



Theories of eGovernment Adoption: Literature Review

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Abstract-*eGovernment as a platform offers a large opportunity for improved service delivery. eGovernment promises lots of advantages in governance process but at the same time requires efforts for changing processes, building infrastructures, capacity enhancement, etc. Employing eGovernment to improve efficiency and effectiveness of public service delivery in government structures is one facet of economic sustainability. The majority of countries have reached or are evolving toward higher levels of eGovernment development. There are some examples of clever use of ICTs and eGovernment in developing countries. However, the effect and the spread of eGovernment in these countries has so far been less than expected. Developing countries have invested more in core government administration systems than in transactions with citizens, and the governmental institutions are still unable to deliver basic services with reasonable quality. Low usage rate of the available eGovernment services is one of the main obstacles to the success of eGovernment projects. This paper aims to provide a literature review in the area of eGovernment adoption to examine the state of the art, identify the essential factors that are likely to affect citizen adoption, understand citizen's usage behavior regarding technology adoption models/theories and make empirical studies, taking into account three models TAM, DOI and UTAUT.*

Keywords: *eGovernment, adoption models; adoption factors, TAM, DOI, UTAUT.*

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I. Introduction

eGovernment represents the idea of delivering government services and information through the internet and electronic technologies. Many governments have recognized the benefits of this idea to enhance the citizens-government relationship. By eGovernment adoption, government information is offered to citizens anytime/anywhere [1]. Besides, it could support democratic activities, which give citizens the ability to participate in government decisions [2]. eGovernment delivers various types of online services such as conducting electronic transactions, which facilitates individuals' life. However, obtaining these benefits requires successful eGovernment adoption, as well as the consideration of factors influencing citizens' usage of eGovernment. This is because effective eGovernment adoption depends on the willingness of all citizens to use its services [3]. Besides, failing to consider these factors could also lead to eGovernment project failure as evidenced in the Qatari government [4]. Consequently, many researchers attempt to discover and understand these factors in different developed and developing countries.

The potential benefits from the effective adoption of eGovernment, particularly in developing countries, are really large. eGovernment can contribute to development, make governments more transparent and accountable, improve disaster mitigation and management, help governmental institutions to enhance the quality of basic services in all sectors, and ultimately enhance citizen satisfaction with government performance. Developing countries have invested more in core government administration systems than in transacting with citizens and businesses [5]. People's readiness is very relevant because organizations, such as the latest technology, have a transitional period. People play an important role in deciding an organization's success and failure; however small or significant their positions may be [6].

The importance of the use of information and communication technologies (ICTs) to improve the efficiency, accountability, and transparency of government processes, achieve better public service delivery, and empower citizens by enabling them to participate in the decision-making processes governments through the acronym governance can never be overemphasized.

The term adoption was defined as a simple decision, depending on certain factors, to use or not to use online services[7]. A different concept of eGovernment is the decision of a person to use or not technology based on technological perceptions [8]. According to [7] how many programs are currently used will be the next step of adoption. One usage every year, which might be taken by others, does not mean that governments or residents use it in any substantive way. Another significant factor of adoption is the variety of usage. The other aspect concerns the preference for electronic media over other forms of government transactions.

This paper aims to review the prior studies and relevant publications about eGovernment adoption to get important background information about the subject under study, to identify the suitable data-collection instruments, to avoid duplicating previous research, and to be aware of inconsistencies and gaps that may need extra research.

