTION OF CORRUPTION PROSPECTS

The anti-corruption nature of e-government is gradually lauded as one of the most important benefits of e-government implementation. Scholars such as Bertot et al. (2010), Srivastava et al. (2016), Ameen and Nam (2018) concluded that implementation of e-government systems



minimises the prospects of corruption and leads to an increase in citizens' trust in governments of developing countries. E-government could be a formidable tool in a fight against corruption (Srivastava et al., 2016) and enhances the transparency of government institutions (UN, 2018). In Ghana, the prospects of corruption are mitigated by introducing online passport applications and online renewal of driver licenses and change of vehicle ownership through Driver and Vehicle License Authority (DVLA) and the provision of the electronic business registration and the renewal of business license by RGD. The online passport application and renewal have eliminated the grafts exacerbated by the activities of the middlemen, the so-called "Goro boys" (Ghanaweb, 2019).

#### THE EFFICIENCY OF GOVERNMENT SERVICES

Among the notable advantages of e-government are government institutions and agencies' improved services, speed of large data processing, and a better understanding of users' needs (UN, 2018). One of the key areas where e-government has brought tremendous benefits to Ghanaians is the use of online systems by students and parents of Junior High School and Senior High School graduates to check results remotely. This system is a complete transition from the previous practice of physically going to the schools to get results and admission. Moreover, the admission department in most tertiary institutions of higher learning in Ghana has adopted online application, verification, and admission process and removed the manual paper-based process (Osei-Kojo, 2017). Furthermore, the online passport application and renewal services, the renewal of vehicle license and change of vehicle ownership with DVLA, business registration, and renewal of license online have brought tremendous benefits to the public and the Ghanaian government. As these services are given electronically, the government gains the return of providing fast services to the citizens electronically at a lower cost.

#### ACCESS TO GOVERNMENT SERVICES

Ability to have access to government services 24/7 is one of the major advantages of e-government systems. Osei-Kojo, (2017) defined access as *"the range of public services, which are available to citizens through online access."* Access to the services that institutions have monopolised is critical. Such services in Ghana consist of vehicle registration and licensing services provisions, airport and harbor clearance of items, registration, and license renewal services. Regarding these, the government's ability to implement online services and remove bureaucracy is very important (Osei-Kojo, 2017). The online services that citizens have access to are as follows: On the services front, the DVLA currently provides license renewal and transfer of vehicle ownership online; The Births and Deaths Registry portal for citizens to apply for a birth or death certificate online; the Ghana Revenue Authority's website allows citizens and organisations to file their tax returns; the introduction of integrated financial systems with appropriate databases offers the possibility to better control inflows within the state; the online passport application and renewal services; and e- parliament website that gives an update about the parliamentary activities and proceedings and disseminates important parliamentary to the general public. E-government in Ghana has been expanding access to Ghana services (Osei - Kojo, 2017). Besides, more and more Ghanaians are increasingly gaining access to e-government services. For example, in partnership with the Ministry of Communications in 2018, a Danish ICT company connects the unconnected Ghanaians in four selected villages in Western Ghana in a project called "connecting the unconnected project." This innovation consisted of satellite wifi and a local cloud at the base station that provides fast and easy access

to e-government, e-learning, e-health, and services. It enables the rural folks to share important information, such as health, agriculture, and communicating online with government authorities (UN, 2018). To help farmers make the most of their land, they can watch training videos and sell their crops reasonably. Doctors in these villages can have access to life-saving information and retrieve other very useful information. Also, public establishments like hospitals, schools, police stations, banks, and market places have access to the infrastructure.

#### COST REDUCTION

Like the rest of developing countries, the government of Ghana operates under a tight budget, yet they have to deliver quality and prompt services to citizens at a lower cost. United Nations (2018) have posited that government institutions and agencies could be run with e-government at a reduced cost. The cost of paperwork, document storage, mailing, telephone calls, staffing, printing, and retrieving documents from old offices could be reduced. The time involved in delivering the services online, too minimised, could be significant. A good example in the context of Ghana is the reduction of time involved in the clearance of items from Kotoka International Airport. The average clearance time currently stands at four hours instead of three days, and the time involved in processing custom documents is slashed to 10 minutes instead of the previous time of 24 hours (Asogwa, 2013). Also, the total cost of producing and renewing Ghanaian passports through the online application system is cheaper than producing and renewing a passport (Graphic, 2019).

