

# A COMPREHENSIVE ADOPTION MODEL OF M-GOVERNMENT SERVICES AMONG CITIZENS IN DEVELOPING COUNTRIES

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## ABSTRACT

M-government (Mobile Government) has become popular among many developing countries including Bangladesh. Since m-government is still in early stage of implementation, few studies have identified the acceptance factors of using services among citizen. However, most of the studies identified the adoption factors based on Technology Acceptance Model (TAM), Theory of Planned Behavior (TPB), Theory Reason Action (TRA) and trust-related model. This study aims to propose an adoption model suitable for developing countries using Unified Theory of Acceptance and Use of Technology (UTAUT) and model of trustworthiness. Some important factors such as, perceived good governance and less corruption, perceived public value and culture also are included in this model.

**Keywords:** *Mobile Government, Technology Adoption, UTAUT, Trustworthiness, Public Value, Good Governance, Corruption, Developing Country.*

## 1. INTRODUCTION

Mobile technology is experiencing rapid growth in terms of capabilities of mobile devices, services, applications, standards and network implementation [1]. Thus, governments around the world are investing more on m-government projects, especially where the fixed-line is not very popular. M-government allows the government administration to communicate with citizens anytime and anywhere. M-government refers to the use of all kinds of wireless and mobile ICTs to offer government information and services to citizens, businesses and other government organisations. The International Telecommunication Union defined m-government as, “an extension or evolution of e-government through utilisation of mobile technologies for public service delivery” [2]. Thus, it became a subset of e-government rather than a new option. M-government development may aim to improve public service delivery, improve access to information and services and increase government transparency and accountability [3]. Due to the ubiquitous nature of m-government it is also as a tool to obtain

higher forms of efficiency, effectiveness, openness and proximity [4]. Despite the many advantages of m-government, it also has some challenges such as; mobile devices contain low memory and storage, small screen and keypads, and frequently need to recharge the battery. Moreover, security and privacy are the most significant challenges for m-government.

However, although adoption of m-government has the potential to provide better and faster services to citizens at lower costs, its acceptance has been limited. For example, China has more than 465 million mobile phone users, yet their m-government practices are very low [5]. This is the reality for other developing countries as well. Much of m-government research has focused on technical barriers such as, security and privacy issues and inadequate infrastructure [6,7]. While these are important issues for implementing m-government, there are risks in investing significant resources in providing technologies and services whose acceptance is uncertain. We need to look beyond the groups that are driving m-government to those individuals who will use mobile



technologies in providing or consuming m-government offerings. Success and acceptance of m-government depend on the citizens' willingness to adopt the innovation with many governments facing low level of m-government service adoption [8,9]. Although few studies have recently been conducted in developing countries such as China [10,11], India [12], and other countries [13-15], there is yet to be a complete understanding of m-government adoption in the information system (IS) literature. Thus, empirical research is needed in the area of m-government adoption.

In addition, many developing countries (i.e. India, China and Bangladesh) are implementing e-government/m-government to fight corruption. As most e-government projects in developing countries have failed [16], the governments took the initiative in implementing more m-government projects along with internet-based systems. This initiative aims to combat high levels of corruption, especially in the government sector and promote good governance. Researchers emphasized that e-government can play a significant role on good governance especially in developing countries [16]. However, as mentioned earlier the internet based e-government is not successful in many developing countries, leading researchers to acknowledge the m-government can be a solution for promoting good governance in developing countries [17,18]. Despite the huge mobile penetration in most of the developing countries, it seems that the level of m-government adoption among citizens remains low. Thus, understanding the factors that influence the citizens' intention to use m-government services is important. Therefore, this study examines the factors that influence citizens' adoption of m-government services in developing countries. We extend the UTAUT model [19] by adding a set of political constructs and trust related constructs derived from different literatures such as perceived good governance and less corruption, perceived public values and trustworthiness. The proposed m-government model can be used to help the government in implementing m-government services.

