

# Quality Evaluation of e-Government Services: A Systematic Literature Sudan as a Case Study

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## Abstract:

The technological revolution, also referred to as the Fourth Industrial Revolution, it embraced by government should transform the way governments serve their citizens. The growth of broadband in Africa is leapfrogging its technological development. And thus, many African governments will soon be able to offer quality e-Government services to their citizens. These technologically driven governments will be able to provide decision-makers with timeous information to make judgments that could influence policies. Proponents of e-Government believe that in the digital age, governments can use this information to reduce corruption and increase, accountability, transparency, efficiency, and public participation. e-Government service quality should ensure customer satisfaction. Although many studies have examined the role of e-Government and the quality of its services, few studies have examined the quality of e-Government services in terms of both supply and demand. This paper examines and reviews the academic-state-of-the-art on the factors that affect the quality of e-Government services from both perspectives. Utilizing both qualitative and quantitative methods for data gathering and analysis, a mixed methods research methodology was used.

## Keywords:

*Data quality, e-Government quality, and service quality in the digital world.*

## 1 Introduction

According to Schwab the next technological revolution, the Fourth Industrial Revolution, as it is known, will alter how we live, work, and communicate faster than previous revolutions. The fourth technological revolution is expanding exponentially rather than linearly in comparison to earlier ones (Schwab, 2015, p. 1). This revolution can be characterised by the ubiquitous internet, through smaller and extra effective sensors which have emerged as cheaper, through system intelligence and system learning. (Schwab, 2015, p. 1) This rapidly changing environment will require governments globally to transform and move from a traditional style of government to a more accessible and

innovative government management strategy (Hanna et al., 2015), (Obi, 2015).

### a) e-Government

e-Government has developed into an effective tool for enhancing communication between governments and stakeholders. It can boost productivity and save costs, facilitate accountability and transparency, and so contribute to a nation's overall growth (Bekkers and Moody, 2009, Abdallat, 2014, Sá, Rocha and Pérez-Cota, 2016, Al-Nidawi et al., 2018, Al-Mutairi, Naser and Fayeze, 2018).

### b) Service Quality:

Since the beginning of civilization, people have relied on others to provide services. These services come in a variety of formats, from the most conventional to cutting-edge computerized services. According to (Berry, Parasuraman, and Zeithaml, 1994), when a buyer traditionally buys a product, the decision to purchase is based on several criteria, including the product's style, texture, colour, tags, packaging, and so on (Alabdallat and Alhawari, 2021). However, purchasing services are intangible. According to (Arduini et al., 2010) traditional quality of service (QoS) refers to the standardization of all customer interactions that take place in person and are not done online. There is a continuing need to assess the quality of interaction when a citizen turns to an organization for a service, whether the connection takes a traditional or technological shape. To gauge the customer's satisfaction with service, it is critical to understand how high he believes the quality of the service was. (Sá, Rocha and Pérez-Cota, 2016), (I. A. Amrouni, A. Arshah and J. Kadi, 2019).

## 2. Background and Literature Review:

### 2.1 The Impact of Information and Communication

#### Technology ICT on Government:

In modern society, ICT performs a critical function and adjustments the manner we use services the adoption of ICT in government brings people closer together, assisting in the process of satisfying the public's rising expectations for how they should connect with the government and obtain suitable public services and information (Fang, 2002). According to (Hanna et al., 2015) there are four areas where ICT can play an important role for everyone: infrastructure, lifeblood, communication, and improving the quality of daily life in society. Furthermore, the enlargement of broadband gets the right of entry, and the latest enlargement of undersea broadband fibre optic cables to Africa is using the development and use of ICTs. Furthermore, the expansion of broadband access and the recent extension of the broadband undersea fiber optic cables to Africa is leapfrogging the development and use of ICTs (Melia, 2019). In reaction, Africa has skilled a massive growth in the usage of the net and cell technology and these services have come to be greater inexpensive to the commonplace man on the road (Al-Nidawi et al., 2018).

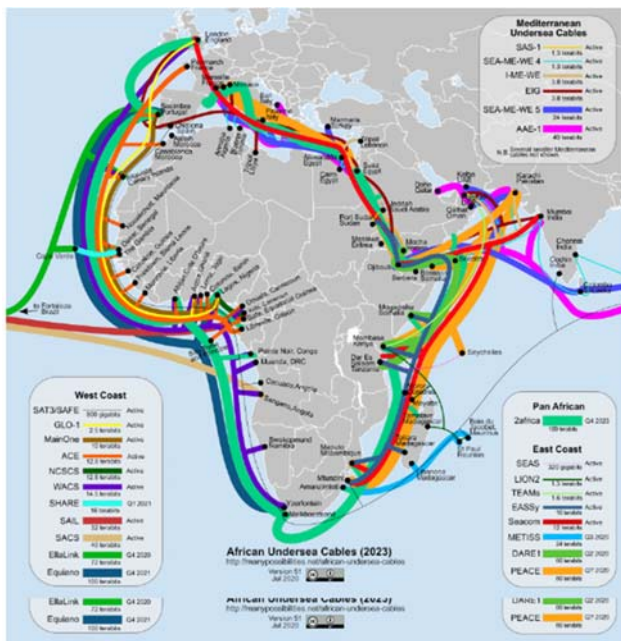


Figure 1 Africa undersea cables (Song, 2020)

### 2.2 From Government to E-Government:

Based on the International Academy of Chief Information Officers (NGUYEN, 2015) e-Government ranking 2015, The transition from government to e-Government is still progressing slowly, especially in certain developing countries in Africa and the Middle East. In some countries, such as Denmark, the USA, Singapore and, the e-Government motion is gaining momentum as they remember that the transition to open government is critical. (Index and Development, 2020). In addition, we need to reduce corruption. To transition to the e-Government era, the government must be more adaptable, agile, knowledgeable, transparent, and inclusive than ever (2015) Firestone and Scholl. Governments have a special opportunity to increase operational transparency, purpose clarity, and responsiveness to their citizens through the government-to-e-Government transition process, according to Nguyen (2015) (Marche and McNiven, 2003). E-Government is a paradigm shift from conventional public administration, and it will develop gradually. It started with creating a web presence, develops into communication via email and other electronic media, and then moves on to business logic development-infused front-end applications. The process is completed by integrating government operations outside of the web interface. E-Government is related to improving the quality of services and facilitating service delivery to citizens, businesses, and organizations doing a citizen and convenient way. The goals and nature of the transition from government to e-Government and the application of ICT in public administration and management (Obi, 2016).

