E-GOVERNMENT ADOPTION: A SYSTEMATIC REVIEW IN THE CONTEXT OF DEVELOPING NATIONS

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ABSTRACT

Objective of the Study: This paper reviews the studies of e-government adoption in developing nations to come up with the factors that influence e-government adoption.

Methodology/Approach: Secondary data was collected from the findings of other researches. Systematically, two reputable databases; Scopus and IEEE Explore were searched to retrieve studies of e-government adoption in developing nations.

Originality/Relevance: Adoption has a key role in the successful implementation of e-government initiatives in the context of developing nations. However, minimal research has been carried out to explore determinant factors of e-government services adoption among developing nations' citizens.

Main Results: The theories and models applied in previous researches were identified. Moreover, the frequency of factors investigated in these studies was identified. The results showed that there are many studies investigated trust as an important factor of e-government adoption in developing nations, while there are other critical challenges such as security and awareness got less attention.

Theoretical/Methodological Contribution: This study results may open for future research based on the gap in theories applied and the factors investigated in the context of developing nations.

Keywords: E-government. Adoption. Factors. Developing Nations.

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1   Introduction

E-Government enhances the access to government information, and delivery of services to citizens, partners, other organizations, and even government entities themselves. E-Government is considered as a tool for easy administrating of government functions and activities. It is defined as the use of Internet technology to enhance the accountability and functionality of the government functions, which include delivery of government services and information to citizens and businesses (DeBenedictis, Howell et al. 2002). E-Government can provide standard, efficient and convenient public services for both service provider and service recipient (Zheng, Chen et al.). Successful implementation and adoption of e-government insures low-cost, high speed, responsible, and reliable services to citizens, businesses and government agencies (Jaeger 2003, Jaeger and Thompson 2003, Ke 2004, Dwivedi, Papazafeiropoulou et al. 2006, Dwivedi and Williams 2008). E-Government implementation may require building a relatively highly cost infrastructure, but successfully adopting its services results in vast savings towards government's operations. In addition, e-government can improve transparency, and reduce corrupt in public service delivery (Safeena and Kammani 2013).

For citizens, e-government offers a number of advantages. Citizens can interact with the government whenever and however they want (Kumar, Mukerji et al. 2007). They have the choice to access public information and receive services anywhere and anytime, instead of visiting an agency at a particular location at a particular time (Kumar, Mukerji et al. 2007). This can help mitigating the transaction costs of government services (Lee, Kirlidog et al. 2008). E-Government web portals provide information on government regulations, processes and services, so citizens can participate in democratic processes from anywhere at

any time. E-Government applications may include filling and submitting forms and applications for several services such as e-voting, e-visa, eID, and online bill and tax payment. Hence, various e-government projects have been implemented in different countries to offer services focusing on citizens' needs, and provide more accessibility of government services (Al-Obaithani and Ameen , Saha 2008). However, such advantages can only be realized if the e-government projects considered successful from all perspectives (Rana, Dwivedi et al. 2013). Indeed, following implementation, several governments faced many problems and do not get the expected benefits, and hence, most of them fail.

On the other hand, for those who need to use the technology they have to accept it (Al-Haderi 2013). Therefore, e-government has to carefully address the citizens' perspective (Al-Hujran, Al-dalahmeh et al. 2011). In order to develop citizen-centred e-services which provide citizens with accessible, relevant information and quality services, governments should first understand the factors that influence citizen adoption of this innovation (Carter and Belanger 2004). By understanding the motivation of citizens to use the e-government services, governments will be able to take strategic actions to increase the e-services adoption. Therefore, adoption is an important aspect to be considered for the success of e-government initiatives in developing nations. Accordingly, the government's decision makers should understand the factors that would motivate the citizens to use electronic service delivery channels rather than traditional ones (Sharma 2015). Understanding the factors influencing citizens' behaviour toward adopting e-services provides a good guidance to implement e-government projects. Models of e-government adoption provide such an insight (Kanat and Ozkan 2009). However, most e-government projects have often low acceptance rate. In this regard, despite the considerable investments made by the government, majority of e-government initiatives often encounter

problems. Thus, the underlying factors that impact e-government services adoption and dissemination among citizens are still a favoured topic in research dedicated to IS (Kumar, Sachan et al. 2018). In addition, studies concerning citizen's adoption in developing nations are still few and far between (Carter and Bélanger 2005, AlAwadhi and Morris 2008, Zhan, Wang et al. 2011, Ghazali, Mustapha et al. 2014). According to the U.N report (UN 2014), the developing nations citizens' usage of e-services is still low, and although this is the case, e-government empirical studies are still confined to developed nations, while in the developing nations, IT studies are largely overlooked (Chatfield and Alhujran 2009, AlKhatib 2013). Therefore, the main aim of this study is to highlights the factors that affect the e-government services adoption in developing nations.

