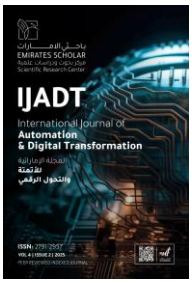

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Investigating the factors that lead to mobile government application acceptance: Extending UTAUT2 with technology readiness

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ABSTRACT

Purpose: This research intends to measure the main factors that lead to mobile government acceptance. The research intends to study the consumers' perspectives of mobile government application before and after usage. In this study, two theories are assessed the extended theory of acceptance and use of technology (UTAUT2) and technology readiness index (TRI).Research Design/Methodology: This study is considered deductive research as is seeks to examine the theories in a logical approach; from general ideas of technology acceptance towards a specific conclusions made for mobile government (m-government). The population of focus is Egyptian citizens as Egypt seeks to become completely digitalized in its public services by 2030. The sampling used is convenience sampling. 800 administrated questionnaires were used in the analysis. The questionnaires are analyzed through SEM path analysis. Findings: This study shows that before the citizens' usage of mobile applications, the factors that encouraged consumer's usage towards government services are: Perceived enjoyment and optimism towards technology in a significant and positive manner; whereas personal innovativeness and behavioural intentions impacted their m-government usage behaviour in a significant and positive manner. Once the consumers used the mobile service, their behaviour intentions towards the application were due to the following significant factors: Perceived enjoyment, personal resource cost, and optimism towards technology; whereas facilitating conditions, personal innovativeness and behavioural intention impacted their m-government usage behaviour in a significant and positive manner. Originality and Value: Many studies that have existed in the literature to assess the technology theories focus on digitalization and innovative products; few studies focused on services, such as those found through the mobile applications. In addition, studies that focus on mobile applications examine commercial and entertainment application. This study contributes insights that show consumers' usage to government services applications, which help practitioners in the public sector to create an application that is deemed attractive to the citizens, encouraging its usage.

Keywords: *Behaviour Intention, usage behaviour, m-government, UTAUT2, TRI*

1.Introduction

Technology has had a profound influence on different fields of practice and on helping technology users in both their professional and personal life. As the application of mobile devices expands beyond just connecting to a lifestyle item, a new paradigm is emerging (Gerger, 2021). Mobile devices are rapidly being used by customers to identify merchants, perform product research, make purchases, and manage their accounts (Wang and Teo 2020). At first this technology were used by commercial businesses; and now government entities are beginning to create their own applications so consumers can use them on their mobile phones, which is known as M-government (Mandari and Koloseni, 2021).

Egypt is a developing country that seeks to become digitalized by 2030. The Ministry of Communications and Information Technology (MCIT) seeks to develop the national information and communication technology (ICT) sector. The Ministry of Communications and Information Technology (MCIT) works to realize the digital economy by utilizing ICT technologies to create freedom, democracy, social equality, and wealth for all. Its objective is to accelerate the emergence of a society that is knowledge-based in the digital age and a strong digital economy built on equitable and cost-effective knowledge access, digital rights and the improvement of a dynamic and inventive information and communication technologies industry. Egypt has developed many mobile applications (M-government) to aid in this 2030 vision (MCIT, 2022).

M-government has made it feasible for anybody with a mobile phone to access government services, thereby eliminating the need for internet connectivity to the World Wide Web (Quintanilla, 2015). A mobile application, also known as an app, is application software that is used to run on a mobile phone. Mobile applications often serve to furnish consumers with comparable administrations to those got on PCs (Mossey et al., 2019). When governments seek to create an application, they intend to make the services more convenient for the citizens; with the application, citizens gain more accessibility through their phones, provide integration with other systems, increase flexibility and scalability, etc. People using mobile applications can complete a service without physically being available (Fei, 2021). Nevertheless, these advantages are not encouraging individuals to use mobile government applications. People still prefer to go to the government entity to conduct their requests (Azab et al., 2009). Therefore, it is important that practitioners to understand why consumers are not using the application like they use commercial and entertainment application (Tang et al., 2021). Poor system adoption means that the investment returns will be lower than expected throughout the system development phase (Busolo, 2021).

Many theories and models exist to explain consumer technology acceptance, which is necessary to gain an understanding of user's willingness to employ technology for the tasks it is designed to support (Ahmad and Khalid, 2017). Many models exist in the literatures that illustrate the different products and innovations acceptance (Liang et al., 2021); nevertheless, few studies have tested the models on mobile applications, specifically in relation to government services (Sharma et al., 2018). Accordingly, there is a need in literature to study this issue and fill in this academic gap. According to Venkatesh et al. (2003), different components may be taken from several user acceptability models that have been coined by various scholars to help explain the dynamics that influence the introduction of applications in new cultures.

Studying the factors that affect mobile government services adoption in Egypt is significant for several reasons. Firstly, it helps in understanding the challenges and opportunities associated with the adoption of mobile government services in a developing country like Egypt. This understanding is crucial for the effective implementation of digitalization efforts and the provision of government services to citizens (Elbatanouny et al., 2023). Secondly, it can contribute to the development of theoretical frameworks and models that explain user acceptance of government mobile applications,

which can be valuable for policymakers and practitioners (Elbatanouny et al., 2023). Additionally, by identifying the factors that influence adoption, it becomes possible to address barriers and enhance the adoption of mobile government services, ultimately leading to improved service delivery and governance (Elbatanouny et al., 2023).

This article is divided into sections for the convenience of the reader. The introduction is followed by the following sections, which seek to provide a literature review and explain the theoretical background, leading to a detailed literature review with associated theories. Hypotheses are then produced based on logical links between the theoretical framework's suggested constructs. The research design, measuring scale, and methodology that were utilized in order to investigate the suggested theoretical framework using the structural equation modeling (SEM) approach are described in the following section. The results of the analysis are detailed in the section that follows. Goodness of fit (GoF) analysis and hypothesis testing will be covered. Finally, the main findings will be clarified, followed by the research conclusion, implications, the study's limitations, and concluding remarks.