## 2. LITERATURE REVIEW

The limited numbers of studies have been conducted in particularly m-government adoption. Adoption of m-government has two

perspectives. One is the supply side and other is the demand side. Success of m-government depends on citizen acceptance. Therefore, the focus of this research will be the citizen (demand-side) adoption of m-government. Studies on m-government adoption are shown in the following sections .

El-Kiki and Lawrence developed a conceptual survey model for user satisfaction and usage of m-government services [20]. Authors have identified some factors which are influencing the satisfaction such as, pricing, content, quality of services, awareness, accessibility, availability, reliability, accuracy, responsiveness, courtesy, helpfulness, effective transaction usability, timeliness, trust, privacy, security, accountability and transparency.

Susanto and Goodwin have identified the factors that determine citizens' acceptance of SMS-based e-Government services among 25 countries [21]. The authors have collected the data through web-based survey, phone-call interviews and paper-based questionnaires from 159 respondents by asking open-ended questions. This study investigated the level of awareness and adoption of SMS-based e-government services among respondents. The results indicate that 70% of the respondents were aware of this service.

This study found that there are 15 beliefs (see table 1) which may influence citizens to use or to reject the service. Those factors are perceived ease of use, perceived efficiency in time and distance, perceived value for money, perceived responsiveness, perceived convenience, trust in the SMS technology, perceived usefulness, perceived relevance, quality and reliability of the information, perceived risk to user privacy, perceived reliability of mobile network and system performance, , trust of the government and perceived quality of public services, perceived risk to money, perceived availability of device and infrastructure, perceived compatibility, self-efficacy in using SMS. However, the relationship among the variables was not investigated in this study. Besides, the results may not be the same for the developing countries. Because the respondents in this study mainly comprise the citizens having internet access.

Afterward Susanto and Goodwin conducted another experimental study in Australia where they implemented two m-



government systems called SMS-MIIAS (Indonesian Muslim community in South Australia) and SMS-OBM (October Business Month)[22]. The authors experimented with SMS-MIIAS among the Muslim community in which they can get information about the time for prayer and breaking fast during the month of Ramadhan (a fasting month for Muslim) and SMS-OBM for business people to know information about business events. The results showed that interpersonal influence significantly affects the adoption-decision. In addition to perceived usefulness, perceived value, perceived convenience, perceived relevance, quality and reliability of information also influence adoption behaviour.

Table 1. Factors Influencing Citizen Adoption of SMS-Based eGovernment Services [22]

Factors	Definition
Perceive ease of use	The degree to which an individual perceives that an SMS-based e-government service is free of difficulty to use
Perceived efficiency in time and distance	The degree to which an individual perceives that the service will reduce the time spent and effort to go to the public service office or to use another channel.
Perceived value for money	The degree to which an individual perceives that an SMS-based e-government service is better value for the amount paid is defined as perceived value for money
Perceived responsiveness	The degree to which an individual believes that his or her SMS will be responded by government quickly, appropriately and satisfactorily
Perceived convenience	The degree to which a citizen perceives that the services can be accessed anytime anywhere.
Trust in the SMS technology	The degree to which a citizen believes that using an SMS channel is safe and will not initiate any problems for him or her is one of the factors that influences citizens to use SMS-based e-government services.
Perceived usefulness	The degree to which a citizen believes that using the SMS-based e-government service

	will help them to get what they want and make their life easier
Perceived relevance, quality and reliability of the information	The degree to which a citizen perceives that the information is relevant for him or her, reliable and of high quality is another factor which influences citizens to use or to reject an SMS-based e-government service.
Perceived risk to user privacy	The degree to which a citizen perceives that using SMS-based e-government services and dealing with the government agencies may divulge his or her personal information and pose problems for his or her privacy (perceived risk to user privacy) is another determinant of service usage.
Perceived reliability of mobile network and system performance,	The degree to which a citizen is confident that his or her mobile network is reliable when using an SMS-based e-government service and the SMS-based system is also reliable are other determinants toward using SMS-based e - government services.
Trust of the government and perceived quality of public services	The degree to which citizens trust the government and perceive that the public services have been delivered well is another belief that influences citizens to use or to reject available SMS-based e-government services.
Perceived risk to money	The degree to which an individual believes that using the services might cause financial problems.
Perceived availability of device and infrastructure	The degree to which an individual believes that the device and infrastructure for using SMS-based e-government services is available for them is another determinant of the services' usage.
Perceived compatibility	The degree to which a citizen perceives that the service is consistent with the existing public service channels and the popular communication media.