The road map in this paper is as follow. It starts with the introduction then E-government adoption, followed by the methodology applied in this research. Next, E-government adoption in developing nation based on the results of analysing the reviewed studies is discussed. Finally, the paper is concluded.

2 E-Government Adoption

In regarding to technology adoption, mainly the thought motivates the adoption. It means that adopters often adopt something perceiving that they will get benefit from it. In other words, the entity (whether organization or individual) has the freedom to decide to adopt or not. Among the challenges faced by adoption studies is determining situations whereby the actual adopter is the party that makes the adoption choice, because in majority of cases, the user of an innovation is not the same entity that makes the adoption decision (Conklin 2007). E-Government adoption is referred as the intention of the citizen to participate in government activity, access information and receive services from the government online

(Warkentin, Gefen et al. 2002). Carter & Belanger (2005) and Gilbert, Balestrini et al. (2004) describe e-government adoption as the intent to use or willingness to use e-government services. Although the phrases used to describe e-government may vary, they have the same meaning, which is the simple decision to use or not to use e-government services. To this end, the next e-government challenge is to make the citizen use the services frequently, since using e-government for example once a year would not be deemed as a meaningful use of its many applications (Safeena and Kammani 2013). Direct technology experience and technology acceptance drive the user to adopt the technology (Venkatesh, Morris et al. 2004, AlAwadhi and Morris 2008). Hence, the primary motive for e-government adoption in a country is that it enhances citizens' access to the delivery of government services (Lofstedt 2012, Khanyako and Maiga 2013). E-Government services cover e-mail, e-tax, e-voting, e-health, e-banking, e-commerce, etc. Adoption of e-government entails the participation and contribution of entities from various stakeholders such as government implementers and end users because the definition of e-government is not satisfied unless the entire users are determined and addressed (Lowery 2001).

E-Government success depends on the adoption of its system and its actual use by the citizens (Khanyako and Maiga 2013). Promoting e-government benefits is among the primary goals of governments. In fact, benefits provided by e-government rather than traditional services have derived governments to invest in e-government service implementation. Following implementation, several governments face the problem of benefits falling short of their expectations, and hence, most of them fail. Therefore, it can be concluded that e-government projects' success depends on support from government as well as its adoption by citizens (Ahmad 2013) which supports to the fact that it is significant for technology

users to accept the technology first (Al-Haderi 2013).

In many countries, e-government services adoption and use remain limited because of the fact that is primarily being guided by the factors on the supply side (Kolsaker and Lee-Kelley 2008, Verdegem and Verleye 2009). It is important for the governments to acknowledge that e-government success does not only hinge on the supplier side but also from the side of demand and the inclination towards online service adoption (Carter and Bélanger 2005). The adoption of information systems includes its adoption followed by use (post-adoption), with the former focused on the decision to implement information systems and the latter focused on the ongoing use and the process of diffusion (Daqing 2010). Therefore, it can be stated that one of the many issues of implementation any system is user's adoption. This is significant in public organizations and it is one of the key issues that managers of organizations have to address (Shajari and Ismail 2013). In this regard, the government should be aware of the factors that could impact the successful e-services adoption (Zailani and Abd Salam 2006). Thus, understanding the influencing factors of e-government services adoption by citizens is crucial (Tanaka and Matsuda 2006).

In the first decade of this century, technology system implementation has been expansively studied but the successful adoption of IT has largely been ignored (Zailani and Abd Salam 2006). E-Government success depends on the way governments encourage citizens to use online public services (Daqing 2010). It is pertinent for decision makers to understand the factors that would boost citizens' use of e-delivery channels. However, to date, studies dedicated to e-government services have been confined to developed rather than developing

nations (Titah and Barki 2006, AlAwadhi and Morris 2008). In this regard, adoption is a crucial aspect of e-government initiatives success in developing nations (Yonazi, Sol et al. 2010). However, as stated earlier, empirically studying the citizens' adoption of e-government services in this part of the world has largely been ignored (AlAwadhi and Morris 2008, Alateyah, Crowder et al. 2013). Nevertheless, the factors that affect e-government services adoption and diffusion remains a popular topic in the field of IS in developing nations (Kumar, Mukerji et al. 2007, Akkaya, Wolf et al. 2012).

