

# E-Government Sustainability & Governance: A General Framework

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**Abstract:** The rapidly growth nowadays of information technology influence the world in many aspects, such as the e-business, geographical boundaries, government services, and banking sectors,...etc. Currently, the E-government is considered as a vital medium for providing government services with much comprehensiveness and efficiency, were as it improves the government performance credibility and proactivity in addition to enabling quick responses to wide aspects. This paper in specific review and assess the latest literatures related to e-government implementations, factors affecting it or affected by it (two-dimensional assessment) in term of economic sustainability, governance, collaboration, and urbanization. About the effect of e-government on the sustainability indicators, the paper outputs illustrate that digital transformation of government infrastructure and services enhance corruption control and governmental best practices. According to our findings, the paper provides recommendations for better future implementation of e-government and setting the related framework on how to dedicate technology to be used in the process of public sector reform.

**Index Terms:** Digitalization, Developing Countries, E-Government, Empirical Study, Governance, Sustainability, Smart Cities.

## 1 INTRODUCTION

All the economy stakeholders, both on micro and macro level are having growing interest in sustainability, where as strong claims are made regarding sustainable development [1] as it affects all our living aspects on both macro and micro level. We had found that the most eligible and cited definition of sustainability is the related to the UN Commission on Economic Development in the Brundtland Report which states that sustainable development is “development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs” [2]. Sustainable Development Goals (SDGs) were adapted by United Nations (UN) in 2015 were as to enforce the national development through digital and technological revolution by embracing the advances in information and communication technology [3]. “From digital perspective, SDGs commit to increase information access and online services participation particularly in the rural areas and the least developed countries” [4]. The term “e-Government” is related to the government that adapts the use of Information and Communications Technology (ICT) in a way that improve the public services [5]–[8], were as to serve as a major tool in the transformation of the traditional government services delivery channels to be more effective, efficient and improve accessibility to both citizens and business firms. This transformation supports the economic and social development goals of the country which will result in improving standards of living and both micro and macro indicators.

This transformation off course also demands assuring sustainability, the e-government sustainability is defined as “the ability of government organizations to constantly operate and use the e-governmental systems to provide sustainable benefit added values for both government organizations and stakeholders [9]–[10], we consider this definition is broad that didn’t address the actual effect of sustainability of e-government and it needs more details to better assess and so improve and maintain the concept. As for e-government sustainability benefits, many authors agreed that it helps to avoid e-government failure in the short and long terms, which increases e-government longevity [11]. It also helps to decrease bureaucracy and saves time, utilizing e-government development for sustaining the economy [12], and enhancing maintainability of e-government hardware and software to keep up with upgrades to avoid failures. Accordingly, effective adaptation and implementation of a sustainable e-government system can bring both micro and macro benefits for the whole economy and society. Nowadays, good governance has considerable potential for modernizing public administration, improving public service delivery, dealing with increasingly more complex development imperatives, and promoting well-being. It may contribute to the fulfillment of the 2030 Sustainable Development Goals (SDGs) set by the United Nations [13,14]. Accordingly, this study aims to review previous literatures related to the e-government sustainability in order to inspect the current sustainability measures and characteristics, assessing the role of governance and its relationship with sustainable e-government

## 2 RESEARCH METHOD

The research approach used in this study includes a review of literatures related to e-government giving special attention to sustainability, sustainable development, and governance, with the aim of characterizing the use of them in e-government. Review of articles have the aim to synthesize the existing literature without the analysis of primary data. The present paper can be considered a theoretical review as it draws on existing conceptual studies with the goal of improving the current conceptual framework for future additional works. Our main scope and objective were to perform and illustrate a comprehensive analysis to set keywords, general aspects and possible characteristics of e-government sustainability and governance according to the existing literatures and related studies. The below sub-sections in the paper illustrates the

