Alshammari, Thamer

Article

Factors affecting continuance intention of M-government : an empirical study

International journal of e-business research

Reference: Alshammari, Thamer (2023). Factors affecting continuance intention of M-government : an empirical study. In: International journal of e-business research 19 (1), S. 1 - 23. https://www.igi-global.com/viewtitle.aspx?TitleId=326550. doi:10.4018/IJEBR.326550.

International Journal of E-Business Research
Volume 19 • Issue 1

Factors Affecting Continuance Intention of M-Government:
An Empirical Study

Thamer Alshammari, Saudi Electronic University, Saudi Arabia*
https://orcid.org/0000-0002-8129-9854

ABSTRACT

Mobile government (m-government) can potentially provide substantial benefits. Nonetheless, the low level of use has prevented realizing the potential benefits of m-government. As a result, researchers have studied the factors affecting the acceptance of m-government. However, to date, no study has empirically investigated the factors affecting the continuance intention of using m-government. This article argues that investigating these factors will provide a greater insight into why the potential benefits have not been realized. The theoretical foundation of the proposed model builds on the expectation-confirmation model, information system success model, and the external factor trust. This study has adopted a quantitative methodology and conducted an online questionnaire. The data were collected from 553 m-government users in Saudi Arabia, who have used multiple m-government services. The results show that the proposed model has the capability to identify the factors affecting the continuance intention in m-government context.

KEYWORDS

Continuance Intention, Expectation-Confirmation Model, M-Government, Satisfaction, Trust

INTRODUCTION

Over the past few years, governments worldwide have launched and implemented mobile government (m-government) services. These initiatives aim to provide both public information and services to citizens, the public, and private sectors. M-government can be used in different areas; for example, in healthcare, mobile applications can be used to notify parents of their children's vaccinations (Qabajeh et al., 2021). M-government can also benefit the transportation sector by allowing citizens to purchase tickets via mobile devices (Nuryasman & Warningsih, 2022). Moreover, m-government provides personalized services and real-time access to information (Alkhwaldi & Al-Ajaleen, 2022). Aside from improving citizens' livelihoods, m-government can increase governments' effectiveness, efficiency, and citizen participation, as well as reduce spending (Wirtz et al., 2021). However, the adoption level of m-government services by citizens in many countries, such as Saudi Arabia (Bamufleh et al., 2021), Tanzania (Ishengoma, 2022), India (Hebbar & Kiran, 2022), and Spain (Liébana-Cabanillas

DOI: 10.4018/IJEBR.326550 *Corresponding Author

et al., 2021), is unsatisfactory. Thus, m-government's benefits and possible downstream sustainable social developments have not been fully realized.

Researchers have explored the factors preventing the adoption of m-government (Goyayi & Subramanium, 2021). The majority of researchers have concentrated on investigating the factors that influence users' initial rejection or adoption decisions; they assumed that users' initial adoption automatically results in usage continuance intention. To address this fallacy, this paper argues that the factors influencing continuance intention are different from those influencing initial adoption. Hence, identifying the factors related to continuance intention will offer a deeper understanding of why the benefits of m-government have not been achieved. Thus, this paper attempts to bridge this gap by examining the factors affecting m-government continuance intention.

To answer the following research question, the article employed the expectation-confirmation model (ECM), which has yet to be tested in the m-government context, and some aspects of the information system (IS) success model:

What are the factors influencing m-government continuance intention?

This study adopted a quantitative methodology and carried out an online questionnaire. The data were collected from 553 m-government users in Saudi Arabia. Because the aim of this study was to identify the factors affecting m-government continuance intention, only those who had used m-government were included in this research.

This paper first reviews the literature and then discusses the proposed model's theoretical background and the hypotheses. Then, it outlines the research methodology. Following that, the data are analyzed. Finally, a discussion of the research implications, limitations, and future work is presented.

LITERATURE REVIEW

M-Government Services

Governments aim to serve their citizens through the provision of information and public services (Abu-Shanab, 2021). Many governments have adopted mobile technologies as forms of communication and service delivery to enhance the quality of the services they provide and to reach a larger population (Almuraqab, 2020).

M-government can offer many benefits to different sectors, including health, education, security, and transportation. A good example that may enhance security is Kamnapp, which is an application that enables mobile users in the Kingdom of Saudi Arabia to notify responsible authorities of incidents, such as traffic accidents and crime (Omaier et al., 2019). Another good example is a mobile application that allows students' parents and teachers to communicate, thus enhancing education (Alkhalifah et al., 2020). This application is useful for parents who do not have sufficient free time to visit their children's schools. Furthermore, certain duties performed by public sector employees who work in the field, such as law enforcement officers and home healthcare professionals, are best handled using mobile devices (Adly, 2020). For instance, parking inspectors in Austria carry mobile devices that give them immediate access to the central parking database so that they can monitor the status of each vehicle (Fowdur & Luckhun, 2022). Furthermore, m-government enables the accomplishment of tasks that would have otherwise been completed in the old-fashioned way (face-to-face) because it provides instant real-time information that serves people on the move.

Current State of M-Government

The number of countries adopting and implementing m-government has increased in recent years (Alshammari et al., 2022). Most governments have considered utilizing mobile devices, given

their importance (Glood et al., 2016). However, in several nations, citizens' current utilization of m-government services is lower than expected (Sultana et al., 2016). For instance, approximately 50% of people in the world access the internet frequently, but few utilize the benefits of m-government initiatives (Alssbaiheen & Love, 2015; World Bank, 2012). Furthermore, some scholars have reported that despite developments in mobile technology infrastructure, only a small percentage of people have used m-government applications (Al-Hujran et al., 2015). Al-Hujran et al. (2015) suggested conducting not only a theoretical study but also an empirical study to understand the determinants of the adoption of m-government.

In recent decades, several models and theories on the adoption of new innovative technologies have been developed; some of these models have been applied in studies that assessed users' acceptance of m-government. In this context, the most frequently employed models include the unified theory of acceptance and use of technology (UTAUT) (Venkatesh et al., 2003), the technology acceptance model (TAM) (Davis, 1989), and the diffusion of innovation (DOI) theory (Rogers, 1995). These models are usually referred to as the traditional models (Mamonov & Benbunan-Fich, 2021), and they focus on various aspects, such as ease of use, usefulness, and social influence.

Other models, including the ECM and expectation confirmation theory (ECT), which are known as post-adoption models, focus on factors affecting continuance intentions rather than adoption intentions. The author reviewed studies on m-government to identify which models needed further examination.

According to Alshammari et al. (2018), most researchers have applied the traditional models (e.g., TAM and DOI) to explain citizens' acceptance or rejection of m-government. However, as the red arrows in Figure 1 indicate, the link between acceptance and continuance (or discontinuance) has not been investigated. Therefore, it is not clear how citizens' use of m-government after acceptance can lead to continuance or discontinuance intentions. As Bärsch et al. (2020) noted, traditional models are unable to explain why certain end users discontinue IS use following their initial acceptance. Moreover, aspects related to continuance intention are different from those related to initial acceptance.

Some researchers have claimed that initial IS adoption is a crucial indicator of its success, but others have argued that without adopters progressing beyond first use and becoming continuous users, initial adoption does not always result in expected outcomes (Tsui, 2019). Bärsch et al. (2020) also stated that the long-term success of any system is attributed to continued use, not initial use. Moreover, as described in relation to the business realm (Leschik et al., 2022), the volume of new customers (first adopters) and the volume of current customers (continuous users) combined determine the success of any business. The significance of studying the factors that affect continued use over initial adoption is stated in a common rule of business: Keeping a client is five times cheaper than finding a new client (Liu et al., 2023).

Moreover, it was found that recent studies have focused on the adoption of m-government (Fu et al., 2022; Mensah et al., 2023; Mensah & Mwakapesa, 2022). One study has focused on continuance intention; however, this study has not provided statistical analysis, as the aim was to validate research items and the number participants did not exceed ninety (Alshammari et al., 2022).