Technology Adoption Models/Theories

In the last four decades, several theories of technological adoption were embraced and validated to explain the acceptance of technology for consumers, where users can be people, households, companies or societies. The three main technology adoption theories and models: include Technology Acceptance Model (TAM) as The degree that users believe that using the system is easy [9]. TAM is the most widely applied model in the users' acceptance and use of technology research [10]. According to TAM, users' perceived ease of use affects the perceived usefulness of an Information System (IS), users' perceived ease of use and the perceived usefulness together decide their attitudes toward using an IS. So instead, perceived utility and users' attitude decides users' goal. And users' purpose dictates their actual usage of an IS [9]. Nevertheless, the TAM model does not include demographic, economic and external variables, suggesting shortcomings in describing users' behaviors and behavioral intentions toward mobile service adoptions [10]. Therefore, previous studies integrate additional factors into TAM to gain a better understanding of the determinants of online banking adoption. For instance, [11] added subjective norms, as well as demographic factors, to TAM in their analysis of users' intention to follow online banking. Moreover, [12] expanded TAM by adding additional constructs, which are required for interaction, perceived risk, perceived expense, compatibility with lifestyle, perceived reputation and trust. Given the limited inclusion of influencing factors in TAM, this study does not use the TAM model to construct the research model.

Diffusion of Innovation Model (DOI) is The degree to which an invention is viewed as relatively difficult to understand and use [13]. DOI, also known as the diffusion of innovation principle (Rogers, 1995) and has been widely applied in researching users' adoption and use of new technology [14][15]. As customers pose different levels of willingness when implementing an innovation, [13] categorized customers into five groups of individual innovativeness. These are innovators, early adopters, early majority, late majority, and laggards. Five factors, including relative benefit, compatibility, testing, observability, and complexity, for innovation adoption have also been identified. However, although a behavioral process, from being aware of innovation to the adoption of it, is acknowledged in DOI, how attitudes form and finally lead to acceptance or rejection and how innovation attributes fit the process are not explained by it[16], therefore it is not a new technology. Thus, DOI is not being used in the research because it captures only the initial utilization by new users of the new technology and not the continuous use by existing users of existing technology.

Unified Theory of Acceptance and Use of Technology (UTAUT) is the degree to which an individual believes that an organizational and technical infrastructure exists to support the use of the system and how easily new technology can be used experimentally, the unified theory of acceptance and use of technology model (UTAUT) is an extended model based on TAM and was proposed by [10]. Four constructs in UTAUT are found to have a major influence on the adoption and usage of an IS among users, including performance expectancy, effort expectancy, social influence, and facilitating conditions. The predicted performance is close to the estimated performance of TAM and the relative gain of DOI. Therefore, the standards of commitment are close to those in TAM and DOI [10]. The social impact demonstrates how the actions of users can be affected by external factors, such as the views of people close to the user (e.g. colleagues, family, or superiors)[17]. Facilitating criteria demonstrate how user capital, capacity, and knowledge of an IS affect the conduct of users [10]. UTAUT, therefore, expands the TAM model with other components, such as social impact and circumstances, capturing consumer perceptions of aspects relating to interpersonal consideration and usage.

The UTAUT research has integrated four main building blocks, namely the expected results, the expected effort, social impact, and the facilitating conditions that the most critical forecaster of online payment acceptance is results expectations. Such studies have shown that UTAUT is successful in predicting the conduct of users in the field of mobile banking research[18], [19].

Citizens and society as a whole have been researching the factors that affect the adoption of eGovernment technology[20]. The goal and willingness of the people in developing and advanced countries (countries according to World Bank categorization) to use eGovernment were also included and several models for adoption were suggested and tested in 2016[21]. In [10] found that most of the defined models used TAM [10] to predict user acceptance of technology as the most "well-established, tested, efficient, strong and slim model." TAM's test of technology adoption on a single level[22], which has been commonly used and validated in the past two decades in various information systems like Eservices, is regarded as among the top mature technological adoption models. The limits of these models are listed in Table 1. There is no questioning the value of these models for technology adoption. Several researchers have built TAM, DOI, and UTAUT own-citizen models, [23],[24],[25],[26],[27] and updated insufficiencies in their original forms with the introduction of additional constructed frameworks such as the formation of trust and the design of a website.