2.Theoretical background

The world is currently experiencing a revolution in information and communication technology (ICT). People are generally open and willing to try new technology because it is designed to enhance various aspects of their lives, such as education, work, and leisure. In today's market, it is difficult for individuals to achieve sustainable development and progress in their activities without utilizing available technological products (Batanony, S.E., & Aziz, R.A. 2015; Almarashdeh and Alsmadi, 2017). However, while technology acceptance is common, individuals do not always have the intention to use it (Saxena, 2017; El batanony et al., 2008). Therefore, it is crucial to create strategies and campaigns that encourage consumer appeal. Many models and theories have been developed to investigate the elements that impact users' decisions on how and when to utilize new technological inventions (Talukder et al., 2020). This study focuses on identifying the factors that drive mobile application acceptance.

This section will provide a brief overview of the theoretical frameworks that have been previously used to investigate technology adoption. The technology acceptance model (TAM) developed by Davis (1989), the unified theory of acceptance and use of technology (UTAUT) developed by Venkatesh et al. (2003), and the extended theory of acceptance and use of technology (UTAUT2) developed by Venkatesh et al. (2012) are some of the commonly used models, along with Parasuraman's (2000) technology readiness index (TRI). While these models are somewhat similar to and influenced by the theory of reasoned action (TRA) developed by Fishbein and Ajzen (1975), they also have notable differences.

Reviewing the existing research uncovers a variety of theories that were utilized to explain the technology adoption behaviour of individuals. Most of these models, for instance, Davis' (1989) technology acceptance model (TAM), are influenced by Fishbein and Ajzen's (1975) theory of reasoned action (TRA). Van-Raaij and Schepers (2008) state Fishbein and Ajzen's (1975) theory of reasoned action (TRA) is one of the most important and widely used theories for forecasting human behaviour. According to Fishbein and Ajzen's (1975), attitudes towards behaviour are determined by subjective norms, which directly affect intention, which in turn determines specific human behaviour. The theory of reasoned action (TRA) is built on essential core ideas of social and human psychology. In this context, attitude is a person's view of participating in a particular behaviour, whether positive or negative. According to Fishbein and Ajzen's (1975), subjective norms, on the other hand, indicate whether important others see a specific behaviour positively or negatively. Moreover, any potential driving forces that could have an effect on a certain behaviour trait are intended to be included in the intention towards behaviour. Hence, intention shows how motivated a person is to engage in a particular behavioural activity (Ajzen and Fishbein, 1980).

The claim stated by Fishbein and Ajzen's (1975) theory of reasoned behaviour (TRA) is one of the key presumptions of Davis' (1989) Technology Acceptance Model (TAM), which holds that behaviour intention mediates the effect of extrinsic influencing variables on human behaviour. TAM asserts that many external variables, including self-efficacy, training implementation, and system design, affect the intention of an individual through perceived usefulness and perceived ease of use.

Thus, the intensity of a person's feelings about whether he or she will be able to employ a specific technology without trouble is referred to as perceived ease of use, and the extent to which a person believes a certain technology is beneficial in everyday life is referred to as perceived usefulness (Davis, 1989). The technology acceptance model (TAM) is considered the leading model to present human psychology aspects for understanding persons' attitudes (i.e., perceived ease of use and perceived usefulness) as motivators for using new technologies; nevertheless, the fundamental difference between the technology acceptance model (TAM) and the theory of rational action (TRA) was the exclusion of subjective norms (Davis, 1989).

According to Davis (1989), the Technology Acceptance Model (TAM) has been extensively utilized in research studies to examine the adoption of technology from both consumer and organizational viewpoints. Nonetheless, recent scholarly work has proposed more inclusive models that consider both perspectives of technology adoption.

One of these models is the Unified Theory of Acceptance and Use of Technology (UTAUT), which was developed by Venkatesh et al. (2003). UTAUT concentrates on the organizational outlook of technology adoption behavior and examines the factors that influence organizations' adoption of information technology. The model identifies four crucial factors that shape organizational behavioral intention to adopt new technology, including performance expectancy, effort expectancy, social influence, and facilitating conditions.

Another model that has gained considerable attention in recent years is the extended theory of acceptance and use of technology (UTAUT2), which was also developed by Venkatesh et al. (2012). UTAUT2 builds on UTAUT and expands its scope to include the consumer perspective of technology adoption behavior. The model identifies seven key constructs that impact the behavioral intention of consumers to adopt new technology, including performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, price value, and habit.

In summary, these models offer a framework for comprehending the factors that influence the adoption of technology from both an organizational and consumer perspective. Understanding these factors is crucial in developing effective strategies for technology adoption that can result in increased productivity, efficiency, and growth for organizations and enhanced technology experiences for consumers facilitating conditions.

In conclusion, these models provide a framework for understanding the factors that influence the adoption of technology, both from an organizational and consumer perspective. Understanding these factors is crucial in designing effective strategies for technology adoption that can lead to increased productivity, efficiency, and growth for organizations and enhanced technology experiences for consumers.

The Unified Theory of Acceptance and Use of Technology (UTAUT) was developed by Venkatesh et al. in 2003 to describe the factors that affect the adoption and use of Information and Communication Technologies (ICTs) by organizational employees. The UTAUT model is based on eight different models drawn from various social and psychological theories, such as the Theory of Reasoned Action (TRA), Technology Acceptance Model (TAM), Theory of Planned Behaviour (TPB), and the Model of PC Utilization (MPCU) (Tosuntas et al., 2015), and it comprises four dependent variables that affect the use behavior (UB) of technology, namely effort expectation (EE), performance expectation (PE),

social influence (SI), and facilitating conditions (FC) (Venkatesh et al., 2003). This model has been widely used to assess the adoption and use of ICTs in different fields, such as e-government adoption, online banking, online ticketing system, online learning, online recruiting process, and online ticketing system (Wulff et al., 2014; Schaupp et al., 2010; Nair et al., 2015; Farooq, 2016).