Self-efficacy in using SMS	The degree to which an individual perceives his or her ability to use SMS is one of the factors which influence a citizen to use or not use an SMS-based e-government service.
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Al-Hadidi and Rezgui investigated adoption and diffusion factors of m-Government in developed and developing countries [23]. The authors have found the technical and non-technical and as well as economic factors are influencing the adoption of m-Government. First of all, the lack of infrastructure is the main barrier particularly in developing countries. Another technical barrier is security which is equally important for both developed and developing countries. Next the authors have identified culture as non-technical barrier such as: trust, language, resistance to change, management support and user expectation. Demographic factors such as income, education level, gender, age also affect the adoption behavior. Most importantly lack of legal status also poses a big challenge for some countries. Finally, they focus on the economic impacts such as, reducing cost and time, decrease corruption and increase transparency and accountability. However, these factors found in the literature review are not empirically proved.

All of the aforementioned studies are still in conceptual level. However, some studies empirically were found to be validated afterwards [24]. Susanto and Goodwin identified 15 beliefs in adoption of SMS-based e-government services. They validated their SMS-based e-government model derived from those beliefs and others technology adoption models [25]. The authors collected data from the 589 citizens who never used SMS-based e-government services in three cities in Indonesia. The results show that attitude towards use significantly influenced the usage intention. Perceived cost, perceived compatibility and perceived convenience influence the attitude towards use. Self-efficacy significantly influenced perceived ease of use and perceived behavioural control but perceived ease of use did not influence attitude towards use. Although facilitating condition significantly influenced perceived behaviour control, perceived behavioural control and normative social influence did not directly influence usage

intention. Even though perceived personal relationship, perceived risk and perceived reliability and quality information did not influence attitude towards use. The authors argued that due to the availability, low cost, simplicity of SMS-based e-government services, social pressure and perceived behaviour control may not influence the citizens. This study only considered SMS-based e-government adoption rather than all types of mobile services. Besides, the result did not reflect those citizens who are using the services.

Susanto and Goodwin also compared their findings with adopters from Australia [24]. The results indicated that attitude towards use plays a central role among both adopters and non-adopters. Among other determinants of attitude, perceived compatibility was found to be the strongest predictor for both the adopters and non-adopters. The authors explained that the citizens have other options to use government services. Individuals tend to compare the channels they are using. However, perceived cost, perceived risk, perceived behavioural control and perceived convenience did not influence the attitude towards use. The reason they have given are based on developed country with much higher of education. SMS-based government services are almost free of cost and facilities are easily available. Thus they are more confident with services and it has become their way of life.

Abdelghaffar and Magdy conducted an empirical study on adoption of m-government services in Egypt [26]. They used TAM, societal, individual, trust and cultural factors - to identify the essential factors of youth's m-government adoption. The result of this study indicated that the perceived usefulness, compatibility, social influence, youth's awareness and face to face interaction are significant determinants of youth adoption of m-government services. The authors found that higher level of perceived compatibility would increase youth intention to use m-government services. The study indicated that social influence had a significant contribution to the youth intention to adopt m-government services. The authors argued that the Egyptians are widely affected by their family and friends. Those who have better awareness about the usefulness of using m-government services are more likely to adopt m-government services. Consistent with few studies, the result indicated that perceived ease of use is not significant.



Likewise, internet experience, trust and personal connections were not supported.

Similarly, Hung, Chang and Kuo studied the acceptance of mobile e-government in Taiwan [13]. They empirically validated their acceptance model among 331 users of m-government services and found that perceived usefulness, perceived ease of use, trust, interactivity, external influence, interpersonal influence, self-efficacy, and facilitating conditions are critical factors. Most surprisingly, compatibility was found to be an insignificant factor towards attitude. This is in contradiction with others where they found compatibility was the strongest predictor [24,26]. They also provided the explanation that the m-government services in Taiwan are still developing and hence compatibility was less important in their study.