Table 1 Limitations of DOI, TAM, and UTAUT

Model	Limitations	
TAM	Many significant factors directly impact behavior in terms of intention to use. It reflects the system's subjective user evaluations.	[27]
DOI	Some primary DOI constructs are similar to the TAM constructs. Relative significance resembles the perceived interest and difficulty resembles the perceived ease of use. Within the relative advantages construct the observability construct may be implemented inferred.	[26],[27]
UTAUT	It does not discuss other very critical eGovernment buildings such as trust and understanding. Grouping and marking UTAUT products are difficult.	[27]

II. Methodology of Research

The literature review is a systematic, explicit, and reproducible method for identifying, evaluating, and interpreting an existing body of completed and recorded work produced by researchers, scholars, and practitioners [28]. The data source provided the reference for our analysis of the literature by international organizations, journals and conference proceedings. A suitable and trustworthy selection of established work in eGovernment adoption is considered to be the variety and consistency of the publications involved in the latest literature review. To identify potentially important articles, systematic reading of abstracts was carried out. To fill out the predefined extraction forms designed to summarize the relevant details from the reviewed empirical studies, the selected studies were read and analyzed in detail. Studies not explicitly related to the adoption and acceptance of eGovernment were omitted and no details were published on the studies. Additionally, the studies are divided into irrational dimensions with unclear methodology, the unclear relationship between the dependent and independent variables, or factors.

III. Review of Empirical Studies

Numerous empirical research on eGovernment adoption has been performed. The literature review identified several factors that affect, especially from the perspective of citizens, eGovernment information and services. Some of the eGovernment adoption studies are discussed in the discussion below.

In [27],[29] the authors included TAM and DOI variables. Apart from a few additional considerations, the key factors that should be taken into account when dealing with the issue of eGovernment services are trust and trust on the Web, website growth, religious values, Web and computer skills, resistance to changes, perceived usefulness, relative advantages and complexity. In addition, twelve environmental factors which Jordanians perceive to have an effect on eGovernment services' expectations of adoption were investigated [30]. The twelve factors have been organized into three dimensions: financial, infrastructural and governmental. The social aspect became Jordan's highest understanding of the challenges to the implementation of the trusting and privacy eGovernment. The findings of the regression test in [31] have shown that the history, knowledge and trust and the adoption of eGovernment in Bahrain contribute significantly to one another. In Egypt, students in private and public universities have studied the efficacy of marketing governmental services [32]. The report concluded that the government has largely struggled to market eGovernment services.

The findings of the longitudinal analysis of the understanding of and the adoption of the "Government Portal" by British people have shown that citizens with home access to broadband are more likely to be conscious of eGovernment services and accept them. In the understanding of citizens and their adoption of eGovernment services within the household, demographic features of people, such as age, gender, employment, and social class, play an imperative role. More awareness and acceptance of the government's portal were observed as the number of people expanded. Some of the eGovernment key objectives are to improve service quality, enhance administrative capacity, and enable governments to interact and communicate more effectively with users of the service [33].

A surprising finding was that, after 54 years, the adoption rate fell significantly. Male adoption is more

likely to be motivated. When the social status of respondents declines, awareness and adoption of eGovernment services decrease. The higher the respondents' income the more likely the adoption of eGovernment services [34].

The key factors for the standard of service and the subsequent decision to start the e-tax were examined in [35]. The results showed that the main factors of quality e-Tax service are protection, usability, and perceived usefulness. No important forecast was perceived as being easy to use and could be attributed to the study framework—i.e., Hong Kong is one of the most technologically advanced societies, and the survey's respondents were very young and appear to be less relevant in their perceived ease of use. The [36] study found that both citizens' trust in government and citizens' trust in technology is being consistently addressed by Singapore's government and is moving gradually but steadily toward the high trust regime on both dimensions.

The effect of the standard of the website has been investigated in Saudi Arabia for allowing the use of eGovernment services [24]. The findings show that the quality of the website is one of the main factors. Effort motivation planned performance and conditions of facilitation influence eGovernment services' user behavior. In [37], an integrated model was developed to explore the adoption of eGovernment systems by Saudi Arabia by its citizens based on DOI with some additional variables. The effects of most of the factors found were adequate. The report also found that eGovernment services related to the postal system are difficult to provide. There is no specific address for Saudi citizens such as house number, street name or a secure postal address, which is usually at your doorstep or in a box. While post office boxes for citizens' rent are open, not a large number of Saudis have one which makes it difficult for people to communicate with the government. The mail service network must, therefore, be established and strengthened in Saudi Arabia to shape a certified partnership.