### 2.3 e-Government explained

The development of (ICT) has a significant impact on the operations and procedures of the local, state, and federal governments. Technical components of ICT include the Internet, intranets, extranets, and other technologies. Governments adopted ICT for improving the governing procedures and assisting in redesigning their organization. The adoption regarding the citizen side is providing citizens with the opportunity to be involved in decision-making processes. This led to generating alternative forms of administration. Several benefits have been achieved by improving efficiency, accountability, and resource management. In developing countries, 80% of e-Government projects are exposed to some failure due to focusing on the technical aspects without considering other aspects involving people, culture, and politics inducing a hard gap. Another reason is to set up the private sector developed systems regardless of the fundamental differences between the private and public sectors. Also, it is not logical to implement a developing country's use of an

e-Government system that was primarily created for developed nations without taking into account regional considerations (El-Sofany, 2012). In the last years, governments focused on service quality based on responsiveness to clients with changed e-Government approach (says who?). Since e-Government came to the light in public administration in the 1990s, it was not clearly defined by public administration experts. The term e-Government is derived from the concepts of e-commerce in the public sector and represents the provision of government services to the public online. Governments started by developing websites with information and then online transactions to engage both citizens and decision-makers (Mahapatra, 2018). The expression refers to the utilization of the internet, ICT, and World Wide Web (WWW) in government functions and procedures regarding citizens, organizations made up of companies, workers, and other electronic entities. The use of the internet to access information and services was referred to as "e-Government" by the United Nations.

#### D. e-Government benefits

In addition to the potential to reform the public sector and the relationships between citizens, businesses, and the government through open planned communication, the benefits of e-Government included affordable and dependable services for citizens (Tarek and Mohamed, 2015). The advantages of the e-Government programs were explained in (by M. and Mesbah, 2016), (and Abdelhafez and Amer, 2014) as cost reduction and efficiency gains using online services without many activities. Also, all services can be accessed through the internet, which improved service delivery quality and reduce bureaucracy process. Moreover, the organizations can be supported by capacity increase when organizing the work leading to greater efficiency and assistance in making decisions. The development of networks and communities that foster interaction and information sharing among all participants in e-Government is another advantage (Oseni, Dingley, and Hart, 2015). Through the use of information technology and the internet, citizens can interact with and receive services from the government seven days a week, 24 hours a day, in a more convenient and affordable way thanks to e-Government. Another way to think of it is as a constant optimization and constituency through technological advancements, the Internet, and new media relationships with both internal and external parties. It is also described as the application of internet protocols and technology to improve the effectiveness, efficiency, and standard of services provided by agencies. The broader definition of e-Government is "government-owned or operated systems of information and, communication technologies that transform relationships with citizens, the private sector, and/or other government agencies in order to promote citizens' empowerment, improve government efficiency

and service delivery, strengthen accountability, and increase transparency." This definition deals with the integration and availability of e-Government services, the operation of citizen figure 2 shows the contribution of the e-Government systems.

#### 2.4 e-Government maturity:

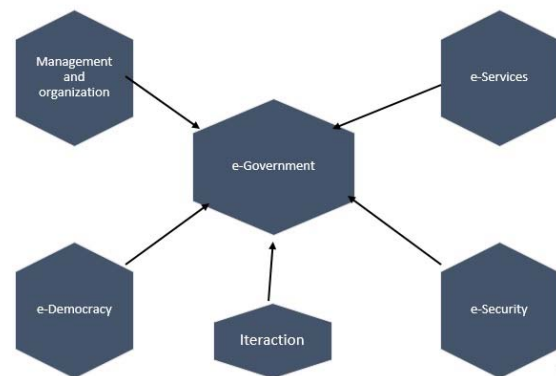


Figure 1 e-Government contributors

Using ICT as a tool to increase the effectiveness and efficiency of governmental operations is known as e-Government. It can also be referred to in a limited sense occasionally as citizen services, technological re-engineering, or online procurement. The Government also partakes in. E-commerce uses the internet to market and conducts business. E-governance is defined as the transformation of governance procedures brought about by the constant and exponential introduction of more sophisticated digital technologies into society (Maule and Hodgkinson, 2021) showed the progress in the transformation from the government to e-Government in (Obi, 2016). Capabilities developed by maturing through repetitive S-shape and interoperability required to share between departments and internally of a common interface for citizens prior to administration data.