Shareef and others developed a mobile government adoption model based on TAM, Diffusion of Innovation (DOI) and trust related constructs [11]. They have tested their model in Urban and Sub-urban citizens in India. The result indicated that the relative advantage, perceived ease of use, perceived security and empathy are the important predictors in m-government adoption. In addition, perceived reliability also have positive relationship with adoption although it is a weak contributor. However, compatibility and perceived usefulness were found insignificant predictors in adoption m-government among Indian citizens. Compatibility was also found to be insignificant in the above studies [13]. But other studies found compatibility as a strongest predictor [24,26].

Liu and others have conducted another empirical studies on m-government adoption in rural China [11]. They used integrated model based on modified TAM, trust and social variables to assess the m-government adoption. The study found that the long-term usefulness, social influence, perceived ease of use directly influence the intention behavior. However, near-term usefulness and image were not found to be significant predictor in intention to use m-government services. In addition, integrity and benevolence have indirectly influence intention to use through near-term usefulness and long-term usefulness

Recently, Wang has validated m-government adoption model in China which is based on TAM model [10]. In this study, perceived value was used as a dependent variable

rather than intention to use. Authors argued that the study context was based on continuous use (long-term use) instead of initial adoption. The study also provided the consequence of perceived value as satisfaction, trust in technology, trust in agent and trust in government. The result indicated that the perceived usefulness, mobility and perceived security are the strongest predictor in perceived value. On the other hand consequence of perceived value contributed to users' satisfaction, trust in technology, trust in agent and trust in government. Contrary to other studies [11,12], perceived ease of use found insignificant predictor for Chinese people). However, this result is supported by Abdelghaffar & Magdy.

Table 2. M-government Adoption Studies

Studies	Theoretical Background	Findings
[25]	TPB	<p>The results show that attitude towards use significantly influenced the usage intention. Perceived cost, perceived compatibility and perceived convenience influence the attitude towards use. Self-efficacy significantly influenced perceived ease of use and perceived behavioural control</p> <p>However, perceived ease of use did not influence attitude towards use. Although facilitating condition significantly influenced perceived behaviour control, perceived behavioural control and normative social influence did not directly influence usage intention.</p> <p>Even though perceived personal relationship, perceived risk and perceived reliability and quality information did not influence attitude towards use.</p>
[26]	TAM, societal,	The result of this study indicated that the



### 3. M-GOVERNMENT ADOPTION MODEL

Based on the literature review, this study formulated an m-government adoption model using UTAUT model by integrating some other constructs such as trustworthiness, perceived public value, perceived good governance and less corruption and culture. The detailed relationships among each factor with supported studies for m-government model (see figure 1) are provided in the following section.

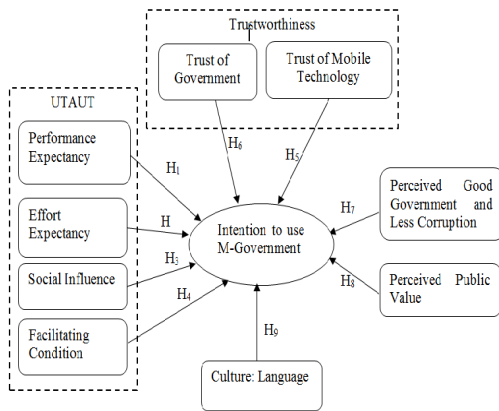


Figure 1. Proposed M-Government Adoption Model

#### Performance expectancy

Performance expectancy refers to the degree to which individuals believe that using a system will help them improve their job performance. Venkatesh and others integrated similar constructs from other model such as perceived usefulness, outcome expectancy, relative advantage, job fit and extrinsic motivation constructs into performance expectancy factors [27]. Performance expectancy was found as a strong predictor of intention to use Information Technology [28]. A large number of prior studies also validated performance expectancy as a significant predictor of intention to use e-government services adoption [29,30]. Thus, the following hypothesis was formulated.

