

The effect of quality, security and privacy factors on trust and intention to use e-government services

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ABSTRACT

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In keeping abreast with the digitized and automated world today, governments of developing and developed nations must provide appropriate e-government services to assure confidence and effective and efficient usage among their citizens. The quality, security, and privacy of current e-government implementation have been impairing the trust and participation of users, in Jordan especially. Hence, this study examined the impacts of quality, security and privacy of e-government services on the intention to use e-government services among Jordanian citizens. Questionnaires were used to gather data, and questionnaire items covered the constructs of quality factors (information quality, system quality, and service quality), perceived security, and perceived privacy as independent variables, and the constructs of trust and intention to use as dependent variables. The study samples comprised academics in Jordanian public universities. The universities were selected using stratified sampling method, while the respondents were chosen using simple random sampling method - 212 respondents were selected. SPSS Version 18 and PLS Version 3.3.6 were used in data analyses and hypotheses testing. Results affirmed a positive and significant link between information quality, system quality, service quality, perceived security, perceived privacy and trust in e-government services, and a positive and significant link between trust in e-government services on intention to use. In e-government services implementation, Jordanian government should take into account the quality factors (information quality, system quality, and service quality), perceived privacy, and perceived security, to increase trust of the citizens and consequently their intention to use the e-government services.

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1. Introduction

Information and communication technology (ICT) has greatly transformed how people, organizations and governments execute their tasks. ICT is now an integral part to the government, as it facilitates the government in efficiently and effectively serving both the citizens and businesses (Meftah et al., 2015; Kanaan et al., 2016). Pertinently, an electronic government or e-government, which was introduced during the 90s, denotes the application of ICTs in public administration, in order that citizens, businesses, and government agencies could conveniently gain access to government information. Fang (2002)

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described e-government as the utilization of information technologies like the Internet, and mobile computing (among others) by government agencies to change the connections of government with citizens, businesses, and other government bodies. The internet mediated services are now the main interfaces among governments, and between government and stakeholders, citizens, businesses (Karkin & Janssen, 2014), as governments are now heavily using the internet to serve the citizens, business organizations and other stakeholders.

E-Government is among the efforts made by the governments to increase their effectiveness and efficiency of services (Alanezi et al., 2010). Among the advantages of e-government are: better service delivery, information access to citizens which empowers citizens, more effective interactions between government and businesses and industries, and more efficient government management. Additionally, Palvia and Sharma (2007) stated that the use of e-government increases convenience, transparency, and revenue growth, while decreasing corruption and cost. Ndou (2004) relevantly mentioned the establishment of e-government in both developed and developing countries as a way to grasp the prospects and benefits of ICTs and establish knowledge society. Investments in e-government generated public value directly for the clients of the new systems and also for two other groups of stakeholders: taxpayers interested in the effective use of government resources, and citizens who have broader social objectives including developing trust, communications, and engagement with government.

An e-governments encompasses a portal that allows communication to occur between government institutions and citizens. Factually, a country's revenue level significantly denotes its economic capability and progression, and the country's economic capability and progression could affect its national e-government improvement. More than ever, ICT resources access and the instruction procurement, ICT education included, become indicators of a country's revenue level.

The use of e-government could majorly change the relationship between governments and citizens (Norris, 2010; MacLean & Titah, 2022). However, for low-revenue and low-salaried nations, the variables that could empower the execution of e-government activities were lacking despite the availability of the right approaches and methods for its implementation. In fact, these nations scored poorly in the e-government development index as their e-government is still very rudimentary. In addition, there is still no clarity as to the specific benefits brought about by e-government implementation (Goh & Arenas, 2020; Stanimirovic & Vintar, 2013).

Many e-government initiatives were not fully executed, particularly in developing nations. As reported, (see: Mkude & Wimmer, 2013; Yusof, & Yusuff, 2013; Sonnenberg, 2020), about 60% to 80% of e-government projects did not succeed. On the other hand, for e-government bodies in developing nations especially, it is important to provide the citizens with e-government portals with good accessibility abilities, quality measures, and awareness aspects, to increase usage behavior and consequently user satisfaction, leading to positive feelings towards e-government portals adoption (Alawneh et al., 2013). Notably, successful e-government adoption is highly factored by high-level satisfaction towards the provided online services (Komba & Ngulube, 2014).

The increased needs for e-government portals have led to the increased needs for quality development and evaluation. However, many countries have yet to succeed in their e-government initiatives (Sharma, 2015), and service providers and end-users of e-government are among the factors for e-government projects success. Li and Shang (2020) relevantly mentioned the need for validated measuring instruments, considering that the perceptions and expectations of citizens contribute in the formation of high-quality e-government information products and services.

Notably, at the global level, little is known pertaining to the delivery and maturity of the services of e-government applications and public services. Today's world is fast moving, facilitated by digitization and automation. Hence, governments of both developed and developing nations need to improve their e-government services so that the citizens will be more confident to use the e-services. In e-government implementation, quality, security, and privacy are among the factors that could affect the trust and participation of the citizens as user. Problems associated with the quality, security and privacy of the services could decrease trust of users, and consequently their intention to use e-government services. Hence, the present study attempted to examine the following: the determinants of intention to use e-government services, the factors that impact trust in e-government services, and whether trust affects intention to use e-government services.

2. Literature review

2.1 E-government

E-government is a system that employs information technology (IT) to combine different governmental organizations to become one body. Koh (2017) reported that transformations in government work have changed the direction of e-government, and the use of e-government facilitates in making government work more efficiently. As the demand and supply increase, the provision of effective and efficient e-government could increase the confidence of users and consequently their intention to use the system.

E-government eradicates the need for face-to-face civil service while making the government work process more transparent and efficient. For the public, the use of e-government services is fast and less costly, and as indicated by Hawamleh and Ngah (2017), e-government allows users to actively use the services provided. For the government, the implementation of e-government decreases administrative costs, via the use of e-documents and administrative information sharing among ministries.

E-government encompasses a service government which makes different administrative services accessible and usable at all times and places, provided that there is Internet connection. Through the use of innovative ICT, e-government combines and discloses the administrative service system, and this makes the government more productive and transparent, while the services provided to the citizens are significantly better (Li & Shang, 2020).

In examining e-government, Lee (2021) described the concept as an innovative government, formed through the merger between government services and ICT, and its services are accessible by the citizens at all times at no cost. Furthermore, the system allows participation of citizens. Cho et al. (2019) stated that mobile government services delivered via wireless internet ease people and corporations, while also improving the on-demand customized service, making administrative work more efficient.

The definition of e-government is affected by use level, interpretation of ICT, and changes that occur within the social environment. Currently, information technology has progressed so much, as evidenced by the emergence of IA, cloud, and IoT. Meanwhile, the fourth industrial revolution has caused a paradigm shift to the government. Hence, e-government will keep progressing and expanding to become more influential to the citizens, the government, and the country as a whole.

2.2 Trust

In e-government, trust in the privacy and security of the information system is an important matter. In this regard, e-government implementation allows more efficient government administration and the services provided to the public are of better quality while the public can use the administrative services more conveniently. Tolbert and Mossberger (2006) stated that the e-government initiative can effectively increase the confidence of the citizens in the government.