3   Methodology

This work is a preliminary review study, so secondary data collected from the findings of other researchers are used. Two reputable databases were used to search studies of e-government adoption in developing nations; Scopus and IEEE Explore. "E-Government adoption" "E-Government services" and "E-Government to citizens" with "developing countries/nations" were used as the keywords to retrieve the related articles. The aim of this search was to find only research papers which are directly or indirectly related to the e-government adoption in developing notions to filter out the specific papers on the factors affecting e-government services adoption. A total of 451 (154 articles in Scopus and 297 articles in IEEE) on e-government adoption research was found. These studies were carefully analysed to get only those articles which have studied the success factors aspects of e-government services in developing nations. The investigation indicated that 41 of these studies focus on the e- government adoption success factors in developing nations as shown in Figure 1.
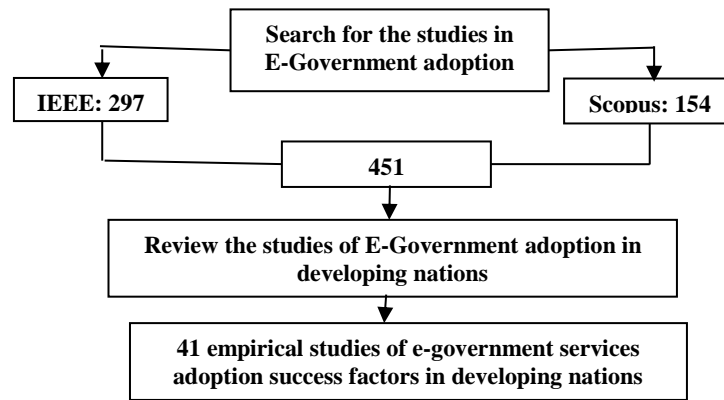
Fig1. - Methodology Process

4 E-Government Adoption in Developing Nations

Scanning the reviewed papers across the years shows that the trend of e-government adoption studies in developing countries starts in 2007 and the number of studies increases through the last years. Figure 2 represents the statistics of the number of publications since 2007 till 2018.
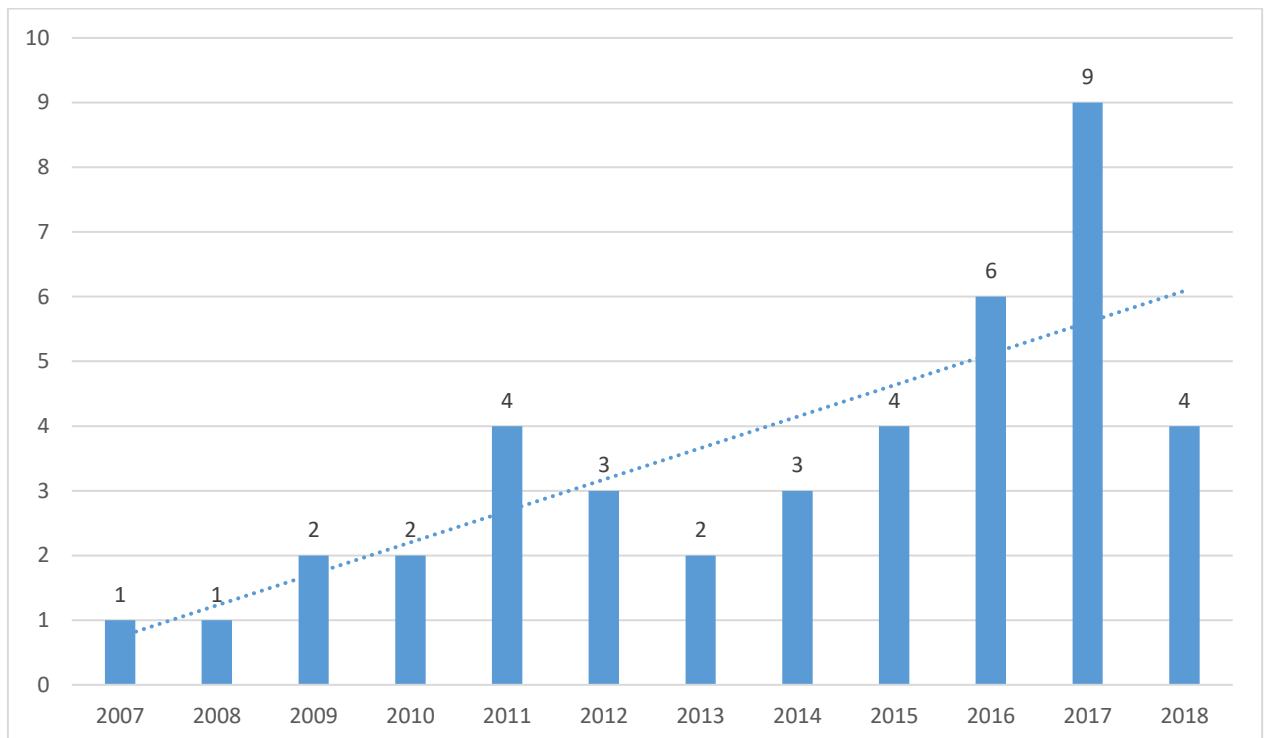
Fig2. - Papers distribution through the years (2007 – 2018)

Table 1 shows e-government adoption studies that were conducted in some developing nations (2007-2018). Reviewing the literature indicates that several models have been examined to determine the influencing factors of e-government services adoption in developing nations. Adoption models and

theories, such as Theory of Reasoned Action (TRA), the Theory of Planned Behavior (TPB), the Technology Adoption Model (TAM), the Diffusion of Innovation (DOI), Social Cognitive Theory (SCT), e-government adoption model, Technology Readiness Index (TRI) and the Unified Theory of Adoption and Use of Technology (UTAUT) were used to investigate the adoption of e-government services in developing nations.