H1: There is a direct and positive relationship between performance expectancy and intention to use m-government services.

#### Effort Expectancy

Effort expectancy refers to the degree of ease associated with the use of the any system. Venkatesh and others integrated effort

expectancy from other models based on similar constructs such as perceived ease of use, complexity, and ease of use [19]. Many researchers proved that perceived ease of use is a significant determinant of user acceptance of information technology [32]. Marchewka and others claim that effort expectancy can be significant determinant in user acceptance of information technology [31]. Extensive numbers of studies [29,30] found that effort expectancy has a significant influence on intention to use e-government service. In contrast, Chau and Hu, argue that effort expectancy does not have significant influence to intention to use behavior [33]. In this study, effort expectancy was considered as a determinant of intention to use the m-government services because the respondents also contained rural citizens. Thus, the following hypothesis was formulated.

H2: There is a direct and positive relationship between effort expectancy and intention to use m-government services.

#### Social Influence

Social influence refers to “the degree to which peers influence use of a system” [19]. Citizen’s decisions influence by their family, colleagues and friend’s [34]. The findings of many scholars like Venkatesh et al., (2003) integrated social factors in MPCU, subjective norms in TRA, TAM2, and TPB, and image in IDT into the social influence construct. In many e-government adoption studies researchers found that the social influence is the significant determinant of intention to use [29][30]. Thus, the following hypothesis was formulated.

H3: There is a direct and positive relationship between social influence and intention to use m-government services.

#### Facilitating Conditions

Facilitating condition is the degree to which an individual believes that an organizational and technical infrastructure exists to help the system [19]. Venkatesh and others integrated facilitating conditions based on other constructs such as: perceived behavioural control, facilitating conditions, and compatibility from the TPB, TAM, Model of Personal Computer Utilization (MPCU), and Innovation of Diffusion Theory (IDT) models. Although facilitating condition in UTAUT model found to be significant predictor to actual usages behavior



and this relationship also supported by other researchers in the field of technology studies [31-33]. However, some studies focus on only intention to use services due to the initial stage of that particular technology. For example, few researchers in e-government fields have shown that the facilitating condition also influence intention behavior [35,36]. Thus, the following hypothesis was formulated.

H4: There is a direct and positive relationship between facilitating condition and intention to use m-government services.

### Trustworthiness

In most developing countries, citizens do not trust the government, especially when there has been a history of dictatorship, political instability and corruption. Thus, the trust factor has been gaining enormous attention among many researches especially in the field of e-commerce, m-commerce and e-government [37-40]. Rotter defined trust as an expectancy that the promise of an individual or group can be relied upon [41]. On the other hand, Belanger and others defined trustworthiness as, “the perception of confidence in the electronic marketer’s reliability and integrity” [42].

According to the Hart–Teeter national survey reported by General Accounting Office (GAO), “many Americans concerns about sharing their personal information with the government over the internet, fearing that the data will be misused and their privacy diminished” [43]. Although trustworthiness is a complicated term, however, researchers explained the impact of trust on adoption of information systems. Tan and Theon believed that in any electronic services, people must trust in the service provider as well as the mechanism through which the services are provided [44]. For m-government services, we must have trust in the government as the service provider and the mobile technology through which the government offers its services [40]. Many e-government researchers classified trust of the internet (TOI) as institution-based trust. Similarly, in m-government services, trust of the mobile technology (TOM) will be considered as institution-based trust. Trust of government (TOG) refers to, “one’s perception regarding the integrity and ability of the agency providing the services” [45]. For m-government services, there might arise a question as to whether it is necessary for the citizen to be confident about

the government as the service provider as well as the mobile technology it is using to offer the services. Many researchers tested the trust as a determining factor of e-commerce and e-government adoption services. Thus, the following hypotheses were formulated.

H5: There is a direct and positive relationship between trust of the mobile technology (TOM) and intention to use.

H6: There is a direct and positive relationship between trust in government (TOG) and intention to use.

