

An Integrated Conceptual Model for m-Government Acceptance in Developing Countries:

The Case Study of Jordan

<https://doi.org/10.3991/ijim.v14i06.11449>

Dr. Bassam A. Y. Alqaralleh ^(✉)
Al-Hussein Bin Talal University (AHU), Ma'an, Jordan
alqaralleh@ahu.edu.jo

Dr. Ahmad H. Al-Omari
Northern Border University, Arar, Saudi Arabia

Dr. Malek Zakarya Alksasbeh
Al Hussein Bin Talal University, Ma'an, Jordan

Abstract—Mobile government services have changed how people and businesses can benefit from government public services at any time and from any place. The success of these services is becoming more dependent on satisfying the needs and the expectations of both citizens and business organizations. The current study aims to propose a new integrated conceptual model for examining some important key factors that may affect m-Government acceptance in Jordan from user perspective. It also aims to explore the effect of the following factors: trust in mobile technology, trust in government, perceived usefulness, perceived ease of use, compatibility, service quality and user satisfaction on the behavioral intention to use mobile government applications. A survey method was applied through self-administrated questionnaire that were distributed randomly to 500 citizens who have used mobile government services. Empirical tests were conducted to analyze the collected primary data. Results showed that Jordanian citizens intention to use m-Government services increases if they have high level of positive trust toward Internet and the technologies used to access m-Government services. Perceived ease of use and perceived usefulness were the original constructs in Technology Acceptance Model. Failures to reveal the advantages of m-Government services to potential users will most likely result in low rate of satisfaction. Thus, both perceived ease of use and perceived usefulness were found to have a significant effect on citizen satisfaction. Results indicated the appropriateness of the fundamental elements of Technology Acceptance Model in the Jordanian m-Government context. The higher levels of satisfaction lead to more usage and acceptance of modern mobile service.

Keywords—M-Government, e-Government, technology acceptance, success factors, mobile network

1 Introduction

Globally, Information and Communication technology (ICT) is gradually becoming more important part of our daily life. Mobile services has emerged as a result of the significant growth in ICT such as mobile technology (i.e. WAP and Satellite), mobile devices (i.e. smart phones, handheld and laptop computers) along with instant messaging (i.e. SMS and MMS), other Internet services and web applications [1]. These technologies presented many new opportunities for mobilizing the collaboration and interaction between humans, firms and organizations by employing the power of mobile networks to close the connectivity gap between them and provide access to innovative mobile services from anywhere at any time.

Most recently, several researchers highlighted the advantages of the integration of mobile technology and various important fields such as education, government, healthcare, etc. For example, some researchers [2-5] stated that education institutions must follow the fast propagation of mobile technology and incorporate mobile digital devices in their classrooms since mobile devices have been recognized as the new media for the delivery of education materials and the collaboration between the members of the educational community, at various levels of education.

On the other hand, governments worldwide seek for new and advanced technologies to link government to citizens and firms and to facilitate online information sharing. Due to the massive penetration rate of mobile devices among public citizens, these governments moved from electronic government (e-Government) to mobile government (m-Government) to develop the social life in their countries via facilitating the delivery of government public services and information to citizens and firms [6].

A successful m-Government has two key elements. The first is a successful design and implementation. The second is an effective user engagement and acceptance of its services. Developing new mobile services that are not accepted by the users will increase the failure rate for these services and will waste the design and implementation efforts [7]. In order to prevent this waste, the acceptance of new services and technologies should be an important concern of government institutions and the developers of mobile systems worldwide and must be assessed beforehand.

Within the context of Jordan as an example of developing countries, it seems that Jordanian citizens are not fully interested in accepting the increasing amount of new innovations at the service level such as m-Government services. Many research studies [8, 9] argue that in spite of the growing investment of the governments in e-services at different government levels such as national and local levels, the research results revealed evidence of poor citizen adoption of e-government. So do the authors in [10] claimed that the acceptance of m-Government services in Jordan is still in infancy stage in contrast to other mobile applications. Therefore, it is important to highlight the factors that affect Jordanian citizens' acceptance of m-Government services to be able to predict their reaction towards new technologies.

Therefore, this study proposes a theoretical conceptual model for m-Government acceptance to analyze the most influential factors that affect the behavior of Jordanian citizens towards accepting m-Government services. Identifying these factors can help

to develop m-Government applications and avoid the possibility of its failure. The aim of this study is to help us to provide a conceptual model that may suit the Jordanian context and develop a potential efficient strategy to raise the participation of Jordanian citizens as end users of m-government services. A better understanding of these factors is significant for policy making in Jordan. Therefore, it can be argued that although this paper focuses on Jordan, the key findings provided may have important implications for other Arab countries and other developing countries which have similar circumstances as Jordan.

2 Literature Review

M-government is defined as the utilization of mobile technologies, applications and devices in changing government procedures, and enhancing the delivery of government services to the main parties who are involved in m-Government including public citizens and business firms [11, 12]. M-Government can support the mobility of citizens, and provide them with customized, real-time and location-based information and services. Also, it can be considered as another channel to deliver government services to citizens in rural and urban areas and to extend the delivery of government services to those who simply prefer to use mobile devices [13].

Successful design and implementation of m-Government can be considered an important factor for increasing the success rate of m-Government projects. Therefore, it is important to highlight some of the technical challenges and barriers that may affect m-Government development and dissemination efforts in developing countries such as lack of infrastructure, compatibility and security threats [14]. Moreover, the authors in [15] argued that regardless some success, the e-government program in Jordan still face key challenges such as lack of citizens' awareness, limited ICT skills among the government employees, integration problems, financial issues.

2.1 M-Government acceptance in developing countries

Most of the previous studies regarding various issues of m-Government has concentrated on developed countries (i.e. Hong Kong, Germany and Singapore) where m-Government has already become more important for the provision of public government services. On the other hand, m-Government in developing countries is still in its early stage and its actual acceptance rate is still below the expectations due to some important factors such as the government support and the level of ICT infrastructure.

Jordan is a good example of developing countries which have a good opportunity to offer a new era for m-Government adoption since the mobile devices penetration rate was 118.2 per cent in December 2011 [16]. Also, SMS service has become hugely popular recently, particularly with younger generation. In 2008, Jordanian government has started a new SMS gateway project to provide some of its services via mobile phones to improve government-to-citizen communications using SMS services. This project has shown to be effective in reaching people living in rural areas. The Jordanian government has invested a large amount of money in e and m-Government

projects to solve many problems such as the shortages of resources (i.e. human resources). As mentioned earlier, m-Government projects may not succeed if the number of people that are keen to accept its services is not enough even if it is sufficiently funded and well designed. Also, this will increase the risk of wasting the invested human, financial, and technical resources [17]. Factors such as trust, satisfaction, and PEOU, PU, and quality of service are other important related factors that may affect citizen's acceptance of m-Government.