2.5 e-Government service classification

Table 1 e-Government definitions

E-government definition	Perspective
Using Information and Communication Technology (ICT), and particularly the Internet, as tools to achieve better government	Technology
Using ICT to improve the efficiency, effectiveness, transparency and accountability of government	Management
Using ICT in public administrations combined with organizational change and new skills in order to improve public services, democratic processes and strengthen support to the public policies	Change Management
E-government should be divided into four distinct areas of activity, namely e-democracy, e-service provision, e-management and e-governance	E-government dimensions
Using the Internet and the World-Wide Web for delivering government information and services to citizens	Technology
A government's use of technology, such as the Internet, to aid the delivery of information and services to citizens, employees, business partners, other agency and other government entities	The relationships with partners
E-government offers an opportunity for governments to re-organize themselves, get closer to the citizen and co-operate with a variety of societies	Political
Government's use of the modern technologies in government sector to better delivery of services and information to citizens, effective interactions with business and industry, citizen empowerment through access to information, more efficient and effective public sector management, or lead to less corruption, increased transparency, greater convenience, revenue growth, and cost reductions	Management
E-government is defined as the combination e-administration and e-democracy to achieve the aim of balanced e-government	Political
E-government can be defined as a way for governments to use the most innovative information and communication technologies, particularly web-based Internet applications, to provide citizens and businesses with more convenient access to government information and services, to improve the quality of the services and to provide greater opportunities to participate in democratic institutions and processes	Political, Technology

(According to (H. Zaied, Hanafy Ali, and El-Ghareeb, 2017) E-Government services can be classified as:

- (G2C) Government-to-Citizen.
- (C2G) Citizen-to-Government.
- (G2B) Government-to-Business.
- (B2G) Business-to-Government.
- (G2E) Government-to-Employee.
- (G2G) Government-to-Government.
- (G2N) Government-to-Non-profit.

(N2G) Non-profit-to-Government. And he summarizes the definitions of these services as depicted in table 2

Table 2 Definitions of e-Government services

Type	Definition
G2C	e-government service from government to citizen as valuable information
C2G	e-government service offered for payment of bills as a citizen's feedback to the government
G2B	e-government service providing transaction and procurement facilities for government purchase and call for tenders
B2G	e-government service providing communication and collaboration transaction and procurement of goods and services for business initiatives
G2E	e-government initiative that facilitate the management of civil service and internal communication with governmental employees to encourage paperless office
G2G	e-government initiative provided to government departments or agencies cooperation and communication online including external change information and commodities
G2N	e-government initiative that provides information and communication from government to non-profit organizations, political parties, and social organizations, ... etc.
N2G	e-government initiative that enables exchange of information and communication from non-profit organizations to government organizations, political parties, and social organizations, ... etc.

The following characteristics must be satisfied in the e-Government system (H. Zaied, Hanafy Ali, and El-Ghareeb, 2017). The Citizen should be capable to make full access to the services via e-Government (Comprehensive). All electronic services and applications must be integrated for successful interaction (Integrated). The capability to access e-Government via any internet connection (Ubiquitous).

The process by which the citizen access information through e-Government must be simple and reliable (Transparent). The system design must take into account the needs of all partners Accessible. Protecting citizen data records confidentiality (Secure). All transaction data and contents must be protected (Private). The overall re-evaluation of the system structure is necessary (Re-engineered). Public administration involves public entities and mutual relationships besides wider relationships with the larger world in these themes (Department of Economic and Social Affairs United Nations, 2022): Management and organization of the public sector. The structure and design of reliable government programs. Means of inter-relationships between government, citizens, and agencies that stratify goals and plans. Z heavily utilizes information technology to enhance interaction between the government and society (Čiarnienė and Stankevičiūtė, 2015). The development of the e-Government considers the public administration trust as an assessment factor for specific public services. Such public trust can be determined by e-Government adoption and the public policy of the institution ((Arduini *et al.*, 2010), (Gasova and Stofkova, 2017). (Gracia and Casaló Ariño, 2015) showed that the e-Government services quality and communication had an impact on public services comprehensively. ICT infrastructure in the public sector can be leveraged by investing in the maturity of e-Government to improve organizational efficiency and effectiveness and reduce bureaucratic burdens (Cordella and Bonina, 2012), (Cordella, 2013), (Przebyłowicz, Cunha and Meirelles, 2018). However, the transparency of the e-Government eliminates the option and consumes facilities by reducing page paper-based procedures which in turn results in enhancing the socio-economic development. As a result, e-Government services act as an effective means of interaction between governments, citizens, and businesses. Based on e-Government inter-relationships, these means of interaction can be divided into internal and external inter-relationship. In contrast to the external one, which can be between businesses, governments, and citizens, the internal one can be between governments, businesses, and citizens (Karokola, 2012).

## 2.6 The gap between e-Government in the developed and developing World

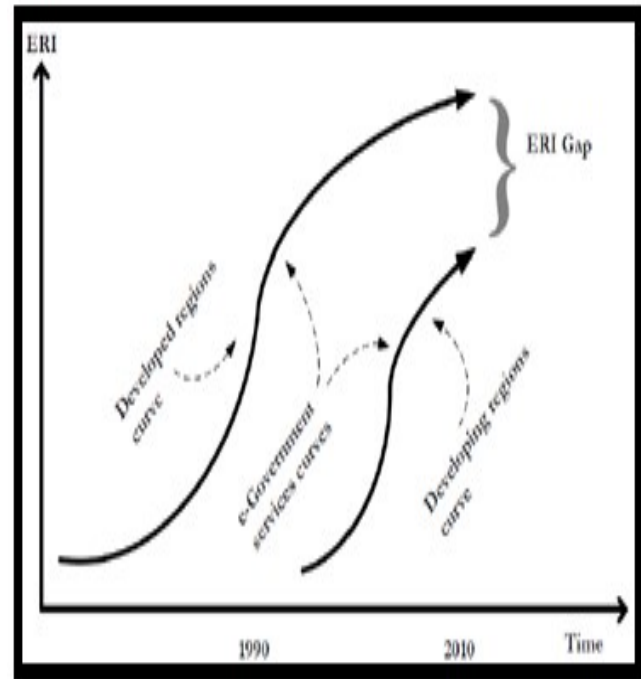


Figure 2 e-Government gap between developed and developing regions

The development and enhancement of electronic services and their attributes, such as website, security, privacy, responsiveness, information accessibility, ease of use, and reliability, have been encouraged by the governments of many nations. The majority of the time, a main electronic gate includes a number of services spread across numerous departments, and the electronic services are available constantly. Such a gate displays high-speed infrastructure that is well-protected by sophisticated security measures. Daily operations carried out through the main gate can involve over a quarter of a million processes, including requests, the delivery of services, and review pages. Because of the great benefits, governments are keen on continuously developing electronic services in order to provide the best facilitations. Users now find it simpler to finish transactions quickly and secretly. The electronic services developed into a standard for all institutions, both nationally and internationally.

