



# Investigating the Adoption of Mobile Government from Citizen's Perspectives in Saudi Arabia

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**Abstract.** With the rapidly evolving mobile technology, governments are delivering services to the citizen through a mobile platform. These services include administrative services, health services, and awareness campaigns. To effectively provide mobile services to citizens, it is necessary to understand user perceptions of these services thoroughly. Therefore, the acceptance rate is influenced by a variety of factors. These elements are categorized as social, technological, cultural, personal, or facilitating. This paper aims to present a study on the acceptance of the Mobile-Government (M-Government) system in Saudi Arabia. One of the primary goals of this research is to promote M-Government adoption in developing countries such as Saudi Arabia. As a result, a study is being carried out to determine 'How citizens' cultures and attitudes affect the acceptability of M-Government?' By identifying and analyzing cultural influences on M-Government, it is possible to understand people's needs better. The primary aim of this research is to identify the limitations and research gaps in previous studies and broaden the scope of technology acceptance models to determine the acceptance rate of M-Government services. The Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT) were used to investigate the impact of various factors on M-Government system acceptance. Previous studies' limitations, which are addressed in this paper, include more appropriate constructs added to the models for hypothesis building. These hypotheses are based on Saudi Arabia's demographic profiles, sociological and technological foundations. The findings will help policymakers, and government officials better understand the factors that influence service's user acceptance.

**Keywords:** M-Government · Saudi Arabia · TAM · UTAUT · Hypothesis Testing · User Acceptance

## 1 Introduction

The rapid improvements in Information Technology (IT) have revolutionized every aspect of human life. Beginning with conventional services and progressing to technological devices in government employment, the evolution of public services began.

M-Governments in industrialized nations have found a means to provide information to the public quickly and efficiently. Mobile phones have been in commercial use since 1984 [1]. Several governments have started offering mobile services to residents to improve efficiency and effectiveness. Mobile technology allows access to government services and information anytime and anywhere [2]. Globally, over 7 billion mobile cellular users at the end of 2015, up from 738 million in 2000. Fastest-growing IT ever. The primary goal of M-government is to ensure that the public, businesses, and government are all mobile via the use of wireless devices. As a result of the M-government initiative, residents may save time and energy by using their mobile phones and other wireless devices to access the Internet and government networks.

This research study contributed significantly to the field of IT and will be beneficial to understand better the needs, evaluations, and perceptions of individuals about M-Government services, in both in terms of theory and application. Firstly, when it comes to M-Government in Saudi Arabia, it used a model that hasn't been well studied: the TAM model. Secondly, it is also included some constructs: Facilitating Conditions that enable the acceptance of technology and social influence, to the TAM model, to understand the effect of numerous variables on Saudi residents' behavioral intentions and acceptance of M-Government. Thirdly, Saudi politicians and technology service providers must also better comprehend service delivery from the standpoint of Saudi residents to better serve their constituents in the Kingdom. Fourth, researchers in Saudi Arabia have looked at whether or not M-Government services are well-liked in the country. This study tried to contribute to knowledge in this area by examining if the influence of increased TAM elements on M-Government may be tempered by gender, age, experience, and voluntariness of Saudi residents. Finally, by expanding the breadth of the technology acceptance models, and tried to understand better how people feel about these services. Additionally, efforts were made to resolve the drawbacks of prior research.

Prior research [4–6] on M-Government adoption in countries with comparable cultural, economic, and geographic characteristics to Saudi Arabia is included in the literature review. In this section, many models of technology adoption are examined critically. The methodology section follows the literature review and details the steps taken to access Saudi Arabia's M-Government system. A series of hypotheses were created based on TAM and UTAUT models' unique constructions. These hypotheses are used to build a questionnaire for data collection. Then comes the analysis of the data, which follows. The outcomes of the hypothesis testing were discussed, and the study is ended in the discussion and conclusion parts. The study's shortcomings and potential solutions are discussed in the last detail to guide future research.