In their study, Newton and Norris (2000) described government trust as public confidence in government actions. Having the trust, users will feel encouraged to utilize the new services as the increase in action expectations allows them to overcome the objective risk situations, and so, users feel safe using the new services (Cho et al., 2019).

The importance of trust in e-government is factored by the fact that the government is the provider of e-government Services, while the people as users of e-government are the ones who measure trust in the government. Hence, e-government Services users have high expectations towards the service. Meanwhile, the degree of individual confidence in e-government will dictate the individual's level of trust towards e-government, which in turn can affect the willingness of the individual to use e-government.

People consider security and privacy of information as factors that affect the formation of trust in e-government (Liu & Carter, 2018). Al-Omari and Al-Omari (2006) indicated that the assurance of secure and private transactions will facilitate the formation of trust of users towards e-Government users. In addition, the authors stressed the importance of the assurance of transparent laws, institutional devices and policy procedures to users. In discussing trust, Najafi (2014) stated that trust of information providers towards information collectors will diminish the concerns towards information privacy.

Government trust is affected by various political and social factors. At the same time, trust affects e-government Services as well. The current concern is the degree to which e-government is able to protect personal information and assure stability of information and services in service use. In other words, the assurance of trust by e-government is manifested through privacy protection, security guide, and technology improvement to assure safe transactions online, so that users could confidently use the service.

Social issues associated with information security like privacy and security could affect the general confidence of e-government, which could affect the intention to use the user significantly, and so, information security is an important factor in e-government activation (Ayyash et al., 2013). Also, with the inclusion of new technologies in e-government like Blockchain, IoT and AI, users are more assured of safe services and personal information protection. In fact, these new technologies become the building blocks in the implementation of intelligent e-government with the ability to gather and analyze large amounts of personal information in real time.

2.3 Information Quality

Information Quality affects the information furnished to consumers in various ways. According to Rieh (2002), Information Quality relates to current, good, valuable, and accurate information, while Salaün and Flores (2001) described it as the information that the user perceives as valuable. Comparatively, Klischewski and Scholl (2006) indicated that Information Quality

has varied definitions depending on the specific e-government information consumer, and so, Information Quality is defined based on key players. The authors further stated that for citizens, Information Quality is related to consumer-centered information because citizens are the key players in e-government information use. For government administrations, Information Quality is perceived as integrated government-standard information (Malodia et al., 2021), while Chan et al. (2021) described Information Quality from the perspective of IT developers as the information based on established IT data formats.

E-government could significantly increase the government's internal efficiency and service delivery quality, in addition to increasing public involvement (Parent et al., 2005). Nonetheless, Carter and Belanger (2005) indicated that citizens need to trust the e-government systems before they would decide to engage in e-government transactions. In fact, Belanger and Carter (2009) stated potential reluctance among many citizens in adopting e-government services because they lack confidence towards the security of online transactions, in addition to having concerns towards using the information acquired by their government.

Equally, Belanger and Carter (2009) indicated the potential of e-government systems in enhancing transparency, responsiveness, and accountability of government, but citizens are not likely to use e-government services without trusting the system. In their study, Alkrajji and Ameen (2021) indicated the need to empirically explore the factors affecting the trust of citizens in e-government systems. Studies (e.g., Belanger & Carter, 2009; Khan et al., 2021; Alkrajji & Ameen, 2021) found trust as a major determinant in the intention of citizens to use e-government services. However, the impact of Information Quality on trust in e-government systems is still unclear.

In their study, Salaun and Flores (2001) found a link between Information Quality and the trust of citizens in e-government systems, while Evans and Yen (2006) reported trust as vital in the implementation of e-government systems. Santa et al. (2019) mentioned that trust involves the belief that others are obliged to keep their end of the bargain, and for this reason, trust has a strong social element. The authors also found that trust is crucial in the computerization development process. In various economic interactions, Alzahrani et al. (2017) described trust as a centrally-defining aspect, because it demonstrates confidence that results will happen. The authors further stated trust as an efficient system to govern transactions, considering that high-level trust decreases the likelihood of a consumer to become victim to opportunistic behavior.

2.4 System Quality

With active internet connection, e-government services become available at any time. Also, e-government services are transparent, less costly, faster, and of better quality, when compared to the traditional method (Lee et al., 2021). In other words, there are many advantages of using e-government services. However, Hwang et al. (2004) mentioned that the use of e-government services in a given country is evaluated through the number of citizens using them (the services).

In their D&M IS success model, Delone and McLean (2003) stated System quality as a dimension that affects success of information systems. The authors described System quality as the characteristic of operation of an e-government system itself, involving factors like flexibility, credibility, ease of use, and response time. Additionally, Nelson et al. (2005) indicated that systems quality denotes the information processing's systems quality, and the information processing is established based on the desired characteristics embedded within the system.

E-service encompasses indirect interaction. Hence, information systems are the window of e-government services, making e-government systems quality the initial impression of users. Rai, Lang and Welker (2002) indicated that an e-government system perceived as of high quality is likely to be trusted and used by citizens to obtain online government services. System quality is hence a very important indicator in performance measurement of the entire system, and in measuring trust and perception of the user. In their study, Tan et al. (2008) found that, to a large extent, system quality affects the trust of citizens towards e-government services. It has been reported in studies (e.g., Delone & McLean, 2003; Tan et al., 2008; Alshaher, 2020) that expectation of user of system quality will cause user's trust in e-government services to increase or reduce particularly in continual use.

2.5 Service Quality

Service Quality (SQ) entails the variance between the requirements and the expectations of customers concerning service performance. In their study, Uzir et al. (2021) described this variance or difference as a key standard for demonstrating how services can compete in the market and achieve competitive advantage. Meanwhile, Olorunniwo et al. (2006) stated that support quality received by users from the IS department and IT support system, includes service quality as a vital measure of information system effectiveness to assure quality of the provided service.

Technological advancements have affected how governments provide their services to the citizens while also affecting the life of the citizens. The outbreak of COVID-19 has increased the need of utilizing technology and online platforms worldwide, causing dramatic change to the life of people. In order to provide the citizens with the needed services, many governments are now offering online alternatives. Poor and unsatisfactory online services will cause dissatisfaction and trust reduction, and

consumers will eventually stop using the e-service. As such, the critical factors affecting customer trust with regards to service quality need to be explored. Slack et al. (2020) reported the increasing significance of Service quality in the determination of both the success and failure of e-government portals, and in imparting users with an experience of interactive flow of information, implying change to business execution.

The global outbreak of Covid-19 pandemic has dramatically increased the significance of services, particularly those of e-government (Mat Dawi et al., 2021). The pandemic has made face-to-face interaction nearly impossible, and highly risky, and so, e-government has been regarded as a highly practical solution, turning e-government services into a necessity. Somehow, as reported by Sharma et al. (2021), there are still uncertainties and suspicions among users towards e-government services use. Meanwhile, Mansoor (2021) mentioned that service quality of e-government websites is influential, and may affect trust and intention to use citizens as users. Hence, service quality as perceived by the user, should be examined.