### Perceived Public Value

The term ‘perceived consumer value’ is used in marketing research [46]. Numerous IS/IT studies have explored the concept of perceived value as the ‘perceived benefit’ and found that it is an influential determinant of technology adoption and usages [47]. Gilbert and Balestrini explored perceived benefit on adoption of e-government services and found that it has a direct effect on intention to use [48]. They identified the determinants of perceived benefit such as, avoiding personal interaction control, time, cost, convenience and personalization.

In a recent study, the construct of public value has been included in the e-government phenomenon. Kelly and others defined public value as, “the value created by the government through services, laws regulation and other actions” [49]. Alhujran empirically proved that perceived public value is the most influential determinants of e-government adoption [50]. Furthermore, Susanto and Goodwin explored ‘perceived value’ as citizens’ attitude toward using the service [22]. They referred to perceived value as, “the degree to which an individual perceives that what is received from the services is worthy to what is given to the services”. Thus, the following hypothesis was formulated.

H7: There is a direct and positive relationship between perceived public value and intention to use.

### Culture

As the nature of culture is complicated, its definition varies among researchers. According to Hofstede, national culture refers to, “the collective programming of the mind which distinguishes the members in one human group from another” [51]. Thomas and Streib opined





that culture significantly influenced the technology adoption behaviour in developing countries [52]. Mahadeo examined cultural aspects (i.e. language) in e-government adoption in Mauritius where the French was spoken while English was the official language [35]. The author assumed that language has a direct and positive effect on behaviour intention. Thus, the following hypothesis was formulated.

H8: There is a direct and positive relationship between language and intention to use.

### **Perceived Good Governance and Less Corruption**

Social scientists and economists have discussed the importance of good governance for more than two decades. Good governance has been defined in many different ways. According to the World Bank, good governance is, “epitomized by predictable, open and enlightened policy making; a bureaucracy imbued with a professional ethos; an executive arm of government accountable for its actions; and a strong civil society participating in public affairs; and all behaving under the rule of law” [53]. (United Nation Development Programme) UNDP further elaborated on this definition, “among other things, participatory, transparent and accountable, it is also effective and equitable. And it promotes the rule of law fairly. Good governance ensures that the voices of the poorest and the most vulnerable are heard in decision-making over the allocation of development resources, and that political, social and economic priorities are based on broad consensus among the three stakeholders – the state, private sector and civil society” [54].

In addition, UNDP described nine attributes of good governance such as, participation, rule of law, transparency, responsiveness, consensus orientation, equity, effectiveness and efficiency, accountability and strategic vision. Recently Kaufmann and others identified six dimensions of good governance those are defined as: voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law, control of corruption [55]. Over the last few years, researchers have paid attention on good governance in IT/IS literatures. The use of ICT in government organizations yielded good governance that reduced corruption. This, in turn, promotes sustainable development and global economic growth [56]. E-government

plays a critical role in decreasing the interaction between government and citizens, and thus reduces the discretionary power of government. It may also enhance accountability and transparency by disseminating quality information to the citizen. Moreover, it can combat corruption particularly in developing countries where corruption appears to be the greatest obstacle to economic development. Many researchers, policymakers and international organizations found that e-government is promoting good governance there by combating against corruption. As such, Alhujran empirically proved that the citizens value transparency, accountability and less corruption when they use the e-government services [50]. Similarly, Susanto and Goodwin (2010) explored that citizens’ intention to use m-government services depends on ‘perceived good governance. Thus, the following hypothesis was formulated.

H9: There is a direct and positive relationship between perceived good governance and less corruption and intention to use.

## **6. CONCLUSION**

This paper proposes an m-government adoption model based on UTAUT and trustworthines by integrating some other variables such as, perceived good governance and less corruption, perceived public value and culture (language). This model is mainly suitable for developing countries. This study reviews the literatures on m-government adoption to find the research gap in the field of information system. Then, proposes some hypotheses which will be empirically tested in the future, using the instruments from the related literatures. The outcome of this study will help the government officials to understand the needs of the users and to implement the m-government services that will be most urgent and efficient.

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