Governments in developed nations are based on information technology, telecommunications, and knowledge. As a result, the governments of developing nations must deal with all of the recent developments. Applications and certain steps are necessary in order to use e-Government services. This includes information about the website's security and privacy policies, the quality of the

electronic services received from it, and the adaptability of the e-Government services. These factors raise the level of satisfaction with e-Government services, which are now a critical component of development plans for keeping up with global information technology. The nations made an effort to support e-Government services for greater efficiency and effectiveness. Information and communication technology can be used to accomplish this (Holzer, Manoharan, and Melitski, 2019). In order to benchmark and guide the implementation of e-Government and the provision of services, international organizations have proposed various e-Government implementation models known as e-Government maturity models. To achieve the most effective e-Government services, the models provide various maturity stages for governments to adhere to. They also describe the level of complexity, the sophistication of the system, and user interaction (Karokola, 2012). The benefit of having a successful approach is that it gives the government the ability to monitor the implementation progress of the delivery of e-Government services, allowing the flexibility to change and improve related activities to achieve e-Government goals by guaranteeing the effectiveness of the technological components (Karokola, 2012) discussed detailed analyses about e-Government models with the stages of implementation and service delivery of e-Government services. Figure 5 illustrates how the e-Government gap between developed and developing regions is growing based on the models. Heavy investment can bridge the e-Government services gap between the developed and developing countries using sophisticated e-Government services facing a number of challenges related to technical issues such as unfavourable environmental conditions, the context between systems designers, poor internet access, late adoption of new technologies, a lack of knowledgeable and skilled IT staff to support the services, a lack of security, and insufficient funding to build an infrastructure for IT support are all problems. There are also the issues of inadequate training and lack of proper protection of electronic data.

## 2.7 e-Government Security

While in developed countries, implementing e-Government mitigates many challenging aspects, involving IT security relevant issues. With proper implementation procedures and taking appropriate measures, the gap in security services in figure 5 appears to be systemic (Karokola, 2012)).

In any environment, the security risks and threats are managed by information security, which acts as a quality issue. This stage requires all employees to be involved at the strategic, tactical, and operational levels. Information security is managed by a set of procedures that ensure improvement in the offered service quality. Security can

vouch for the confidentiality, integrity, and availability of all the vital data when evaluating its storage, processing, and transmission within e-Government domains. This creates confidence and trust among e-Government users and leads to e-Government success. So many attempts have been made regarding the security services requirements gap in e-Government services through developing approaches that bridge the security service gap and security risks and threats.

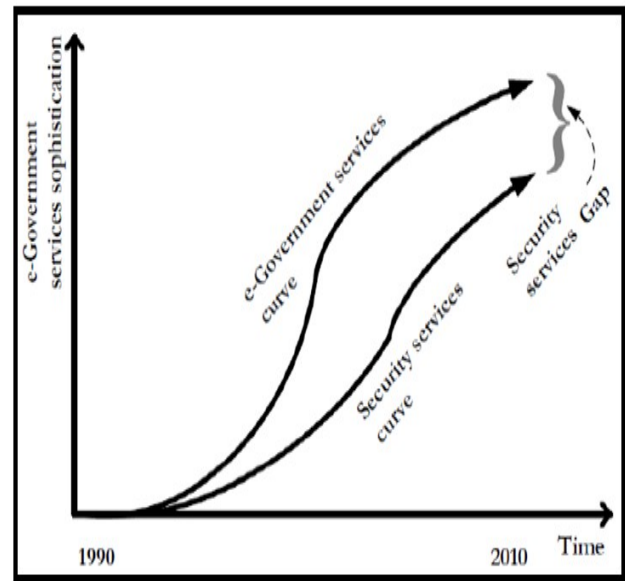
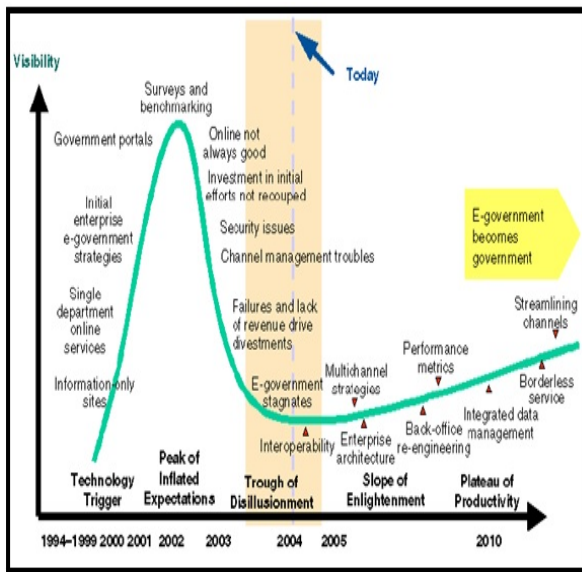


Figure 3 e-Government services security gap

## 2.8 e-Government Capabilities in Africa

Africa is a diverse continent, and despite the big regional variations, the full potential of digital technologies is not yet being used. Some countries entered the technological revolution but are still behind raw. There are big differences between urban and rural areas within such countries. In such areas, peoples use technology devices supported by networks besides the growing wave of innovation in public and private services. For example, Namibia is very advanced in the interoperability of databases which is the principle of e-governance. Nigeria is ahead by implementing e-ID by the National Identity Management Commission. Rwanda shows ambition for internet access, while Morocco has a large number of public e-services, and even Somalia has a private ICT sector. In another case, the central database infrastructure for electronic IDs in Ghana was completed. Africa has entered the digital era and harmonized e-governance rules, and local organizations were crucial in accelerating the development of the information technology



**Figure 4** Capabilities and issues within the e-Government journey

The systematic application of ICT in social, political, and economic life to enhance the knowledge base and social potential is called computerization. The computerization of society aims to affirm people's right to access information. The measurement of the informatization of society can be made on the basis of indicators of the accessibility, value, and excellence of information and information services (Eggrickx et al., 2018).