Table 1 - E-Government Adoption Studies in Developing Nations

| Study	Objective	Country	Theory	Factors
(Lee and Lei 2007)	To assess and test the factors that are related to E-Government Adoption.	Macao	DOI TAM	Perceived Usefulness - Easy to Use - Trust - Compatibility
(AlAwadhi and Morris 2008)	To explore the factors that determine the adoption of E-Government services in Kuwait.	Kuwait	UTAUT	Performance Expectancy - Effort Expectancy - Peer Influence - Facilitating Condition - Behaviour Intention - Gender - Academic Cause - Internet Experience
(Lean, Zailani et al. 2009)	To investigate the factors that influencing the intention to use e-government service among Malaysians.	Malaysia	TAM + DOI	Perceived Usefulness - Perceived Ease of Use - Relative Advantage – Compatibility - Complexity - perceived image - Trust
(Alomari, Sandhu et al. 2009)	To identify the main factors affecting e-government adoption in order to specify the strategies required to successfully implement an e-government strategy.	Jordan	-	Trust in terms of the security and privacy - trust in government - attitudes – beliefs - education - accessibility
(Al-Shafi and Weerakkody 2010)	To explore the intention of citizens to use E-Government services in Qatar	Qatar	UTAUT	Performance Expectancy - Effort Expectancy - Social Influence - Facilitating Conditions
(Suki and Ramayah 2010)	To identify the factors that determine users' acceptance of e-Government services and its causal relationships using a theoretical model based on the Technology Acceptance Model.	Malaysia	TAM	Perceived usefulness - ease of use – compatibility - interpersonal influence - external influence - self efficacy - facilitating conditions - attitude,- subjective norms - perceived behavioral control
(Ozkan and Kanat 2011)	To develop and validate an E-Government adoption model for predicting and explaining citizens' adoption behaviour regarding the use of government to citizen (G2C) E-Government services	Turkey	TPB TAM	Perceived Usefulness - Perceived Ease of Use - Attitude - Perceived Behaviour - Control - Trust - Access - Skills
(Zhan, Wang et al. 2011)	To explore the motivators for the government employees to use E-Government.	China	UTAUT	Performance Expectancy - Effort Expectancy - Facilitating Conditions - Social Influence
(Lin, Fofanah et al. 2011)	To develop a successful model of the Gambian e-Government system to assist Gambians with more efficient and cost-effective government operations	Gambia	TAM	Perceived usefulness - Ease of use - Information system quality - Information quality - Attitude toward behavior
(Lessa, Negash et al. 2011)	To understand the acceptance and adoption of Information Technology in Ethiopian context	Ethiopia	UTAUT	Performance Expectancy - Effort Expectancy - Facilitating Conditions - Social Influence

| (Alomari, Woods et al. 2012)	To identify factors that affect E-Government adoption in the developing country of Jordan.	Jordan	DOI TAM	Trust in Internet - Trust in Government - Attitudes – Beliefs - Internet and Computer Skill – Website Design - Relative Advantage – Compatibility - Complexity - Perceived Ease of Use - Perceived Usefulness
(Rehman, Esichaikul et al. 2012)	To identify critical factors that enable citizens to adopt e-Government services in a society, which is at a rudimentary stage of e-Government adoption.	Pakistan	-	Quality of service - Web site design- Security and trust - E-readiness- Level of e-government
(Olatubosun and Madhava Rao 2012)	To identify the determinants of civil servant users' adoption of e-government services in four different ministries in Ondo State Nigeria	Nigeria	UTAUT	Performance expectancy, self-efficacy, social influence and attitude behavior
(Alateyah, Crowder et al. 2013)	To identify the influential factors that affect the citizens' intention to adopt E-Government Services in Saudi Arabia.	Saudi Arabia	TAM DOI	Quality of Service - Diffusion of Innovation - Computer Literacy - Culture – Awareness - Technical Infrastructure - Website Design - Security - Privacy - Trust
(Ahmad, Markkula et al. 2013)	To study E-Government services in Pakistan from the user's point of view.	Pakistan	UTAUT	Performance Expectancy - Effort Expectancy - Facilitating Conditions - Social Influence
(Alomari, Sandhu et al. 2014)	To explore how citizens socialize and network in relation to using and adopting E-Government	Jordan	-	Trust in Internet - Religious Views - Internet and Computer Skills - Digital Divide - Word of Mouth – Favouritism - Resistance to Change - Relative Advantage
(Ghazali, Mustapha et al. 2014)	To identify which factors that may be consider in predicting the intention of people regarding the usage of the service.	Malaysia	TPB	Subjective Norms - Perceived Behavioural Control - Behavioural Intention
(Freire, Fortes et al. 2014)	To explores the factors explaining the adoption of E-Government platforms by Portuguese citizens.	Portuguese	-	Social influence - Perceived security - Trust - Perceived Privacy - Relative Advantage - Web Design - Perceived Ease Of Use - Behavioural Intention Adoption
(Al-Hujran, Al-Debei et al. 2015)	To develop an integrative research model by extending extant TAM through the incorporation of a set of social, political, and cultural constructs: trust, perceived public value, and national culture.	Jordan	TAM	Perceived usefulness - Perceived ease of use – trust - perceived public value - national culture
(Ahmed, Alhadi et al. 2015)	To identify the factors influencing citizens' acceptance and intention to use e-government in Sudan	Sudan	TAM	Perceived usefulness - Perceived ease of use - Perceived trust - Quality of service - Advertising
(Susanto and Aljoza 2015)	To investigate influence of PU, PEU, Social Norms, Facilitating Conditions, and Trust toward individual acceptance of a new e-government service in a developing country.	Indonesia	TAM	PU – PEU - Social Norms - Facilitating Conditions - Trust
(Mohajerani, Shahrekordi et al. 2015)	To investigate the impact of factors influencing on trust in e-government and intention to use e-government system.	Iran	-	Privacy – security - trust in technology - information quality