A situation evaluation of current eGovernment adoption in Tanzania was conducted to provide the eGovernment adoption model for the assessment of new initiatives, together with an identification of critical factors affecting eGovernment services [26]. The model proposed includes TAM, DOI, population, criteria for knowledge and other external factors. The results show that the eGovernment's current status is established in certain districts of Tanzania through the Internet presence process. Problems with eGovernment have improved several times. The results of the validity test for an AMT in the Gambia eGovernment environment in [38]demonstrated a significant influence on eGovernment products for users of the core TAM structures. The perceived accessibility and quality of knowledge have major consequences for the perceived value of the government.

The researchers in [39] investigated the impact of a variety of factors on employee intention to use IDMS in Taiwan. For eGovernment initiatives, IDMS is the most common intergovernmental service. The study found that training in trust and perceived ease of use was increasingly effective rather than considered to be of use. In [40] the main drivers of eGovernment projects have been highlighted by the Omani Government. The economic aspect played a more driving role to meet international norms, followed by bureaucratic needs. Service and IQ motivations have also been seen as complementary to a national commitment to a competitive information economy, in the economically-forced eGovernment implementation strategy.

Analysis of the cases of Romania has shown that a better sense of utility, quality, and confidence among the citizens of eGovernment services directly improves the satisfaction of citizens and the level of adoption by eGovernment implicitly. The objective of this research was also to examine the impact on perceived utility, usability and eventually the adoption cycle of demographic variables. The most significant variables were found in education level and age [41]. The study in [42] examined how Indonesian Internet users accept eGovernment services. Relatively advantageous and compatible factors to predict eGovernment use intention have been confirmed. besides, the image variables and usability will not be verified.

The applicable knowledge from the examined scientific studies is presented in a data sampling process. The collected data were divided into two tables. The background of the analysis, the underlying models/theories, the research approach, dependent and independent variables as well as the results are included in Table 2. The vast majority of the empirical studies analyzed were quantitative. The key data collection methods were the questionnaire and the interview. With the exception of [43],[37], the Multiple Regression Analysis was the most popular research technique. Structural equation analysis was another analytical technique employed.

Table 2Empirical studiesreview and research strategy

Study	Research Strategy	Models	Dependent Variables	Independent Variables	Results
[44]	Quantitative		intention to use eGovernment	Effort expectancy Socialfactors Ease of use	The combination of initiative and social impact has had important effects on the government's continuing purpose.
[31]	Quantitative		Intention to adopt	Awareness Cultural Trust	There was a significant connection to the purpose of these three variables. Trust has the greatest influence, and then culture and