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results of the literature review and our recommendations and conclusions related to our main subject and question. First, some definitions are discussed. After, the main aspects and characteristics of e-government are presented and reviewed. Earlier studies demonstrated multiple research papers in which many of the e-government competency models were developed in addition to some models that relates to the sustainability of e-government efficiency models. Those models will be reviewed and assessed throughout this paper. The search and review criteria were based on searching scientific databases in order to refine the paper outputs, were as the literatures were conducted to further explore e-government sustainability and governance and relevant studies. Identification through searching online databases, we use the (Direct science, ACM digital library, MDPI and Google scholar), using keywords as example (e-governments, e-governments and sustainability and e-government Services) and screen the most updated articles (published from 2019 until 2021). The eligible articles and research papers were selected based on exclusion and inclusion criteria, The articles that were in different language had been excluded (if it was not translated to English) and kept only English language ones, in addition to excluding not published and non-relevant articles such that which contain block chain, Big data...etc., Additionally, articles that are related to the research question and to the subject of research, as per to the upper selection criteria and retrieve the data outcomes from database including main article even out of time frame as much as possible.

### 3 RESEARCH QUESTION DESIGN

To find out what major factors persist for assuring sustainable e-government and e-governance, we will research to find answers throughout comprehensive overview of related literatures in the. Research Question from this article is "What is e-government and what are factors and models that provides sustainable e-government that assure efficiency, effectiveness with best e-governance measures

### 4 BACKGROUND & RELATED WORKS

Following the introductory motive, many earlier studies had approached the e-government sustainability and governance throughout several research papers, much of the e-government competency and sustainable efficiency models discussed was developed. This paper will review most of those approaches and models in addition to provide further recommendations for further studies. A good understanding of the relationships between e-government, good governance, and sustainable development requires first knowledge and definition of these relevant concepts [14]. The e-government as to the mentioned earlier involves the use of ICTs to transform the tasks and processes of government agencies and their relationship with all external and internal stakeholders such as the citizens, businesses, and other related parties of the government. The objectives of sustainable development include, among other, stable, and long-term economic growth, social development (education, health, etc...), preservation of the environment, etc. Current development challenges are more complex. Indeed, and according to the SDG agenda, sustainable development should concern economic, social, and environmental dimensions [15]. E-government for sustainable development is the use of ICT to support public service and to improve the

interaction between government and the public society with involving public participation in government decision-making, supporting social equity and socioeconomic development factors, in addition to improving practices transparency aiming to protecting and maintaining natural resources for our future generations. As for good and effective governance, it is the process of the management of government in a manner that is essentially free of abuse and corruption, with due regard for the rule of law and respect of people's rights to be engaged in public affairs. Good governance as the quality management and orientation of development policies is assumed by many economists, having a positive influence on economic performance [16]. Another comprehensive definition for good governance is the process of setting and allocating qualitative characteristics related to the processes of rulemaking and their institutional bases. It involves and reflect the dedication and use of multiple values such as enhanced participation, credibility transparency, reliability of information, quality of disclosures, accountability, and public access to information. Also, it helps to combat corruption and secures both basic human rights and the rule of law" [17]

#### 4.1 E-Government Competency Model Towards Sustainable Development

Many models had been proposed to improve the e-government sustainability factors. In common, many models agreed that development of an e-government occurred in a linear and progressive trend. The government achieves its maturity at different stages. The reviewed models consist of six stages, besides to the technological development factors [17,18]. Most researchers suggest the efficiency model through two stages. The efficiency model identifies efficiency stages to be reviewed as a catalog. The governments try to arrange and allocate information inside such a catalog that can be easily accessed by the public, internal or external parties, businesses, and transactions where governments provide full comprehensive services of e-government. Researchers proposed a model that mainly consist of three stages, in addition to stages that involves the publishing name, interaction, and transactions. As first stage, the governments publish information on the internet, then interact with users via internet, and finally they allow users to make online transactions [19]. On the other hand, other researchers indicated that efficiency models related to e-government have offered a limited definition for e-government. Those models had identified e-government as a medium to offer and deliver web-based services. Most models discussed previously consist of six stages, the technological developments, Agile Accessibility, Trust & Awareness, Detailed assimilation Process, Streamlined Services, Involvement & Know How [20]. The Agile Accessibility refers to the fact that the success of e-government services is illustrated by wide and quick access to services for largest group of citizens according to their needs. There had been quite a lot of challenges for the developing countries in this stage because of the digital gap among the users. As a result, governments shall assure comprehensive accessibility and easiness to emphasize benefits of electronic awareness services [21]. Awareness and trust in the system can be defines as the degree of compliance with the e-government application stage. Changes shall be recognized be the different stakeholders when launching the proposed governmental services and channels, besides to spreading knowledge and training. Detailed assimilation Process,