(Ibrahim and Zakaria 2016)	To determine the factors enhancing e-government adoption in a developing nation (Iraq) from employee perspective.	Iraq	UTAUT	website quality, awareness, computer self-efficacy, capability of IT workforce, Behavioural intention, Effort expectancy, Facilitating condition, Performance expectancy, Social influence, Training
(ElKheshin and Saleeb 2016)	To investigate determinants and factors necessary to enhance adoption of citizens for government services in developing countries, with particular focus on Egypt	Egypt	TAM	Website design - Perceived Public Value - Trust in Government - Trust in the Internet - Perceived Ease of Use - Perceived Usefulness – Attitude - Behaviour intention
(Alharbi, Kang et al. 2016)	To examine a number of factors that may influence the intentions of citizens to engage in e-participation activities on e-government websites.	Saudi Arabia	-	Trust - subjective norms
(Asmi, Zhou et al. 2016)	To investigate the citizens behaviour in terms of social influence and trust in the existing e-services by the government while filing their tax online.	Pakistan	TAM	Trust - Social Influence - Perceived Ease of Use - Perceived Usefulness
(Amagoh 2016)	To identify the benefits of e-government, and examine factors of e-government diffusion in Nigeria.	Nigeria	TAM, DOI and UTAUT	Accessibility, efficiency, transparency and accountability, economic, democracy, reliability, Trust in Government, Trust in the Internet, Perceived Ease of Use, Perceived Usefulness, Relative Advantage, Compatibility, Digital divide, Technological infrastructure, Skilled human capital
(Mutimukwe, Kolkowska et al. 2017)	To investigates information privacy concerns, perceptions of privacy practices, trust beliefs and behavior intentions towards using e-government services in Rwanda.	Rwanda	-	Privacy - Trust
(Kurfalı, Arifoğlu et al. 2017)	To investigate underlying factors that play role in citizens' decision to use e-government services in Turkey.	Turkey	UTAUT	Trust of internet - Trust of government - Performance expectancy - Effort expectancy - Social influence - Facilitating conditions
(Munyoka and Maharaj 2017)	To investigate those factors that affect citizens' decisions to use e-government services in the SADC region.	SADC Countries	UTAUT	Facilitating conditions – e-government awareness - behavioural intention
(de Moraes, Hermínio et al. 2017)	To study which factors influence the use of e-government in Brazil	Brazil	TAM - UTAUT	Perceived Benefit; Facilitating Conditions; Perceived Ease of Use; Social Influence; Perceived Security; Trust in the Government and Habit.
(Lallmahomed, Lallmahomed et al. 2017)	To investigate the antecedents of e-Government adoption in a small island developing state.	Mauritius	UTAUT	Performance expectancy - Effort expectancy - Social influence - Facilitating conditions - Price value – awareness - Computer self-efficacy – Trust
(Khanra and Joseph 2017)	To study the users' perception about e-Government services and investigate the key variables that are most salient to the Indian populace.	India	-	Reliability – Security – Efficiency – Responsiveness