## 2 Literature Review

M-Governments have been an integral part of governance in most countries for several years. Services provided by M-Governments are being consistently improved. The mode of delivery is also improving due to M-Government, being one of the most researched areas in recent years. This section will discuss the contributions made by researchers in the M-Government system and analyze them regarding Saudi Arabia [5, 6]. Despite the availability of M-Government services in countries like Saudi Arabia, they are affected

by the low acceptance rate by citizens. In addition, various factors hinder the adoption of these services.

Alonazi et al. [5] have used the M-Government adoption and usability Model 'UTAUT' to study the low usability of M-Government services in the Saudi Arabia [4]. Several parameters like perceived usefulness, social influence, perceived interest, and system quality were assessed in this research. It was concluded that the personal and professional experience with technology was one of the most important elements in the acceptance rate of M-Government services. The study was reported to be a lighthouse for Saudi IT policymakers and Information & communication technology (ICT) professionals. Althunibat et al. [6] have presented a framework of M-Government acceptance. In this research, the advanced statistical methods are used to draw conclusive results from the surveyed data.

The acceptance of M-Government services in Jordan is represented by Althunibat et al. [6]. This survey found that SMS is the most popular service among people. It led to M-Government services in Jordan. The TAM was used to assess M-Government services. The TAM is the most often used model [6–9]. TAM's major components are perceived usefulness and perceived ease of use. Jordanians strongly seek M-Government services [4, 10, 11] have presented the study on M-Government services in the UAE. An implementation framework based on the Fuzzy Delphi technique was suggested in this research. In the UAE, E-Government gave way to M-Government in 2013. IT skills, IT and Cyber Security Policy, and IT infrastructure were among the challenges faced in the UAE. Saxena et al. used TAM and UTAUT to study the influence of socioeconomic and demographic constraints on M-Government in India [11, 12].

Many researchers have used the term M-Government; however, this study will focus on studies undertaken in Saudi Arabia. M-Government is a strategy and execution that employs mobile technology to improve the benefits of E-government for all parties involved, including people and businesses [13]. According to Joseph and Boateng [14], advances in e-business and M-business have helped governments embrace mobile technology. According to Kim et al. [15], M-Government could give extra information and services such as civic statistics, microfinance, and electronic identity. Finally, Mandari and Koloseni [16] claim that the high penetration of mobility and reachability among people can accomplish E-government via M-Government. Mobile phone use in Saudi Arabia has grown tremendously in the last few years [11, 15]. As a result, M-government services supplied by the Saudi Arabian government are the focus of this study.

Over the past several years, mobile wallets have continuously been in demand and improved, particularly during the COVID-19 pandemic [17]. Mobile communication technology is primarily responsible for the transmission of information, including factors such as information channels' capacity, transmission efficiency, and information security, among others [4, 11]. Therefore, organizations responsible for information management should focus on acquiring, integrating, and expressing information [10, 18]. According to Althunibat et al. [13] was conducted as study, technologies that aid in implementing M-government may be divided into four broad categories:

- a) Government-to-Government (G2G) transactions: The use of ICT to conduct commerce inside and between government entities.

- b) Transactions between the government and the citizen are known as G2C transactions, and they include the use of ICT to provide m-government services to the public.
- c) Transactions between the government and businesses (G2B): The use of ICT to provide M-government services to the business sector.
- d) Transactions between government and employees (G2E): The use of ICT to provide and conduce workshops and training among government agencies.

M-government may bring prospective advantages for the public sector, apart from the obstacles, as shown in Table 1. Apart from the issues listed in Table 1, M-Government can provide advantages to the public sector.

**Table 1.** Benefits and challenges.

Benefits	Challenges
It is boosting the efficiency of government services	Privacy & security
The government served a vast number of people	People Awareness
A public service's efficiency	Trust
Low-priced	Additional costs
Government information and services are made available	Information overload
Use whenever you want	Struggle & Hard-work

In most of the research on the adoption, acceptance, and utilization of M-Government services, social, demographic, or design factors are considered as the literature review has suggested that there are several state affairs, social background, demographic facts, and technical factors that play a decisive role in the acceptance rate of M-Government services. In this research paper, all these factors will be addressed for the Kingdom of Saudi Arabia. In this paper, the researcher used the UTAUT models to build the hypothesis.