Figure 1. M-government adoption stages

THEORETICAL MODEL AND HYPOTHESES

Theoretical Background

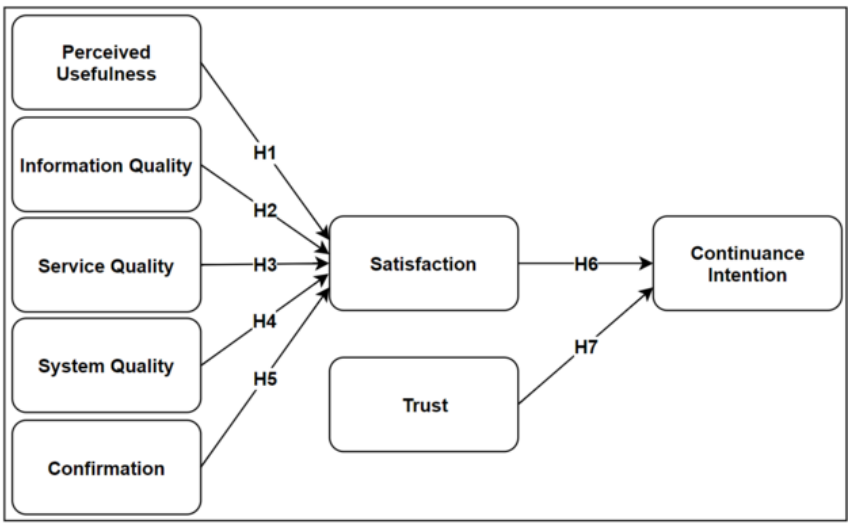
The ECM has been validated in many electronic service contexts and has successfully predicted continuance intention. Therefore, the ECM was employed in this research to investigate citizens' intentions to continue using m-government. Although the ECM is widely used in IS field, to date, no study has empirically tested the ECM in the m-government context. This paper modified the ECM to improve its explanatory power by including the IS success model and trust as external factors. This modification was made in response to Hsu et al.'s (2015) request to extend the ECM. For example, some studies have extended the ECM by incorporating perceived enjoyment (Jangir et al., 2022), trust (Prakash et al., 2021), and quality dimensions (Rahimullah et al., 2022).

The IS success model is considered a success measurement framework that is commonly used to assess the success of an IS (Delone & McLean, 2004). The model has been regarded by some researchers as a breakthrough (Alghamdi & Basahel, 2021). The ECM and IS success models share two characteristics. First, rather than just examining initial acceptance, they provide greater insight into system sustainability and success. Second, they highlighted the importance of user satisfaction in influencing user behavior. The proposed research model integrates three factors from the IS success model (service, system, and information quality). Other factors of the IS success model are outside the scope of this paper. The incorporated factors were examined in many IS studies and were found to have a positive relationship with satisfaction (Budiardjo et al., 2017; Yang et al., 2017).

Proposed Research Model

The ECM forms the basis of the research model. This model also combined three factors from the IS success model: service, system, and information qualities. These can be used with perceived usefulness as determinants of satisfaction, which in turn leads to continuance intention. Moreover, trust was integrated into the proposed model because it has been shown to be an influential factor in the usage continuance intention toward an IS (Zhang et al., 2018). Therefore, trust beside satisfaction will provide a better understanding of continuance intention. Figure 2 shows the proposed research model.

Figure 2. The research model explaining m-government post-adoption



The following subsections discuss the hypotheses. Since the relationships of the model's aspects have not been tested in the context of m-government, the results of studies in other contexts have been reviewed.

Perceived Usefulness

Perceived usefulness (PU) is the extent to which system users believe that by using the system, their performance is improved (Davis, 1989). Researchers have empirically proven that PU influences not only IS adoption but also IS continuance intention (Bhattacherjee, 2001; Davis et al., 1989; Karahanna et al., 1999). PU has the strongest effect on user satisfaction (Bhattacherjee, 2001). Recent studies on social networking sites (Ruangkanjanases et al., 2020) and online payment (Sarassina, 2022) have empirically proven that PU has a positive impact on satisfaction. Accordingly, this research formulated the following hypothesis:

H1: Perceived usefulness positively affects satisfaction.

Information Quality

Information quality (IQ) is the extent to which a system's information satisfies users' needs (Yao & Xu, 2022). Key IQ aspects are information completeness, accuracy, and timeliness (Desmal et al., 2022). The IQ factor is part of the IS success model (DeLone & McLean, 2003). Over the years, researchers have tested the relationship between IQ and satisfaction in contexts such as social networking sites (Chow & Shi, 2015), electronic learning (Dangaiso et al., 2022), and mobile banking (Geebren et al., 2021). All of these studies found that IQ had a significant positive effect on satisfaction. Therefore, the following hypothesis was formulated:

H2: Information quality positively affects satisfaction.

Service Quality

Service quality (SeQ) is the extent to which a system delivers its services in a superior and excellent way (Parasuraman et al., 1985). SeQ is determined by responsiveness, reliability, empathy, and assurance (Bolton & Drew, 1991). Studies conducted in different contexts have shown that SeQ has a positive impact on satisfaction. For example, Dangaiso et al. (2022) examined how SeQ affects students' satisfaction with electronic learning. He concluded that SeQ has a positive relationship with user satisfaction. Another study conducted by Geebren et al. (2021) concluded that SeQ is positively related to user satisfaction with mobile banking. Based on the above studies and others, such as those by Sensuse et al. (2017) and Michel and Cocula (2017), the following hypothesis was formulated:

H3: Service quality positively affects satisfaction.

System Quality

System quality (SyQ) is the degree to which users can learn how to use a system with as few errors as possible (Chen et al., 2015). SyQ is determined by performance, usability, availability, functionality, and dependability (Sarrab et al., 2015). DeLone and McLean (2003) argued that an IS that has a high SyQ can increase user satisfaction. Studies in different contexts, such as mobile commerce (Gao et al., 2015), mobile banking applications (Geebren et al., 2021), and electronic learning (Dangaiso et al., 2022), have empirically assessed the effect of SyQ on satisfaction and concluded that SyQ has a positive relationship with satisfaction. Therefore, this paper tested the following hypothesis:

H4: System quality positively affects satisfaction.

Confirmation

Confirmation (C) in the context of IS continuance intention is the extent to which a system's performance matches users' expectations (Assadi & Hassanein, 2010; Bhattacherjee, 2001). C is a cognitive notion that can be generated from previous experience of using a system (Bhattacherjee, 2001). When users' requirements of a system are met, they will be pleased, and they will therefore most likely keep using the system. Conversely, if users' expectations of a system are not met, they will be dissatisfied and will discontinue using the system (Bhattacherjee, 2001).

IS studies have proven that C has a positive effect on satisfaction. For instance, a study conducted by Ruangkanjanases et al. (2020) in the context of social media websites, determined that C leads to higher user satisfaction. Another study on electronic learning (Abdullahi et al., 2021) found a positive relationship between C and user satisfaction. Thus, the following hypothesis was tested:

H5: Confirmation positively affects satisfaction.

Satisfaction

The concept of satisfaction (S) has various definitions. Locke (1976, p. 1300) first defined it as a "pleasurable or positive emotional state resulting from the appraisal of one's job." However, in the IS field, S is "the degree to which users have a positive affective orientation toward an information system; i.e., the extent to which they feel good about it" (Mclean, 1992, p. 4). S was found to have the most significant effect on usage continuance intention. In different contexts, such as online payments (Sarassina, 2022) and social media websites (et al., 2020), S was found to have the strongest effect on continuance intention. Thus, this paper tested the following hypothesis:

H6: Satisfaction positively affects continuance intention.

Trust

Trust (T) has several definitions in the field of ISs. For example, T has been defined as the readiness to be exposed to actions accomplished by a trusted individual or party based on the instinct of assurance or confidence (Mayer et al., 1995). Choung et al. (2022) defined T as believing in the trusted party's competence, benevolence, and integrity.

T is very important to IS users in general and m-government users in particular. Users of m-government services might share private and important details. In an IS, T can inform usage continuance intentions. For instance, T was found to have a positive influence on usage continuance intention in the context of electronic payments and electronic health (Mensah, 2019; Zhang et al., 2018).