Apart from the benefits discussed above in the context of Ghana, the United Nation (2016) found that countries implemented e-government systems gain these key advantages; (1) the ability to facilitate policy integration through the provisions of the many vital elements required; (2) the increase in accountability, transparency, efficiency, and public institutions effectiveness particularly through Open Government Data (OGD); (3) the remarkable ease of facilitation of public participation in government decisions. As the seamless availability of ICT enables a new and creative method of communication between citizens and government, consisting of social media, citizens involvement in government decision has become more prevalent and pervasive; (4) the enabling nature of e-government to facilitate the growth of the relationship between government officials and citizens which is pivotal in attaining a sustainable development; and (5) the capability of using e-government by governments to integrate and utilise digital technologies to bring complex mobile and electronic services to the benefits of all people.

#### E-GOVERNMENT CHALLENGES

Despite this significant investment in e-government infrastructures, there are several challenges faces by e-government, thus impeding their success. From the findings, the following factors contribute to the adoption and implementation of e-government.

#### DIGITAL DIVIDE

The digital divide refers to the haves and have-nots of ICT or the disparities among societies in matters relating to ICT. Two levels of digital divide exist today; international and national levels. The digital divide is also present in both advanced and developing nations. The latest combined infrastructure access index reported by International Telecommunication Union

(ITU, 2017) demonstrates the infrastructure and access differences. The gaps can be seen in Table 3. Ghana lacks a solid telecommunication infrastructure to implement a robust e-government system, though Ghana has made much progress in this area. Five infrastructure and access indicators, which are mobile phone subscriptions per 100 inhabitants, fixed-telephone subscriptions per 100 inhabitants, internet bandwidth bit per usage of internet, percentage of homes with internet access, and percentage of homes with a computer, were used to measure the infrastructure and access of the nations (ITU, 2017).

TABLE 3. ITU IDI Telecommunication Infrastructure & Access Index Ranking of Countries  
Source: (ITU, 2017)

Economy	2017 Ranking	IDI Access-Sub-Index 2017	2016 Ranking	IDI Access-Sub-Index 2016
Luxembourg	1	9.54	1	9.54
Iceland	2	9.38	2	9.32
Hong Kong, China	3	9.22	3	9.16
France	11	8.64	13	8.55
Singapore	12	8.61	12	8.56
United States	17	8.27	17	8.18
Bahrain	22	8.14	27	7.92
United Arab Emirates	24	8.11	23	8.07
Australia	26	8.00	28	7.90
Canada	30	7.93	30	7.86
Macao, China	36	7.83	35	7.73
Brunei Darussalam	44	7.47	47	7.25
Italy	47	7.33	48	7.23
Russian Federation	50	7.23	54	7.12
Saudi Arabia	52	7.21	49	7.20
Mauritius	58	7.04	61	6.78
Malaysia	62	6.93	67	6.67
<b>Ghana</b>	<b>120</b>	<b>4.36</b>	<b>122</b>	<b>4.20</b>
Burundi	172	2.14	171	2.04
Chad	173	2.01	173	1.84
Congo (Dem. Rep.)	174	1.68	174	1.79
Central African Rep.	175	1.57	176	1.20
Eritrea	176	1.38	175	1.32

In Table 3, Luxembourg is ranked first with an IDI Access Sub-Index of 9.54. This means that Luxembourg possesses a very advanced ICT infrastructure and a very high ICT household penetration. Almost all of its citizens are online. Meanwhile, Eritrea is ranked 176, the last in the survey with an IDI Access Sub-Index of 1.38. This means that it possesses a very poor ICT infrastructure and the lowest ICT penetration. Less than 2% of its citizens have access to the Internet. From Table 3, it is clear to see the disparity in countries. Africa's continent lags in regions providing ICTs infrastructure, whereas Europe remains the most connected continent. If the figures are looked at in terms of economic grouping, evidence of a wide gap exists between developed and least developed countries. The majority of the least developed

countries live without any PC at home, but this is compensated by high household penetration rates of mobile phones (ITU, 2017). Dewan and Riggins (2005) and Billon et al. (2009) found infrastructure, economic and demographic inequalities influence the disparity in ICT use across countries.