2.6 Privacy

Personal information is a crucial element in matters like civil service, administration, and financial transactions, and companies view personal information as a valuable asset as it is a source of profits. For e-government, personal information is an essential foundation in the provision of services. ICT development paired with the Internet has resulted in the online spread of information, including personal information, in large quantities. Somehow, as reported by Hawamleh et al. (2020), third parties can easily access, keep, and use this personal information online, and this situation has become a major problem in society.

Privacy is a social issue, but considering that privacy is subjective, as it differs based on individual, society, and national settings, there has been no clear standard on this matter. In discussing the concept of privacy, Swire (2003) stated that it entails one's right to be alone, observing the notions of confidentiality and anonymity. Many individuals have become victim to personal information leaks from portal sites, Internet shopping and financial institutions, whether directly or indirectly. Following the increase in the amount of personal information gathered irrespective of the owner's status of consent, privacy has become a concern today, because there is no telling as to how an individual's personal information is being utilized and managed.

Within the context of e-government, privacy entails personal information protection when a user is engaged in e-government Services, which are provided online. In e-government adoption, privacy can significantly affect, considering the storage of personal information in databases by governments, municipalities and public institutions, to allow them to provide the public with different kinds of online administrative services.

2.7 Security

Security concerns information asset management and technical protection from security threats, prevention acts before security related events happen, and efforts to minimize loss caused by various security threats during gathering, processing, storage, and retrieval of information.

In their study, Kim et al. (2006) discussed some types of risks associated with the Internet usage, as follows: security, information abuse by the inside parties, email related fraud, mobile viruses, non-compliance, serviceability, stability, illegal infringement, privacy encroachment caused by personal information leakage, circulation of malicious codes, and Internet banking related fraud.

Security issues are increasingly a concern today, causing people to be wary of the amount of protection assured to them (Al-Gasawneh et al., 2022). Furthermore, rampant reckless disclosure of personal information through photos, location information and conversations from smartphones and other mobile device applications can definitely lead to problems like personal privacy violations. It can also lead to financial-related frauds through methods like voice phishing and spam text messages, and instant messaging (among others), which could cause severe harms like property and economic loss and damage, and social problems, at individual and global level.

E-government generally deals with very sensitive information like personal information, corporate information, and national confidential information, and this information is sent and processed to the public. Hence, in e-government development, security becomes a critical consideration, to build public trust and consequently usage of the system (Alshehri & Drew, 2011). As reported by Stibbe (2005) and Li and Shang (2020), breaches of security on government services (e.g., financial losses, malicious attacks, information leaks, etc.) can cause the public to feel discouraged from using the e-services while also increasing dissatisfaction of the public towards service quality of e-government systems. In their study, Hu et al. (2014) and Li and Shang (2020) found perception of citizens towards e-government services security a major antecedent to trust and intention to use e-government services, and also a major predictor of e-government service quality.

3. Method

Questionnaire was the instrument used for gathering the study data. There were five sections to the questionnaire that covered the constructs of quality (information quality, system quality, and service quality), perceived security, perceived privacy, trust and intention to use. Specifically, the first section comprised the construct of quality represented by information quality, system quality, and service quality – there were 9 items in this section, adapted from Doll and Torkzadeh (1988), Teo et al. (2008) and Li and Xue (2021). The second section comprised the construct of Perceived Security covered by 5 items adapted from Shin (2010) and Flavián and Guinalíu (2006). The third section comprised the construct of Perceived Privacy, covered by 5 items adapted from Colesca (2009). The fourth section comprised the construct of Trust with 4 items adapted from Alshehri et al. (2012). The constructs in sections one through four were handled as unidimensional constructs. Section five comprised the construct of Intention to use, covered by 3 items adapted from Venkatesh et al. (2012). In addition, there was one section on the demographic information of respondents. There were 6 items in this section. Overall, there were 33 items in the questionnaire. The construct items were measured using a Likert-type scale which is also commonly used in marketing and social sciences studies. Based on Sekaran and Bougie (2016), the scale comprised five points (five-point scale) because it was appropriate for the study context.

The questionnaire was reviewed by three experts who were academics in a university. The validity of the construct items were examined by these experts. The questionnaire was accordingly modified based on the feedback provided by these experts. In addition, interviews were carried out with selected respondents regarding the study instruments' adequacy and clarity of items. Then, based on the respondents' inputs, the questionnaire was accordingly amended. This procedure was also used in Geisen and Murphy (2020), Akroush et al. (2015) and Willis and Lessler (1999).

The study population consisted of academics in public universities in Jordan, and these academics were chosen owing to their deep knowledge on the subject under study, and so, it was likely that academics were able to accurately answer all the questionnaire items. G-power technique was employed in the determination of the minimum sample size, guided by the number of predictors, and 74 was the determined minimum sample size. However, considering the potential low response rate, this study followed the recommendation of Hair et al. (2010) to utilize a sample size larger than 100. Hence, a total of 212 respondents were chosen as the study sample.

This study used stratified sampling method in choosing the sample universities (Jordanian public universities), while the academics in each chosen university were selected using simple random sampling technique. SPSS Version 18 and PLS Version 3.3.6 were used for data analyses. Descriptive statistics and inferential analyses were used in describing the response rate and respondents' profile, and in ascertaining the link between the study variables, respectively.

3.1 Hypothesis Settings

Based on the discussion of past findings, a total of six (6) hypotheses were proposed in this study as follows:

H₁: *Information Quality has a positive influence on trust in e-government services.*

H₂: *System Quality has a positive influence on trust in e-government services.*

H₃: *Service Quality has a positive influence on trust in e-government services.*

H₄: *Perceived Privacy has a positive influence on trust in e-government services.*

H₅: *Perceived Security has a positive influence on trust in e-government services.*

H₆: *Trust has a positive influence on the intention to use e-government services.*

3.2 Construct Measurement

All measurement items used in this study were obtained from past studies. The items were modified slightly, to fit the current study's context, and to facilitate understanding of the respondents. The construct items were all provided with a five-point Likert-type scale (1= "strongly disagree" and 5= "strongly agree") to facilitate the respondents in answering the items. The researcher also performed a pilot test to assure that the questionnaire was reliable. Details are displayed in Table 1.

4. Data analysis and findings

The proposed hypotheses were tested using Smart-PLS 3.3.6, which is a variance-based SEM. Hair et al. (2019) mentioned that Smart-PLS has the ability to predict relationships between variables. From the 160 returned responses, 22 were incomplete and were thus excluded from analysis. The finalized number of responses was hence 138, and the demographic profiles of the respondents were as follows: Majority were male (61.2%), married (59.6%), and were between the age of 40 and 44 years (59.2%). Data normality was evaluated as recommended by Hair et al. (2019), with the following results: Mardia's multivariate skewness, $\beta = 8.013$, $p < 0.01$, and Mardia's multivariate kurtosis, $\beta = 51.666$, $p < 0.01$. Hence, the results were showing non-normal multivariate data. As such, the use of Smart-PLS as a non-parametric analysis software, was appropriate for data analyses.