The UTAUT model has been extended in UTAUT2 by adding three new variables, namely habit (H), price value (PV), and hedonic motivation (HM), in addition to the four primary constructs (Venkatesh et al., 2012). UTAUT2 attempts to measure consumer acceptance and use of technology by including these seven dependent variables. The new variables are derived from the revised and modified UTAUT, the hedonic motivation (HM) (Van-der-Heijden, 2004), the idea of habit (H) (Limayem et al., 2007), and the price value (PV) (Ketterl et al., 2011; Burton-Jones and Straub, 2006).

UTAUT3 is an extension of the UTAUT2 model that adds an additional independent variable, Personal Innovativeness (PI) in Information Technology (IT) context, to the eight predictors of technology acceptance. This model has been recognized for its significance in assessing the adoption and use of technology (Gunasinghe et al., 2019).

The integration of Technology Readiness Index (TRI) and the extended Unified Theory of Acceptance and Use of Technology (UTAUT2) offers a robust framework for predicting and understanding technology adoption behavior, particularly in the context of mobile applications. This academic synthesis will draw from relevant literature to demonstrate the potential benefits of this combined approach.

TRI, as proposed by Parasuraman (2000), measures an individual's psychological willingness to accept new innovations and technologies, encompassing optimism, insecurity, discomfort, and insecurity as key components. UTAUT2, developed by Venkatesh et al. (2012), extends UTAUT by including additional moderators and provides a more comprehensive understanding of technology adoption behavior (Kwateng et al., 2019).

Previous research has shown that TRI impacts readiness to accept and use a technical service or product, with factors such as innovativeness and optimism positively influencing readiness to accept and inhibits such as insecurity and discomfort negatively influencing readiness to usage. UTAUT2 has been proven to be highly efficient at interpreting mobile payment technology adoption intentions and actual usage behavior (Kwateng et al., 2019).

The combination of these two models recognizes the unique characteristics of users and their personal attitudes towards technology. For instance, Lin et al. (2007) combined technological readiness (TR) and the acceptance model (TAM) into one model (TRAM) and discovered a substantial association between technology readiness (TR) and behavioral intention (BI) in the e-service context. Several researchers have discovered similar results.

This study proposes a combination of technological readiness (TR) and UTAUT2 based on the aforementioned relevant m-service and e-service and adoption research and follows the same logic connection formed by several researchers. The integration of TRI and UTAUT2 can provide a more comprehensive understanding of the complex interplay of factors that influence technology adoption and user behavior, thereby offering valuable insights for researchers and practitioners in the field of technology adoption and mobile application development.

3.Development of hypotheses and theoretical framework

Hypothesis development

As a result of this advancement, we have come to the conclusion that TRI and UTAUT2 will perform as the underpinning theories for the investigation of m-government application service adoption and use in Egypt. According to technological readiness index (TRI) Parasuraman, (2000) and extended theory of acceptance and use of

technology *(*UTAUT2) and proposed by and Venkatesh et al.'s (2012), respectively, personal innovativeness (PI) and insecurity, perceived enjoyment, effort expectancy regarding ease of use (EE), social influence (SI), performance expectancy (PE), perceived cost personal resource, facilitating conditions (FC), optimism towards technology (OT) all have a significant impact on intention to use m-government services (BI). Additionally facilitating conditions, personal innovativeness and insecurity have a significant impact on usage behaviour (UB) (of m-government services). Furthermore, 'intention to use' has a significant influence on usage behaviour (of m-government services). Thus, taking into account how the UTAUT2 and TRI models' current variables logically relate, i.e. perceived enjoyment, effort expectancy regarding ease of use (EE), social influence (SI), performance expectancy (PE), perceived cost personal resource (PC), facilitating conditions (FC), perceived cost personal resource (PC), optimism towards technology (OT), personal innovativeness (PI), insecurity, intention to use m-government services (BI) and usage behaviour (UB), we propose the following hypotheses:

Perceived enjoyment is a crucial factor in technology adoption. When users find a technology enjoyable, they tend to use it more. Social media studies show that perceived enjoyment positively affects users' intent to continue using platforms like Facebook or Instagram. Moreover, the hedonic aspects of technology use, such as entertainment and pleasure, significantly contribute to users' satisfaction and intent to adopt new services (Venkatesh et al., 2012).

H1. There is a significant relationship between perceived enjoyment and behavioural intentions to use m-government application (BI).

Performance expectancy is users' belief in the usefulness of a technology, and it consistently influences technology adoption intentions. Users who perceive higher performance benefits are more likely to express positive intentions toward using a system (Venkatesh et al., 2003).

H2. There is a significant relationship between performance expectancy (PE) and behavioural intentions to use m-government application (BI).

Effort expectancy is a key determinant of users' perceptions of technology adoption. Perceived ease of use has been consistently found to have a significant positive effect on adoption intentions, according to the Technology Acceptance Model (TAM) (Davis, 1989; Venkatesh et al., 2003). Thus, it is essential for designers and developers to prioritize ease of use in their products to ensure their widespread adoption.

H3. There is a significant relationship between effort expectancy (EE) and behavioural intentions to use m-government application (BI).

Social influence is a key factor in technology adoption (Venkatesh et al., 2003). According to the theory of reasoned action (TRA) and the theory of planned behavior (TPB), subjective norms - or the perceived influence of significant others - can significantly impact an individual's behavioral intentions. Research has shown that when individuals perceive that family, friends, or colleagues endorse a particular technology, they are more likely to adopt it (Venkatesh et al., 2003). These findings have important implications for promoting the adoption and diffusion of new technologies.