H7: Trust positively affects continuance intention.

Continuance Intention

Continuance intention (CI) is defined as "users' intention to continue to use IS after its initial acceptance" (Bhattacherjee, 2001, p. 357). Continuance intention is a key dependent variable in many proposed models (Gao et al., 2015; Zhang et al., 2018). According to Bhattacherjee (2001), continuance intention is determined primarily by satisfaction; however, this study determined continuance intention through both satisfaction and trust. According to Jiang (2015) and Bhattacherjee (2001), continuance intention is the most relevant dependent variable in post-adoption studies.

METHODOLOGY

Data Collection

The questionnaire method was employed to collect data to validate the proposed model. Questionnaires are the most common and cost-effective method in this context (Alshammari et al., 2018). Moreover, the research methodology was determined by the research question (Crewell & Crewell, 2017). Since the question aimed to identify the factors affecting continuance intention and the target population was Saudi citizens, the questionnaire was determined to be the most suitable data collection method. The questionnaire allowed the participants to be recruited at their convenience. Furthermore, it allowed the researchers to measure concepts quantitatively.

As the data necessary for this research had to be collected from a large number of participants, to validate the ECM in the context of m-government, an online questionnaire was employed to reach a greater number of people than a paper-based questionnaire would have.

A five-point Likert scale was used, with responses ranging from "strongly agree" to "strongly disagree." The Likert scale is the most commonly used method because of its simplicity for self-administered questionnaires (Ngulugulu et al., 2023). The items were validated and recommended by Alshammari et al. (2022) for researching the continuance intention of m-government (see the Appendix for the research items). These items are results of constructs conceptualization and operationalization as well as rigorous techniques to validate items including interviews, content panel, q-sort, pre-test, and pilot test (Alshammari et al., 2022).

Sample

Selecting participants relevant to any research project is crucial to the resulting findings. This paper investigated m-government usage continuance intention in the context of Saudi Arabia. Because this research aimed to identify the factors influencing m-government continuance intention, only those who had used m-government were included in this research.

There are a number of sampling techniques that can be used to collect quantitative data. These techniques can be categorized into two types: probability and non-probability (Pace, 2021). Based on the timeline of the research, financial constraints, and various circumstances, including the research context and research objective, a suitable sampling technique should be selected (Cooper et al., 2018). Having a list of all members of a population is required for probability sampling techniques. Given the time and financial constraints, it was difficult to obtain a list of the entire population for this research. Therefore, the convenience sampling technique, which is a non-probability sampling technique, was used because it was considered the most suitable for this research. According to Harvey and Land (2016), the convenience sampling technique is the most commonly used technique in behavioral research. Furthermore, the convenience sampling technique is the cheapest and most convenient (Cooper et al., 2018). In addition to these benefits, it ensures a large research sample (Cooper et al., 2018). The author intentionally included participants from different age groups, income classes, education levels, and professions to minimize the chance of bias caused by the selected technique and to enhance the findings' generalizability.

Planning for the sample size is crucial, as it has a direct effect on the research findings. According to Hair et al. (2021), a small sample size may lead to inaccurate findings. Conversely, Rao (2012) argued that a large sample size does not guarantee accurate findings; instead, it might waste time and money. Scholars have identified many ways to determine the required sample size. For example, Comrey and Lee (2013) suggested having a sample size between 100 and 500. Others, such as Arrindell and Van der Ende (1985), suggested having ten participants for each investigated variable. Nunnally (1978) suggested having ten participants for each questionnaire item. Finally, some scholars have established formulas to calculate the required sample size (Yamane, 1973). There are no right or wrong answers, but the author followed Comrey and Lee's (2013) suggestion and aimed to recruit 500 participants, as some of the responses would need to be excluded because of missing data and outliers.

After conducting an online questionnaire, the author received 553 responses (table 1). It is worth mentioning that since the aim of this study was to identify factors affecting m-government continuance intention, the questionnaire was designed to only include those who had used m-government. In the first part of the questionnaire, respondents were asked whether they had used m-government, and those who had not were thanked and told that they were unable to complete the questionnaire.

Table 1. Demographic statistics

		Frequency	Percentage
Gender	Female	216	39.1
	Male	333	60.2
	Missing Data	4	0.7
Age	18–24	12	2.2
	25–29	98	17.7
	30–34	130	23.5
	35–39	136	24.6
	40–44	76	13.7
	45 or older	101	18.3
Education level	Less than high school	3	0.5
	High school	106	19.2
	Diploma	83	15.0
	Bachelor	252	45.6
	Master	91	16.5
	PhD	18	3.3
Career	Public sector	417	75.4
	Private sector	49	8.9
	Student	35	6.3
	Self-employed	6	1.1
	Retired	20	3.6
	Unemployed	24	4.3
	Missing Data	2	0.4
Income range	1,000 or less	23	4.2
	1,001–5,000	37	6.7
	5,001–10,000	85	15.4
	10,001–15,000	172	31.1
	15,001–20,000	106	19.2
	20,001–25,000	51	9.2
	25,001 or more	73	13.2
	Missing Data	6	1.1

RESULTS

Reliability Test

Cronbach's alpha is widely used in quantitative studies to determine the reliability of research items (Hair et al., 2021). It is used to evaluate the strength of the relationship between items of the same construct (i.e., the internal consistency of the items) (Pallant, 2013). Its values range from 0, which means entirely unreliable, to 1, which means completely reliable. Table 2 shows the Cronbach's alpha values of the research items, which ranged from 0.900 to 0.968, with an overall reliability of 0.944, indicating that the instrument had highly reliable coefficients. All Cronbach's alpha values exceeded the cut-off value of 0.70 (Pallant, 2013).

Table 2. Mean, standard deviation, and Cronbach's alpha values

Item	Mean	Standard Deviation	Cronbach's Alpha	
PU1	4.156	1.008	0.962	0.944
PU2	4.165	1.029		
PU3	4.167	1.057		
IQ1	4.033	1.012	0.935	
IQ2	3.899	1.043		
IQ3	3.873	1.078		
IQ4	3.911	1.06		
SeQ1	4.031	0.991	0.921	
SeQ2	3.926	1.032		
SeQ3	3.976	1.008		
SeQ4	3.966	1.036		
SyQ1	4	1.032	0.900	
SyQ2	3.98	1.04		
SyQ3	4.123	1.111		
SyQ4	3.629	1.14		
C1	3.975	0.94	0.962	
C2	3.949	0.943		
C3	4.018	0.942		
S1	4.022	1.016	0.968	
S2	4.078	1.003		
S3	4.033	1.025		
T1	3.944	1.124	0.964	
T2	3.993	1.063		
T3	4.018	1.051		
CI1	4.197	1.066	0.962	
CI2	4.114	1.053		
CI3	4.221	1.062		

In addition to Cronbach's alpha, composite reliability (CR) can also be used to determine items' reliability. CR is recommended over Cronbach's alpha because it considers the factor loadings of the items while evaluating the constructs' reliability. Conversely, Cronbach's alpha does not consider the factor loadings of the research items, and all items are calculated equally when evaluating the constructs' reliability (Hair et al., 2021). Table 3 illustrates the values of the constructs' CR, which ranged from 0.931 to 0.979 and exceeded the 0.70 threshold (Fornell & Larcker, 1981).

Convergent Validity

Convergent validity is the degree of correlation between items of the same construct (Hair et al., 2021). It is important that researchers conduct a convergent validity test to ensure that the items have convergent validity. High convergent validity means that items have strong correlations and measure their intended construct. In the measurement model, convergent validity was assessed by considering the factor loadings and average variance extracted (AVE) (Hair et al., 2021). All factor loadings were above the recommended value of 0.70 (Hair et al., 2021). In fact, factor loadings ranged from 0.787 to 0.981 (see Table 4).