Social computerization creates the electrification of services and, therefore, e-Government. E-Government ensures the development and dissemination of internet-quality digital content. The use of information and communication technology (ICT) involves a plan for the private and public sectors. The public sector must compensate for the diffusion of ICT pressures caused by the conventional bureaucracy to safeguard e-Government solutions and to ensure usable and accessible services (Gasova and Stofkova, 2017).

Figure 6 shows the sequences of interventions that underpin the e-Government. The figure presents an e-Government Hype Curve which indicates the main capabilities and problems that most nations encounter when implementing e-Government.

## 2.9 Emergence and Impact

By using ICT to deliver services, the government has been able to modernize its processes, which has led to e-Government. E-governance, on the other hand, is the decision-making process that manages the service delivery aspects using ICT to involve multiple stakeholders in decision-making and to make government open and accountable. In the 1990s, the public choice theory emerged

as a result of the new public management and reimagining of government. Since then, governments around the world have been working to enhance the public system of service delivery. The re-invention of governments to meet the needs of society was made possible by the rapid dissemination of information. Therefore, the information age updated certain aspects of service delivery mechanisms. The vision is the articulation of the need for modernizing the channels through which the government interacts with its citizens. This relates to the idea of e-Government, which is a more effective form of government because it is carefully implemented and regulated. It reinvents internal processes using digital technology and functions as an electronic government to meet the needs of the public. The global revolution of ICT had a great impact on the economy of most countries as being realized that government machinery cannot stay isolated from the information technology revolution and its role in the delivery of Information and services. The governments and ministries had to launch a plethora of initiatives in order to advance e-Government. At various levels, these efforts have been made to make it easier to access information and provide public services. Additionally, it was acknowledged that e-Government advancements helped to speed up and simplify administrative systems by making it possible to deliver services in a way that was both efficient and transparent. The requirements of a legal and policy framework for ICT and e-Government are:

- Information Technology
- Plan for the transformation into an e-Government
- Experts in Electronics, Information Technology, and Administration
- Right to launch the electronic system
- the primary initiatives could be:
- National e-governance centre, which is in charge of service delivery.

Infrastructure for e-governance model.

- Projects in mission mode.
- Accurate identification of people, companies, and government services.
- Projects and Initiatives.
- Study and Development (R).

Governments, on the other hand, have taken numerous measures to promote e-governance and have established a plan for implementing IT and providing services online. Government to Citizen (G2C), Government to Business (G2B), and Government to Government (G2G) services were all taken into account during implementation.

More initiatives are necessary for a comprehensive, applicable e-Government system as follows:

- National gateway for the delivery of e-Government services.
- interchange of electronic data in commerce.
- e-procurement for procurement reforms to create effective and transparent public procurement.

• e-courts centres for services that can offer high-quality and reasonably priced video, voice, and data content and services in the fields of e-governance, education, health, telemedicine, and entertainment services. These facilities provide web-enabled e-governance services, including application forms, certificates, and utility bill payments for things like electricity, phone, and water bills. The electronic services provided by the e-Government could be listed as:

- Agricultural services.
- services for education and training.
- services for health.
- monetary transactions and insurance.
- services for amusement.
- utilitarian services.
- business services.

2.10 Government uptake and significance

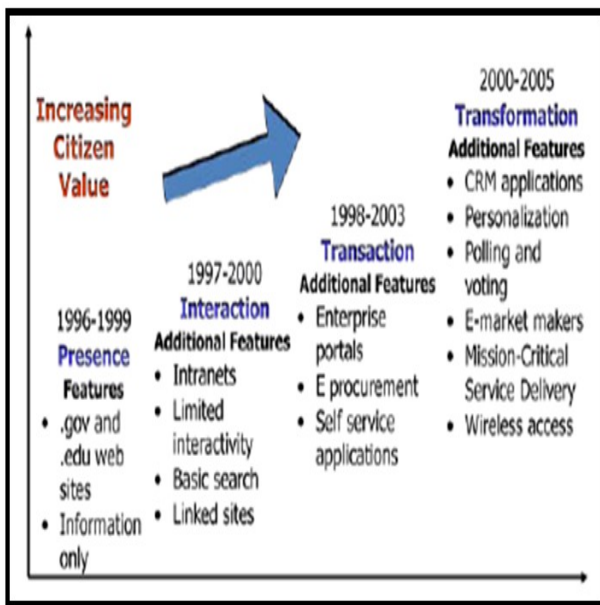


Figure 5 Increasing citizen value

The benefits of e-Government services are realized by the citizens' effective and real adoption of e-Government. To achieve the greatest return on e-Government investments, there is a constant need. This can be done by extending the e-Government facilities to the maximum level. It is likely that many employees in the health care, education and other government services offered via the electronic system will lose their jobs as a result of the implementation of e-Government. The only opportunities will be available in case of lack of skills or inability to access specific services. E-Government was described as an evolutionary process. It starts with a basic web presence and moves up through several levels (Melia, 2019) resending (1) Basic Web Presence; (2) Interaction; (3) Transaction; (4) Integration or Transformation (see figure 7). The fourth stage is

“horizontal integration” because it involves common processes and information systems in an integrated form spanning multiple departments and organizations. This is offered as a long-term objective.