H4. There is a significant relationship between social influence (SI) and behavioural intentions to use m-government application (BI).

Facilitating conditions, including infrastructure, technical support, and resources, play a crucial role in technology adoption (Venkatesh et al., 2003). In the context of e-government adoption, users are more likely to express positive intentions towards using e-government services if they perceive necessary resources are readily available (Venkatesh et al., 2003). Policymakers must understand the factors that facilitate or impede technology adoption to devise strategies to enhance technology adoption.

H5a. There is a significant relationship between facilitating conditions (FC) and Behavioural intention to use m-government application (BI).

Facilitating conditions - such as user-friendly interfaces, reliable connectivity, and timely support - have been found to be essential in shaping both intentions and actual usage behavior (Venkatesh et al., 2003). Therefore, it is crucial for m-government service providers to optimize these conditions to promote consistent and sustainable usage behavior among users.

H5b. There is a significant relationship between facilitating conditions (FC) and m-government usage behavior (UB).

Perceived cost significantly influences technology adoption (Venkatesh et al., 2012). This includes both monetary and non-monetary aspects. High perceived costs related to time, effort, or personal resources associated with using m-government services can decrease users' intention to adopt (Venkatesh et al., 2012). Conversely, perceived affordability positively affects adoption intentions (Venkatesh et al., 2012). Thus, it is essential to consider perceived cost when designing and promoting m-government services to enhance their adoption and usage.

H6. There is a significant relationship between perceived cost personal resource (PC) and behavioural intentions to use m-government application (BI).

According to Parasuraman (2000), optimistic individuals tend to be more open to change and exhibit a positive attitude towards technological advancements. This dispositional factor has been found to have a significant impact on technology acceptance, as optimistic users are more likely to express positive intentions towards adopting new services. Therefore, the role of dispositional factors such as optimism should be considered when examining the factors that influence the adoption of new technologies (Parasuraman, 2000).

H7. There is a significant relationship between optimism towards technology (OT) and behavioural intentions to use m-government application (BI).

Personal innovativeness refers to an individual's willingness to adopt new technologies or innovations. Research in the context of technology adoption has consistently found that individuals with higher levels of personal innovativeness are more likely to embrace novel services. For instance, Rogers' Diffusion of Innovations theory emphasizes that innovators and early adopters exhibit higher personal innovativeness. Therefore, users who perceive themselves as innovative are more likely to express positive intentions toward using m-government services (Farooq et al., 2012).

H8a. There is a significant relationship between personal innovativeness (PI) and behavioural intentions to use m-government application (BI).

The link between personal innovativeness and actual usage behavior is well-documented. Innovative individuals tend to explore and experiment with new technologies. In the context of m-government services, users who score high on personal innovativeness are more likely to actively use these services. Their curiosity, openness to change, and willingness to explore novel features contribute to sustained usage (Farooq et al., 2017).

H8b. There is a significant relationship between personal innovativeness and m-government usage behavior (UB).

Insecurity can act as a barrier to technology adoption. Users who feel uncertain or insecure about using m-government services may hesitate to express positive intentions. Research on trust and security perceptions in e-government contexts has shown that perceived security significantly influences adoption intentions. When users trust that their personal information is secure and their privacy is protected, they are more likely to intend to use such services (Apaua and Lallie, 2022).

H9a. There is a significant relationship between insecurity and behavioural intentions to use m-government application (BI).

Insecurity not only affects intentions but also shapes actual behavior. Users who lack confidence in the security of m-government services may limit their interactions or avoid certain features altogether. For instance, concerns about data breaches, identity theft, or unauthorized access may lead to cautious usage patterns. Therefore, addressing users' security concerns is crucial for promoting sustained usage (Almaiah et al., 2019).

H9b. There is a significant relationship between insecurity and m-government usage behavior (UB).

The relationship between behavioral intentions and usage behavior is fundamental. Users' intentions serve as precursors to actual actions. Research on technology adoption consistently confirms that strong intentions lead to increased system usage. When users express positive intentions (such as the intention to use m-government services), they are more likely to follow through and engage in consistent usage. Therefore, understanding and enhancing behavioral intentions can directly impact the success of m-government initiatives (Venkatesh et al., 2012).

H10. There is a significant relationship between behavioural intentions to use m-government application (BI) and m-government usage behavior (UB).

Proposed theoretical framework

For this study, we have proposed a theoretical framework that is developed on the foundation of the previously mentioned hypothesized relationships, which includes nine latent exogenous constructs, i.e. perceived enjoyment, effort expectancy regarding ease of use (EE), social influence (SI), performance expectancy (PE), effort expectancy regarding ease of use (EE), facilitating conditions (FC), perceived cost personal resource (PC), optimism towards technology (OT), insecurity, personal innovativeness (PI) and two endogenous valuables, i.e. intention to use m-government services (BI) and usage behaviour (UB). Figure 1 provides a proposed framework that is offered together with a graphic representation of the hypothesized path relations and a graphic representation of this proposed framework.

The proposed theoretical framework reveals how current variables of UTAUT2 and TR impact the adoption of m-government application services and use in Egypt as well as the intention to use m-government services (BI) and usage behaviour (UB). More precisely, intention to use m-government services (BI) to use m-government application services is

In Beirut, Lebanon, the private sector has been dealing with a lot of struggles, especially in light of the digital revolution. The Lebanese private sector must create practical solutions to these problems in order to manage the quickly changing environment. The balanced scorecard and the blue ocean strategy are two tactics that are popular in the business sector. In addition to examining the relationship between these strategies and digital transformation in the Lebanese private sector, the research will look at the function of Porter's Five Forces, the BCG matrix, and Hoshin Kanri.