Another common way to measure convergent validity is AVE. AVE is the total of the squared loadings divided by the number of items (Hair et al., 2021). This means that the AVE can be considered the communality of the construct. In other words, when the AVE is 0.5 or higher, the items explain more than 50% of the variance in the construct. However, when the AVE is less than 0.5, the error is greater than the variance explained by the items (Hair et al., 2021). The AVE values ranged from 0.771 to 0.941 (see Table 5), showing adequate convergent validity. Thus, the convergent validity of the items was established based on the results of both factor loadings and AVE.

Discriminant Validity

Discriminant validity is the extent to which items of the same construct are truly different from those of other constructs (Hair et al., 2021). High discriminant validity means that items of the same construct capture a phenomenon that cannot be captured by other items. To measure discriminant validity, researchers should consider cross-loadings, the Fornell–Larcker criterion, and Heterotrait-monotrait Ratio of Correlations (HTMT). Cross-loading occurs when an item loads on any other factor greater than its intended factor (Fornell & Larcker, 1981). Table 4 demonstrates that no cases of cross-loading were present.

The second measure used was the Fornell–Larcker criterion, which is a very conservative approach to examining discriminant validity (Hair et al., 2021). It compares the constructs' correlations with the square root of the AVE values. The square root of each construct's AVE should be greater than its correlations with other constructs for discriminant validity to be established. Table 5 shows the

Table 3. CR Values

Factor	CR
PU	0.975
IQ	0.954
SeQ	0.95
SyQ	0.931
C	0.964
S	0.979
T	0.977
CI	0.975

Table 4. Factor loading values

	PU	IQ	SeQ	SyQ	C	S	T	CI
PU1	**0.967**	0.804	0.824	0.774	0.763	0.711	0.81	0.786
PU2	**0.961**	0.786	0.802	0.738	0.735	0.702	0.788	0.774
PU3	**0.965**	0.808	0.834	0.762	0.756	0.72	0.805	0.781
IQ1	0.773	**0.891**	0.752	0.687	0.690	0.635	0.744	0.688
IQ2	0.746	**0.922**	0.751	0.658	0.669	0.614	0.688	0.66
IQ3	0.746	**0.92**	0.777	0.685	0.67	0.634	0.687	0.673
IQ4	0.769	**0.927**	0.804	0.703	0.725	0.656	0.745	0.708
SeQ1	0.785	0.794	**0.906**	0.750	0.741	0.680	0.766	0.741
SeQ2	0.782	0.784	**0.932**	0.763	0.730	0.692	0.775	0.741
SeQ3	0.783	0.786	**0.927**	0.735	0.731	0.682	0.769	0.731
SeQ4	0.764	0.722	**0.896**	0.754	0.699	0.681	0.729	0.694
SyQ1	0.737	0.701	0.774	**0.923**	0.712	0.703	0.751	0.723
SyQ2	0.714	0.684	0.738	**0.926**	0.690	0.663	0.720	0.688
SyQ3	0.754	0.691	0.740	**0.870**	0.692	0.675	0.735	0.726
SyQ4	0.540	0.536	0.619	**0.787**	0.608	0.576	0.612	0.566
C1	0.750	0.729	0.745	0.737	**0.955**	0.663	0.774	0.723
C2	0.718	0.692	0.744	0.720	**0.955**	0.672	0.765	0.689
C3	0.747	0.720	0.764	0.735	**0.935**	0.714	0.764	0.722
S1	0.669	0.635	0.681	0.683	0.66	**0.962**	0.697	0.686
S2	0.721	0.676	0.723	0.743	0.71	**0.981**	0.748	0.748
S3	0.751	0.703	0.764	0.745	0.725	**0.967**	0.777	0.787
T1	0.819	0.764	0.805	0.793	0.781	0.730	**0.960**	0.781
T2	0.785	0.749	0.799	0.759	0.775	0.743	**0.966**	0.783
T3	0.802	0.756	0.803	0.781	0.791	0.744	**0.972**	0.774
CI1	0.821	0.754	0.793	0.771	0.739	0.754	0.798	**0.971**
CI2	0.725	0.674	0.730	0.728	0.719	0.714	0.760	**0.952**
CI3	0.793	0.727	0.773	0.736	0.712	0.745	0.774	**0.969**

square root of AVE values (in bold) in the diagonal elements; the off-diagonal elements contain correlations between the constructs.

Table 5 shows that the square roots of the AVE values were higher than correlations among constructs, which means that the Fornell–Larcker criterion result was satisfactory.

The last discriminant validity measure used was HTMT, which is a relatively new measure. HTMT is superior to the former two measures (Ab Hamid et al., 2017). HTMT values closest to 1 imply a lack of discriminant validity. A construct with HTMT values greater than 0.9 should be investigated, and one or more of its items must be removed to improve discriminant validity (Gold et al., 2001). Table 6 shows the HTMT values.

Table 6 shows there was a lack of discriminant validity between SeQ and IQ. The HTMT value of 0.901 means that further investigation is required to improve discriminant validity. The author

Table 5. AVE and constructs' correlations

AVE		PU	IQ	SeQ	SyQ	C	S	T	CI
0.929	PU	**0.964**							
0.837	IQ	0.829	**0.915**						
0.837	SeQ	0.850	0.843	**0.915**					
0.771	SyQ	0.786	0.747	0.820	**0.878**				
0.901	C	0.779	0.753	0.792	0.771	**0.949**			
0.941	S	0.738	0.694	0.747	0.747	0.721	**0.970**		
0.933	T	0.831	0.783	0.830	0.805	0.810	0.765	**0.966**	
0.929	CI	0.809	0.746	0.794	0.773	0.75	0.765	0.807	**0.964**

Table 6. HTMT values

	PU	IQ	SeQ	SyQ	C	S	T	CI
PU								
IQ	0.874							
SeQ	0.886	0.901						
SyQ	0.841	0.811	0.885					
C	0.817	0.800	0.830	0.836				
S	0.762	0.727	0.781	0.798	0.752			
T	0.862	0.824	0.868	0.863	0.849	0.790		
CI	0.841	0.786	0.825	0.828	0.787	0.791	0.837	

investigated the items of the two constructs and found that the lack of discriminant validity was caused by item SeQ1, which was removed. The model was run again and yielded better discriminant validity this time, and the HTMT values of SeQ and IQ were 0.886, which is within the acceptable range. Table 7 shows the HTMT values after removing SeQ1.

Based on the cross-loadings, Fornell–Larcker criterion, and HTMT, SeQ1 was removed and discriminant validity was established.

Table 7. HTMT values (second run)

	PU	IQ	SeQ	SyQ	C	S	T	CI
PU								
IQ	0.874							
SeQ	0.887	0.886						
SyQ	0.841	0.811	0.884					
C	0.817	0.800	0.830	0.836				
S	0.762	0.727	0.779	0.798	0.752			
T	0.862	0.824	0.866	0.863	0.849	0.790		
CI	0.841	0.786	0.825	0.828	0.787	0.791	0.837	

Establishing reliability, convergent validity, and discriminant validity enabled the author to assess the structural model. The hypotheses testing results are discussed in the following section.

HYPOTHESIS TESTING

The structural model relationships represent the research hypotheses. This section discusses the significance of each link in the structural model (hypothesis). This study has seven hypotheses, which were assessed by examining the *t*- and *p*-values. When the *t*-value is greater than the critical value, the coefficient is considered significant at a specific significance level. At a significance level of 5%, the critical *t*-value is 1.96 (Hair et al., 2021).

Table 8 shows that aside from H2, all hypotheses were supported. The results confirmed that PU, SeQ, SyQ, and C have significant effects on S. The effects of both S and T on CI were also significant. The effect of IQ on S has not been empirically confirmed. Figure 3 shows the results of the path model.