Table 1
Construct Measurement

Constructs	Items	Measures	Sources
Information Quality	INQ1	E-government services provide the accurate information you need.	Doll & Torkzadeh (1988)
	INQ2	E-government services provide up-to-date information.	Doll & Torkzadeh (1988)
	INQ3	E-government services contents are easily accessible via the e-government web site.	Doll & Torkzadeh (1988)
System Quality	SYQ1	I can successfully log on to the government website every time.	Teo et al. (2008)
	SYQ2	I can successfully visit the related links provided on the home page.	Teo et al. (2008)
	SYQ3	The guidelines of the government website are user-friendly, which allows me to clearly understand the business that each department is responsible for.	Teo et al. (2008)
Service Quality	SEQ1	The staff can take active measures when I encounter problems in the process of using the government website.	Teo et al. (2008)
	SEQ2	All functions and services on the government website can operate normally.	Li & Xue, 2021
	SEQ3	The e-government websites are stable for transactions.	Li & Xue, 2021
Perceived Privacy	PP1	E-government services will not be allow another party to access my personal information without my willingness.	Colesca, 2009
	PP2	My personal information will not be used in an unintended way by government organizations.	Colesca, 2009
	PP3	My personal information will not be shared with another government organization whom I do not want to provide information.	Colesca, 2009
	PP4	My personal information will not be used for other purposes without my authorization.	Colesca, 2009
	PP5	I will not lose control of my personal information in using government services.	Colesca, 2009
Perceived Security	PS1	I am confident that the private information I share with e-government services is secure.	Shin, 2010
	PS2	I believe that the information I provide to e-government services will not be manipulated by inappropriate/irrelevant groups.	Shin, 2010
	PS3	I believe that the information I provide to e-government services will not be released without my willingness.	Shin, 2010
	PS4	E-government services have security features to protect citizens' data from unauthorized access by third parties.	Flavián & Guinalú, 2006
	PS5	I would feel secure in using e-government services.	Flavián & Guinalú, 2006
Trust	TR1	The Internet is trustworthy.	Alshehri et al. (2012)
	TR2	I have confidence in the technology used by government agencies to operate the e-government services.	Alshehri et al. (2012)
	TR3	Government agencies can be trusted to carry out online transactions faithfully.	Alshehri et al. (2012)
	TR4	I believe that e-government services are trustworthy.	Alshehri et al. (2012)
Intention to Use	INT1	I intend to use e-government services in the future.	Venkatesh et al. (2012)
	INT2	I will always try to use e-government services in my daily life.	Venkatesh et al. (2012)
	INT3	I plan to continue to use e-government services frequently.	Venkatesh et al. (2012)

4.1 Assessment of measurement model

This study performed SEM analysis involving two steps. In the first step, the measurement model was evaluated to ascertain its convergent validity and discriminant validity, while in the second step, the structural model was evaluated, involving hypotheses testing. The variables as first order constructs were examined to learn the relevant logical and consensus functions.

Table 2
Convergent Validity Values for the CFA of the Research Model

CONSTRUCT	ITEM	FL	CR	AVE
Information Quality	INQ 1	0.839	0.904	0.702
	INQ 2	0.870		
	INQ 3	0.847		
System Quality	SYQ 1	0.853	0.909	0.714
	SYQ 2	0.860		
	SYQ 3	0.867		
Service Quality	SEQ 1	0.839	0.901	0.695
	SEQ 2	0.856		
	SEQ 3	0.840		
Perceived Privacy	PP 1	0.807	0.872	0.630
	PP 2	0.825		
	PP 3	0.813		
	PP 4	0.727		
	PP 5	0.765		
Perceived Security	PS 1	0.812	0.891	0.650
	PS 2	0.837		
	PS 3	0.811		
	PS 4	0.735		
	PS 5	0.775		
Trust	TR 1	0.835	0.923	0.750
	TR 2	0.884		
	TR 3	0.890		
	TR 4	0.855		
Intention to Use	INT 1	0.844	0.932	0.733
	INT 2	0.859		
	INT 3	0.854		

Convergent validity was evaluated by computing the composite reliability (CR) and AVE value. AVE of the second-order constructs was determined through first-order variables weighting. According to Hair et al. (2017), convergent validity is affirmed when CR value is larger than 0.7, while loading and AVE higher than 0.5. As shown in Table 2, all values are greater than the threshold value, and so, the measurement model was affirmed in terms of convergent validity.

The correlation of the study variables was examined in this study through the use of Heteromonotrait (HTMT) ratio for the model constructs as recommended by Henseler et al. (2015). As can be observed in the following Table 3, HTMT value of the study constructs in the CFA model was all below 0.90 (0.080-0.796). In other words, based on Henseler et al. (2015), the measurement of each latent construct was completely discriminant.

Table 3
The HTMT Ratio for the Constructs

Construct	1	2	3	4	5	6	7
INQ							
SYQ	0.784						
SEQ	0.776	0.761					
PP	0.651	0.639	0.792				
PS	0.799	0.682	0.228	0.734			
TR	0.231	0.764	0.694	0.792	0.572		
INT	0.335	0.609	0.735	0.228	0.779	0.678	

4.2 Hypothesized Direct Effects of the Constructs in the Structural Model

The structural models were evaluated in this study. This was to describe the ability of the factors that affect intention to use e-government services (see Table 4).

Table 4
Hypothesized Direct Effects of the Constructs in the Structural Model

Ha	Path	β	Std. Dev	T-Value	P-Value	VIF	Decision
H1	INQ \rightarrow TR	0.343	0.069	4.969	0.000	3.465	Supported
H2	SYQ \rightarrow TR	0.128	0.056	2.297	0.002	2.512	Supported
H3	SEQ \rightarrow TR	0.095	0.047	2.032	0.043	1.127	Supported
H4	PP \rightarrow TR	0.189	0.061	3.110	0.002	2.247	Supported
H5	PS \rightarrow TR	0.388	0.080	4.829	0.000	3.156	Supported
H6	TR \rightarrow INT	0.221	0.067	3.273	0.001	2.412	Supported

As shown in Table 4: The direct effects of the quality factors namely INQ, SYQ, and SEQ, as the exogenous variables on TR were evaluated in the structural model involving five hypotheses (H1, H2, H3, H4, and H5). The effect of TR on INT as represented in H6 was examined as well, significantly from zero at the 0.05 significance level (one-tailed), with the existing 0.000 for p-value < 0.05. Based on the results, H1 which describes the impact of INQ on TR scored the following: T-value = 4.969, St, β = 0.343, p-value = 0.000. H2 which describes the link between SYQ and TR scored the following: T-value = 2.297, St, β = 0.128, p-value = 0.002. H3 which describes the link between SEQ and TR scored the following: T-value = 2.032, St, β = - 0.095, p-value=0.043. H4 which describes the link between PP and TR scored the following: T-value = 3.11, St, β = 0.189, p-value = 0.002. H5 which describes the link between PI and TR scored the following: T-value = 4.829, St, β = 0.388, p-value = 0.000. H6 which describes the link between TR and INT scored the following: T-value = 3.273, St, β = 0.221, p-value = 0.001. The results showed that all hypotheses were in direct relationship, and so, all six hypotheses were supported.