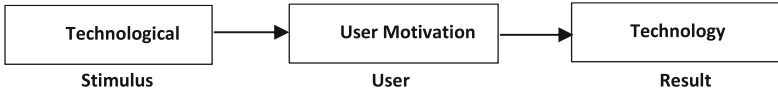
## 2.1 Factors Affecting the Adoption/Acceptance of M-Government

This section discusses the application of technology acceptance models for assessing the acceptance of M-Government in Saudi Arabia. As various researchers have accessed technology acceptance and usability in the recent past, this paper has addressed the research question differently.

### Technology Acceptance Model (TAM)

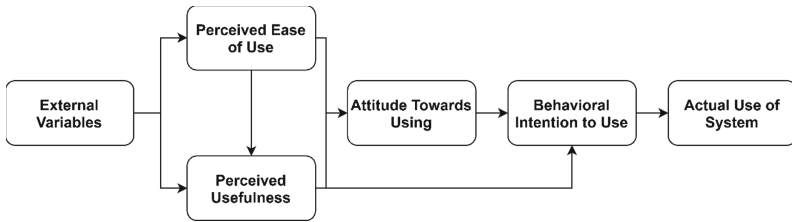
The first model used in this research for M-Government acceptance and usage is TAM. This model was proposed in 1985 to ease off the acceptability of technological services [19].

As shown in Fig. 1, the features of technological services act as a stimulus that can increase the user motivation to accept the technology. A higher explanation of the user results in higher acceptance of the technology. In TAM, user motivation can be



**Fig. 1.** Theoretical framework of the Technology Acceptance Model.

categorized into three types (i.e., perceived usefulness, ease of use, and technology attitude). In addition, these motivations can be stimulated by various variables that can belong to multiple categories like social, demographic, technological design, cultural and religious user awareness, etc. The block diagram of the more specific TAM is shown in Fig. 2.



**Fig. 2.** Technology acceptance model for the assessment of acceptance and usability of technological services [19]

As the Fig. 2 shows, several factors have a proven impact on the adaptability of M-Government services [19]. Therefore, the effect of the above variables and other external variables of Saudi Arabia are statistically analyzed using the method of Hypothesis. In addition, Hypothesis development and testing, will be in detail in next section.

### Unified Theory of Acceptance and Use of Technology (UTAUT)

It adds two more constructs as compared to TAM. These ideas help people accept social and technological change. Venkatesh et al. [20] chose this model after evaluating eight others [20]. It's a finished model. Technology acceptance researchers have thoroughly examined it [19, 20]. Based on users' behaviors'. These are the model's primary components. Performance expectation is an external variable that helps utilization. The generalized flow chart of UTAUT is visually represented in Fig. 3.

## 3 Methodology

This section discusses the application of technology acceptance models for assessing the acceptance of M-Government in Saudi Arabia. As various researchers have accessed technology acceptance and usability in the recent past, this paper has addressed the research question differently. Therefore, TAM and UTAUT are the most suitable technology acceptance models specifically for Saudi Arabia. These models used to study the M-Government services in Saudi Arabia. In addition, these models are customized according to the social, cultural, demographic profiles, and technological aspects of Saudi Arabia.

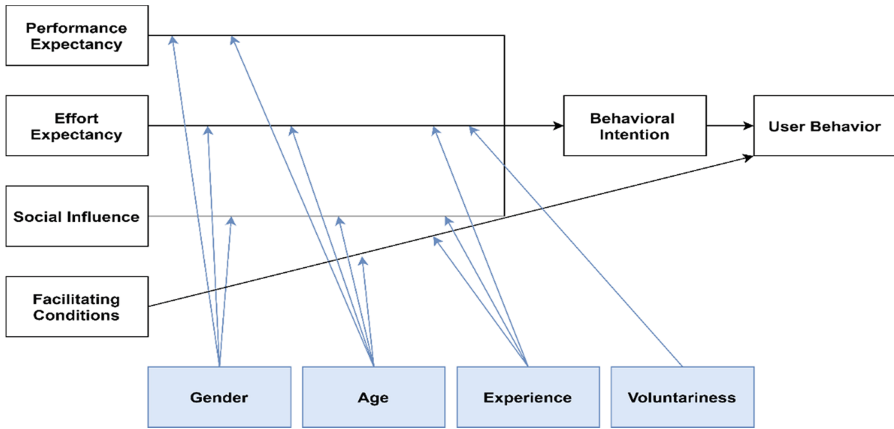


Fig. 3. UTAUT Flow chart [20].