2.2 Previous studies

In order to support the success of innovative services, it is important to observe the important determinants of IT services usage which are essential to illustrate the acceptance of m-Government services. Thus, various Information System (IS) theories/models (i.e. Theory of Reasoned Action (TRA), Technology Acceptance Model (TAM), Diffusion of Innovations (DOI)) have been globally tested, modified and developed over the years. Each of these theories/models was created using different set of constructs in order to predict, understand and explain individuals' behavior towards the acceptance of technology and information systems. There are a plenty of studies in the literature that have used these theories as a theoretical basis for their research models.

In the context of Jordan, Abu-Shanab [18] proposed a conceptual model based on TAM to investigate the factors that may affect the intention to use some m-Government services (i.e. SMS based services). The study has recognized six factors that are closely related to the intention to accept m-Government in Jordan. These factors are Social influence, perceived usefulness (PU), perceived ease of use (PEOU), perceived compatibility, perceived cost and perceived responsiveness. An empirical test was conducted utilizing surveys. The correlations and regression analyses indicated that all factors except for perceived cost of service have significant relationship with the user's intention to use m-Government services. Similarly, Althunibat et al. [19] examined the influence of PU and PEOU which are the main constructs in TAM. Their study stated that these two constructs can influence citizen's acceptance of m-Government services in Jordan.

In the context of other developing countries, Almuraqab and Jasimuddin [20] have identified ten factors that may influence end-user acceptance of m-Government services in UAE. These factors are social influence, PU, PEOU, awareness, facilitating conditions, perceived cost, perceived trust in government, perceived trust in technology, perceived risk and perceived compatibility. Alotaibi et al. [21] also examined some potential factors that may affect m-Government acceptance in Saudi Arabia. These factors include perceived trustworthiness, enjoyment, user experience, awareness and security. This study found that these factors except enjoyment may have significant effect on m-Government acceptance in Saudi context. Also, Babullah et al. [22] in their study adopted some factors from the UTAUT2 model along with other variables such as perceived risk and innovativeness. The findings stated that these factors can play some role in influencing the participants' behavioural intention to use m-Government in Saudi Arabia.

Based on the former literature revision, it can be argued that it is obvious that TAM is the most influential theory that clarifies user satisfaction and technology acceptance factors due to its predictive power [23, 24]. Paul and John [25] stated that TAM model must be combined with a wider set of variables which are related to both social and human factors to enhance its predictive power. In line with their suggestion, this study has proposed an extended conceptual framework which adopts the key factors of TAM and incorporates the key factors of TRUST model, Diffusion of innovation theory (DOI), service quality and user satisfaction. These factors were carefully chosen according to the previous literature that demonstrated the important role that these factors play in influencing the user's acceptance of mobile services.

3 Research Model and Hypotheses Development

There are five aspects to our model: first, TAM which has roots in direct and indirect prediction of user's satisfaction and his behavioral intention to use new technologies and information systems; second, DOI theory which seeks to explain the process through which innovations are disseminated in the society; Trust model which is essential to understand the degree of confidence that the services will be provided to the users according to their expectations; Service quality which seeks to explain the antecedents that affect user behavior and satisfaction; Finally, user satisfaction which may lead to a greater level of acceptance. These theories/models were presented as a suitable theoretical background to examine the key factors that may affect m-Government acceptance in Jordan.

This section presents our research model and hypotheses. Based on the objectives and the theoretical perspectives specified earlier and according to the related literature regarding m-Government acceptance key success factors, the main constructs of used variables were derived, and the theoretical model was established as shown in Figure 1. Seven hypotheses were proposed, one for each variable in the model. The independent variables are proposed to have direct and indirect relationships with the main dependent variable which is m-Government acceptance. The social factors are represented by citizens' trust in government and trust in mobile technology. Compatibility is the main element of the DOI. PEOU and PU are the main determinants in TAM. Finally, the last factor was the quality of service. It is important to mention that PEOU, PU, and quality of service are proposed to have direct relationships with the variable, citizen satisfaction, which in turn influences the dependent variable (m-Government acceptance).

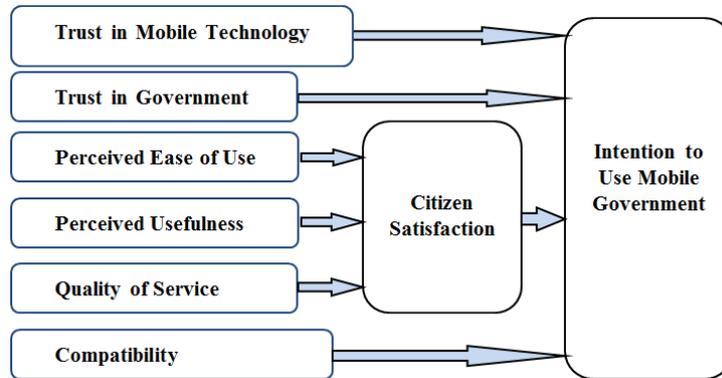


Fig. 1. The Proposed Research Model

3.1 Trust

Trust has received significant attention in recent research since it is crucial for the success of a broad range of public services including e and m-services that depend on behavioral responses from the public citizens. Warkentin et al. [26] defines trust as a willingness to believe that others will act in a predictable and consistent manner.

Trust is essential in building relationships and increasing the confidence. The negative consequences that can stem from the absence of trust in online services can obstruct the success of the service level of e & m-Government [27]. Lack of trust compromises the willingness of mobile users to perform their transactions and to exchange sensitive and personal information online [28]. Trust has different definitions emerged from many disciplines which have examined it. These definitions can be roughly divided in two major streams:

Trust in mobile technology: M-Government transactions involve people, government organizations, and the technologies applied by them through their interactions with each other [29]. These applied technologies rely on mobile devices and telecommunication networks which offer some features that are exclusive to mobile contexts such as mobility, ubiquity, and contextual offers [30]. M-Government trust is built when public citizens form more positive impressions of their online interactions with the government organizations regarding their concerns for security and privacy of their information, and when they agree to accept vulnerability in dealing with it [31]. Using Lee's [30] definition, this study defines trust in mobile technology in the context of m-Government as citizen's willingness to be vulnerable while interacting with the government through a mobile device given existing expectations regarding intentions and behavior of the other party. According to these arguments, the authors make the following hypothesis:

H1: *Higher levels of trust in mobile technology will positively affect the m-Government acceptance in Jordan.*

Trust in government: this research stream treats trust as an aspect of expectation regarding the behaviour of the government as an interaction partner [32]. Trust in

government has received much discussion in the political science literature since it is crucial to enhance the relationship between public citizens and their government. Trust plays a significant role in enabling public citizens to become willing to interact with m-Government services and have confidence that the government will make the right decisions regarding protecting and providing its services [33]. Trust in government can be affected by citizen's experience of using its public services. Therefore, the ability of the government to provide services that is tailored to the citizens' needs and the proper planning and performing of these services can ensure the success of m-Government services. Based on these arguments, the authors make the following hypothesis:

H2: *Higher levels of trust in government will positively affect the m-Government acceptance in Jordan.*

3.2 Technology acceptance model

TAM model was proposed by Davis [34] to determine the potential user's behavioral intention when using a new innovated technology. Some studies [35, 36] have stated that TAM is extensively used to measure the acceptance of new IT innovations. Also, Mather et al. [37] in their study did confirm that the main TAM constructs, PU and PEOU, were suitable to predict user satisfaction which leads to greater level of acceptance. TAM adapts Theory of Reasoned Action (TRA) to explain why users accept or discard new system or new technology [38]. According to TAM, the consumer's attitudes toward his intention to use the system are influenced by two perceptions, usefulness and ease of use [34]. This study examines the role of PU and PEOU in influencing the user's satisfaction and user's intention to accept m-Government services in Jordan.

Perceived Usefulness: can be defined as the degree to which citizens believes that the use of m-Government services can improve their job performance and enhance their life and make it stress-free [34]. Moreover, the related literature has stated that PU has an important influence on the acceptance of both e and m-Government services [18] [23]. In the context of Jordan, the authors in [19, 39] reported that a higher level of PU lead to higher levels of intention to use e-Government services in Jordan. This finding indicates that citizens will be satisfied when they receive more useful m-Government services, and as a result, they will be keen to accept m-Government. According to the above arguments, the authors make the following hypothesis:

H3: *Higher levels of PU will positively affect the citizen satisfaction.*

Perceived Ease of Use: is defined as "the degree to which a person believes that using a particular system would be free of effort" [34]. This construct has been used in prior mobile technology acceptance studies. Some scholars [19, 18] declared that end-users will be motivated to use a service if it is simple, practical, less hassle, easy to access and easy to use. Further recent studies [19, 23] have also stated that PEOU has a significant influence on user satisfaction and his acceptance of m-Government services. Based on these arguments, the authors make the following hypothesis:

H4: *Higher levels of PEOU will positively affect the citizen satisfaction.*

3.3 Diffusion of innovation theory (DOI)

Diffusion of Innovation theory [40] became one of the most popular models that can be used in a broad variety of disciplines (i.e. information systems) research to explain user acceptance of new ideas and new technologies. Rogers [40] defines an innovation as "an idea or object that is perceived to be new". Also, he defines diffusion as "the process by which an innovation is communicated through certain channels over time among the members of a social society". According to DOI, the individual's decision to accept the innovated technology is affected by its following attributes: relative advantage, compatibility, complexity, trialability and observability [41]. After a literature review, the authors in [42] stated that relative advantage, complexity and compatibility were found to be the most relevant constructs to acceptance and adoption research. However, Moore and Benbasat [43] revealed that there is a conceptual overlapping between relative advantage and complexity with TAM's PU and PEOU, respectively. Therefore, this study excluded these two innovation attributes from the proposed research model and presented compatibility as an important key factor affecting the acceptance of m-Government in Jordan. Compatibility is defined as "the degree to which an innovation is seen to be compatible and consistent with existing values, beliefs, past experiences and needs of the potential users" [44]. Thus, the following hypothesis is tested:

H5: *Higher levels of compatibility will positively affect the m-Government acceptance in Jordan*

3.4 Quality of service

In the context of online services, quality of Service and its influence on user's satisfaction has received considerable academic attention in the past few years [45]. Every service must fulfill a list of requirements in order to improve its quality. In fact, some unclear and contradictory objectives may be introduced when we face various users' needs and requirements to fulfill simultaneously along with having those requirements unclear, incompatible or inaccurate. The authors in [46] defined the quality of service as a measure of the difference of service performance between the customers' expectations and the delivered service. Based on the literature [47, 48], the selected measures of service quality elements that have been used in this study are: awareness, accessibility, availability, reliability, accuracy, responsiveness, courtesy and helpfulness. In the light of the above arguments, the authors make the following hypothesis:

H6: *Higher levels of quality of service will positively affect the citizen satisfaction*

3.5 Citizen satisfaction

User satisfaction can be viewed as the core of successful e-government adoption [49]. The success and survival in online environment of electronic and mobile services depends directly on user satisfaction and indirectly on the quality of delivered service [50]. Also, Udo et al. [51] claimed that quality of service is a predecessor of

customer satisfaction. As mentioned earlier, Mather et al. [37] stated that the main TAM constructs, PU and PEOU, were suitable to predict user satisfaction which leads to greater level of acceptance. Also, Westbrook [52] stated that customer satisfaction is a valid measure of subjective evaluation of any outcome or experience related to purchasing a product/service. However, Shankar et al. [53] claimed that customer satisfaction can be measured through transactional satisfaction and overall satisfaction. Transactional satisfaction can be derived from specific individual transactions and leads to overall satisfaction of the customer which can encourage service acceptance. Thus, the following hypothesis is tested:

H7: *Higher levels of citizen satisfaction will positively affect the m-Government acceptance in Jordan.*

4 Research Methodology

The research methodology explains a few aspects about the survey method, sampling technique, survey design, pilot study and data collection procedure. Also, in this section the authors discuss the details of sample profile.

4.1 Survey design and pilot study

A survey method was applied for this study which adapted a set of questionnaires raised by previous studies [47, 54-59]. The survey questions were considered and developed to be short and simple. Also, back translation technique [60] was used to translate the questionnaire into Arabic language since the participants are native Arabic speakers. The questionnaire was reviewed by two bilingual experts to guarantee successful translation. The survey items were rated using 5 point-Likert-scales ranging from strongly disagree to strongly agree.

A pilot study was conducted at some Jordanian government Universities. 35 faculty staff and students were asked to complete the questionnaire and to give written and verbal feedback. On the other hand, the researchers applied reliability tests for each construct to measure the goodness of measuring instrument and ensure more accuracy in the results. The instrument was finalized after making some minor changes based on the provided feedbacks. The questionnaire consisted of 9 sections. The first section was designed to obtain the demographic data whereas the following 8 sections were designed to obtain information about the factors used in the research model.

4.2 Data collection procedure

The research team personally distributed the questionnaires to the participants to be able to respond to any question immediately, introduce the research topic, reduce ambiguity and encourage the participants to give accurate and full answers while filling in the questionnaire [61]. The data collection for this study started in February 2018 in the city of Amman in Jordan. The data were collected randomly from 500 citizens who have used mobile government services. The survey response rate (85 per

cent) was high and acceptable since 425 questionnaires were returned. However, 45 incomplete questionnaires were excluded. Finally, 380 responses were accepted for final analysis. Therefore, the usable response rate was 76 per cent.