Albert S. Humphrey was an American organizational theorist and management consultant best known for his development of the

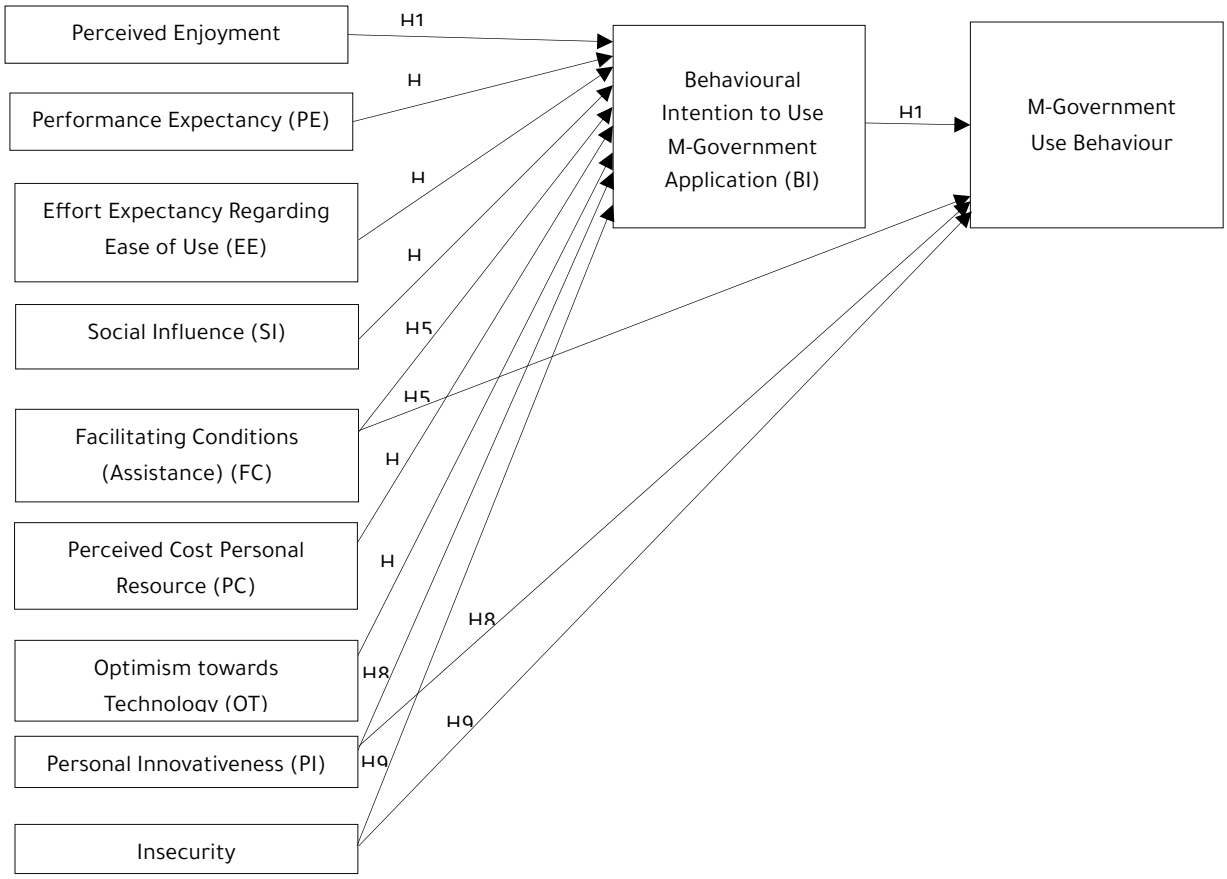

Figure 1: Proposed theoretical framework

preceded by every nine exogenous latent constructs, i.e. perceived enjoyment, facilitating conditions (FC), effort expectancy regarding ease of use (EE), social influence (SI), performance expectancy (PE), perceived cost personal resource (PC), optimism towards technology (OT), personal innovativeness (PI), insecurity, Nonetheless, according to the conclusions that can be drawn from the research review's logical connections, this framework proposes that actual usage behaviour (UB) towards m-government application services is impacted by four valuables, i.e. personal innovativeness (PI), facilitating conditions (FC), insecurity and intention to use m-government services (BI).

4.Research design

The research intends to measure the main factors that lead to mobile government acceptance, and the study's goal is to investigate consumers' perspectives of mobile government application before and after usage. To achieve this goal, the researcher employed a positivist philosophy and a logical approach, using a quantitative research method that utilized an administrated questionnaire to collect the necessary data from mobile applications users. The ultimate sample size was 400 customers, with questionnaires handled for two stages of pre and post-intervention. The proposed theoretical framework for the investigation of m-government application service adoption and use in Egypt is based on two theories, the Unified Theory of Acceptance and Use of Technology (UTAUT2) and the Technology Readiness Index (TRI). Figure 2 illustrates proposed m-government application.