(Dwivedi, Rana et al. 2017)	To develop and validate a unified model of e-government adoption (UMEGA)	India	UTAUT	Performance expectancy - Effort expectancy - Social influence - Facilitating conditions - Perceived risk – Attitude
(Jacob, Fudzee et al. 2017)	To develop a new model of e-government adoption service by extending the Unified Theory of Acceptance and Use of Technology (UTAUT) through the incorporation of some variables	Indonesia	UTAUT	System Quality - Information Quality - Trust - Performance expectancy - Effort expectancy - Social influence - Facilitating conditions - Behavioural Intention
(Hidayanto, Purwandari et al. 2017)	To examine factors influencing citizen to participate in e-participation service in Indonesia	Indonesia	SCT + TRI	Participation self-efficacy - outcome expectation personal - outcome expectation performance – optimism – innovativeness – insecurity – Disconnect
(Mansoori, Sarabdeen et al. 2018)	To explore the factors that might motivate citizens to adopt the e-government public services provided by the Government of Abu Dhabi Emirate.	UAE	UTAUT	Effort expectancy - facilitating conditions - trust - Social influence
(Kumar, Sachan et al. 2018)	To investigate the factors that influence direct and indirect adoption of e-government services in India.	India	TAM + UTAUT	Perceived awareness, perceived usefulness, trust in internet, trust in government and social influence - Availability of resources, computer self-efficacy, perceived ease-of-use, perceived compatibility, multilingual option and voluntariness - Perceived image
(Verkijika and De Wet 2018)	To test the unified model of e-government adoption (UMEGA) in South Africa, a sub-Saharan country.	South Africa	UMEGA	Performance expectancy - Effort expectancy - Social influence - Facilitating conditions - Perceived risk - behavioural intention - Computer self-efficacy - Trust
(Yavwa and Twinomurinzi 2018)	To examine the moderating influence of indigenous culture and internet access on the acceptance of e-government services, in particular e-filing and e-payment services, in a developing country.	Zambia	UTAUT	Performance expectancy - Effort expectancy - Social influence - Facilitating conditions- Internet Access – Indigenous Culture

Fig 3 represents the frequency of applying each model in the related literature. It shows that UTAUT and TAM are the most models used to investigate the factors influencing e-government services in developing nations with 17 and 15 studies, respectively while 10 studies proposed a conceptual model and 5 studies adopted DOI, 2 studies TPB, and 1 for SCT and TRI. Some of these studies integrated more than one theory with removing or adding other factors to come up with comprehensive model which can be fit to a specific country.
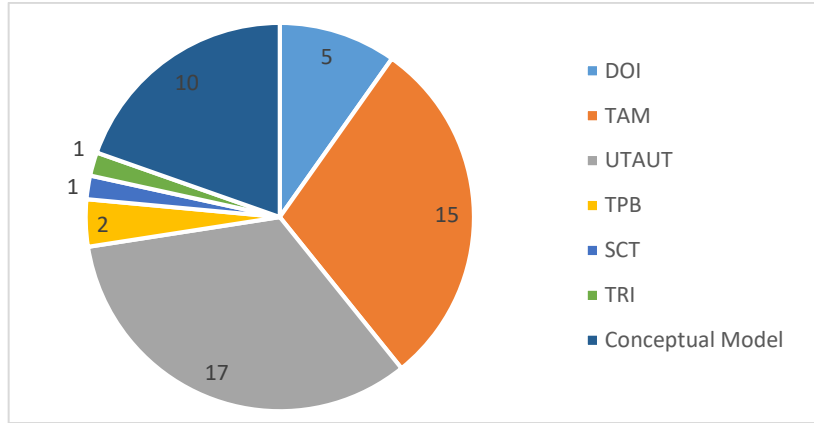
Fig3. - The frequency of models in the related literature

In addition, Table 1 shows that the studies were conducted in the context of different countries including Saudi Arabia, Jordan, China, Malaysia, Portuguese, Kuwait, Pakistan, Qatar, South Africa, Zambia, India, Brazil, Indonesia, UAE, Mauritius, Egypt, Iraq, Sudan, Nigeria, Ethiopia, Rwanda and Turkey.

Additionally, Table 1 presents the factors that were examined in each study. It can be noticed that in each study factors from the literature or from the context were added to the original model. These factors include quality of service, computer literacy, culture, awareness, technical infrastructure, website design, security, privacy, digital divide, word of mouth, resistance to change, access, , interpersonal influence, external influence, level of e-government, perceived public value, advertising, training, responsiveness, perceived risk, outcome expectation, optimism, insecurity, disconnect, multilingual option & voluntariness and trust. Many of these factors are repeated in many studies with different models. Table 2 explains the frequently factors used in developing nations based on the Table 1. Fig 4 represents the factors repeated 3 or more times in the investigated studies.