4.3 Sample profile

A purposive sampling was employed as sampling technique where a specific pre-defined group of participants that suit the purpose of the study is selected. Moreover, it was decided that the suitable randomly selected respondents must fit in the age groups, and preferably should be aware of mobile services. Sekaran [62] stated that purposive sampling is appropriate since it involves the choice of the ideal subjects who can provide the required information.

As shown in Table 1, the analysis results of the demographic data of the respondents are as follows: 66.3 per cent were males and 33.7 per cent were females. These results demonstrate the sufficiency of the variety of responses in generalizing research findings to both genders. Moreover, this study includes 5 age groups, ranging from under the age of 18 to the age of 65 years old. Table 1 shows that the age group of 18 – 34 years old represents the major ages of this study since the majority (68 percent) of the survey respondents were in this group. Also, more than half of the respondents (53.2 percent) had a bachelor's degree and above.

Table 1. Demographic Profile of Respondents – Age, Gender and Education level

Attribute	Demographic Distribution	
	Frequency	Percent (%)
<i>Gender</i>		
Male	252	66.3
Female	128	33.7
<i>Age</i>		
Under 18	6	1.7
18-24	152	40.0
25-34	107	28.0
35-49	95	25.0
50-65	20	5.3
<i>Education Level</i>		
Primary School	11	2.8
Secondary School	70	18.4
Diploma	97	25.6
Degree and Above	202	53.2

5 Data Analysis and Research Results

In this study, different data analysis techniques were applied. These techniques include descriptive, reliability, exploratory factor, correlation, and regression analysis. As recommended by [63], the measurement model was first examined for reliability and validity of the research constructs to test the goodness of the measurements, fol-

lowed by an analysis of the correlation and multiple linear regression for testing the research hypotheses in the research model. In this section, correlation analysis using Pearson correlation matrix was applied to test the direct relationship between the hypothesized variables and measure the strength of these relationships. On top of that, multiple regression analysis was performed in order to investigate the influences of independents variables (IVs) on the dependent variables (DVs).

5.1 Descriptive analysis

Descriptive statistics analysis is performed for all questionnaire items. The values of mean, standard deviation, and skewness and kurtosis were examined for testing the normality of data. Most of the respondents were satisfied with the items in this study since the results showed that the values of mean ranged from (3.5467) to (4.2133) on a five-point scale. Also, the standard deviations ranged from (.9035) to (.9879). The descriptive statistics which are shown in Table 2 indicate that the analysis results were acceptable. Moreover, the normality distribution ranged from -1 to +1 according to skewness and kurtosis assumptions which shows sufficient results [64].

Table 2. Descriptive analysis

Constructs	Items	Mean	Std. Deviation	Skewness	Kurtosis
Trust in Mobile Technology (TMT)	TMT 1	3.7913	0.908	-.743	.229
	TMT2	3.8795	.9590	-.767	.541
Trust in Government (TG)	TG1	3.8469	.9561	-.870	.756
	TG2	3.9231	.9553	-.597	.783
	TG3	3.9427	.9554	-.895	.786
Perceived ease of use (PEOU)	PEOU1	3.8428	.9551	-.775	.791
	PEOU2	4.0424	.9543	-.985	.764
	PEOU3	3.5467	.9474	-.074	.969
	PEOU4	4.1464	.9336	-.748	.488
	PEOU5	4.0264	.9336	-.754	.567
Perceived Usefulness (PU)	PU1	3.9272	.9314	-.435	.423
	PU2	4.1542	.9284	-.635	.734
	PU3	4.1953	.9122	-.465	.544
	PU4	4.0133	.9848	-.543	.529
Quality of service (QS)	QS1	4.1543	.9581	-.632	.759
	QS2	4.1936	.9847	-.453	.522
	QS3	4.2104	.9858	-.541	.579
	QS4	4.0232	.9879	-.653	.722
	QS5	4.0519	.9760	-.726	.659
	QS6	3.9472	.9394	-.485	.375
	QS7	4.1552	.9484	-.635	.759
	QS8	4.1953	.9821	-.455	.522
	QS9	4.2133	.9848	-.541	.579
	QS10	4.0243	.9849	-.653	.722

	QS11	4.0514	.9732	-.725	.659
	QS12	3.9463	.9845	-.486	.375
	QS13	4.1524	.9541	-.632	.759
	QS14	4.1923	.9542	-.466	.522
	QS15	4.2124	.9358	-.533	.579
	QS16	4.1912	.9447	-.444	.622
Compatibility (C)	C1	3.8187	.9035	-.135	.465
	C2	3.8042	.9207	-.146	.538
	C3	3.8164	.9785	-.626	.718
	C4	3.8288	.9670	-.782	.824
Customer Satisfaction (CS)	CS1	3.8238	.9373	-.763	.714
	CS2	3.8342	.9613	-.774	.630
	CS3	3.8263	.9432	-.785	.622
Behavioral Intention (BI)	BI1	3.8181	.9170	-.723	.713
	BI2	3.8032	.9200	-.734	.614
	BI3	3.8223	.9330	-.745	.735

5.2 Goodness of measurement: Reliability and validity

The reliability and the validity were tested to ensure the goodness of measurement. The reliability test in this study is assessed using Cronbach's alpha [65] which is considered the most popular method used for calculating internal consistency of all variables [66]. According to Hair et al. [63], the coefficient of reliability (Cronbach's Alpha) needs to be more than 0.7 to be acceptable. As shown in Table 3, the reliability test shows values above 0.70, ranging from 0.77 to 0.92, for all constructs. These results show well-structured model which have a good level of internal consistency and indicates satisfactory reliability for all variables.

Table 3. Results of Reliability analysis

Constructs	# Items	Cronbach's Alpha ($\alpha \geq 0.7$)
TMT	2	0.92
TG	3	0.89
PEOU	5	0.91
PU	4	0.88
QS	16	0.77
C	4	0.84
CS	3	0.87
BI	3	0.86

In order to establish construct validity test, convergent and discriminant validity tests were applied. Convergent validity was evaluated based on Confirmatory Factor Analysis by investigating the factor loadings that should be above the threshold of (0.7) as recommended by [67]. The results in Table 4 indicates that all items have loadings above 0.7 which indicate agreeable factors loading for all variables.

Table 4. Confirmatory Factor Analysis

TMT	TG	PEOU	PU	QS	C	CS	BI
.798	.865	.866	.856	.902	0.88	.903	0.83
.802	.871	.867	.842	.903	0.85	.898	0.81
	.863	.878	.858	.898	0.89	.896	0.82
		.884	.855	.896	0.83		
		.889		0.83			
				0.81			
				0.82			
				0.79			
				0.84			
				0.71			
				0.73			
				0.75			
				0.72			
				0.76			
				0.78			
				0.80			

Discriminant validity test was conducted to determine the degree of correlation between the various variables [68]. This test was conducted using the correlation matrix approach. The results in Table 5 showed that all the off-diagonal values for all variables are less than 0.85 as suggested by [69], thus indicating that discriminant and convergent validity of the measures are reasonable.