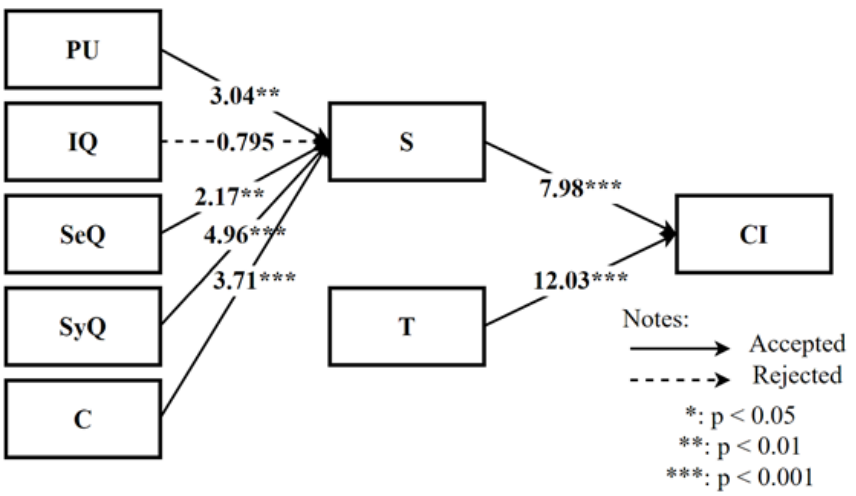
Goodness of Fit

Goodness of fit (GoF) is used to assess how well a model fits by indicating the similarities/discrepancies between the observed and approximated values (Hair et al., 2021). GoF's usefulness is controversial;

Table 8. Hypothesis confirmation results (NS = not supported)

H		Original Sample	Sample Mean	Standard Deviation	T-Value	P-Value	Empirical Support
H1	PU > S	0.192	0.187	0.063	3.038	0.003	Supported
H2	IQ > S	0.044	0.048	0.055	0.795	0.427	NS
H3	SeQ > S	0.159	0.156	0.073	2.174	0.030	Supported
H4	SyQ > S	0.283	0.284	0.057	4.963	0.000	Supported
H5	C > S	0.197	0.200	0.053	3.721	0.000	Supported
H6	S > CI	0.358	0.357	0.045	7.981	0.000	Supported
H7	T > CI	0.533	0.534	0.044	12.026	0.000	Supported

Figure 3. Results of the path model



for example, Henseler et al. (2016) argued that GoF cannot distinguish between valid and invalid models. However, Henseler et al. (2016) also reported that it is now possible to determine whether a model fits well. According to Henseler et al. (2016), two different criteria can measure the model's GoF: the approximate fit criterion, which is measured by the standardized root mean square residual (SRMR) and normed fit index (NFI), and the exact fit criterion, which is measured by the unweighted least squares discrepancy (d_ULS) and geodesic discrepancy (d_G). A lower SRMR indicates that the model fits well. The ideal fit was achieved when SRMR is 0. SRMR values of 0.08 or less are acceptable, whereas greater values indicate poor fit (Hair et al., 2021). GoF is also indicated when the NFI is higher than 0.90. Although d_ULS and d_G have no threshold values, lower values are considered better for model fit (Benitez et al., 2020). Last but not least, X^2/df acceptable values are less than 3.

Table 9 shows that SRMR and NFI values demonstrated the model's adequate fit. Moreover, d_ULS, d_G, and X^2/df showed reasonable values. Overall, the model had good fit.

DISCUSSION AND CONCLUSION

The literature has shown that the use of m-government services by citizens is still lower than expected. Therefore, the benefits of m-government have not yet been achieved. Previous papers have studied the factors influencing initial adoption. However, little has been done to determine the factors affecting usage continuance intention. The author argued that by studying the factors that influence usage continuance intention, this paper can extend our comprehension of the unsatisfactorily low level of m-government use.

This paper adopted the ECM, some factors from the IS success model, and the factor of trust. The findings showed that satisfaction and trust have positive relationships with continuance intention. These results are in line with other studies (Mensah, 2019; Sarassina, 2022; Ruangkanjanases et al., 2020). The findings also showed that PU, SyQ, SeQ, and C have positive relationships with satisfaction. These findings are in agreement with the findings of other studies (Abdullahi et al., 2021; Dangaiso et al., 2022).

However, the results of IQ's effect on satisfaction contradicted the results of other studies (Dangaiso et al., 2022; Geebren et al., 2021). This finding led the researcher to further examine the m-government applications most commonly used in Saudi Arabia, the study context. The type of mobile application was examined to identify a possible explanation for the results of IQ in this study, which contradicts other studies. It was found that most commonly m-government services used at the time of data collection offered almost no information; however, they focused on providing services, such as booking an appointment with a doctor, renewing passports, and paying services fees. As Epstein et al. (2021) reported, due to the nature of mobile devices, mobile applications provide less information than pages in web applications. When the web portals of the Saudi government were reviewed, it was found that a large amount of information is provided for those accessing the portals via web applications. Therefore, the results showed that IQ had no significant effect on user satisfaction.

Table 9. GoF for the model (NA = not applicable)

Fit Indices	Benchmark	Reference	Value
SRMR	< 0.08	(Henseler et al., 2016)	0.032
d_ULS	NA, lower values are better	(Benitez et al., 2020)	0.367
d_G	NA, lower values are better	(Benitez et al., 2020)	0.463
X^2/df	< 3	(Benitez et al., 2020)	2.912
NFI	> 0.9	(Chicaña-Huanca et al., 2022)	0.921

The results may have been different if m-government services provided some information in addition to the services they offered.

THEORETICAL CONTRIBUTIONS

This study makes a number of theoretical contributions. First, this study was the first to empirically investigate and provide statistical analysis of the m-government continuance intention. This explains the differences between the model and factors related to continuance intentions and those related to initial acceptance. It is worth mentioning that some factors, such as PU, can affect both acceptance and continuance intention, while others can affect only one or the other. For instance, the social influence factor might influence adoption decisions. Nonetheless, the influence of social influence declines after someone has used a system, specifically when a user is not satisfied with it (Triandis, 1971). Ease of use might also influence users' adoption of a new IS. However, after the first use and acquiring some experience with a service, the ease-of-use impact declines (Karahanna et al., 1999). Therefore, this paper adds to and extends prior studies in the m-government context that focus on acceptance.

Second, it contributes to IS usage continuance by validating the ECM in the m-government context. Prior studies have employed the ECM mostly in contexts such as social networking sites; however, as m-government is a relatively new topic, to date, no study had tested the ECM in an empirical study that applied statistical analysis in the context of m-government. Therefore, this paper proves that the ECM is capable of elucidating factors affecting usage continuance intention toward emerging technologies. Finally, the ECM was extended to increase its explanatory power. The enhanced version of the model was used to investigate the effect of IQ, SeQ, SyQ, PU, and C on satisfaction. It also investigated the impact of satisfaction and trust on continuance intentions.

PRACTICAL CONTRIBUTIONS

This paper also offers practical contributions by providing decision makers with deeper insights into how to enhance m-government services to sustain a high level of use by citizens. Both satisfaction and trust were shown to have significant effects on continuance intention. Therefore, decision makers should take these factors into account to enhance citizens' use of m-government. They must ensure that m-government services are satisfactory and adopt advanced security standards to obtain citizens' trust who, in return, maintain a sustainable level of use. Moreover, it was found that PU, SeQ, SyQ, and V have significant effects on satisfaction. Therefore, decision makers must ensure that citizens are satisfied by promoting the benefits of m-government, enhancing its service and system quality, and confirming citizens' expectations of m-government. This can be done by including a representative sample of citizens in the development and implementation phases, as well as by attaining their functional and non-functional requirements. The increased use of smartphones provides a great opportunity for these technologies to create a channel of communication between the government and its citizens.

RESEARCH LIMITATIONS

This paper investigated the factors influencing m-government continuance intention. The proposed model was developed based on a solid theoretical background. The model was then empirically tested by collecting data from a large sample from Saudi Arabia (553 participants). However, this study has some limitations. One arguable limitation is related to the sample, of which the vast majority of respondents worked in the public sector (about 75%). However, this is no surprise, as Saudis are largely employed in the public sector (Grand & Wolff, 2020). The Ministry of Labor and Social Development reported that about 67% of the population works in the public sector (MLSD, 2016).

The data were collected in Saudi Arabia, which means that although the findings might be useful for the Saudi government in obtaining deeper insights to boost m-government continuance intention and increase the use of m-government among citizens, the findings might not be generalized to other countries with different characteristics.