Based on complexity, consistency, value, cost, integration, and time, the various stages are differentiated. Providing application forms, email addresses, and information requires little modification to current systems, making Level 2 countries easier to reach. Countries that attained Level 3 were able to set up genuine transaction services, make significant changes to the back-office systems, and engage in cross-organizational negotiations (Publication, By and Partnerships, no date).

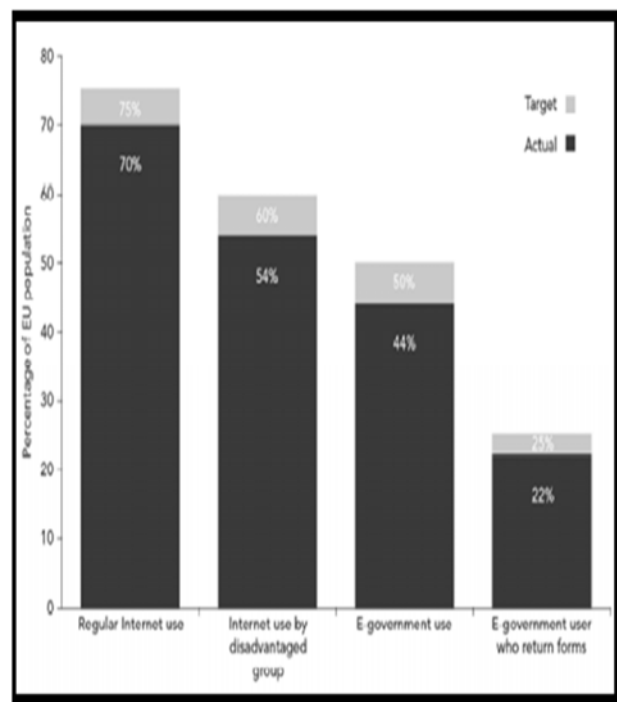


Figure 6 Planned and achieved digital agenda of e-Government in the EU

The adoption of e-Government was at its highest in the Nordic nations (Iceland, Denmark, Norway, Sweden, and Finland). with over 80% of the citizen interacting with the e-Government services. The opposite side in Chile and Italy, less than 20% of citizen’s access e-Government services. Figure 9 demonstrates the relatively low e-Government adoption of more sophisticated services in the member states of the European Union. The Organization for Economic Co-operation and Development (OECD) defines e-Government as the use of ICTs and the Internet to improve government, focusing on the justifications for e-Government implementation rather than the ICT tools themselves. The OECD countries have made e-Government



services, information, and services available online in order to use them as a potent tool to change the structures, procedures, and culture of government for greater efficiency and transparency. This is due to an increase in government performance and responsiveness to citizens' needs. OECD nations have understood the importance of achieving more general policy goals while reforming public administration through e-Government. E-Government can improve efficiency and quality through online information and service access, enabling convenient service delivery to citizens and businesses rather than adhering to existing government structures. E-Government expedites organizational change, increases teamwork and arrangement flexibility, and improves knowledge management practices. By allowing citizens to participate in the policy-making process, which also reduces corruption, e-Government increased trust between the government and its constituents. A number of obstacles have been put in the way of e-Government implementation both internally and externally by OECD nations. External barriers to e-Government implementation are found in breakdowns, lack of components, and lack of procedural flexibility. These barriers required efforts from agencies and administration to be resolved. Legislative and regulatory, financial, and digital divide barriers can hinder the adoption of e-Government, making it difficult to implement it from a whole-of-government perspective. The establishment of a solid legal framework is essential for the success of e-Government processes and initiatives. The adoption of e-Government may be hindered by the inconsistency between manual and automated processes. In 2005, the legislation was enacted in full in 28 of the 30 OECD nations. They have promised to remove the legislative barriers preventing the adoption of e-Government in order to remove the barrier. Because they raise the cost of agency collaboration and the availability of enabling information and services, the OECD countries identified a lack of flexibility, clarity, and facilities in regulations as major obstacles to e-Government. Another obstacle to collaboration and information sharing between organizations, they discovered, is the fact that the current public management frameworks are built on the premise that agencies operate independently. Also, improper allocation of privacy and security legislation and practices impede the e-Government implementation. Moreover, financial arrangements depending on vertical funding structures are not suitable for efficient e-Government as they do not meet the specific need of long-term funding needs and agency cooperation in an e-Government system. As in Canada and Italy, OECD nations established a number of solutions to strengthen horizontal resource and funding collaboration. Governments in the OECD are keen to increase investments and decisions that are based on value rather than unsupported assumptions. It was necessary to present a business case for e-Government in order to evaluate the investment return and support the

implementation of e-Government initiatives. Few OECD started measuring the advantages of e-Government to governments, citizens and businesses and report positive outcomes. They use different economic and noneconomic methods such as benchmarking and capacity assessment for the evaluation of e-Government projects. Regardless of the deferent methods it was found that cost benefits analysis of e-Government induces better objective scarce funds, build support and political will, and eliminate the failure risk for e-Government.