standardizing the stages of e-government shall be assured, also the level of efficiency shall be revised and assessed during by the project. Also, its should be pointed that streaming line the e-government services shall be realized to assure sustainability and efficiency in a way that the user experience to be enriched and serve as a substitute of visiting the government agencies. The Know how model stage can be referred on knowing how e-government services are approved and processed. Additionally, streamlining services shall involve stakeholder to be part in it and the users' knowledge should be strengthened to be more involved and participate effectively in the e-government activities. Suitable training shall be provided be all available different mediums and channels As a result, it's concluded that the current efficiency models were simple and subjective, this is besides that there were no available facts for evaluating the degree of success related to the stages involved throughout the models which had been used in dealing with e-government application. Those models were directed for presentation while ignored the verification phase. Accordingly, all the earlier assumptions related to the researcher's vision and conclusions related to the efficiency models had been based as there were no international models [20,21]. Nevertheless, the above-mentioned works and conclusions that were previously developed by a few researchers are considered influential and have contributed directly to an effective implementation and development of the e-government process. Still, there were several limitations of these models from our point of view, but still considered important and effective in their outputs as they had contributed to the implementation of effective and improved e-government process. However, many restrictions were identified by many researchers. These restrictions are as follow [21]:

- **Processing Occurrence by E-Government Through Linear Pattern:** it was noticed that most of the assessed e-government efficiency models agree that e-government processing is set throughout linear patterns. Were as the development progress and trends evolved to complicated technology gradually from simple one
- **Transaction Occurrence before Integration:** it was noticed that most of efficiency models of the current e-government agree on the fact that transactions stage is vital and shall be prioritized over the integration stage related to e-government
- **Lack of the Latest Techniques:** In most of assessed models and cases, the efficiency models failed in implementing the modern technologies and ICT up to certain limit in the developing more sustainable e-government
- **Absence of Detailed Process:** Some models classified the efficiency levels of e-government and the processes involved throughout the development and implementation phase. Nevertheless, those models failed in providing a strategic and optimum solution for building e-government stages and processes.
- **Lack of Reliability Perspective:** in some cases, efficiency models were categorized depending on the current available technology and didn't consider the technology updates. On the other hand most of the models agree that using advanced technology provide high levels of e-government efficiency as a two-dimensional factor for sustainability.

Razavian, Procaccianti and Tamburri [22] state that "in order to be sustainable, government e-services must address the economic, social, environmental, and technical dimensions". It should be considered that the effective sustainability could not be achieved unless the system is cost-efficient, continuously maintained, ability to continuously updated, dynamic and supports customization over the lifecycle. Ashaye[23] empirically studied e-government evaluation and implementation in developing countries. As stated, assessing sustainability and transparency is considered as a vital success factor during the implementation process. As mentioned before and in order to achieve sustainable e-government, several models were proposed in published papers and articles such as "The Quality Framework of Sustainable e- Government Development and Sustainability Framework for e-Government Success" [24]. Another reviewed model considers the wider concept of implementation by proposing sustainable e-governance, throughout indicating economic sustainability as one of the evaluation aspects for e-government policies [25], nevertheless some authors didn't justify the exact meaning of sustainability in terms of evaluation, and social dimension as they ignored the implications of it over the e-government sustainability models. Razavian, Procaccianti and Tamburri [22] "propose a model for sustaining e-services which covers four dimensions"; however, it misses how to resolve a trade-off, clear guidance, metrics, and support. Those models face common issues and weaknesses including limited understanding of sustainability, which leads to a lack of guidelines or documentation needed for proper and effective implementation. [10].