5. Discussion

The present study investigated the link between quality factors (information quality, system quality, and service quality), perceived security and perceived privacy, and trust of the citizens of Jordan in e-government services provided by the government. In addition, this study examined the relationship between trust and intention to use e-government services among Jordanian citizens. Clearly from literature review, quality factors, perceived security, and perceived privacy have not been examined much, in terms of their impact on trust and intention of users to use e-government services. The lack of research on trust in e-government transactions was also mentioned in Navarrete (2010), despite the deep exploration of the topic in other contexts. The situation has motivated the researcher to perform the present study, as the finding could facilitate government policy makers in identifying the factors that significantly impact trust and intention of users to use e-government services.

In essence, the present study was looking at the interrelations between quality factors (information quality, system quality, and service quality), perceived security, and perceived privacy, and trust. Consequently, the present study examined the impact of trust on the intention to use of Jordanian citizens of e-government services. Selected academics in Jordanian public universities were surveyed using questionnaires. A total of 6 hypotheses were proposed, and then tested using Smart-PLS. Through PLS analysis, the formative structure of intention to use e-government services was verified. The concept model was tested using structural equation modeling. A formative construct of intention to use e-government services was formed using six

indicators namely information quality, system quality, service quality, perceived security, perceived privacy, and trust. The details of each proposed hypothesis is as presented below:

H₁: *Information Quality has a positive influence on trust in e-government services.*

Information quality in e-government and e-commerce has been examined in several researches including Wangpipatwong et al. (2005) who found significant impact of information quality on the adoption of e-government websites. In another study, David et al. (2004) revealed that information is the strongest major predictor of willingness towards e-government usage. Additionally, Almahamid et al. (2010) concluded significant positive linkage between information quality and intention to use e-government services. On the other hand, the effect of information quality on trust of users in e-government services has not been adequately examined. In this study, regression analysis on H1 showed that information quality significantly and positively affected trust of user in e-government services ($\beta=0.343$, $St=0.069$, $T\text{-value}=4.969$, $p\text{-value}=0.000$), and so, H1 was supported. In agreement with this result, Phung et al. (2009) also found a significant and positive impact of information quality on trust of users in an online company. Based on the result, high-level information quality can be associated with high-level trust in e-government services. Hence, as information quality affects trust of users in e-government services, information that is recent, accurate and highly accessible (high-quality information) will increase the intention of users to use e-government services.

H₂: *System Quality has a positive influence on trust in e-government services.*

Regression analysis on H2 showed that system quality significantly and positively affected trust of users in e-government services ($\beta=0.128$, $St=0.056$, $T\text{-value}=2.297$, $p\text{-value}=0.002$). In a related study, Tan et al. (2008) reported that high quality e-government systems and websites increase trust of users towards e-government. Hence, a system of high quality will appear more attractive to users and attract more use. Hence, considering that a better quality system will attract users to use, designers and evaluators of e-government systems or websites must keep the system updated to cater to the changing requirements of users. In short, a system that users find attractive is one that is user friendly, timely, has an attractive interface, easy to use, and time and cost saving.

H₃: *Service Quality has a positive influence on trust in e-government services.*

Regression analysis on H3 showed that service quality significantly and positively affected trust of users in e-government services ($\beta=0.095$, $St=0.047$, $T\text{-value}=2.032$, $p\text{-value}=0.043$). This was in agreement with Colesca (2009) who also found a positive link between service quality and trust in e-government services. High quality service has been linked to highly trustable e-government services, and so, the provision of superior service quality will increase the motivation of users to use e-government services. When e-government services are perceived as prompt, customizable, and linkable to other sites, users are more likely to use it to connect with government agencies. The impact of service quality on e-government has been examined in studies including Lee et al. (2003), Wangpipatwong et al. (2005) and Shareef et al. (2007), but the impact of service quality on trust of user towards e-government services has not been sufficiently explored.

H₄: *Perceived Privacy has a positive influence on trust in e-government services.*

Regression analysis on H4 showed that perceived privacy significantly and positively affected trust of users in e-government services ($\beta=0.189$, $St=0.061$, $T\text{-value}=3.110$, $p\text{-value}=0.002$). This finding was in agreement with Beldad et al. (2012) who concluded the significant impact of confidence in online privacy statements on trust in government organizations, in their study involving new e-government users in Holland. Hence, within the context of e-government services, increase in privacy will increase trust, and so, a system that offers strict privacy will attract more users. Essentially, the findings of this study could facilitate future e-government implementation, considering that users need to have faith that their personal information in a given service/site will be kept confidential, and will not be used without their consent. The role of privacy in forming the trust of users in e-commerce has been examined in various studies including Cheung et al. (2005) and Kim et al. (2008), but the impact of privacy on trust of users in e-government services has not been sufficiently examined.

H₅: *Perceived Security has a positive influence on trust in e-government services.*

Regression analysis on H5 showed that perceived security significantly and positively affected trust of users in e-government services ($\beta=0.388$, $St=0.080$, $T\text{-value}=4.829$, $p\text{-value}=0.000$). Similarly, Liu and Zhou (2010) reported in their study that perceived security had a direct and positive link to trust in e-government services. Hence, a highly secure system is a highly trustable system, and so, a very secure e-government system will attract more citizens to use it. Developers of e-government must therefore convince users that the services/site assures protection of user's credit information, and security of transactional information, to assure that violations of private information of users are not likely to happen. Equally, the provider needs to have appropriate mechanisms in place to address violation issues. The role of security in forming the trust of users in e-commerce has been examined in various studies including Cheung et al. (2005) and Kim et al. (2008), but the impact of security on trust of users in e-government services has not been examined as adequately.

H₆: *Trust has a positive influence on the intention to use e-government services.*

Regression analysis on H₆ showed a positive significant impact of trust on intention to use e-government services ($\beta=0.221$, $St=0.067$, $T\text{-value}=3.273$, $p\text{-value}=0.001$). Similarly, Bélanger and Carter (2008, 2009) and Abu-Shanab and Al-Azzam (2012) were among those who found a positive impact of trust in e-government services. This shows that the increase in trust in e-government will increase the intention of users to use the system. Users need to feel sure that e-government services will protect their personal information and keep it confidential, and that it will not be used without their consent. Users also need to be assured of the system's reliability, and security, aside from user protection.

Based on the outcomes of the hypotheses testing, Jordanian government should consider the impact of quality factors (information quality, system quality, and service quality), perceived privacy, and perceived security in their implementation of e-government, as these factors have been found to affect trust of users, and consequently their intent to use e-government services.