					knowledge.
[38]	Quantitative	TAM	Gambia's eGovernment usage intention	perceived ease of use information quality attitude towards using behavioral intention perceived usefulness	The core components of the TAMs influence the eGovernment intent of Gambia considerably and strongly.
[34]	Quantitative		adoption of the Government	Demographic characteristics.	In explaining citizens' knowledge of and adoption of eGovernment services in the household, demographic characteristics of individuals such as age, gender, education, and social class play a crucial role. eGovernment services are more likely to be recognized by people with domestic broadband connectivity.
[12]	Quantitative	TAM	Intention to use mobile	Perceived ease of use, perceived usefulness, perceived risk, compatibility with lifestyle perceived cost, perceived credibility, trust	It has been noticed that mobile banking is adopted by Iranian customers through these systems. The most important precedents for online banking adoption were adapting to lifestyle and trust.
[45]	Quantitative	TAM	Satisfaction of citizen	Quality Perceived Usefulness Perceived Ease of Use Trust Citizen satisfaction	The most important demographic factors influencing perceived usefulness and ease of use are education and age. People's enhanced understanding of value, efficiency, consistency, and confidence increases the satisfaction and level of adoption of citizens directly.
[35]	Quantitative	TAM	Service quality Continuance intention	Security Perceived usefulness Perceived ease of use Quality of Service	The key determinants of service quality were both service characteristics (i.e. protection and convenience) and one technical function (i.e. perceived usefulness but not perceived ease of use).
[39]	Quantitative	TPB + TAM	Intention to accept EDMS	Training, Trust Facilitating conditions personal innovativeness Compatibility perceived ease of use perceived usefulness compatibility Self-efficacy	Employees' intention to use EDMS is significantly predicted by their perceived utility, perceived ease of use, preparation, accessibility, external impact, interpersonal effect, self-efficacy and promoting conditions. The study showed that training with trust and perceived ease of use becomes more successful than perceived usefulness.
[27]	Quantitative	DOI + TAM	eGovernment adoption	Religious beliefs computer skill Word of mouth Confidence Resistance Technology Waste (favoritism) Perceived usefulness Website Design Trust in the Internet Relative advantage	Trust, religious values, website design, internet and information technology, mouth-words, resistance to change, perceived usefulness, relative advantage, and complexity are the major factors relating to the adoption of eGovernment. Wasta has been the only factor that has decreased since a weak charge has been registered.

Study	Research Strategy	Models	Dependent Variables	Independent Variables	Results
[23]	Quantitative	UTAUT	Intention to use Usage behavior	Expectancy Effort Expectancy Compatibility Social influence Intentions to use Computer-self Efficacy Availability of Resources Information Quality Trust in the Internet Trust in Government System Quality Awareness of the System Performance	The expected performance is a good predictor of eGovernment use followed by internet trust. The intention to use, the computer's effectiveness and resource availability are significant user behavior.

[24]	Quantitative	UTAUT	Use Behavior of eGovernment services	Effort Expectancy Facilitating Performance Expectancy SocialInfluence Conditions WebsiteQuality	Effort expectancy, performance expectations, and enabling factors contribute greatly to the public's acceptance of eGovernment services. Website efficiency is an important aspect of eGovernment services adoption. There was also a negligible social impact.
[37]	Mixed	DOI	Intention to adopt	DOI factors usability Infrastructure computer security service quality speed of accessibility multilingual, delivery reliability awareness, culture literacy Demographic	The outcome of most of the factors described was sufficient The outcome of an examination of the multicultural factor, even if the expert findings were not considered to be sufficient, was recognized as a consequence of the examination of the surveys for residents and government workers, but also from history.
[26]	Triangulation approach	TAM + DOI	eGovernment adoption	DOI factors Demographic char. External factors Information needs TAM factors	In the selected districts in Tanzania, the current situation of eGovernment is distinguished by its Internet presence. Improvements include knowledge and resources available, awareness, confidence in using the website, Internet access and reliability, the possession of ICT, up-to-date website information, education, income, and social effect.
[42]	Quantitative	DOI	Intention to use	Ease to use Compatibility	Relative advantage and reliability are two essential variables. The Image and ease of use are two non-significant variables.
[19]	Mixed	UTAUT	Usage Behavior	Effortexpectancy, performance expectancy, social influence perceived convenience perceived credibility.	The respondents in the study did not find the facilitation conditions a major role in their adoption of online banking because they did not feel they had the means to use online banking and that they couldn't be helped if they had trouble using online banking.

Study	Research Strategy	Models	Dependent Variables	Independent Variables	Results
[4]	Quantitative	DOI	Behavior intention	Compatibility Image Relative advantage Ease of use Government support	The facility of use is the strongest determinant of behavioral purpose and it can be due to the lack of technology in most rural farmers. The impact of relative advantages and ease of use was moderated by age and gender.
[46]	Qualitative Case study	literature on trust			Citizens' trust in governments is created by institutional confidence-built steps, citizen input and a strong commitment to leadership and eGovernment support. Citizens' confidence in technology is created by a robust and efficient legal system and by the provision of adequate information and expertise.
[11]	Quantitative	TAM	Intention to Adopt m Banking	Perceivedease of use,perceived usefulness, subjective norms	They find that PEOU, PU and SN have different demographic influences and that PEOU, PU and SN constructs have been considered optimistic in their intention to adopt m banking.