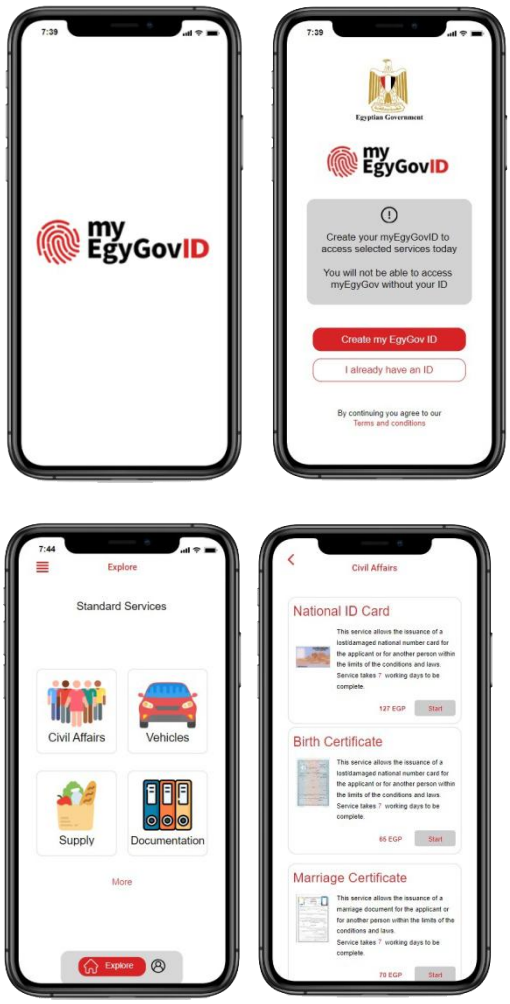

Figure 2: Proposed m-government application

The researcher followed ethical procedures before conducting the data collection that was set by the university. In this study the variables were assessed in the quantitative research by five point likert scales (1 meaning strongly disagree and 5 meaning strongly agree) that were developed by prior research. For example, the scale that measured perceived enjoyment was developed by Park and Pobil (2013); the scale that measured Performance Expectation was developed by Im et al., (2011); Effort Expectancy regarding ease of use was developed by Im et al., (2011); Social Influence was developed by Deng et al., (2011); Facilitating Conditions (Assistance) was developed by Teo, (2010); Perceived personal resource Cost was developed by Kozak, and Andreu, (2006); Personal innovativeness was developed by Jackson et al., (2014); Optimism towards technology was developed by Lin and Hsieh, (2006); Insecurity was developed by Chen and and Tung, (2014); Behavioural Intention was developed by Park and Pobil, (2013); and Use Behaviour was developed by Park and Pobil, (2013). Before the actual data collection took place, a pilot test was conducted on 50 individuals to see if the questionnaire after modification is understood and reliable to be used in this study. Collecting data started once the pilot test proved the scales' validity and reliability. The questionnaire was placed online on the university website.

Research findings and results

Once the necessary data was gained for the quantitative research, the researcher sought to assess the data and test the hypotheses through the use of statistical analysis with the program of SPSS and AMOS version 20. Based on the analysis, the participants of this study come from different socio-demographic background. Table 1 illustrates the portfolio of the individuals that participated in the study.

Table 1: The Participants of the Study

Descriptive Statistics for Before Mobile Application Development				Descriptive Statistics for Before Mobile Application Development			
Item	Category	Frequency (N=400)	Percent %	Item	Category	Frequency (N=400)	Percent %
Age	Under 20	32	8.0	Age	Under 20	90	22.5
	20 - less than 35	227	56.8		20 - less than 35	215	53.8
	35 - less than 50	87	21.8		35 - less than 50	58	14.5
	50 - less than 65	44	11.0		50 - less than 65	26	6.5

	65 and above	10	2.5		65 and above	11	2.8
Education	Elementary School	1	.3	Education	Elementary School	3	.8
	High School	63	15.8		High School	105	26.3
	College Degree	104	26.0		College Degree	175	43.8
	Graduate Degree	102	25.5		Graduate Degree	52	13.0
	Postgraduate Degree	107	26.8		Postgraduate Degree	33	8.3
	Other	23	5.8		Other	32	8.0
City	Cairo	86	21.5	City	Cairo	66	16.5
	Alexandria	294	73.5		Alexandria	300	75.0
	Other	20	5.0		Other	34	8.5
Gender	Female	172	43.0	Gender	Female	191	47.8
	Male	228	57.0		Male	209	52.3
Marital	Single	239	59.8	Marital	Single	284	71.0
	Married	145	36.3		Married	88	22.0
	Divorced or Separated	13	3.3		Divorced or Separated	16	4.0
	Widowed	3	.8		Widowed	12	3.0
Children	None	243	60.8	Children	None	301	75.3
	One	36	9.0		One	21	5.3
	Two	79	19.8		Two	52	13.0
	More than two children	42	10.5		More than two children	26	6.5
Job	Manager/Executives	67	16.8	Job	Manager/Executives	47	11.8
	Clerks	37	9.3		Clerks	20	5.0
	Professionals	18	4.5		Professionals	17	4.3
	Academics	102	25.5		Academics	92	23.0
	Self Employed	20	5.0		Self Employed	19	4.8
	Technician	2	.5		Technician	3	.8
	Other	154	38.5		Other	201	50.3
Income	Less than 2,000	59	14.8	Income	Less than 2,000	81	20.3
	2,000 - less than 5,00	70	17.5		2,000 - less than 5,00	77	19.3
	5,000 - less than 10,0	85	21.3		5,000 - less than 10,0	69	17.3
	Over 10,000	186	46.5		Over 10,000	173	43.3

Before testing the hypotheses, the research sought to confirm the reliability and the validity of the scales to make sure that the collected data were from scales that are consistent and dependable and measure what they intend to measure. According to table 2, the study's scales are all accepted as valid and reliable. Based on the table, the data analysis showed a significant Bartlett's Sphericity test and sampling adequacy according to the Kaiser-Meyer-Olkin (KMO) measure of greater than 0.5, which was considered good, which was regarded as good. It was discovered that the extracted average variance (AVE) was higher than 50%. Additionally, every Cronbach's alpha value exceeds 0.7. The findings revealed sufficient dependability and convergent validity.