6. Implication for research and practice

This research sheds light on the moderation impact of INQ, SYQ, SEQ, PS, and PP on the Trust of citizens in e-government services, and the intention to use e-government services. In theory, the outcomes of this study have implications on studies on the adoption of e-government services. In practice, the findings of this study have implications on government officials in their decision-making especially – these officials are those responsible in overseeing e-government implementation and adoption in making available public services to the citizens. Hence, in designing and implementing e-government services for citizens, it is crucial for public administrators to consider the factors of Trust, Information Quality, System Quality, Service Quality, Perceived Security, and Perceived Privacy in e-government services, considering that citizens would be interested to use the e-government service if these factors/predictors are perceptible.

In addition, the findings of this study reaffirmed the finding that security and privacy features of e-government may increase trust of users in e-government. As such, e-government with high-level security and privacy features will make citizens as users more confident in using e-government. Hence, the factors of security and privacy should be regarded as major factors when an e-government provider wants to increase trust of users in e-government services, consequently increasing their intention to use the services. Clearly, trust in e-government can be associated with high intention to use the system, and so, this factor needs to be the focal point of decision makers in their efforts to increase intention to use users.

The effects of trust in the adoption of e-government have not been examined much previously (Ayyash et al., 2013), and this fact has motivated the execution of this study. Hence, this study examined the effect of trust in e-government on the intention to use citizens of Jordan as users. A model was accordingly proposed, and the factors in the model are of value to the e-government literature especially in examining trust of users in other forms of e-government.

7. Limitations and suggestions for future research

There are several limitations of this study which should be taken care of in future studies. Firstly, the factors examined in this study in relation to trust of Jordanian users in e-government services were quality factors (information quality, system quality, and service quality), perceived security, and perceived privacy. For this reason, other factors should be considered in future studies like cultural factors, in understanding trust in e-government services. In addition, future studies should consider incorporating theories like Innovation Diffusion Theory or the Unified Theory of Acceptance and Use of Technology.

Another limitation concerns the study samples used in this study; this study obtained samples from Jordanian public universities, and so, the results may not sufficiently represent the whole Jordanian universities or ministries. For future studies, larger sample scope should be used, like the inclusion of samples from private universities. Another point worth noting is that, even though the size of sample used in this study was sufficiently large (212), future studies may want to use even larger sample size, to make the results more generalizable. Also, this study should be replicated to other countries to allow comparison of results, and also to generate better outcomes concerning the factors affecting trust of users in e-government services and consequently their intention to use these services.

8. Conclusion and future research

In this study, six hypotheses relating to the relationship between information quality, system quality, service quality, perceived security, and perceived privacy and trust of user in e-government services, and the effect of trust of user in e-government services on the intention to use the services, were presented and tested. The results of this study could enrich the knowledge of trust in e-government services and intention to use the services. However, studies that examined trust of users in e-government services and intention of users to use the services are still too few.

From the results, this study concluded a positive and significant link between information quality, system quality, service quality, perceived security and perceived privacy, and trust in e-government services. In addition, trust in e-government services was found to have positive and significant impact on intention to use e-government services. All six hypotheses were supported. Notwithstanding, other factors with potential impact on trust in e-government services and subsequently the intention to use e-government services, should be tested in future studies, to increase the knowledge on this subject.

References

- Abu-Shanab, E., & Al-Azzam, A. (2012). Trust Dimensions and the adoption of E-government in Jordan. *International Journal of Information Communication Technologies and Human Development (IJICTHD)*, 4(1), 39-51.
- Adam, A. S., Stalcup, L. D., & Lee, A. (2010). Customer relationship management in Hong Kong. *International Journal of Contemporary Hospitality Management*, 22(2), 139-159.
- Akroush, M. N., Al-Mohammad, S. M., & Odetallah, A. L. (2015). A multidimensional model of marketing culture and performance: A different approach to the use of Webster's marketing culture measurement scale. *International Journal of Contemporary Hospitality Management*.
- Alanezi, M. A., Kamil, A., & Basri, S. (2010). A proposed instrument dimensions for measuring e-government service quality. *International Journal of u-and e-Service, Science and Technology*, 3(4), 1-18.
- Alawneh, A., Al-Refai, H., & Batiha, K. (2013). Measuring user satisfaction from e-Government services: Lessons from Jordan. *Government information quarterly*, 30(3), 277-288.
- Al-Gasawneh, J. A., Anuar, M. M., Dacko-Pikiewicz, Z., & Saputra, J. (2021). The impact of customer relationship management dimensions on service quality. *Polish Journal of Management Studies*, 23.
- Al-Gasawneh, J., AL-Hawamleh, A., Alorfi, A., & Al-Rawashde, G. (2022). Moderating the role of the perceived security and endorsement on the relationship between perceived risk and intention to use the artificial intelligence in financial services. *International Journal of Data and Network Science*, 6(3), 743-752.
- Alkrajji, A., & Ameen, N. (2021). The impact of service quality, trust and satisfaction on young citizen loyalty towards government e-services. *Information Technology & People*.
- Almahamid, S. O. U. D., Mcadams, A. C., Al Kalaldehy, T. A. H. E. R., & MO'TAZ, A. S. E. (2010). The relationship between perceived usefulness, perceived ease of use, perceived information quality, and intention to use e-government. *Journal of Theoretical & Applied Information Technology*, 11.
- Al-Omari, H., & Al-Omari, A. (2006). Building an e-Government e-trust infrastructure. *American Journal of Applied Sciences*, 3(11), 2122-2130.
- Alshaher, A. (2020). IT capabilities as a fundamental of electronic government system success in developing countries from users perspectives. *Transforming Government: People, Process and Policy*.
- Alshehri, M., & Drew, S. (2011). E-government principles: implementation, advantages and challenges. *International Journal of Electronic Business*, 9(3), 255-270.
- Alshehri, M., Drew, S., Alhussain, T., & Alghamdi, R. (2012). The impact of trust on e-government services acceptance: a study of users' perceptions by applying UTAUT model. *International Journal of Technology Diffusion (IJTD)*, 3(2), 50-61.
- Alzahrani, L., Al-Karaghoul, W., & Weerakkody, V. (2017). Analysing the critical factors influencing trust in e-government adoption from citizens' perspective: A systematic review and a conceptual framework. *International business review*, 26(1), 164-175.
- Ayyash, M. M., Ahmad, K., & Singh, D. (2013). Investigating the effect of information systems factors on trust in e-government initiative adoption in Palestinian public sector. *Research Journal of Applied Sciences, Engineering and Technology*, 5(15), 3865-3875.
- Bélanger, F., & Carter, L. (2008). Trust and risk in e-government adoption. *The journal of strategic information systems*, 17(2), 165-176.
- Bélanger, F., & Carter, L. (2009). The impact of the digital divide on e-government use. *Communications of the ACM*, 52(4), 132-135.
- Beldad, A., van der Geest, T., de Jong, M., & Steehouder, M. (2012). A cue or two and I'll trust you: Determinants of trust in government organizations in terms of their processing and usage of citizens' personal information disclosed online. *Government information quarterly*, 29(1), 41-49.
- Carter, L., & Bélanger, F. (2005). The utilization of e-government services: citizen trust, innovation and acceptance factors. *Information systems journal*, 15(1), 5-25.
- Chan, F. K., Thong, J. Y., Brown, S. A., & Venkatesh, V. (2021). Service Design and Citizen Satisfaction with E-Government Services: A Multidimensional Perspective. *Public Administration Review*, 81(5), 874-894.
- Cheung, C. M., Chan, G. W., & Limayem, M. (2005). A critical review of online consumer behavior: Empirical research. *Journal of electronic commerce in organizations (JECO)*, 3(4), 1-19.
- Cho, S. H., Oh, S. Y., Rou, H. G., & Gim, G. Y. (2019, July). A study on the factors affecting the continuous use of E-Government Services-Focused on privacy and security concerns. In *2019 20th IEEE/ACIS International Conference on Software Engineering, Artificial Intelligence, Networking and Parallel/Distributed Computing (SNPD)* (pp. 351-361). IEEE.
- Colesca, S. E. (2009). Understanding trust in e-government. *Engineering Economics*, 63(3).