### 3.1 Sample of Study

A questionnaire technique was used. 1000 Saudi nationals participated in the study as sufficient sample size based on research study for determining appropriate sample size in survey [3] (i.e., the sample represents the population). The questionnaire consists of close-ended questions. Each subject has to respond to the question on a scale of 1 (Extremely Agree) to 5 (Extremely Disagree). The questionnaire was distributed among different age groups, gender, and monthly income. Citizens living in urban, suburban, and rural areas were included. In addition, citizens with diverse educational backgrounds were considered. The questionnaire was distributed among citizens with different levels of IT experience. The questionnaire was distributed among citizens with different levels of IT experience. 60% of the subjects were male. The majority of subjects were above 30 years of age (52%). About two-thirds (73%) of issues have an intermediate level of IT literacy, and around half (55%) of subjects have an average income per month of 20,000–40,000 (SAR) as shown in Table 2.

Table 2. Demographic Profile for Participants

Gender	Age	Issues Ratio: Intermediate IT literacy	Average Income/per-month
Male (60%)	Above 30 years (52%)	About Two third (73%)	20,000–40,000(SAR) (55%)

### 3.2 Questionnaire

Qualtrics.com was used to send the final questionnaire to four Saudi general subject email’s newsgroups for the study’s full scale, which ran from early January through

February 2021. As broad subject email newsgroups, the researcher found just four major newsgroups, each with 250+ members (only Saudi citizens, Non-Saudi was excluded). Approximately 1000 people received these emails, which were used as a sample. A wide range of subjects from various interests was chosen to reflect Saudi society in these email newsgroups. After three weeks, a follow-up email was sent as a reminder, only 0.78% of those contacted completed the questionnaire (780 participants). When Neuman computed the response rate in 2006, he used this formula:

$$\text{Response Rate} = \frac{\text{Total number of responses}}{\text{Total number of participants in the sampling frame}}$$

The questionnaire was disseminated online to ensure that the sampled Saudi nationals have access to the Internet and hence use e-transactions; using an online sampling method would allow researchers in a large country like Saudi Arabia, as study was conducted by [21] to reach a much larger population of current or potential users of electronic transactions. A questionnaire with close-ended responses was distributed among 1000 Saudi nationals via email. Subjects have to answer each question on a scale from 1 (strongly agree) to 5 (strongly disagree). The subjects were scattered throughout Saudi Arabia, ranging from modernized urban areas to remote villages. Different age groups, gender, and IT experience were considered. The questionnaire was sent via email and hands in the villages to include highly educated personnel and illiterate citizens. The response rate of the questionnaire was 91%. The questionnaires were distributed among 60% males and 40% females. More than half the subjects were over 30 years of age. As far as the technology experience of subjects is concerned. About 73% of subjects were well aware of the internet and were intermediate-level users of internet technology. Almost 39% of subjects have never used any M-Government service in their life.

### 3.3 Variables and Measurement

All instruments/items were selected or used from the literature and were adapted for use in the context of m-government. Table 3 summarizes the constructs related to the proposed model UTAUT with a brief description.

**Table 3.** The Proposed Construct for UTAUT

UTAUT Constructs	Description
Performance Expectancy	To what extent does use believes in the successful completion of a task?
Effort Expectancy	How easily can a user achieve the goals?
Social Influence	To what extent do other citizens agree with the use in service usage?
Facilitating Conditions	To what extent, the system infrastructure and environment support users in availing the technical service?
Behavioral Intention	The user's personal chances to avail the service

## 4 Research Model and Hypothesis Development

As illustrated in the block diagram (Fig. 3), numerous social factors influence user's behaviour. All of these elements are taken into account while developing and testing hypotheses. For example, UTAUT's hypothesis is as follows:

H1: There is a significant positive association between users' behavioural intentions to adopt and use the M-Government system and their performance expectations.