Table 2: The Reliability and Validity Test before Mobile Application Development

	Before Usage of the application					After Usage of the application			
Variables	KMO	AVE%	Cronbach's Alpha	Items	Factor Load	KMO	AVE%	Cronbach's Alpha	Factor Load
Perceived Enjoyment	0.890	79.235	0.934	PEJ1	.826	0.847	58.754	0.822	.616
				PEJ2	.843				.627
				PEJ3	.735				.544
				PEJ4	.779				.525
				PEJ5	.779				.625
Performance Expectation	0.741	82.524	0.894	PEX1	.786	0.693	67.818	0.762	.709
				PEX2	.847				.650
				PEX3	.843				.675
Effort Expectancy	0.753	85.866	0.918	EEP1	.826	0.713	72.452	0.810	.730
				EEP2	.878				.742
				EEP3	.871				.702
Social Influence	0.724	76.474	0.846	SOI1	.748	0.678	64.168	0.718	.653
				SOI2	.747				.607
				SOI3	.799				.665
Facilitating Conditions	0.711	78.634	0.863	FC1	.771	0.686	66.032	0.739	.653
				FC2	.846				.691
				FC3	.742				.637
Personal Resource Cost	0.806	68.354	0.883	PC1	.627	0.846	65.373	0.867	.708
				PC2	.668				.630
				PC3	.729				.631
				PC4	.713				.639
				PC5	.682				.660
Optimism towards technology	0.820	64.049	0.858	OTT1	.570	0.851	59.745	0.831	.563
				OTT2	.643				.596
				OTT3	.674				.659
				OTT4	.674				.581
				OTT5	.641				.588
Personal innovativeness	0.700	72.520	0.804	PIN1	.747	0.694	68.534	0.768	.691
				PIN2	.660				.646
				PIN3	.769				.719
Insecurity	0.830	76.070	0.895	INS1	.791	0.818	69.256	0.851	.665
				INS2	.802				.750
				INS3	.704				.656
				INS4	.746				.699
Behavioral Intention	0.700	72.720	0.810	BIN1	.745	0.695	67.725	0.761	.663
				BIN2	.774				.699
				BIN3	.662				.670
Usage Behavior	0.729	78.216	0.861	ATT1	.746	0.709	71.613	0.801	.695
				ATT2	.792				.712
				ATT3	.809				.741

Structure equation model (SEM) path analysis is the method utilized in this study to test the model and hypotheses. However, prior to SEM, when a researcher extracts a factor structure to use as a measuring scale for each dimension, they must do a confirmatory factor analysis (CFA) to verify its validity (SEM). When the CFA fit was calculated, The chi-square divided by the degrees of freedom (CMIN/DF) or minimum discrepancy equaled 2.274, according to the findings; the probability of having a larger discrepancy than the current sample (p-value) equaled 0.000 before usage of mobile application while chi-square was 1.643 and (p-value) was 0.000 after usage of mobile application ; the goodness of fit (GFI) equaled 0.840 before mobile application usage while 0.882 after usage of mobile application; and the adjusted goodness of fit index (AGFI) was 0.805 before usage of mobile application while 0.859 after usage of mobile application, which compares the model's fit to the number of estimate coefficients or degrees of freedom required to achieve that level of fit; the Bentler-Bonett normed fit index (NFI) equaled 0.882 before usage of mobile application while 0.919 after usage of mobile application, and the Tucker-Lewis index or Bentler-Bonett non-normed fit index (TLI) was 0.918 before usage of mobile application while 0.962 after usage of mobile application, which compares the model's incremental fit to a null model; the CFI (comparative fit index) was 0.929 before usage of mobile application while 0.966 after usage of mobile application. Additionally, the root mean square residual (RMR) equaled 0.070 before usage of mobile application while after usage of mobile application 0.013, indicating how much the estimates of the sample variance and covariance differ from those obtained when the model is assumed to be correct; as well as the root mean square error of approximation (RMSEA), it is a supportive criteria for modeling covariance structures that provides a measures the amount of error present when trying to estimate the population, equaled 0.057 before usage of mobile application while after usage of mobile application 0.040 (Hair et al., 2016). The CFA values are shown in Table 3.

Table 3: Fit Indices and Thresholds for Measurement Model

Before Mobile Application Development			After Mobile Application Development		
Measure	Results	Threshold	Measure	Results	Threshold
Chi-square /df	2.274	< 5 sometimes permissible; < 3 good; < 2excellent	Chi-square/ df	1.643	< 5 sometimes permissible ; < 3 good; < 2 excellent
CFI	0.929	> 0.80	CFI	0.966	> 0.80
TLI	0.918	> 0.85	TLI	0.962	> 0.85
P-value	0.000	> 0.05	P-value	0.000	> 0.05
GFI	0.840	> 0.80	GFI	0.882	> 0.80
NFI	0.882	> 0.80	NFI	0.919	> 0.80
AGFI	0.805	> 0.80	AGFI	0.859	> 0.80
RMR	0.070	< 0.09	RMR	0.013	< 0.09
RMSEA	0.057	< 0.10	RMSEA	0.040	< 0.10

The hypotheses were tested in two different contexts. The first contest, when testing the hypotheses, was among the users that did not use mobile government's services, but heard about them. The researcher sought to know what factors triggered their expectations to want to develop behavior intentions towards the application. The second context when testing the hypothesis focused on the consumers who actually used mobile government applications. They were asked what interested them in the application usage to develop favorable behavior intentions. Table 4 illustrates the result of the SEM path analysis. Based on the results, when it comes to the consumer's opinion related to mobile government application, before usage, they believed that perceived enjoyment, and optimism towards technology, impacted behavioral intentions to use m-government application in a significant and positive manner; whereas personal innovativeness and behavioral intentions impacted their m-government usage behavior in a

significant and positive manner. When it comes to the usage of mobile government application, the individuals believed that perceived enjoyment, personal resource cost, and optimism towards technology, impacted behavioral intentions to use m-government application in a significant and positive manner, whereas facilitating conditions, personal innovativeness and behavioral intention impacted their m-government usage behavior in a significant and positive manner.