Many citizens in some OECD nations are unable to access digital services and information, preventing them from taking advantage of the digital system as a result. This is known as the "digital divide," and it is a significant barrier to e-Government in these countries. The governments of the OECD adopted a number of policies to close the digital divide, boost the marketing of online services, and improve ICT training and skills. Internal challenges to e-Government implementation include ensuring a unified concept and mission across all government levels. This asserts the necessity of adequate leadership to accomplish the target. The target also requires coordination and collaboration, clarification of partnerships, skills and tools to perform mission, monitoring and evaluating success, and engaging in partnership with private sectors. Same concept must be satisfied by e-Government so that agencies can collaborate and get confidence and support from leaders. OECD countries' organizations are linked to political commitment at a general manager level or the leader of an ICT unit with reliable determination and facilities. They have a successful protocol that links e-Government initiatives to strategic and reform targets. This boosts managerial coordination, balance and equivalence, and sustainability to many years. For the vision to be approved throughout the organization, it needs to be communicated across government.

The success of e-Government initiatives in OECD countries depends on leadership at all organizational levels translating the vision into programs and action plans. As a result, opportunities and incentives for reform may be produced, encouraging coordination and cooperation among initiatives. Politicians in some OECD nations are in charge of directing and supporting e-Government initiatives and approving high standards of e-Government coordination. E-Government service providers in OECD nations are unable to operate independently because coordination is required for effective e-Government implementation. E-Government initiatives were managed by specific agencies and ministries in many OECD countries. They come up with plans to help each person fulfil their mandate. Wider digitization of information and services was the result, but it also brought about new difficulties. Because e-Government is cross-cutting, it requires commitment to assert coordination of processes to prevent duplication, ensure coherence in actions like

security and privacy protection, and develop the foundation and capacity for seamless services. As in Australia, where the Australian Government Information Management Office (AGIMO), a semi-autonomous body responsible for e-Government in the Federal Department of Finance and Administration, is one example, OECD countries moved the single function of e-Government and recognize the overall efforts to improve government. The structure of the government structures has an important role to steer and coordinate the implementation of e-Government. This role is representing developing a framework for agency collaboration in order to maintain e-Government activity in line with public needs. The strategies employed for that purpose included the formation of committees made up of agency heads and senior officials, whose duties ranged from advisory and information sharing to policy development and implementation oversight. Since seamless services need tied work by the different agencies, OECD countries improved collaboration in delivering e-Government services. Regarding the information provision, agencies started a collaboration for establishing online government gates.

In order for OECD nations to put into practice a multi-channel delivery strategy, they forced agencies to coordinate based on all government business and ICT architectures, service delivery policies and standards, content development, and the coordinated acquisition of ICT services and equipment.

Governments in OECD nations supported the growth of e-Government by enhancing employee capabilities and competencies. Governments then put in place a number of policies to encourage the development of fundamental and advanced ICT skills throughout society. E-Government requires specific skills for general managers to engage the decision making in the e-Government. Implementation requires a technical understanding of information management and the information society. Managers must be capable to manage IT department and outside partners, and integrate the organization's ICT strategy with the wider goals. In OECD countries, e-Government is still held by employees and managers, in a way that makes expertise in e-Government technical issues carried out by experts. The governments made an effort to identify the skills gap and set driving policies to improve development and skills throughout the government. There are no extensive statistics on the global adoption of e-Government in developing nations. The uptake of e-Government is, however, shown to occur at varying rates according to the data 50% of the citizens in Columbia have access to the e-Government, while only 11.3% of Egyptians and 41.3% of Turkish interact with the electronic services (Chandra-Mouli, Chatterjee and Bose, 2016). There is a fast transformation in the traditional government form into modern e-Government. The government has become more focused on its constituents as a result of this transformation

and the related reengineering initiatives and experiments it has adopted. Some governments rank the advancement of e-Government as one of their top priorities. Their main goal in this direction is to make it possible for citizens to actually benefit from public services and ICT delivery. Such uptakes appear as new challenges with supply and demand side uptakes as well as their importance. The advancements made during the supply side's establishment of e-services are the demand side. While the investment in e-Government with effective execution of how public service delivery and its content reach the citizens makes up the supply side. E-Government focuses on the areas or applications with the highest sustainable developed return when it adopts the supply side.

For the government to develop its strategy successfully, the high-end usage of e-services must be considered in addition to gaining actual benefits from citizen usage. Furthermore, the e-Government has to invest to strengthen capacity building as a step in the demand side uptakes to support the government-citizen interaction as well as citizen-government interaction in the e-service delivery. This extends the usage to a sustainable achievement on the social, environmental and economic levels. In the processing stage the e-Government uptake shows emerging usage challenges, international efforts, and concentration on citizen services of high investment returns for sustainable development.

### 2.11 The significance of good Service Quality

The quality of electronic services is the most important requirement from users, just like other traditional services. (Sá, Rocha, & Pérez-Cota, 2016). The concept of "service quality" has grown in importance in marketing theory, especially in the context of services offered by the government. Ancarani (2005) asserts that the effectiveness of e-Government services reflects citizens' satisfaction with and faith in their government. In the public sector, a number of earlier studies defined service quality as how well a service satisfies a customer's needs or expectations (Karakola, 2012). E-Government, according to Srivastava, is the use of ICT to enhance stakeholder access to government services and deliver value-added targeted processes. One of the main determinants of whether e-Government succeeds or fails is the quality of the services provided, which some researchers define as an overall evaluation of user quality in a virtual context. Both the national government and the populace are impacted (Srivastava, 2011).

### 2.12 e-Government Assessment

Pre-evaluation and post-specifications are the two main categories of assessments. Planning and designing are when the pre-evaluation assessment is conducted. It is more pertinent to developing nations since they are still in the

early stages of e-Government development. The primary issue with evaluation is the lack of clear procedures that can be applied to various e-Government initiatives. Different perspectives, dimensions, and integrated knowledge must be taken into account when assessing and evaluating e-Government.

The e-readiness and maturity measurements are the method that is most frequently used to evaluate e-Government. Models for assessing an organization's "e-readiness" are called "e-readiness models.". The maturity of e-Government initiatives is to be measured using maturity models (Al-Sebie and Irani, 2005). The distinction between the two is that while e-readiness gives an indication of a nation's potential to implement e-Government, maturity demonstrates behavior (Cordella, 2013).