H1-a: Gender will influence the relationship between performance expectations and users' behavioural intention to use the M-Government system.

H1-b: The link between performance expectancy and users' behavioural intention to use the M-Government system will be influenced

H2: There is a significant positive relationship between effort expectation and users' behavioural intentions to accept and use the M-Government system.

H2-a: Gender will affect the relationship between effort expectancy and behavioural intention to use the M-Government system.

H2-b: The link between effort expectancy and user behavioural intention to use the M-Government system will be influenced by age.

H2-c: Technology experience will affect the relationship between effort anticipation and user behavioural intention to utilize the M-Government system.

H2-d: The association between effort expectancy and users' behavioural intention to use the M-Government system will be influenced by voluntariness.

H3: There exists a considerably positive correlation between the influence of society and the user's behavioral intentions to accept and use the M-Government system.

H3-a: Gender will impact the correlation between the influence of society and the user's behavioural intention to use the M-Government system.

H3-b: Age will impact the correlation between the influence of society and the user's behavioural intention to use the M-Government system.

H3-c: Technology experience will impact the correlation between effort expectancy and users' behavioural intention to use the M-Government system.

H4: There exists a considerably positive correlation between conditions that facilitate the user and the user's behavioural intentions to accept and use the M-Government system.

H4-a: Age will impact the correlation between effort expectancy and user's behavioural intention to use the M-Government system.

H4-b: Technology experience will impact the correlation between effort expectancy and user's behavioural intention to use the M-Government system.

## 5 Result and Analysis

In this section, the statistical results of the hypothesis testing are discussed. To analyze and evaluate the statistical data, Statistical Package for Social Science (SPSS) was used.

Cronbach's Alpha formula was used to test the reliability and internal consistency to construct a model collectively. It helps to quantify the closeness of the variable set in

the group of the model. Cronbach is a function of the correlation of model constructs. It is formalized by:

$$\alpha = \frac{Nc}{v + (N - 1)c}$$

N = total items.

C = the average covariance of all N elements.

V = the average variance among all N elements.

The internal consistency is excellent for value above 0.90, good between 0.90–0.80, acceptable between 0.80–0.70, questionable between 0.70–0.60, poor between 0.60–0.50 and unacceptable below 0.50. The values of Cronbach Alpha for UTAUT are given in the Table 4 below.

**Table 4.** Cronbach Alpha table of UTAUT Model

UTAUT Construct	# Items	Cronbach Alpha
Performance Expectancy	4	0.89
Social Influence	3	0.81
Facilitating Factors	2	0.90
Effort Expectancy	3	0.80

The table values of Cronbach show that four out of five constructs are considered good, while only one has low internal consistency. Yet, it can be categorized as acceptable. In a collectivist and tribal culture, self-enhancement ideals such as power and achievement are earned through personal connections, the energy obtained from families and supporters, and an accomplishment in leveraging social interactions to attain control or status. However, due to the disintermediation caused by online transactions, the chain of favors acquired via personal connections may be broken.

The statistical results of the hypothesis testing of UTAUT are enlisted in Table 5. Depending on the p-value, either the null hypotheses were rejected or accepted.

When items lack homogeneity, reliability criteria for reflecting constructs and objects include assessing the construct's internal consistency and delving further into the items' general correlations. Reflective things change as a result of their underlying structure changing. The surface of the group's items was assessed in 2003 by Jarvis et al. since they all represent the same concept. The detailed statistical parameters of the data collected for TAM are also shown in Table 6. Table 6 shows the mean, standard deviation, p-value, and composite reliability.