Table 5. Assessment of discriminant validity

Variables	TMT	TG	PEOU	PU	QS	C	CS	BI
TMT	1							
TG	0.582	1						
PEOU	0.472	0.493	1					
PU	0.563	0.454	0.559	1				
QS	0.534	0.424	0.458	0.466	1			
C	0.543	0.491	0.543	0.447	0.473	1		
CS	0.465	0.471	0.473	0.465	0.435	0.579	1	
BI (m-Gov Acceptance)	0.468	0.429	0.293	0.473	0.429	0.565	0.561	1

These results support the reliability and the validity of the variables, and show that the proposed measurement model exhibit a good fit with the obtained data. As a result, the proposed structural model is close enough to contribute to the citizens acceptance of m-Government services in Jordan.

5.3 Hypotheses testing: Correlation analysis

In this section, Pearson's correlation analysis was conducted to quantify the strength of linear relationship between every pair of variables in the hypotheses. The correlations between the independents variables (IVs) and the dependent variables (DVs) in the research model are shown in Table 6. The correlation analysis supports the seven hypotheses since the results demonstrated a significant positive relationship between the variables, thereby, confirming the hypothesis.

Table 6. Summary of correlation analysis results

Hypotheses	IV	DV	Results	Support or not
H1	TMT	BI	0.453	Support
H2	TG	BI	0.522	Support
H3	PEOU	CS	0.468	Support
H4	PU	CS	0.593	Support
H5	QS	CS	0.654	Support
H6	C	BI	0.659	Support
H7	CS	BI	0.711	Support

5.4 Hypotheses testing: Regression analysis

In this study, seven hypotheses were proposed to test the impacts of PEOU, PU and quality of service on the citizen's satisfaction that can together with trust in mobile technology, trust in government and compatibility affect the citizens' behavioral intention to use of m-Government services. Therefore, there are two DVs in this study. The proposed hypotheses were tested by multiple regression analysis. The summary of regression hypotheses test is presented in Table 7.

The first regression model was tested by multiple regression analysis between citizen satisfaction as a DV and PEOU, PU and quality of service. As shown in Table 7, the results show that citizen satisfaction was significantly impacted by perceived ease of use (H3, $\beta = 0.381$, $p < 0.001$), perceived usefulness (H4, $\beta = 0.373$, $p < 0.001$), and quality of service (H5, $\beta = 0.494$, $p < 0.001$). Furthermore, the value of R2 for the citizen satisfaction as a DV is 0.734; this means that perceived ease of use, perceived usefulness, and quality of service within the proposed model can explain 73.4% of the variance in the citizen satisfaction of m-Government services. Therefore, the first regression model supports the following hypotheses: H3, H4 and H5.

In the second regression model, the citizen's behavioral intention to use m-Government applications was significantly affected by four determinants including trust in mobile technology (H1, $\beta = 0.351$, $p < 0.001$), trust in government (H2, $\beta = 0.173$, $p < 0.01$), compatibility (H6, $\beta = 0.121$, $p < 0.05$) and citizen satisfaction (H7, $\beta = 0.517$, $p < 0.001$) as shown in Table 6. The value of R2 for the dependent variable behavioral intention to use is 0.875; this means that the trust in mobile technology, trust in government, compatibility and citizen satisfaction can explain 87.5% of the variance in the behavioral intention to use m-Government. Also, this value is consid-

ered high and indicates that the power of the regression model is very good. Thus, the second regression model supports the following hypotheses: H1, H2, H6 and H7.

Table 7. Summary of regression analysis results

Hypotheses	IV	DV	Beta (β)	Sig. ($\rho < 0.05$)	Support or not
H1	TMT	BI	0.351	0.001	Support
H2	TG	BI	0.173	0.01	Support
H3	PEOU	CS	0.381	0.001	Support
H4	PU	CS	0.373	0.001	Support
H5	QS	CS	0.494	0.001	Support
H6	C	BI	0.121	0.05	Support
H7	CS	BI	0.517	0.001	Support

6 Discussion and Implications

This section provides a discussion for the significant results of multiple regression analysis. This study has revealed several key findings. Firstly, trust in mobile technology and trust in government are very important elements which have been found to influence user acceptance of technology-enabled government services by many prior studies. Consequently, it is not surprising to find that, those two factors also affect the citizens acceptance of m-Government services.

The latest mobile technologies and mobile devices are exposed to various security threats such as cybercrime, malware and viruses which may cause people to be worried about the security and the privacy of their sensitive data and, as a result, hesitate before using mobile applications for transactions. The outcomes of this research are consistent with some previous studies [20, 70], these results specified that Jordanian citizens intention to use m-Government services increases if they have high level of positive trust towards Internet and the technologies used to access m-Government services. Therefore, the Jordanian government agencies should ensure that their mobile services are accessible by all users and should maintain the privacy and the security of the citizens' sensitive information while dealing with the government departments via smart phones using Internet.

Also, the findings confirmed that citizens' intention to use m-Government increases if the citizens have a high level of positive trust toward government. These findings are in line with some previous studies such as [20, 70]. Therefore, the government has the responsibility to put a strong government-wide integrity in place and should be capable to provide m-Government services according to the expectations of the citizens.

Secondly, the results of this study stated that when m-Government services are presented to be useful and easy to use, the Jordanian citizens will be more satisfied. However, these results agree with previous studies [71] and indicate the appropriateness of the fundamental elements of TAM, PEOU and PU, in the Jordanian m-Government context. Therefore, the Jordanian government should introduce its services in an easy, clear and understandable way via ensuring the simplicity of perform-

ing diverse transactions by having clear instructions to perform these transactions using a small number of clicks (i.e. passport renewal). On the other hand, the government should provide information and services in a manner that is useful for the people.

Thirdly, this study has responded to the findings of some research studies [51] which indicated that quality of service is also an antecedent of citizens' satisfaction. In this study, the quality of service has been considered in order to achieve citizens' satisfaction. The quality of service was found to have the strongest impact on citizens' satisfaction among all IVs. These outcomes are consistent with previous studies [71, 72]. Therefore, the Jordanian government should enhance the performance of the delivered services to meet the expectations of Jordanian citizens and increase their satisfaction.

Also, some prior studies found that compatibility is consistently significant in technology adoption [42]. The fourth finding of this study highlighted the significant impact of compatibility on citizens' intention to use m-Government services. These outcomes are consistent with some previous studies [70].