Table 2 - Frequently Factors Used in Developing Nations

Factors	(Alateyah, Crowder et al. 2013)	(Alomari, Woods et al. 2012)	(Lee and Lei 2007)	(AlAwadhi and Morris 2008)	(Ozkan and Kanat 2011)	(Lessa, Negash et al. 2011)	(Olatubosun and Madhava Rao 2012)	(Al-Shafi and Weerakkody 2010)	(Ahmad, Markkula et al. 2013)	(Alomari, Sandhu et al. 2014)	(Zhan, Wang et al. 2011)	(Ghazali, Mustapha et al. 2014)	(Freire, Fortes et al. 2014)	(Lean, Zailani et al. 2009)	(Alomari, Sandhu et al. 2009)	(Suki and Ramayah 2010)	(Lin, Fofanah et al. 2011)	(Rehman, Esichaikul et al. 2012)	(Al-Huiran, Al-Debei et al. 2015)	(Ahmed, Alhadi et al. 2015)	(Susanto and Aljoza 2015)	(Mohajerani, Shahrekordi et al. 2015)	(Ibrahim and Zakaria 2016)	(ElKheshin and Saleeb 2016)	(Alharbi, Kang et al. 2016)	(Asmi, Zhou et al. 2016)	(Amagoh 2016)	(Mutimukwe, Kolkowska et al. 2017)	(Kurfalı, Arifoğlu et al. 2017)	(Munyoka and Maharaj 2017)	(de Moraes, Hermínio et al. 2017)	(Lallmahomed, Lallmahomed et al.)	(Khanra and Joseph 2017)	(Dwivedi, Rana et al. 2017)	(Jacob, Fudzee et al. 2017)	(Hidayanto, Purwandari et al. 2017)	(Mansoori, Sarabdeen et al. 2018)	(Kumar, Sachan et al. 2018)	(Verkijika and De Wet 2018)	(Yawwa and Twinomurinzi 2018)
Quality of Service	√																√	√		√		√	√										√		√					
Computer skills		√		√						√														√																
Computer Literacy	√															√																								

Factor																																		
Culture	√												√																						√
Awareness	√											√									√		√						√					
Website Design	√	√							√			√			√																			
Security	√								√		√		√			√						√		√										
Privacy	√								√		√					√				√														
Trust	√	√	√		√			√		√	√	√		√	√	√	√	√		√	√	√	√	√	√		√	√			√		√	√	√
Technical Infrastructure	√											√					√														√			
Relative advantage		√						√		√	√							√																
Beliefs		√									√																							
Attitude		√		√		√					√	√	√				√											√						
Perceived Usefulness		√	√		√						√	√		√	√	√		√		√	√			√							√			
Complexity		√									√																							
Perceived Ease of Use		√	√		√					√	√		√	√	√		√		√	√			√								√			
Compatibility		√	√							√		√					√			√											√			
Performance Expectancy				√		√	√	√	√		√								√					√	√	√	√						√	√
Effort Expectancy				√		√		√	√		√								√					√		√	√		√				√	√
Social influence				√		√	√	√	√		√					√		√					√	√	√		√	√		√	√		√	√
Facilitating condition				√		√		√	√		√					√		√					√	√	√	√		√	√		√		√	√
Behaviour Intention				√						√	√		√						√	√					√					√				√
Access				√																				√										√
Perceived Behaviour Control				√						√			√																					
Digital Divide							√																	√										
Word of mouth							√																											
Resistance to change							√																											
Religious view							√																											
Subjective norms								√			√								√															
Perceived image										√																							√	
Self-efficacy						√					√					√									√				√			√	√	
Interpersonal influence											√								√															
External influence											√																							
Level of e-government												√																						
Perceived public value													√				√																	
Advertising														√																				
Training															√																			
Habit																								√										
Price value																		√						√										
Responsiveness																			√															

Perceived risk																								√				√	
Outcome expectation																									√				
Optimism																									√				
Insecurity																									√				
Disconnect																									√				
Multilingual option & voluntariness																												√	
Efficiency													√																
Transparency & accountability,													√																
Democracy													√																
Reliability													√																
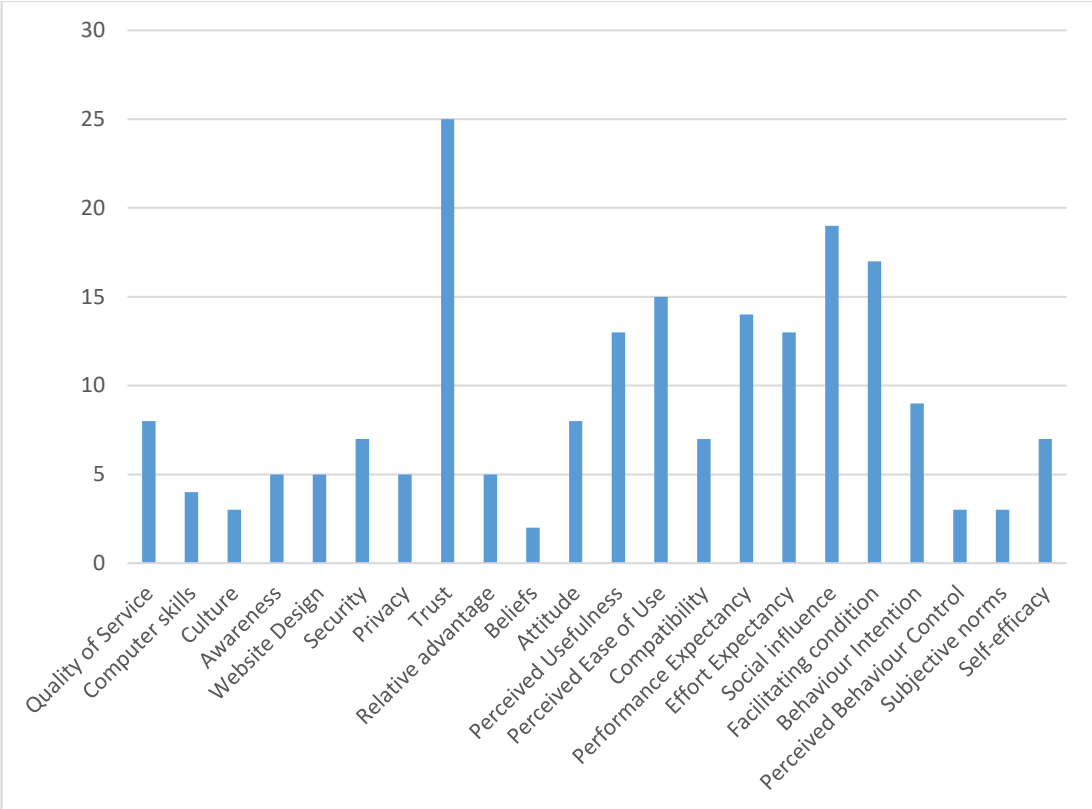
Fig4. - The factors repeated 3 or more times in the investigated studies