#### DIMENSIONS OF DIGITAL DIVIDE

To understand the depth of digital divide issues, Srinuan (2012), Rahman (2015), and Bakon et al. (2020) argued that technological determinism is not sufficient in explaining it. DiMaggio & Hargittai (2001), Bertot (2003), Helbig, Gil-Garcia & Ferro (2005), and Rahman (2015) posited that the digital divide should be considered and studied in different dimensions instead of categorising and measuring the digital divide on "haves" and "have-nots." The dimensions of the digital divide which are particularly relevant in the context of Ghana are access divide, digital literacy/capability divide, innovativeness divide, and economic divide and are further explained in the following sub-headings.

#### ACCESS DIVIDE

Access divide refers to unequal availability of ICT and the absence of the related technologies like fixed phone, internet, mobile phone, 3G, 4G, WiMax, and wifi (ITU, 2017). In Dewan and Riggins (2005) famous framework of the digital divide, the importance of the access divide was acknowledged by positioning it as the first phase. In other words, it is the preliminary requirement for ICT use. Despite the different definitions of access divide by scholars, it was widely studied, and it remains the most used dependent variable in past digital divide literature. Osei-Kojo, (2017) and Yaw et al. (2017) found that access to ICT technologies is one of the most important factors impacting e-government used in Ghana.

#### DIGITAL LITERACY/CAPABILITY DIVIDE

The digital literacy divide refers to the gap in skills or know-how regarding ICT usage (UN, 2018). It is also known as the capability divide. Dewan and Riggins (2005) defined capability divide as one's ability to use ICT. In other words, it is about one's proficiency or ability to use ICT to empower himself or herself. Dewan and Riggins (2005) posited that differences in computer skills are among the most important dimensions of disparity. In Wei et al. (2011) comprehensive digital divide mode, capability divide was ranked as the second most important variable of the digital divide in the hierarchy (Dewan and Riggins 2005; Wei et al. 2011). Capability to use technology or self-efficacy study originated from Bandura (1977) social cognitive theory. Adu et al. (2018) found a connection between a capability to use e-government efficiently and its usage in Ghana.

#### INNOVATIVENESS DIVIDE

According to Agarwal and Prasad (1998), innovativeness refers to "*an individual readiness to change and explore new information technology.*" Rogers (1995) posited that a person is deemed 'innovative' if he or she demonstrated rapid willingness to embrace and use an innovation but considered 'non-innovative' if he or she tends to embrace an innovation later. Agarwal and Prasad (1998) found innovativeness to be a major predictor of ICT. Rahman (2015) found the link between innovativeness and e-government success in Indonesia.

#### ECONOMIC DIVIDE

United Nations (2018) defined the economic or affordability divide as the gap between rich and poor and its effect on ICT adoption. Norris (2001) broadly defined the economic divide as the income disparity between those who can afford a computer and other digital devices and

afford to access the internet and those who cannot. Extant researchers of information systems found ICT use to be influenced by economic factors. In the latest United Nations (2018) survey, it was found that citizens with high income in developed nations are more likely to have access to ICT than citizens in developing countries. The same report indicated that citizens with low income, especially in developing economies, can now access digital devices and the internet because of affordable smartphone devices. The same survey also indicated that mobile phones have increased among developing countries, irrespective of income disparity. The economic divide influenced E-Government success in Indonesia (Rahman, 2014) and Ghana (Adu et al., 2018).