Finally, the emergence and the growth of new innovations in information technology highlighted the importance of satisfying the citizens. This research contributes more knowledge to the acceptance of m-Government services by investigating citizens' satisfaction with the new installed mobile-government systems. This empirical study shows that citizens' satisfaction is one of the most influential factors in its success and acceptance. However, the results indicated that higher levels of acceptance of m-Government services by citizens in Jordan are associated with increased satisfaction with these services. These outcomes are in line with previous studies [73, 74].

7 Conclusion

However, since m-Government services in Jordan are facing some important challenges such as remaining unknown to and underutilized by the public citizens, one of the most important contributions of this study is to detect and understand the main factors that can promote and inhibit the acceptance and the diffusion of m-Government services as perceived by Jordanian citizens.

This study explored the architecture of the conceptual model that has been proposed and introduced many variables that commonly play important role in heavily influencing the individual's behavior of accepting new technologies. These variables have a large share among technology acceptance studies. Overall, citizen satisfaction, compatibility and other user requirements such as trust in mobile technology, trust in government are considered the gateway to accept m-Government services and increase the behavioral intention to use it. Moreover, in order to increase the citizen satisfaction, the government should demonstrate the benefits of the m-Government services, maintain the easiness in accessing and using these services and enhance its quality.

The consideration of the factors identified in this study can significantly enhance the understanding of technology acceptance of m-Government services in Jordan, and as a result, it should lead to more successful acceptance of these services.

8 Limitations and Future Work

This study demonstrates strong evidence concerning some important factors that affect the Jordanian citizens' acceptance of m-Government services. One of the main limitations of this study was that this research did not cover all the factors that may influence the citizens' acceptance of m-Government services in Jordan. However, in future studies, the authors may conduct further studies to explore more useful dimensions based on the research goals. Also, this study has only focused on the issues related to citizen acceptance in the domain of Government-to-Citizen. Therefore, similar research efforts can be applied to the domain of Government-to-Business in developing countries. Finally, the door is open for future research to perform further assessment and analysis of the acceptance of m-Government services from a larger perspective based on the classification of m-Government products and services into different categories.

9 References

- [1] P. Germanakos, G. Samaras and E. Christodoulou, "Multi-channel Delivery of Services—the Road from eGovernment to mGovernment: Further Technological Challenges and Implications," in Proceedings of the First European Conference on Mobile Government, EURO mGOV, 2005.
- [2] M. Kalogiannakis and S. Papadakis, "Evaluating pre-service kindergarten teachers' intention to adopt and use tablets into teaching practice for natural sciences," *International Journal of Mobile Learning and Organization*, 13(1), pp. 113-127, 2019. <https://doi.org/10.1504/ijmlo.2019.10016617>
- [3] S. Papadakis, "Evaluating pre-service teachers' acceptance of mobile devices with regards to their age and gender: a case study in Greece," *International Journal of Mobile Learning and Organisation*, 12(4), pp. 336-352, 2018. <https://doi.org/10.1504/ijmlo.2018.095130>
- [4] S. Papadakis and M. Kalogiannakis, "Mobile educational applications for children. What educators and parents need to know," *International Journal of Mobile Learning and Organisation (Special Issue on Mobile Learning Applications and Strategies)*, 11(3), pp. 256-277, 2017. <https://doi.org/10.1504/ijmlo.2017.085338>
- [5] S. Papadakis, M. Kalogiannakis, E. Sifaki and N. Vidakis, "Evaluating Moodle use via Smart Mobile Phones. A case study in a Greek University," *EAI (European Alliance for Innovation) Endorsed Transactions on Creative Technologies*, 5(16), e1, 1-12, pp. 1 - 12, 2018. <https://doi.org/10.4108/eai.10-4-2018.156382>
- [6] O. Östberg, "A Swedish View on Mobile Government," in Paper presented at the International Symposium on E & M-Government, Seoul, Korea, 2003.
- [7] E. Kaasinen, " User acceptance of mobile services—Value, Ease of use, Trust and Ease of Adoption," VTT-Publications 566, Espoo, Finland, 2005.

- [8] M. Hamner and F. Al-Qahtani, "Enhancing the case for Electronic Government in developing nations: A people-centric study focused in Saudi Arabia," *Government Information Quarterly*, 26, no. 137–143, 2009. <https://doi.org/10.1016/j.giq.2007.08.008>
- [9] F. F. S. Lin and D. Liang, "Assessing citizen adoption of e-Government initiatives in Gambia: A validation of the technology acceptance model in information systems success," *Government Information Quarterly*, 28(2), pp. 271-279, 2011. <https://doi.org/10.1016/j.giq.2010.09.004>
- [10] M. Gharaibeh and M. Arshad, "Current Status of Mobile Banking Services in Jordan," *World Applied Sciences Journal*, 34(7), pp. 931-935, 2016.
- [11] J. Schlaeger, "The role of m-government in Western China development," in *Mobile Information Communication Technologies Adoption in Developing Countries: Effects and Implications*, 2012, pp. 364-381. <https://doi.org/10.4018/978-1-61692-818-6.ch009>
- [12] A. Bassara, M. Wisniewski and P. Zebrowski, "USE-ME.GOV- Usabilitydriven open platform for mobile government," in *In Proc. Business Information Systems (BIS)*, Poznan, Poland, 2005.
- [13] M. Deep and G. Sahoo, "M-governance for better G2C service," *Journal of Internet Banking and Commerce*, 16(1), p. 1–5, 2011.
- [14] G. N. L. Stowers, "The State of Federal Websites: The Pursuit of Excellence," in *E-Government, USA*, Rowman & Littlefield Publishers Inc., 2003.
- [15] O. Al Hujran, A. Aloudat and I. Altarawneh, " Factors Influencing Citizen Adoption of E-Government in Developing Countries: The Case of Jordan," *International Journal of Technology and Human Interaction*, 9, pp. 1-19, 2013. <https://doi.org/10.4018/jthi.2013040101>
- [16] ITU, "Key Global Telecom Indicators for the World Telecommunication Service Sector," 2011. [Online]. [Accessed 12 Oct 2011].
- [17] G. Colclough, "The user challenge benchmarking the supply of online public services-7th measurement," Capgemini, European Commission Directorate General for Information Society and Media, Bruxelles, 2007.
- [18] E. Abu-Shanab, "Major factors influencing the adoption of m-government in Jordan.," *Electronic Government An International Journal*, 11(4), pp. 223-240, 2015. <https://doi.org/10.1504/eg.2015.071394>
- [19] A. Althunibat, T. Alrawashdeh and M. Muhairat, "The acceptance of using m-government services in Jordan," *Journal of Theoretical and Applied Information Technology*, 63(3), pp. 733-740, 2014. <https://doi.org/10.1109/itng.2014.65>
- [20] N. Almuraqab and S. Jasimuddin, "Factors that Influence End-Users' Adoption of Smart Government Services in the UAE: A Conceptual Framework," *The Electronic Journal Information Systems Evaluation*, 20(1), pp. 11-23, 2017.
- [21] R. Alotaibi, L. Houghton and K. Sandhu, "Exploring the Potential Factors Influencing the Adoption of M-Government Services in Saudi Arabia: A Qualitative Analysis," *International Journal of Business and Management*, 11(8), 2016. <https://doi.org/10.5539/ijbm.v11n8p56>
- [22] A. Babullah, Y. Dwivedi and M. Williams, "Saudi Citizens' Perceptions on Mobile Government (mGov) Adoption Factors," in *Proceedings of UK Academy for information systems conference* , 2015.
- [23] M. Dahi and Z. Ezziane, "Measuring e-government adoption in Abu Dhabi with technology acceptance model (TAM)," *International Journal of Electronic Governance*, 7(3), pp. 206-231, 2015. <https://doi.org/10.1504/ijeg.2015.071564>
- [24] P. Luarn and H. H. Lin, "Toward an understanding of the behavioral intention to use mobile banking," *Computers in Human Behavior* 21(6), pp. 873-891, 2005. <https://doi.org/10.1016/j.chb.2004.03.003>