#### 4.2 The Efficiency Model of Sustainable and Secured E-Government

The comprehensive legal framework and long-term strategy for ICTs are required to provide strategic direction and guidance for sustainable development of the country [3]. However, many agencies are still lacking in developing their legal framework that is communicated to external stakeholders specifically to address issues related to E-government services integration [4]. From legal perspective, these services are the prerequisite and cannot be fulfilled without validating the preconditioned service. Therefore, it is important to refer to specific policies and legislation that provide strategic direction and guidance for program development. In addition, the control and regulatory actions can also help prevent potential conflicts between stakeholders involving federal and local governments [26]. Effective organizational structure is vital to the successful implementation and adaptation of E-government initiatives related to setting online services that boost and support sustainable development. An organization must be properly designed to make it function and work across government to transforms the bureaucratic processes, break down silos, eliminate conflict of interests and contradictions in its existing structures and the proposed one, as well as promoting and enforcing clear, open mind set needed for and effective adaptation [3]. Sustainable development cannot be achieved by the efforts of governments alone. It has been mentioned that collaborations are a fundamental pillar of SDG to ensure information sharing and accountability, as well as smart partnerships among public - private and multi-stakeholder [27]. From there, government can have access to many experts working in various background to deliver the

best services to their citizens. Meanwhile, coordination across government will shape collaborative efforts and strategies that can improve efficiency and effectiveness across organizational and political boundaries [28]. According to European Institute of Innovation & Technology, through the “digital first” approach as well as continuous awareness and training program, digital literacy rate among the United Nations countries will be increased [29]. This will certainly contribute to sustainable economic growth that could pave the way to competitiveness. In the same time, strong and effective digital infrastructure is a vital need in the E-government development in a certain country. Digital infrastructure represents the technological infrastructures and comprehensive telecommunications services to support digital access for global and local communities [30]. As a result, this will lead to improving e-government service delivery efficiency to vulnerable populations and increase their quality of living. Two different dimensions are considered in the identification process related to sustainable and secured e-government services providing: implementation and reliability. The implementation dimension is connected directly to technology, available budget, and human resources factors needed for the effective implementation of e-government. As for reliability factor, its agreed that is directly connected with the design process of e-government services and the provisioning for realizing high participation and accessibility by users [21].

#### 4.3 E-Government Governance

Information Technology (IT) governance has function to ensure that IT organizations use efficient resources, secure the organizational assets, withholding both integrity and security of information, and retain the desired outputs effectively. IT is an important aspect of overall organizational governance [31]. Good IT management will ensure efficiency and achievement of good service quality for organizational goals [32]. Evaluation of IT governance can be done by several methods such as the ISO 27000 framework, ITIL V.3, COBIT framework. A study for sustainable e-governance in South Korea [33] shows that “trust in government is a mirror of quality e-government services, condensing the importance of policy existence to manage and enforce information-sharing needed for improved privacy protection, as well as supporting cooperation between government agencies [34]. This illustrates how e-government quality is deeply correlated with sustainability, and the impact on one social characteristic will influence e-government systems. Other relevant characteristics such as equity and privacy could highly impact e-government systems. Accordingly, the continuous cooperation of government agencies, ERP & developers during the design and usage stages is important [10]. Now days, E-governance policy framework involves many aspects related to digital requirements needed to access information, security, privacy, technology management, procurement, trade and consumers. It is also suggested that the 'digital first' policy to strengthen the adoption of digital technology in E-government initiatives [35]. This framework provides specific guidance on how to pursue policy making in support of the 2030 Agenda. Policies are required to create trustworthy, effective, accountable, and inclusive E-government initiatives. These policies and strategies entail three principles of E-government, which is tailored to citizen's needs, better governance, and coordination across agencies to reduce costs and optimize resources. The policies guide governments to deliver effective services to their

citizens and promote best solutions for governments to increase their performance, including proactive collaboration beyond the organizational boundaries. As a result, a comprehensive policy shall be introduced in order to synergize the collaborative efforts across sustainable development aspects which involves environmental, economic and social pillars [28].