#### CULTURE CHALLENGE

The importance of culture to the success of information systems was well observed by Hofstede et al. (2010). They added that ignoring the difference in thinking among users and partners is one reason why IS fails to be implemented successfully. Moreover, Leidner and Kayworth (2016) posited that culture is an important variable for clarifying how groups interact with information technology. Nam (2018) found that in cultures where individuals perceive an unequal distribution of power (high power distance) and are uncomfortable with uncertainty and ambiguity (high uncertainty avoidance), the success of e-government turns to be less and the anti-corruption effect of e-government significantly decreases. Osei-Kojo (2017) found that some Ghanaians prefer and still use a manual, paper-based approach. They are hesitating in using a technology that they are unsure of it. This indicates they are uncomfortable with the uncertainty and ambiguity of new technology.

#### SABOTAGE OF E-GOVERNMENT INFRASTRUCTURE

Aladwani (2016) posited that e-government fails in most developing countries partly because of corruption forces. Aladwani (2016) added that e-government implementations fail because of the political, cultural, judiciary, and economic corruption effects. Besides, the ability of e-government systems to eliminate corruption in government institutions and agencies makes it a target for sabotage and vandalism. In Ghana, Ghanaweb (2017) reported that some staff at the immigration office collaborate with the middlemen, popularly known as "Goro boys", to take advantage of unsuspecting passport applicants by extorting money from them with an assurance to secure the passports within the shortest possible time despite the implementation of online passport system to speed up the process.

#### POWER INTERRUPTIONS

The frequent power outages and rationing in Ghana dubbed "Dumsor" affect e-government services in Ghana. Government institutions, agencies, and private institutions become ineffective without electric power (Cobbinah and Adams, 2018). For example, when there is an electric power outage, and there are no electricity generators, government institutions and agencies at all levels turn to be unproductive, and the functioning of all institutions is badly affected.

#### CITIZENS TRUST

E-government doubters argue that the government's transparencies of e-government systems are questionable as these systems are maintained by the government and could be used to disseminate information favourable to the government of the day. E-government could serve as a tool to promote the government's hidden agenda and influence public opinion (Joseph, 2015). According to Sharma et al. (2012), developing countries could use e-government to maximise their citizens' control. There are some major concerns from citizens and businesses regarding giving detailed and sensitive data to the government. Trust, enthusiasm, and the

willingness for citizens to engage in e-government are probably bound to decline because of trust issues with e-government platforms that were already conceived (Ngulube, 2007; Bwalya et al., 2012). Rahman (2015) found a link between the e-government system used and the trust in government authorities. Yaw et al. (2017) found that trust is an important factor that Ghanaians consider before adopting e-government systems.

#### SECURITY THREATS

Security threat remains the most significant worry regarding e-government though the confidence level in online government systems' security has increased over the years. Threats such as interception of data, identity theft, hacking, copyright, and fraud are some of the issues users frequently encounter. Security is always mentioned as the greatest obstruction to initiatives relating to e-government (Bwalya et al., 2012). Security does not only concern technical aspects but non-technical ones as well. E-government security assurances are significant if citizens are to use them (UN, 2018). Security of e-government must be established from the technical and non-technical viewpoint (Wimmer and Bredow, 2002). Bakon and Elias (2019) found an association between security and e-government patronising in the Ghanaian context.

#### MINIMUM PUBLIC KNOWLEDGE

The majority of Ghanaians are not aware of the availability of these public e-government services, the institutions and agencies that provide these services, and the online service delivery capabilities. A study conducted by Yaw et al. (2017) suggested that the awareness of e-government services in the urban areas is high compared with rural areas where most residents indicated that they are unaware of e-government existence and their capabilities.

### CONCLUSION

As a result of the heavy investment and some brilliant policies that the Government of Ghana formulated, Ghana has attained a good level of e-government development. This paper concludes that e-government has improved the delivery of government services, increased efficiency of government institutions and agencies, reduced the prospect of corruption, and enhanced transparency in a government institution. It has also provided remote access to government institutions and reduced the cost of government service and time involved in delivering them. However, challenges such as the digital divide, cultural diversities and complexities, sabotage of e-government infrastructure, citizens' trust issues, security threats, and lack of awareness of online government services need to be empirically studied and adequately addressed the full potential of e-government.

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