Due to time constraints, this was a cross-sectional study, which means that the participants' perceptions were collected over a short period. Therefore, as opposed to longitudinal studies, this paper did not observe changes in technology and the environment.

Although studies have shown that IQ has a significant effect on satisfaction, the results of this study contradict those of other studies. A potential explanation could be that during the data collection period, the most commonly used m-government services in Saudi Arabia offered insufficient or no data. Therefore, the results regarding IQ might not be consistent with future studies, even in the same context, considering the rapid growth of m-government services in Saudi Arabia.

Overall, despite these limitations, this paper provides deep insights into the factors influencing m-government usage continuance intentions. Moreover, these limitations can be avenues for future research.

FUTURE DIRECTIONS

Future research could test the validity of the proposed model in different geographical contexts, such as in other countries, to either confirm or extend the results of this study. Another future direction is to test the model in relation to other research topics, such as mobile commerce and mobile learning.

As mentioned earlier, this was a cross-sectional study. Therefore, to take into account and observe the effects of changes in technology and the environment, a longitudinal study could be conducted to investigate continuance intention by applying the model developed in this paper.

This study investigated the factors influencing m-government continuance intention from a citizen's perspective. This area of research requires more extensive studies that examine the perceptions of different stakeholders. For example, government officials' perceptions can provide deeper insights into the topic. Moreover, telecommunication companies (as stakeholders) may have a direct impact on the use of m-government because they run networks that connect governments with their citizens. In other words, if the mobile technology infrastructure built by telecommunications companies is poor, then m-government will not succeed, even when citizens are willing to use it (Alshammari et al., 2018). Thus, forthcoming studies that consider the perceptions of various stakeholders can make valuable contributions to the field and advance the development of a holistic view of the topic.

CONCLUDING REMARKS

Although this paper has limitations, it contributes to the IS field in general and the m-government context in particular. By answering the research question, this paper can help researchers and policymakers gain a solid understanding of m-government usage continuance intentions. The proposed model combines several factors related to continuance intention. In the future, it can be validated in different contexts (e.g., other countries and other topics, such as mobile commerce and learning). In addition, this paper and the literature have shown the importance of continuance intention in realizing the benefits of m-government. Therefore, decision makers can benefit from this paper, as they have been presented with the factors that encourage citizens to continue using m-government and, as a result, include citizens in decision-making.

COMPETING INTERESTS

The authors of this publication declare there are no competing interests.

FUNDING

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors. Funding for this research was covered by the author(s) of the article.

REFERENCES

Ab Hamid, M. R., Sami, W., & Sidek, M. H. M. (2017). Discriminant validity assessment: Use of Fornell & Larcker criterion versus HTMT criterion. *Journal of Physics: Conference Series*, *890*, 12163. doi:10.1088/1742-6596/890/1/012163

Abdullahi, M., Ayub, A. F. M., & Sulaiman, T. (2021). Understanding mathematics learning continuance intention: An extension of ECM. *Annual SEAAIR Conference Proceedings*, 283.

Abu-Shanab, E. A. (2021). *Demographic factors as determinants of e-government adoption. In Recent Developments in Individual and Organizational Adoption of ICTs*. IGI Global.

Adly, A. S. (2020). Integrating vehicular technologies within the IoT environment: A case of Egypt. *Connected Vehicles in the Internet of Things: Concepts, Technologies and Frameworks for the IoV*, 85–100. https://doi.org/https://doi.org/10.1007/978-3-030-36167-9_4

Al-Hujran, O., Al-Debei, M. M., Chatfield, A., & Migdadi, M. (2015). The imperative of influencing citizen attitude toward e-government adoption and use. *Computers in Human Behavior*, *53*, 189–203. doi:10.1016/j.chb.2015.06.025

Alghamdi, M., & Basahel, S. (2021). COVID-19 and continuance intention to use mobile payment technology: A moderated mediation model. *International Journal of Human Potentials Management*, *3*(2), 1–18. https://t.ly/CUiQ

Alkhalifah, G., Alqahtani, F., & Orji, R. (2020). Towards Mobile Applications for Co-Monitoring Children's Health Condition. *2020 IEEE 8th International Conference on Serious Games and Applications for Health (SeGAH)*, 1–8.

Alkhwaldi, A. F., & Al-Ajaleen, R. T. (2022). Toward a conceptual model for citizens' adoption of smart mobile government services during the COVID-19 pandemic in Jordan. *Inf. Sci. Lett*, *11*(2), 573–579. doi:10.18576/isl/110225

Almuraqab, N. A. S. (2020). E & M-Government and smart city: A review of ICT strategies and plans in the United Arab Emirates. *International Journal of Management*, *11*(3), 43–54. https://t.ly/DVMXv

Alshammari, T., Cheung, Y., & Messom, C. (2018). M-government adoption research trends: A systematic review. *Proceedings of the Australasian Conference on Information Systems*. doi:10.5130/acis2018.aq

Alshammari, T., Messom, C., & Cheung, Y. (2022). M-government continuance intentions: An instrument development and validation. *Information Technology for Development*, *28*(1), 189–209. doi:10.1080/02681102.2021.1928589

Alssbaiheen, A., & Love, S. (2015). The opportunities and challenges associated with m-government as an e-government platform in KSA: A literature review. *International Journal of Management & Business Studies*, *5*(2), 31–38. https://t.ly/Cz4I

Arrindell, W. A., & der Ende, J. (1985). An empirical test of the utility of the observations-to-variables ratio in factor and components analysis. *Applied Psychological Measurement*, *9*(2), 165–178. doi:10.1177/014662168500900205

Assadi, V., & Hassanein, K. (2010). Continuance intention to use high maintenance information systems: The role of perceived maintenance effort. *Proceedings of the 18th European Conference on Information Systems (ECIS 2010)*.

Bamufleh, D., Alshamari, A. S., Alsobhi, A. S., Ezzi, H. H., & Alruhaili, W. S. (2021). Exploring public attitudes toward e-government health applications used during the COVID-19 pandemic: Evidence from Saudi Arabia. *Computer and Information Science, 14*(3), 1–24. https://doi.org/https://doi.org/10.5539/cis.v14n3p1

Bärsch, S., Siepermann, M., Lackes, R., & Wulfhorst, V. (2020). *Nothing but cash? Mobile payment acceptance in Germany*. *Forty-First International Conference on Information Systems*, Hyderabad, India.

Benitez, J., Henseler, J., Castillo, A., & Schuberth, F. (2020). How to perform and report an impactful analysis using partial least squares: Guidelines for confirmatory and explanatory IS research. *Information & Management*, *57*(2), 103168. doi:10.1016/j.im.2019.05.003

Bhattacherjee, A. (2001). Understanding information systems continuance: An expectation-confirmation model. *Management Information Systems Quarterly*, *25*(2), 351–370. doi:10.2307/3250921

Bolton, R. N., & Drew, J. H. (1991). A multistage model of customers' assessments of service quality and value. *The Journal of Consumer Research*, *17*(4), 375–384. doi:10.1086/208564

Budiardjo, E. K., Pamenan, G., Hidayanto, A. N., Meyliana, D., & Cofriyanti, E. (2017). The impact of knowledge management system quality on the usage continuity and recommendation intention. *Knowledge Management & E-Learning: An International Journal, 9*(2), 200–224. https://t.ly/gO0L

Chen, J. V., Jubilado, R. J. M., Capistrano, E. P. S., & Yen, D. C. (2015). Factors affecting online tax filing–An application of the IS success model and trust theory. *Computers in Human Behavior*, *43*, 251–262. doi:10.1016/j.chb.2014.11.017

Chicaña-Huanca, S., Duche-Pérez, A., Tomaylla-Quispe, Y., & Gutierrez-Aguilar, O. (2022). Factors that influence the acquisition, application and protection of knowledge through m-learning. *2022 XVII Latin American Conference on Learning Technologies (LACLO)*, 1–7. doi:10.1109/LACLO56648.2022.10013415

Choung, H., David, P., & Ross, A. (2022). Trust in AI and its role in the acceptance of AI technologies. *International Journal of Human-Computer Interaction*, 1–13. doi:10.1080/10447318.2022.2050543

Chow, W. S., & Shi, S. (2015). Investigating customers' satisfaction with brand pages in social networking sites. *Journal of Computer Information Systems*, *55*(2), 48–58. doi:10.1080/08874417.2015.11645756

Comrey, A. L., & Lee, H. B. (2013). *A first course in factor analysis* (2nd ed.). Psychology Press. doi:10.4324/9781315827506

Cooper, D. R., Schindler, P. S., & Sharma, J. K. (2018). Business research methods (12th ed.). McGraw Hill Education (India) Private Limited.