Table 4: Hypotheses testing through Path analysis

Consumers Before mobile government app usage						Consumers Before mobile government app usage					
			Estimate	P	R^2				Estimate	P	R^2
BI	<---	Perceived Enjoyment	.245	***	.666	BI	<---	Perceived Enjoyment	.288	.003	.470
BI	<---	Performance Expectation	-.227	.012		BI	<---	Performance Expectation	-.023	.827	
BI	<---	Effort Expectancy	-.087	.346		BI	<---	Effort Expectancy	-.310	.002	
BI	<---	Social Influence	-.029	.797		BI	<---	Social Influence	.261	.094	
BI	<---	Facilitating Conditions	.099	.266		BI	<---	Facilitating Conditions	-.084	.576	
BI	<---	Personal Resource Cost	-.073	.090		BI	<---	Personal Resource Cost	.172	.012	
BI	<---	Optimism towards technology	1.275	***		BI	<---	Optimism towards technology	.425	***	
BI	<---	Personal innovativeness	-.330	.046		BI	<---	Personal innovativeness	.042	.657	
BI	<---	Insecurity	-.031	.440		BI	<---	Insecurity	-.169	.003	
UB	<---	Facilitating Conditions	.012	.633	.940	UB	<---	Facilitating Conditions	.360	***	.657
UB	<---	Personal innovativeness	.162	***		UB	<---	Personal innovativeness	.227	***	
UB	<---	Insecurity	.027	.204		UB	<---	Insecurity	.018	.610	
UB	<---	Behavioral Intention	.782	***		UB	<---	Behavioral Intention	.304	***	

5.Research Conclusion and Discussion

This study aimed to investigate the main factors that lead to citizen's behavior intentions towards the usage of mobile government applications. The purpose this study was to pinpoint the significant facts that contribute to influence before the consumers try out the application and after they try out the application. This study sought to investigate this topic as mobile applications enable the government service to be available to anyone at any time. The applications' core functionality is designed to work offline without the internet. Nevertheless, its usage is limited and not common among citizens. Thus, this study examined the intention to use mobile applications

for the government services in Egypt. This study combines two main theories of technology acceptance to pinpoint people's motive in using the application.

Individuals have developed a perception about mobile government application without its direct usage. Based on the analysis in this study, it was found that consumers' opinion related to mobile government application, before usage, indicated that perceived enjoyment, optimism towards technology, impacted consumers' behavioral intentions to use m-government application in a significant and positive manner; whereas personal innovativeness and behavioral intentions impacted their m-government usage behavior in a significant and positive manner. The variables effort expectancy, social influence, facilitating conditions, and perceived cost personal had an insignificant impact on consumers' behavioral intentions; additional to insecurity had an insignificant impact on both consumers' behavioral intentions and m-government usage behavior.

When individuals used the application, they concluded a change in perception. Therefore, the motives for accepting mobile government application might have differed. Based on the analysis in this study, it was found that consumers' opinion related to mobile government application, after usage, indicated that perceived enjoyment has a significant positive effect, personal resource cost, and optimism towards technology on behavioral intentions to use m-government application, there is a positive significant effect of facilitating conditions, personal innovativeness and behavioral intention on m-government usage behavior. While, there is a significant negative effect of effort expectancy and insecurity on behavioral intention. Moreover, there is an insignificant effect of performance expectation, social influence, and facilitating conditions personal innovativeness on behavioral intention; whereas insecurity had an insignificant effect on m-government usage behavior.

This study contributes academically as there are a few studies that have combined several technology acceptance models to test the mobile government application acceptance. This research is distinct from others in that it is more generalizable. This research does not focus on a single mobile government application, and it is not confined to clients who use a traditional system or who have embraced a mobile government application. This study shows that before actual usage, citizens have their own reasons to consider the acceptance of this technology. Once they use the application, the motivational factors that boost technology acceptance and usage slightly change. This study contributes to the existing body of knowledge by investigating the factors that influence the intention to use mobile government applications in Egypt. The research combines two prominent theories, UTAUT2 and TRI, to understand the motivational factors that lead to the acceptance of mobile government applications. The findings of this study provide valuable insights for practitioners and government officials, as they can help to develop and market attractive applications that are deemed acceptable to the citizens. This study provides various practical contributions. Mobile applications are increasingly being used by the government sector as a preferred form of service delivery, which benefits citizens by making services more accessible and timely. E-government facilitates digital cooperation across government agencies and between the public sector and all citizens. Nowadays, it is common to use it through the mobile, terming the concept as m-government. Delivering affordable, effective service to a variety of government stakeholders is the goal of m-government. Mobile applications provide consumers with access to real-time information, products, processes, and services. The research has several practical implications. First, the study highlights the importance of perceived enjoyment, personal resource cost, and optimism towards technology in the adoption of mobile government applications. Second, the research suggests that facilitating conditions, personal innovativeness, and behavioral intention have a significant positive effect on the usage behavior of mobile government applications. Third, the study emphasizes the importance of addressing insecurity and effort expectancy to enhance the adoption of mobile government applications.

The study's findings can help government officials reach out to a larger audience in order to promote the use of m-government application services. The conclusions of this study may aid individuals in convincing others to take advantage of the benefits of m-government. The findings might be used to enhance user awareness and give locals support via mobile. Most importantly, these results can help people have more confidence in government leaders. The government may create and nurture long-term connections with citizens by establishing trust among stakeholders. The research findings can help individuals in convincing others to take advantage of the benefits of mobile government applications. The findings might be used to enhance user awareness and give locals support via mobile. Most importantly, these results can help people have more confidence in government leaders. The government may create and nurture long-term connections with citizens by establishing trust among stakeholders.

The current study, like any other academic study, has limitations that must be addressed, and additional research is needed to generalize these findings. First, in the future, the model should be expanded to include additional constructs such as system quality satisfaction and confirmation. In addition, the drawback relates to the variables, as the current study only looked at a few variables and theories. Thus, future studies should include other variables and theories that could affect behavioral intention, as well as test other mediating variables that could mediate the relationship between the factors of theories (UTAUT2 and TRI) and behavioral intention. Second, participants in this study were picked at random from a pool of mobile users and technology specialists in the Egypt; future studies should examine the influence of these moderators on the model using other samples from different regions.

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