#### 4.4 Main determinants for effective and sustainable E-Government model

E-government rollout and implementation is not that ease, it requires several factors including a complex structural and procedural framework that involves all relevant stakeholders, and action at the political and legal level, as well as the organizational, semantical, and technical levels, including cultural and historical factors [36] Progressive developments in the field of ICT infrastructure such as cloud computing in specific as an alternative technology for implementing e-government services, this in role enable more effective and reliable outcomes in term of e-government structuring and development. Based on this description, it is necessary to identify the factors or components that influence the implementation of e-government. It's worth to mention that Governments usually use information systems to reduce costs, improve credibility of outputs, transparency and enable the effective contribution by citizens to policy decisions. When increased access to information granted to citizens, power shifts from government to citizens [37-38]. The determinants for implementing e-government efficiency models demands setting the right road map and mind set regarding to the implementation stages, thus identifying the set of activities needed for achieving such stages with the most effective outputs. The determinants of e-government implementation have focused on how the governments would be supported to offer optimum services related to e-government projects in developing countries. The set of the below mentioned determinants and pillars were proposed for the efficiency and sustainable model that is applicable by the e-government. Accordingly, sustainable, and secured e-government services can be offered throughout [39]:

- **A COMPREHENSIVE OPERATION PROCESS AND FRAMEWORK FOR APPLICABLE EFFICIENCY MODEL OF E-GOVERNMENT:**

The e-government efficiency models shall have the ability to provide a detailed briefing and comprehensive overview of processes needed and involved for effective implementation of the stages of e-government processing [21]. Any missing detailed processes often leads to confusion when starting a stage and thus effecting the whole implementation.

- **THE E-GOVERNMENT EFFICIENCY AND SUSTAINABLE MODELS HAVE PROVISION TO GOVERNMENTS FOR DESIGNING STREAMLINED SERVICES:**

Sustainable and secured e-government requires understanding and accurate recognition of governmental services that are citizens oriented. The separated systems of electronic provisioning and standalone databases will impair the user's ability from accepting and adapting the provided services [40]. As a result, this would lead to inconsistent or complete approvals that may require additional processing.

• **THE E-GOVERNMENT EFFICIENCY AND SUSTAINABILITY MODELS SHOULD FOCUS ON THE EMPLOYMENT OF LATEST TECHNIQUES:**

Most advanced and updated ICT solutions techniques shall be dedicated to assuring e-government projects sustainability [21]. Most efficiency models might be considered outdated. More focus and consideration for the deployment and dedication of cybersecurity techniques and cloud computing platforms shall be considered. [41]

• **The E-Government efficiency models should support government for identifying the easy access of services:**

Expected benefits of the systems and how to customize to best fit the customer needed and ease of accessibility are correlated with its success and adaptation [42]. The success of e-government services could be represented by the quick accessibility and offering such services for the largest group of people and stakeholders according to their capabilities and desires [43].

## 5 CONCLUSION AND RECOMMENDATIONS

E-government Sustainability and good governance practices and its positive implications have been a topic of discussion in the international arena were as how to implement, evolve and effectively deploy to derive the upmost maximum outputs. Information and Communication Technologies (ICTs) is one of the most transformational factors of our time, including their impact on effective good governance and sustainable development. The Objective of this study was to review and assess the latest literatures related to e-government implementations, factors affecting it or affected by it in term of economic sustainability, governance, collaboration, and urbanization, were as to provide a comprehensive overview of the main topic in order that we can understand how to improve e-governance and more assure the sustainability and future orientation of this practice. Referring to the impact of e-government development on sustainability, the paper outputs show that digital transformation of government infrastructure and services improves control of corruption and government effectiveness this is beside to transparency measures, credibility, reliability, and innovation. Since most governments today are looking forward to developing E-government services that are customized according to citizens and business's needs, this may lead to business transformation and mutual benefits for both government and citizens. Accordingly, the outputs of this study could be used to design better E-government future initiatives and orientations to promote for more effective and improved resilient and sustainable services. However, many restrictions on the current efficiency models of e-government have been noticed, therefore, based on restrictions imposed on the current models, some determinants for achieving the efficiency and sustainable model applicable to the e-government have been identified as mentioned above. Given this initial effort, we acknowledge some of the limitations of our approach and methodology, in which using a limited number of keywords to identify research related to e-government efficiency models, sustainability, and governance might have left out relevant research. Most importantly, we acknowledge that the next step of our endeavor should be to provide a theoretical framing of the links between e-government and sustainability and delivery channels.

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