Many factors are examined in most of the reviewed studies. Trust was tested in most of the studies and all of these studies found that there is a significant relationship between trust and adoption of e-government services. Some of the studies used trust as two parts: trust of e-government and trust of the internet (ElKheshin and Saleeb 2016, Kurfalı, Arifoğlu et al. 2017, Kumar, Sachan et al. 2018). Social influence, facilitating conditions, perceived ease of use, perceived usefulness, performance expectancy and effort expectancy are also among the most examined factors in the related literature.

5   Discussion

Based on findings reported from different developing nations, the factors influencing e-government services depend largely on the context of the country, and hence, no clear classification of adoption factors exist (Safeena and Kammani 2013). Furthermore, willingness to adopt e-government is important to its success and relatively few studies have extensively examined citizens' adoption of e-government in developing nations. So, governments in developing nations should consider e-government adoption as a challenge and it is important to know the factors that can encourage citizens' adoption. In addition, the adoption challenge can be addressed through investigation and proposing a suitable framework of e-government adoption.

According to several researchers, although governments of developing nations are convinced of the benefits of e-government, challenges still exist and these include privacy, security, trust, culture, computer literacy and IT infrastructure. The study by (Ahmad, Markkula et al. 2013) mentioned that adoption challenges are: lack of appropriate support, lack of awareness and user data privacy. In this regard, adoption is a crucial aspect for e-government initiatives success in developing nations (Yonazi, Sol et al. 2010) but as stated, e-government services adoption by citizens in this part of the world has largely been ignored (AlAwadhi and Morris 2008, Alateyah, Crowder et al. 2013). Nevertheless, the factors that affect e-government services adoption remains a popular topic in the field of Information System (Kumar, Mukerji et al. 2007, Akkaya, Wolf et al. 2012). As has been shown in the results, the trend of these kinds of studies is growing. However, to reach the maturity, further investigating of the factors that affect citizens in these countries to adopt e-government services should be conducted.

The results also show that TAM and UTAUT are the most models applied to examine the affecting factors. In addition, factors were integrated to these two models or other and show significant effect. These two models can be integrated with other models to test more factors with different aspects.

Notably, many factors have been examined with different names and same meaning as explained by (Venkatesh, Morris et al. 2003). For example, the ease of use (perceived ease of use of TAM, technical complexity of DOI, effort expectancy of UTAUT) and the usefulness (perceived usefulness of TAM, relative advantage of DOI, and performance expectancy of UTAUT) are of these factors. These factors were used many times in the literature. Moreover, there are many factors were added to the theories such as (security, privacy, awareness, culture and trust). The trust was the most repeated factor in these studies. So, these factors should be considered in the future by designing new comprehensive theory for e-government adoption. Although there are many challenges of e-government adoption mentioned by many studies in developing nations, but most of these challenges are not used frequently as influence factors of e-government adoption in developing nations as shown in Table 2. Fo r example, security and privacy were mentioned as the most important challenges (Schaupp, Carter et al. 2010, Venkatesh, Sykes et al. 2011, Harby, Qahwaji et al. 2012, UN 2012, Ahmad, Markkula et al. 2013, Al-Aghbari, Abu-Ulbeh et al. 2015, Otieno and Omwenga 2015) in developing nations but only two times used in these studies.

6   Conclusion

This study reviewed the studies of e-government adoption in developing nations to come up with the most important challenges and success factors of e-government adoption.   41 studies were reviewed. The theories and models

applied in these studies were identified. The countries within which these studies were conducted also identified. Moreover, the factors tested in these studies were analysed. This study found that the most frequent factor added to the main models was trust, while there are other challenges in developing nations like security, privacy and awareness got less attention in the previous studies.

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