IV. Discussion and Findings

A few essential observations that provide some feedback and implications can be obtained from this literature review. Resistance or rejection in government institutions of eGovernment systems may adversely affect the spread of the eGovernment phenomenon. Inadequately addressed were not the key factors that help avoid obstacles to the adoption of eGovernment services within the governmental authorities. In many developing countries, such as Bahrain [31], Zambia [26], Libya [47], Oman [40], Jordan [30] and Egypt [48], there is a discrepancy in citizens' use of eGovernment services from one country to another. Many of the studies

reviewed explored the purpose of using eGovernment services as a dependent variable as independent parameters. The aim to only use, however, reflect the full spirit of adoption. Research on eGovernment adoption from a government point of view has been minimal. Funding and motivation for politicians to implement eGovernment measures are the most important issues to be addressed in the discussion of adoption by the government from the eGovernment perspective. Failure to evaluate the efficiency of the services offered to people utilizing eGovernment services.

The citizens lack interest in using eGovernment services because they don't know or know about the existence of eGovernment services but some obstacles hinder their use. The eGovernment services adoption process is fundamentally multi-criteria. It comprises a multitude of interrelated factors with varying degrees of control. For the evaluation and ranking of multiple criteria questions, multi-criteria decisions were used widely. In the field of eGovernment adoption. Nevertheless, the implementation of multi-criteria decisions remains uncommon. Some significant adoption factors include the perception of usability, perceived usefulness, confidence, knowledge, quality of service, website design, resource availability, demographic characteristics, resistance to change, accessibility and word of speech. Nevertheless, the literature failed to address a range of important factors that are supposed to affect the adoption of eGovernment. Citizen satisfaction, distribution networks, payment forms, prices and mandatory are examples of these variables that are absent. There is no alternative for governments around the world not to adopt eGovernment.

Public service technologies can also drive change but can also drive digitalization through ongoing transformations of societal values. We need to be conscious of the value of certain other considerations that must be taken into account inside and outside public sector organizations, between one country and another, eGovernment transformation will be different, but adoption technology is most important [49].

Regular people prefer non-digital services, such as traditional personal government visits, where both digital and non-digital services are available. With compulsory eGovernment programs, people are required to seek to identify their various advantages. The research in [32] is the only one to discuss and answer the mandate factor not as an explicit factor, but as a suggestion. The citizens' satisfaction factor was not included in the literature's suggested eGovernment models. The provision of public services that are accessible, open and convenient will provide a decent life to all citizens and will improve public services to citizens. Governments must track the satisfaction of civilians with current services. Efforts to improve citizens' usage of electronic government services are important to make the ICTs accessible and affordable, including user-friendly interfaces, take into account the accuracy of the information provided, reduce risks from safety infringements, locate eGovernment applications, include cheaper services, reduce the time for service delivery, usage convenient payment methods, and encourage awareness.

V. Conclusion

On the basis of the literature review and research implications, we found that the assessment of the efficiency and identification of strong and weak points of the eGovernment services deployed is most relevant. There is a need to suggest model adoption by eGovernment to explain the mechanism from a citizen's point of view and to include fundamental factors that are expected to have a significant impact on the actions of the citizen concerning the use of eGovernment, including those missed in the previous work. The theoretical model, therefore, takes the view that eGovernment services are not meant to be used in their entirety. The introduction of current usage and future usage reflects citizens' process and adoption phases. Such eGovernment services would possibly not be used for other purposes, such as accessibility problems or an inconvenient method of payment. Current researchers are thus designing a method that can be used by TAM, DOI and UTAUT to assess the efficiency of deployed eGovernment services.

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