**Table 5.** UTAUT Hypothesis Testing Result

Hypothesis	Result (p-value)	Remarks
<b>H1</b>	<b><math>\alpha = 0.49</math></b>	<b>Accepted</b>
H1-a	Not significant	Rejected
H1 = b	0.36	Accepted
<b>H2</b>	<b><math>\alpha = 0.52</math></b>	<b>Accepted</b>
H2-a	0.33	Accepted
H2-b	Not significant	Rejected
H2-c	0.44	Accepted
H2-d	Not significant	Rejected
<b>H3</b>	<b><math>\alpha = 0.33</math></b>	<b>Accepted</b>
H3-a	0.25	Accepted
H3-b	0.41	Accepted
H3-c	Not significant	Rejected
<b>H4</b>	<b><math>\alpha = 0.21</math></b>	<b>Accepted</b>
H4-a	Not significant	Rejected
H4-b	0.50	Accepted

**Table 6.** Descriptive Analysis for UTAUT main Hypothesis Testing Result

Construct	Mean	*SD	P-value	#CR
H1	4.1	0.23	>0.05	0.91
H2	4.3	0.64	>0.05	0.87
H3	4.0	0.48	>0.05	0.90
H4	5.5	1.33	<0.05	0.75

\* Standard deviation; #Composite Reliability

## 6 Discussion

The proposed hypotheses based on UTAUT were also statistically tested, and results showed that all the constructs certainly impact M-Government services acceptability. These constructs include performance expectancy, effort expectancy, social influence, and facilitating factors that affect the acceptance rate of the service provided by the Government. The impact of social influence on the Internet and the Government on the acceptance of electronic transactions was raised and addressed. In fact, these hypotheses that were addressed in the answer to the following research question. What role does social influence in the internet and in government institutions play in determining uptake of new technologies?

This research study examines the link between the social influence element and M-Government services adoption. The adoption of e-government organizations, such as M-Government apps. For instant, in Jordan is not significantly influenced by social influence, contrary to prior studies, according to the findings of this study. One benefit of

social impact that Jordan may be overlooking is that when more people utilize a service and word of mouth spreads, the value of the service generally rises [22]. Likewise, it is not regarded as significant in Saudi Arabia, because there are few users have a substantial effect by social influence. It is due to the high usage of internet services (i.e. internet-societal interaction) in Saudi Arabia.

As part of determining the criteria for the study setting, several models and ideas were drawn from this research. First, a research model was built to predict and explain acceptance in the vicinity of the study. Second, an online poll was used to collect a sample of 870 Saudi residents. Third, e-transactions were studied using structural equation modelling to determine how people's willingness to use them as a communication tool with the Government interacted with their beliefs about how they work, how much faith they had in the Government, and how much social influence they had over them. Perceived compliance with values and citizens' demands and the capacity to communicate outcomes from the use of electronic transactions, faith in the internet, and conservation values are all-important positive factors in the acceptance or disapproval of e-transactions. On the other hand, social influence in government institutions and internet have a desire to attain status and control others and resources (as measured by one's "power value") have a detrimental impact on social acceptability.

## 7 Conclusion

M-Government adoption intentions are examined in this study, which adds to the growing body of research. Many theoretical and practical contributions are made in this study. First and foremost, this study adds theoretical depth to the TAM model by demonstrating This improved model is capable of predicting the adoption of M-Government. As a result, the model can be applied in Saudi Arabia to spot emerging patterns. For the study of M-Government technology adoption in the future. In addition, this is one of the first studies to examine the adoption of Saudi Arabia's M-Government services-based government. A country that is rapidly expanding a Middle Eastern country that is still influenced by Arab cultural and traditional values, despite the fact that it has become more modern and technologically savvy.

This study has some limitations that should be considered when interpreting the results, despite their importance. The first step is to do some research. Target homogeneity and Saudi user's perspectives restriction. The majority of respondents are university students, which may not be representative of the entire population of Saudi Arabia. From now on it will be interesting to put this system to the test on a larger scale with actual government users. Compare the findings of this study with those of other studies that publish student group brackets and other geographic categories of regions. Cross-cultural comparisons allow researchers to get the most accurate results.

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