- DeLone, W. H., & McLean, E. R. (2003). The DeLone and McLean model of information systems success: a ten-year update. *Journal of management information systems*, 19(4), 9-30.
- Doll, W. J., & Torkzadeh, G. (1988). The measurement of end-user computing satisfaction. *MIS quarterly*, 259-274.
- Evans, D., & Yen, D. C. (2006). E-Government: Evolving relationship of citizens and government, domestic, and international development. *Government information quarterly*, 23(2), 207-235.
- Fang, Z. (2002). E-government in digital era: concept, practice, and development. *International journal of the Computer, the Internet and management*, 10(2), 1-22.
- Flavián, C., & Guinalíu, M. (2006). Consumer trust, perceived security and privacy policy: three basic elements of loyalty to a web site. *Industrial management & data Systems*.
- Geisen, E., & Murphy, J. (2020). A compendium of web and mobile survey pretesting methods. *Advances in questionnaire design, development, evaluation and testing*, 287-314.
- Goh, J. M., & Arenas, A. E. (2020). IT value creation in public sector: how IT-enabled capabilities mitigate tradeoffs in public organisations. *European Journal of Information Systems*, 29(1), 25-43.
- Hair, J. F., Hult, G. T. M., Ringle, C. M., Sarstedt, M., & Thiele, K. O. (2017). Mirror, mirror on the wall: a comparative evaluation of composite-based structural equation modeling methods. *Journal of the academy of marketing science*, 45(5), 616-632.
- Hair, J. F., Ortinau, D. J., & Harrison, D. E. (2010). *Essentials of marketing research* (Vol. 2). New York, NY: McGraw-Hill/Irwin.
- Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European business review*, 31(1), 2-24.
- Hawamleh, A. M. A., Alorfi, A. S. M., Al-Gasawneh, J. A., & Al-Rawashdeh, G. (2020). Cyber security and ethical hacking: The importance of protecting user data. *Solid State Technology*, 63(5), 7894-7899.
- Hawamleh, A. M., & Ngah, A. (2017). An Adoption Model of Mobile Knowledge Sharing Based on the Theory of Planned Behavior. *Journal of Telecommunication, Electronic and Computer Engineering (JTEC)*, 9(3-5), 37-43.
- Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the academy of marketing science*, 43(1), 115-135.
- Hu, G., Pan, W., Lin, H., Kang, K., & Best, M. L. (2014). Study on the framework of e-government services capability: An empirical investigation. *Social Science Computer Review*, 32(1), 56-73.
- Hwang, M. S., Li, C. T., Shen, J. J., & Chu, Y. P. (2004). Challenges in e-government and security of information. *Information & Security*, 15(1), 9-20.
- Kanaan, A. G., Bin Hassan, S., & Shahzad, A. (2016). A conceptual model for E-Government success factors in developing countries. *International Journal of Scientific and Research Publications*, 6(12), 39-44.
- Karkin, N., & Janssen, M. (2014). Evaluating websites from a public value perspective: A review of Turkish local government websites. *International journal of information management*, 34(3), 351-363.
- Khan, S., Umer, R., Umer, S., & Naqvi, S. (2021). Antecedents of trust in using social media for E-government services: An empirical study in Pakistan. *Technology in Society*, 64, 101400.
- Kim, B. S., Lee, J., & Kim, K. K. (2006). The impact of perceived trust, risk, usability, and convenience on intention to use e-government service: focused on online application and service. *Informatization Policy*, 13(4), 186-202.
- Kim, D. J., Steinfield, C., & Lai, Y. J. (2008). Revisiting the role of web assurance seals in business-to-consumer electronic commerce. *Decision Support Systems*, 44(4), 1000-1015.
- Klischewski, R., & Scholl, H. J. (2006, January). Information quality as a common ground for key players in e-government integration and interoperability. In *Proceedings of the 39th Annual Hawaii International Conference on System Sciences (HICSS'06)* (Vol. 4, pp. 72-72). IEEE.
- Koh, Y. S. (2017). The Korean national policy for Internet addiction. In *Internet addiction* (pp. 323-336). Springer, Cham.
- Komba, M. M., & Ngulube, P. (2014). Socioeconomic determinants of e-government adoption in selected districts of Tanzania. *ESARBICA Journal*, 33, 71.
- LEE, C. H. (2021). Design of Cloud Service Platform for eGovernment. *International Journal of Internet, Broadcasting and Communication*, 13(1), 201-209.
- Lee, J. K., Braynov, S., & Rao, R. (2003). Effects of public emergency on citizens' usage intention toward e-Government: a study in the context of war in Iraq.
- Lee, T. D., Lee-Geiller, S., & Lee, B. K. (2021). A validation of the modified democratic e-governance website evaluation model. *Government Information Quarterly*, 38(4), 101616.
- Li, W., & Xue, L. (2021). Analyzing the critical factors influencing post-use trust and its impact on citizens' continuous-use intention of e-government: Evidence from Chinese municipalities. *Sustainability*, 13(14), 7698.
- Li, Y., & Shang, H. (2020). Service quality, perceived value, and citizens' continuous-use intention regarding e-government: Empirical evidence from China. *Information & Management*, 57(3), 103197.
- Liu, D., & Carter, L. (2018, May). Impact of citizens' privacy concerns on e-government adoption. In *Proceedings of the 19th annual international conference on digital government research: Governance in the data age* (pp. 1-6).
- Liu, Y., & Zhou, C. (2010, July). A citizen trust model for e-government. In *2010 IEEE International Conference on Software Engineering and Service Sciences* (pp. 751-754). IEEE.
- MacLean, D., & Titah, R. (2022). A systematic literature review of empirical research on the impacts of e-government: a public value perspective. *Public Administration Review*, 82(1), 23-38.