Dangaiso, P., Makudza, F., & Hogo, H. (2022). Modelling perceived e-learning service quality, student satisfaction and loyalty. A higher education perspective. *Cogent Education, 9*(1), 2145805. https://doi.org/https://doi.org/10.1080/2331186X.2022.2145805

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *Management Information Systems Quarterly*, *13*(3), 319–340. doi:10.2307/249008

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. doi:10.1080/07421222.2003.11045748

Delone, W. H., & Mclean, E. R. (2004). Measuring e-commerce success: Applying the DeLone & McLean information systems success model. *International Journal of Electronic Commerce*, *9*(1), 31–47. doi:10.1080/10864415.2004.11044317

Desmal, A. J., Othman, M. K., Hamid, S., & Zolait, A. (2022). Exploring the information quality of mobile government services: A literature review. *PeerJ. Computer Science*, *8*, e1028. doi:10.7717/peerj-cs.1028 PMID:36092013

Epstein, D. A., Blascheck, T., Carpendale, S., Dachselt, R., & Vermeulen, J. (2021). *Challenges in everyday use of mobile visualizations. Mobile Data Visualization*. Chapman and Hall/CRC.

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *JMR, Journal of Marketing Research*, *18*(1), 39–50. doi:10.1177/002224378101800104

Fowdur, T. P., & Luckhun, G. (2022). *A mobile application for real-time detection of road traffic violations. In AI and IoT for Sustainable Development in Emerging Countries: Challenges and Opportunities*. Springer.

Fu, H., Mensah, I. K., Wang, R., Gui, L., Wang, J., & Xiao, Z. (2022). The predictors of mobile government services adoption through social media: A case of Chinese citizens. *Information Development*. Advance online publication. doi:10.1177/02666669221114649

Gao, L., Waechter, K. A., & Bai, X. (2015). Understanding consumers' continuance intention towards mobile purchase: A theoretical framework and empirical study–A case of China. *Computers in Human Behavior*, *53*, 249–262. doi:10.1016/j.chb.2015.07.014

Geebren, A., Jabbar, A., & Luo, M. (2021). Examining the role of consumer satisfaction within mobile ecosystems: Evidence from mobile banking services. *Computers in Human Behavior*, *114*, 106584. doi:10.1016/j.chb.2020.106584

Glood, S. H., Osman, W. R. S., & Nadzir, M. M. (2016). The effect of civil conflicts and net benefits on m-government success of developing countries: A case study of Iraq. *Journal of Theoretical and Applied Information Technology*, *88*(3), 541–552. https://t.ly/o1Uzn

Gold, A. H., Malhotra, A., & Segars, A. H. (2001). Knowledge management: An organizational capabilities perspective. *Journal of Management Information Systems*, *18*(1), 185–214. doi:10.1080/07421222.2001.11045669

Goyayi, M. L. J., & Subramanium, P. R. (2021). A technology adoption model for mobile-enabled government services. *International Journal of Technology and Human Interaction*, *17*(3), 34–53. doi:10.4018/IJTHI.2021070103

Grand, S., & Wolff, K. (2020). Assessing Saudi vision 2030: A 2020 review. *Atlantic Council* (Vol. 17). https://d8-engineering.kku.edu.sa/sites/d8-engineering.kku.edu.sa/files/2021-06/Assessing-Saudi-Vision-2030-A-2020-review.pdf

Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2021). *A primer on partial least squares structural equation modeling (PLS-SEM)*. Sage Publications. doi:10.1007/978-3-030-80519-7

Harvey, M., & Land, L. (2016). *Research methods for nurses and midwives: Theory and practice*. SAGE Publications.

Hebbar, S., & Kiran, K. B. (2022). Do social media and e-WOM influence m-government services?: A citizen perspective from India. *International Journal of Electronic Government Research*, *18*(1), 1–27. doi:10.4018/IJEGR.294891

Henseler, J., Hubona, G., & Ray, P. A. (2016). Using PLS path modeling in new technology research: Updated guidelines. *Industrial Management & Data Systems*, *116*(1), 2–20. doi:10.1108/IMDS-09-2015-0382

Hsu, M.-H., Chang, C.-M., & Chuang, L.-W. (2015). Understanding the determinants of online repeat purchase intention and moderating role of habit: The case of online group-buying in Taiwan. *International Journal of Information Management*, *35*(1), 45–56. doi:10.1016/j.ijinfomgt.2014.09.002

Ishengoma, F. (2022). *Exploring critical success factors towards adoption of m-government services in Tanzania: A web analytics study. In App and Website Accessibility Developments and Compliance Strategies*. IGI Global. doi:10.4018/978-1-7998-7848-3.ch009

Jangir, K., Sharma, V., Taneja, S., & Rupeika-Apoga, R. (2022). The moderating effect of perceived risk on users' continuance intention for fintech services. *Journal of Risk and Financial Management*, *16*(1), 21. doi:10.3390/jrfm16010021

Jiang, X. (2015). Research on mobile readers' continuance intention: A reading type perspective. *Proceedings of the IEEE 12th International Conference on e-Business Engineering*. doi:10.1109/ICEBE.2015.56

Karahanna, E., Straub, D. W., & Chervany, N. L. (1999). Information technology adoption across time: A cross-sectional comparison of pre-adoption and post-adoption beliefs. *Management Information Systems Quarterly*, *23*(2), 183–213. doi:10.2307/249751

Leschik, D., Rossberger, R., & Oczkowski, E. (2022). M&As in Germany: Measuring success for the pharma and biotech industries. *The Journal of Business Strategy*, *43*(2), 87–95. doi:10.1108/JBS-07-2020-0153

Li, Y., & Wang, J. (2021). Evaluating the impact of information system quality on continuance intention toward cloud financial information system. *Frontiers in Psychology*, *12*, 713353. doi:10.3389/fpsyg.2021.713353 PMID:34489815

Liébana-Cabanillas, F., Singh, N., Kalinic, Z., & Carvajal-Trujillo, E. (2021). Examining the determinants of continuance intention to use and the moderating effect of the gender and age of users of NFC mobile payments: A multi-analytical approach. *Information Technology and Management*, *22*(2), 133–161. doi:10.1007/s10799-021-00328-6

Liu, Q., Chen, Q., & Lee, S.-J. (2023). A machine learning approach to predict customer churn of a delivery platform. *2023 International Conference on Artificial Intelligence in Information and Communication (ICAIIC)*, 733–735. doi:10.1109/ICAIIC57133.2023.10067108

Locke, E. A. (1976). The nature and causes of job satisfaction. In Handbook of Industrial and Organizational Psychology (Vol. 1297). Academic Press.