### 2.13 The current practice of e-Government in the Republic of Sudan

In some states and cities of Sudan, the use of information technology has been very successfully implemented, but the standard of services and data collected in the public sector is very low. Sudan was ranked 180 out of 193, placing it below average in the UN's e-readiness assessment (Abdallah and Fan, 2012) and UN e-readiness assessment (UN, 2018). Sudan's e-readiness index only received a score of 0.2394, while the global average for 2018 is 0.5491 and the African region's average is 0.3423 (Przeybilovicz, Cunha, and Meirelles, 2018). Sudan's readiness now ranks in the low OSI group in the 2022 UN survey. (Goal and others, no date), (Department of Economic and Social Affairs United Nations, 2022), as shown in table 3 below

Table 3 UN survey 2022

Low OSI				
Middle TII + Very high HCI	Middle TII + High HCI	Middle TII + Middle HCI	Low TII + High HCI	Low TII + Middle HCI
Libya, Palau	Honduras, Iraq, Sao Tome and Principe	Djibouti, Gambia, Guinea-Bissau, Mauritania, Sudan	Democratic People's Republic of Korea, Democratic Republic of Congo, Equatorial Guinea, Tuvalu	Comoros

This problem thus is how should the service of the public sector in Sudan be improved to provide quality service to its citizens and its service providers? Service quality should be viewed from different approaches and dimensions, from the supply side to the demand side. Therefore, in order to clearly define the service quality of the Sudan public sector, which is the subject of this study,

it is important to analyse it from the perspective of both customers and service providers. In order to increase the quality of services provided to citizens, this will make it possible to identify a model for the evaluation of service quality.

The world has shown a lot of interest in the government-provided electronic services over the past few years. The significance of contemporary advancements in the field of information and communication technology is the cause of this intense interest. The implementation of the electronic services offered by the governments that became a reality was largely made possible by this technology, particularly the internet. The traditional way that government services were provided has undergone a significant transformation to the more modern e-Government model. Digital technologies rely on (ICT) to enable sustainable development and inclusive growth and the creation of a modern information society. This ensures the best use of digital technologies for the benefit of the people in the manner of facilitation and regulation. The objectives are accomplished as government resources and stakeholders are in transparent cooperation. As a result, this way satisfies the benefits of digital technologies for the improvement of the lives of all categories of people by improving accessibility and transparency of governance. Lack of access to ICT is a barrier to the development of e-services using digital technologies. Implementing of e-governance is a comprehensive process and does not focus on a specific factor, but a process in which all organization and regulation concerns are addressed. Otherwise, the situation will be inconvenient toward all parties, and will raise digital data and transactions problems restricting modern technology. Many electronic services became possible because of the advances in ICT (Karokola, 2012).

The quality of electronic services is the top demand from customers, just like it is for other traditional services (Sá, Rocha, and Pérez-Cota, 2016). Especially in relation to services offered by the government, the concept of "service quality" has gained popularity in marketing strategies and grown to be very significant. According to Nilashi, the effectiveness of e-Government services reflects the public's satisfaction with and faith in its leadership. Nilasashi et al., (2016). The extent to which a service meets a customer's need or expectation is how many prior studies have defined service quality in the public sector. They define e-Government, according to Srivastava, as the application of ICT to enhance stakeholder access to government services and deliver value-added targeted processes. According to some researchers, the effectiveness of e-Government for banks will largely depend on the quality of the services provided to users in a virtual environment. It has an impact on both the national government and the populace (Srivastava, 2011). E-Government assessments can be divided into two categories: pre-evaluation and post-evaluation. Planning and designing where the pre-

evaluation assessment begins. In developing nations that are still in the early stages of e-Government development, it is more pertinent. The lack of clearly defined methods that can be applied to various e-Government initiatives is the main issue with evaluation. The assessment and evaluation of e-Government must take into account a variety of perspectives, dimensions, and integrated knowledge (Abdallah and Fan, 2012).

### 3 Method:

#### 3.1 Literature Selection

Researchers needed a robust search strategy, so they chose to look up relevant conference papers from Google Scholar, this prompted the use of literature review. The subject of e-Government services is covered in a wide variety of conference materials, journals, books, and online publications. It is therefore a daunting task to read all the references.

we have done some interviews as well as had people

#### Summary and Conclusion:

As a case study of Sudan, in order to better understand the challenges that e-services technologies in developing nations face, we were able to conduct a structured literature review. Many obstacles may affect the use of e-service technology in developing nations, according to a structured review of the literature. e-Government is still in its infancy in many developing nations, including Sudan, but successful adoption and deployment of e-services will boost revenues and resuscitate the economy. More research is needed to identify and implement e-services technology systems that are cost-effective and usable for the country, and governments can make positive changes in the way they serve their citizens and other stakeholders. should bring Legislation and legislative changes are needed to provide a platform that will help e-service technology flourish in Sudan. Issues such as awareness, service availability and trust need to be further developed to enable citizens to provide and use e-Government services. complete questionnaires in the future A mixed methods methodology will be used, which includes both qualitative and quantitative methods. At present, the qualitative methods include semi-structured interviews which were conducted with a number of experts and stakeholders in Sudan, which were used to evaluate customers' behaviour human-behaviour and their assessment of the effectiveness of online government services. Furthermore, "why" and "how" questions about the decision-making process from a consumer behavioural perspective were assessed.

The quantitative data was collected using a survey administered to five service providers in Sudan which were It is used to assess service quality, information quality and organizational quality structure from a government perspective. From the results, conclusions could be drawn regarding the elements that both government and consumer perspectives believe have an impact on the level of quality of e-Government services.

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