- Malodia, S., Dhir, A., Mishra, M., & Bhatti, Z. A. (2021). Future of e-Government: An integrated conceptual framework. *Technological Forecasting and Social Change*, 173, 121102.
- Mansoor, M. (2021). Citizens' trust in government as a function of good governance and government agency's provision of quality information on social media during COVID-19. *Government Information Quarterly*, 38(4), 101597.
- Mat Dawi, N., Namazi, H., Hwang, H. J., Ismail, S., Maresova, P., & Krejcar, O. (2021). Attitude toward protective behavior engagement during COVID-19 pandemic in Malaysia: The role of e-government and social media. *Frontiers in public health*, 9, 609716.
- Meftah, M., Gharleghi, B., & Samadi, B. (2015). Adoption of E-government among Bahraini citizens. *Asian Social Science*, 11(4), 141.
- Mkude, C. G., & Wimmer, M. A. (2013, September). Strategic framework for designing e-government in developing countries. In *International Conference on Electronic Government* (pp. 148-162). Springer, Berlin, Heidelberg.
- Najafi, I. (2014). Identify effective factors for improving e-trust of e-transactions in the context of e-commerce and e-government. *International Journal of Computer Trends and Technology*, 17(6), 281-299.
- Navarrete, C. (2010, January). Trust in e-government transactional services: a study of citizens' perceptions in Mexico and the US. In *2010 43rd Hawaii International Conference on System Sciences* (pp. 1-10). IEEE.
- Ndou, V. (2004). E-Government for developing countries: opportunities and challenges. *The electronic journal of information systems in developing countries*, 18(1), 1-24.
- Nelson, R. R., Todd, P. A., & Wixom, B. H. (2005). Antecedents of information and system quality: an empirical examination within the context of data warehousing. *Journal of management information systems*, 21(4), 199-235.
- Newton, K., & Norris, P. (2000). Confidence in public institutions. *Disaffected democracies. What's troubling the trilateral countries*, 52-73.
- Norris, D. F. (2010, October). e-government... not e-governance... not e-democracy not now! not ever?. In *Proceedings of the 4th International Conference on Theory and Practice of Electronic Governance* (pp. 339-346).
- Olorunniwo, F., Hsu, M. K., & Udo, G. J. (2006). Service quality, customer satisfaction, and behavioral intentions in the service factory. *Journal of services marketing*.
- Palvia, S. C. J., & Sharma, S. S. (2007, December). E-government and e-governance: definitions/domain framework and status around the world. In *International Conference on E-governance* (Vol. 5, No. 1, pp. 1-12).
- Parent, M., Vandebeek, C. A., & Gemino, A. C. (2005). Building citizen trust through e-government. *Government Information Quarterly*, 22(4), 720-736.
- Phung, K. D., Yen, K. L., & Hsiao, M. H. (2009, December). Examining the factors associated with consumer's trust in the context of business-to-consumer e-commerce. In *2009 IEEE International Conference on Industrial Engineering and Engineering Management* (pp. 2241-2245). IEEE.
- Rai, A., Lang, S. S., & Welker, R. B. (2002). Assessing the validity of IS success models: An empirical test and theoretical analysis. *Information systems research*, 13(1), 50-69.
- Rieh, S. Y. (2002). Judgment of information quality and cognitive authority in the Web. *Journal of the American society for information science and technology*, 53(2), 145-161.
- Salaün, Y., & Flores, K. (2001). Information quality:: meeting the needs of the consumer. *International journal of information management*, 21(1), 21-37.
- Santa, R., MacDonald, J. B., & Ferrer, M. (2019). The role of trust in e-Government effectiveness, operational effectiveness and user satisfaction: Lessons from Saudi Arabia in e-G2B. *Government Information Quarterly*, 36(1), 39-50.
- Sekaran, U., & Bougie, R. (2016). *Research methods for business: A skill building approach*. John Wiley & Sons.
- Shareef, M. A., Archer, N., Kumar, V., & Kumar, U. (2010). Developing fundamental capabilities for successful e-government implementation. *International Journal of Public Policy*, 6(3-4), 318-335.
- Sharma, S. K. (2015). Adoption of e-government services: The role of service quality dimensions and demographic variables. *Transforming Government: People, Process and Policy*, 9(2), 207-222.
- Sharma, S. K., Metri, B., Dwivedi, Y. K., & Rana, N. P. (2021). Challenges common service centers (CSCs) face in delivering e-government services in rural India. *Government Information Quarterly*, 38(2), 101573.
- Shin, D. H. (2010). The effects of trust, security and privacy in social networking: A security-based approach to understand the pattern of adoption. *Interacting with computers*, 22(5), 428-438.
- Slack, N., Singh, G., & Sharma, S. (2020). The effect of supermarket service quality dimensions and customer satisfaction on customer loyalty and disloyalty dimensions. *International Journal of Quality and Service Sciences*.
- Sonnenberg, C. (2020). E-government and social media: The impact on accessibility. *Journal of Disability Policy Studies*, 31(3), 181-191.
- Stanimirovic, D., & Vintar, M. (2013). A critical insight into the evaluation of e-government policies: Reflections on the concept of public interest. *Int. J. Adv. Life Sci*, 5(1-2), 52-65.
- Stibbe, M. (2005). E-government security. *Infosecurity Today*, 2(3), 8-10.
- Swire, P. P. (2003). Efficient confidentiality for privacy, security, and confidential business information. *Brookings-Wharton Papers on Financial Services*, 2003(1), 273-310.
- Tan, C. W., Benbasat, I., & Cenfetelli, R. T. (2008, January). Building citizen trust towards e-government services: do high quality websites matter?. In *Proceedings of the 41st Annual Hawaii International Conference on System Sciences (HICSS 2008)* (pp. 217-217). IEEE.

- Tan, C. W., Benbasat, I., & Cenfetelli, R. T. (2008, January). Building citizen trust towards e-government services: do high quality websites matter?. In *Proceedings of the 41st Annual Hawaii International Conference on System Sciences (HICSS 2008)* (pp. 217-217). IEEE.
- Teo, T. S., Srivastava, S. C., & Jiang, L. I. (2008). Trust and electronic government success: An empirical study. *Journal of management information systems*, 25(3), 99-132.
- Tolbert, C. J., & Mossberger, K. (2006). The effects of e-government on trust and confidence in government. *Public administration review*, 66(3), 354-369.
- Uzir, M. U. H., Al Halbusi, H., Thurasamy, R., Hock, R. L. T., Aljaberi, M. A., Hasan, N., & Hamid, M. (2021). The effects of service quality, perceived value and trust in home delivery service personnel on customer satisfaction: Evidence from a developing country. *Journal of Retailing and Consumer Services*, 63, 102721.
- Venkatesh, V., Thong, J. Y., & Xu, X. (2012). Consumer acceptance and use of information technology: extending the unified theory of acceptance and use of technology. *MIS quarterly*, 157-178.
- Wangpipatwong, S., Chutimaskul, W., & Papasratorn, B. (2005, November). Factors influencing the adoption of Thai eGovernment websites: information quality and system quality approach. In *Proceedings of the Fourth International Conference on eBusiness* (pp. 19-20).
- Willis, G., & Lessler, J. T. (1999). Question appraisal system: QAS-99: Guidelines for designing and evaluating questionnaires. Rockville, MD: Research Triangle Institute.
- Yusof, M. M., & Yusuff, A. Y. A. (2013). Evaluating E-government system effectiveness using an integrated socio-technical and fit approach. *Information Technology Journal*, 12(5), 894-906.



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