- [25] L. Paul and I. John, "Why do people use information technology? A critical review of the technology acceptance model," *Information and Management*, 40, p. 191–204, 2003. [https://doi.org/10.1016/s0378-7206\(01\)00143-4](https://doi.org/10.1016/s0378-7206(01)00143-4)
- [26] M. Warkentin, D. Gefen, P. A. Pavlou and G. M. Rose, "Encouraging Citizen Adoption of e-Government by Building Trust," *Electronic Markets*, 12(3), p. 157 – 162, 2002. <https://doi.org/10.1080/101967802320245929>
- [27] L. Carter and F. Bélanger, "The utilization of e-government services: citizen trust, innovation and acceptance factors," *Information Systems Journal*, 15, pp. 5-25, 2005. <https://doi.org/10.1111/j.1365-2575.2005.00183.x>
- [28] A. Beldad, M. Jong and M. Steehouder, "How shall I trust the faceless and the intangible? A literature review on the antecedents of online trust," *Computers in Human Behavior*, 26, p. 857–869, 2010. <https://doi.org/10.1016/j.chb.2010.03.013>
- [29] J. Boyd, "The rhetorical construction of trust online," *Communication Theory*, 13(4), pp. 392-410, 2003.
- [30] T. Lee, "The impact of perceptions of interactivity on customer trust and transaction intentions in mobile commerce," *Journal of Electronic Commerce Research*, 6(3), pp. 165-181, 2005. <https://doi.org/10.5465/amr.1995.9508080335>
- [31] R. C. Mayer, J. H. Davis and F. D. Schoorman, "An Integration Model of Organizational Trust," *Academy of Management Review*, 20(3), pp. 709-734, 1995.
- [32] E. Garbarino and M. S. Johnson, "The different roles of satisfaction, trust, and commitment in customer relationships," *Journal of Marketing*, 63(2), pp. 70-87, 1999. <https://doi.org/10.1177/002224299906300205>
- [33] J. K. Lee, S. Braynov and R. Rao, "Effects of public emergency on citizens' usage intention toward e-Government: a study in the context of war in Iraq," in in proceedings of ICIS 2003 , 2003.
- [34] F. D. Davis, " Perceived Usefulness, Perceived Ease of Use, and user Acceptance of Information Technology," *MIS Quarterly*, 13, pp. 319-340, 1989. <https://doi.org/10.2307/249008>
- [35] S. Alharbi and S. Drew, "Using the technology acceptance model in understanding academics' behavioural intention to use learning management systems," *International Journal of Advanced Computer Science and Applications (IJACSA)*, 5(1), pp. 143-155, 2014. <https://doi.org/10.14569/ijacsa.2014.050120>
- [36] J. Moon and Y. Kim, "Extending the TAM for a World-Wide-Web context," *Information & Management*, 38(4), pp. 217-230, 2001. [https://doi.org/10.1016/s0378-7206\(00\)00061-6](https://doi.org/10.1016/s0378-7206(00)00061-6)
- [37] D. Mather, P. Caputi and R. Jayasuriya, "Is the technology acceptance model a valid model of user satisfaction of information technology in environments where usage is mandatory?," in *Enabling organisation*, Victoria University, australia, ACIS 2002 School of Information Systems., 2002, pp. 1241-1250.
- [38] F. D. Davis, R. P. Bagozzi and P. R. Warshaw, "User acceptance of computer technology: a comparison of two theoretical models," *Management science*, 35(8), pp. 982-1003, 1989. <https://doi.org/10.1287/mnsc.35.8.982>
- [39] M. Alomari, P. Woods and K. Sandhu, "Predictors for e-government adoption in Jordan," *Information Technology & People*, 25(2), p. 207 – 234, 2012. <https://doi.org/10.1108/09593841211232712>
- [40] E. M. Rogers, *Diffusion of Innovations* (4th ed.), New York, USA: The Free Press, 1995.
- [41] D. Gilbert, P. Balestrini and D. Littleboy, " Barriers and Benefits in the Adoption of e-Government," *The International Journal of Public Sector Management*, 17, pp. 286-301, 2004. <https://doi.org/10.1108/09513550410539794>