Mamonov, S., & Benbunan-Fich, R. (2021). Unlocking the smart home: Exploring key factors affecting the smart lock adoption intention. *Information Technology & People*, *34*(2), 835–861. doi:10.1108/ITP-07-2019-0357

Mayer, R. C., Davis, J. H., & Schoorman, F. D. (1995). An integrative model of organizational trust. *Academy of Management Review*, *20*(3), 709–734. doi:10.2307/258792

Mclean, E. R. (1992). Promoting information system success: The respective roles of user participation and user involvement. *Journal of Information Technology Management*, *3*(1), 1–12. https://t.ly/OuDn

Mensah, I. K. (2019). Predictors of the continued adoption of WeChat mobile payment. *International Journal of E-Business Research*, *15*(4), 1–23. doi:10.4018/IJEBR.2019100101

Mensah, I. K., Adams, S., & Luo, C. (2023). The moderating effect of perceived transparency and accountability on the adoption of mobile government services. *International Journal of Mobile Communications*, *21*(1), 54–73. doi:10.1504/IJMC.2023.127373

Mensah, I. K., & Mwakapesa, D. S. (2022). The Impact of Context Awareness and Ubiquity on Mobile Government Service Adoption. *Mobile Information Systems*, *5918826*, 1–20. Advance online publication. doi:10.1155/2022/5918826

Michel, S., & Cocula, F. (2017). Impact of the three IS qualities on user satisfaction in an information-intensive sector. *Electronic Journal of Information Systems Evaluation, 20*(2), 85–101. https://doi.org/https://t.ly/-e-YO

MLSD. (2016). *Saudi Arabia labor market report 2016*. https://t.ly/PjqN0

Ngulugulu, M. M., Rwela, E. G., & Mkwizu, N. Y. (2023). Adoption of human resource information systems on public sectors in Tanzania. *East African Journal of Information Technology*, *6*(1), 66–76. doi:10.37284/eajit.6.1.1191

Nunnally, J. (1978). *Psychometric theory* (2nd ed.). McGraw-Hill.

Nuryasman & Warningsih. (2022). Determining factors of digital wallet usage. *Jurnal Manajemen, 25*(2), 271–289. https://doi.org/https://doi.org/10.24912/jm.v25i2.740

Omaier, H. T., Alharbi, A. Z., Alotaibi, M. F., & Ibrahim, D. M. (2019). Comparative study between emergency response mobile applications. *International Journal of Computer Science and Information Security*, *17*, 2. https://t.ly/SzrNC

Pace, D. S. (2021). Probability and non-probability sampling-an entry point for undergraduate researchers. *International Journal of Quantitative and Qualitative Research Methods*, *9*(2), 1–15. https://t.ly/viCmJ

Pallant, J. (2013). *SPSS survival manual: A step by step guide to data analysis using IBM SPSS* (5th ed.). McGraw-Hill.

Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1985). A conceptual model of service quality and its implications for future research. *The Journal of Marketing. 49*(4), 41–50. https://doi.org/https://doi.org/10.1177/002224298504900403

Prakash, A. V., Das, S., & Pillai, K. R. (2021). Understanding digital contact tracing app continuance: Insights from India. *Health Policy and Technology*, *10*(4), 100573. doi:10.1016/j.hlpt.2021.100573

Qabajeh, M. M., Mousa, S., Saleh, H. A., & Hasan, J. A. (2021). Design and implementation of mobile-based application for appointments systems for vaccinations in medical centers. *2021 31st International Conference on Computer Theory and Applications (ICCTA)*, 54–58. doi:10.1109/ICCTA54562.2021.9916616

Rahimullah, N. A., Damayanti, S. B., Izra, A. A., & Handayani, P. W. (2022). Assessing the factors influencing users accessing higher education content on TikTok. *Cogent Education, 9*(1), 2148498. https://doi.org/https://doi.org/10.1080/2331186X.2022.2148498

Rao, U. K. (2012). Concepts in sample size determination. *Indian Journal of Dental Research*, *23*(5), 660–664. doi:10.4103/0970-9290.107385 PMID:23422614

Rogers, E. (1995). *Diffusion of innovations* (4th ed.). The Free Press.

Ruangkanjanases, A., Hsu, S.-L., Wu, Y. J., Chen, S.-C., & Chang, J.-Y. (2020). What drives continuance intention towards social media? Social influence and identity perspectives. *Sustainability (Basel)*, *12*(17), 7081. doi:10.3390/su12177081

Sarassina, R. R. F. (2022). Understanding mobile payment continuance in Indonesia: A brand equity perspective continuance model. *CommIT (Communication and Information Technology) Journal*, *16*(1), 105–115. https://doi.org/https://doi.org/10.21512/commit.v16i1.7882

Sarrab, M., Hafedh, A.-S., & Bader, A.-M. (2015). System quality characteristics for selecting mobile learning applications. *Turkish Online Journal of Distance Education*, *16*(4). Advance online publication. doi:10.17718/tojde.83031

Sensuse, D. I., Handoyo, I. T., Fitriani, W. R., Ramadhan, A., & Rahayu, P. (2017). Understanding continuance intention to use mobile commerce: A case of urban transportation service. *Proceedings of the International Conference on ICT For Smart Society (ICISS 2017)*. doi:10.1109/ICTSS.2017.8288870

Sultana, M. R., Ahlan, A. R., & Habibullah, M. (2016). A comprehensive adoption model of m-government services among citizens in developing countries. *Journal of Theoretical and Applied Information Technology*, *90*(1), 49–60. https://t.ly/F1Uq

Triandis, H. C. (1971). *Attitude and attitude change (Foundations of Social Psychology)*. Wiley.

Tsui, H.-D. (2019). Trust, perceived useful, attitude and continuance intention to use e-government service: An empirical study in Taiwan. *IEICE Transactions on Information and Systems*, *102*(12), 2524–2534. doi:10.1587/transinf.2019EDP7055

Venkatesh, V., & Goyal, S. (2010). Expectation disconfirmation and technology adoption: Polynomial modeling and response surface analysis. *Management Information Systems Quarterly*, *34*(2), 281–303. doi:10.2307/20721428

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *Management Information Systems Quarterly*, *27*(3), 425–478. doi:10.2307/30036540

Wirtz, B. W., Balzer, I., & Schmitt, D. (2021). Mobile government: Research development and research perspectives. *International Journal of Public Administration*, 1–22. https://doi.org/https://doi.org/10.1080/01900692.2021.1993910

Yamane, T. (1973). *Statistics: An introduction analysis* (2nd ed.). Harper & Row.

Yang, M., Shao, Z., Liu, Q., & Liu, C. (2017). Understanding the quality factors that influence the continuance intention of students toward participation in MOOCs. *Educational Technology Research and Development*, *65*(5), 1195–1214. doi:10.1007/s11423-017-9513-6

Yao, Y., & Xu, P. (2022). E-participation decision across different channels. *Information Technology & People*, *35*(3), 956–976. doi:10.1108/ITP-05-2020-0314

Zhang, X., Yan, X., Cao, X., Sun, Y., Chen, H., & She, J. (2018). The role of perceived e-health literacy in users' continuance intention to use mobile healthcare applications: An exploratory empirical study in China. *Information Technology for Development*, *24*(2), 198–223. doi:10.1080/02681102.2017.1283286

APPENDIX

Items of the research

Perceived Usefulness
Using m-government improves my performance in completing tasks.
Using m-government increases my productivity in completing tasks.
I find m-government to be useful for me.
Information Quality
M-government provides relevant information to my needs.
M-government provides accurate information.
M-government provides up-to-date information.
M-government provides the information I need on time.
Service Quality
M-government provides on-time services.
M-government provides professional services.
M-government provides personalized services.
M-government provides modern-looking interfaces.
System Quality
M-government applications are easy to use.
M-government applications are easy to navigate.
I can complete tasks in m-government applications anytime anywhere.
M-government applications respond quickly even in the busiest times of the day.
Confirmation
My experience with using m-government was better than what I expected.
The service level provided by m-government was better than what I expected.
Overall, most of my expectations from using m-government were confirmed.
Satisfaction
I feel satisfied with my overall experience of m-government.
I feel pleased with my overall experience of m-government.
I feel contented with my overall experience of m-government.
Trust
I trust m-government applications to keep my personal information safe.
I feel safe in my transactions with the m-government applications.
M-government is trustworthy.
Continuance Intention
I intend to continue using m-government rather than discontinue its use.
I intend to continue using m-government than use any alternative means (face-to-face).
If I could, I would like to continue my use of m-government.

Thamer Alshammari obtained his PhD in 2021 from Monash university. He is currently working for Saudi Electronic University. His research interests include adoption of new technology and usability testing. So far, he has participated in a number of conferences and published a couple of journal articles.