- [42] L. Tornatzky and K. Klein, " Innovation characteristics and innovation adoption implementation: a metaanalysis of findings," IEEE Transactions on Engineering Management, 29, p. 28–45, 1982. <https://doi.org/10.1109/tem.1982.6447463>
- [43] G. Moore and I. Benbasat, "Development of an instrument to measure the perceptions of adopting an information technology innovation," Information Systems Research, 2, p. 173–191, 1991. <https://doi.org/10.1287/isre.2.3.192>
- [44] E. M. Rogers, Diffusion of innovations (3rd ed.), New York: Free Press of Glencoe, 1983.
- [45] M. J. Alsamydai, R. O. Yousif and M. H. AlKhasawneh, "The Factors Influencing Consumers' Satisfaction and Continuity to Deal with E-Banking Services in Jordan," Global Journal of Management And Business Research, 12(14), 2012.
- [46] M. Wisniewski and M. Donnelly, "Measuring service quality in the public sector: The potential for SERVQUAL," Total Quality management, 7, pp. 357-364, 1996. <https://doi.org/10.1080/09544129650034710>
- [47] T. El-Kiki and E. Lawrence, "Mobile user satisfaction and usage analysis model of m-government services," in Proceedings of the Second European Conference on Mobile Government, EURO mGOV, United Kingdom, 2007.
- [48] Z. Yang and X. Fang, "Online service quality dimensions and their relationships with satisfaction: A content analysis of customer reviews of securities brokerage services," International Journal of Service Industry Management, 15(3), pp. 302-326, 2004. <https://doi.org/10.1108/09564230410540953>
- [49] A. Jamal and K. Naser, "Customer Satisfaction and Retail Banking: An Assessment of Some of the Key Antecedents of Customer Satisfaction in Retail Banking," International Journal of Bank Marketing, 20, pp. 146-160, 2002. <https://doi.org/10.1108/02652320210432936>
- [50] V. Zeithaml, " Service excellence in electronic channels," Managing Service Quality, 12, pp. 135-138, 2002. <https://doi.org/10.1108/09604520210429187>
- [51] G. Udo, K. Bagchi and P. Kirs, "An Assesment of Customers' E-service Quality Perception, Satisfaction and Intention," International Journal of Information Management. 30, p. 481 – 492, 2010. <https://doi.org/10.1016/j.ijinfomgt.2010.03.005>
- [52] R. A. Westbrook, "Intrapersonal Affective Influences on Consumer Satisfaction with Products," Journal of Consumer Research.7, pp. 49-54, 1980. <https://doi.org/10.1086/208792>
- [53] V. Shankar, K. S. Amy and R. Arvind, "Customer Satisfaction and Loyalty in Online and Offline Environment," International Journal of Research in Marketing 20(2), pp. 153-175, 2003. [https://doi.org/10.1016/s0167-8116\(03\)00016-8](https://doi.org/10.1016/s0167-8116(03)00016-8)
- [54] K. P. Gupta and P. Bhaskar, "Citizen adoption of e-government: A literature review and conceptual framework," Electronic Government, An International Journal, 12(2), January 2016. <https://doi.org/10.1504/eg.2016.076134>
- [55] A. Rokhman, "E-government adoption in developing countries: The case of Indonesia," Journal of Emerging Trends in Computing and Information sciences 2 (5), pp. 228-326, 2011.
- [56] A. Chatfield and J. Alanazi, "Service quality, citizen satisfaction, and loyalty with self-service delivery options to transforming e-government services," in in Proceedings of the 24th Australasian Conference on Information Systems (ACIS), 2013.
- [57] V. Venkatesh and F. D. Davis, "A theoretical extension of the technology acceptance model: Four longitudinal field studies," Management Science, 46 (2), p. 186–204, 2000. <https://doi.org/10.1287/mnsc.46.2.186.11926>

- [58] A. Althunibat, M. Azan and N. Sahari, "Modeling the factors that influence mobile government services acceptance," *African Journal of Business Management*, 5(34), pp. 13030-13043, 2011.
- [59] O. Al-Hujran, A. Aloudat and I. Altarawneh, "Factors influencing citizen adoption of e-government in developing countries: The case of Jordan," *International Journal of Technology and Human Interaction (IJTHI)*, 9(2), pp. 1-19, 2013. <https://doi.org/10.4018/jthi.2013040101>
- [60] R. W. Brislin, "Back-translation for cross-cultural research," *Journal of cross-cultural psychology*, 1(3), pp. 185-216, 1970. <https://doi.org/10.1177/135910457000100301>
- [61] R. Y. Cavana, B. L. Delahaye and U. Sekaran, *Applied business research: Qualitative and quantitative methods*, Australia: John Wiley & Sons, 2001.
- [62] U. Sekaran, *Research methods for managers: a skill-building approach*, Wiley, 1984.
- [63] J. F. Hair, W. C. Black, B. J. Babin, R. E. Anderson and R. L. Tatham, in *Multivariate data analysis*, 6, Upper Saddle River, NJ: Pearson Prentice Hall., 2006.
- [64] R. A. Groeneveld and G. Meeden, "Measuring skewness and kurtosis," *The Statistician*, vol. 1, no. 4, pp. 391-399, 1984. <https://doi.org/10.2307/2987742>
- [65] L. J. Cronbach, *Essentials of Psychological Testing (3rd Ed.)*, New York: Harper and Row, 1970.
- [66] T. P. Hogan, A. Benjamin and K. L. Brezinski, "Reliability methods," *Educational and Psychological Measurement*, 60, p. 523–531, 2000. <https://doi.org/10.1177/00131640021970691>
- [67] D. Campbell and D. Fiske, "Convergent and discriminant validation by the multitrait-multimethods matrix," *Personality*, 56, p. 162, 1998.
- [68] R. P. Bagozzi, Y. Yi and L. W. Phillips, "Assessing construct validity in organizational research," *Administration Science Quarterly - Sage Journals*, 36, pp. 421-458, 1991. <https://doi.org/10.2307/2393203>
- [69] N. Bontis, "Intellectual capital: an exploratory study that develops measures and models," *Management decision*, 36(2), pp. 63-76, 1998. <https://doi.org/10.1108/00251749810204142>
- [70] M. Alomari, P. Woods and K. Sandhu, "The Deployment of E-Government in the Hashemite Kingdom of Jordan: factors in E-Government adoption," in *Proceedings of the IADIS International Conference WWW/Internet, Rome, Italy, 2009*. <https://doi.org/10.1109/icitst.2009.5402528>
- [71] T. Ahmed, N. Alhadi and M. E. Seliaman, "Acceptance of e-Government Services in Sudan: an Empirical Investigation," in *Proceedings of 2015 International Conference on Cloud Computing (ICCC)*, Riyadh, 2015. <https://doi.org/10.1109/cloudcomp.2015.7149625>
- [72] A. Moradi Abadi, A. Moradi Abadi and A. Jafari, "Innovation acceptance and customer satisfaction. A survey on tax information systems," *AD-minister*, [S.l.], n. 30, pp. 149-171, February 2017. <https://doi.org/10.17230/ad-minister.30.8>
- [73] L. Lee, H. Kim and M. Ahn, "The willingness of e-government service adoption by business users: The role of offline service quality and trust in technology," *Government Information Quarterly*, 28(2), pp. 222-230, April 2011. <https://doi.org/10.1016/j.giq.2010.07.007>
- [74] C. Lai and G. Pires, "Testing of a model evaluating e-government portal acceptance and satisfaction," *Electron. J. Inform. Syst. Evaluat.*, 13, pp. 35-46, 2010.

10 Authors

Dr. Bassam A. Y. Alqaralleh is an associate professor in the Department of Computer Science / Faculty of IT at Al-Hussein Bin Talal University (AHU), Ma'an, Jordan.

Dr. Ahmad H. Al-Omari is an associate professor of network security in the Department of Computer Science at Northern Border University, KSA.

Dr. Malek Z. Alksasbeh is an Associate Professor in the Department of Computer Information Systems / Faculty of IT at Al-Hussein Bin Talal University (AHU), Ma'an, Jordan.

Article submitted 2019-08-05. Resubmitted 2019-12-24. Final acceptance 2019-12-24. Final version published as submitted by the authors.