



# Mobile Government Services Satisfaction and Usage Analysis: UAE Government Smart Services Case Study

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**Abstract**— *Swift expansion of smart mobile technology that has internet access is changing the government's trend for provides services to their citizens. Each type of Mobile device has different abilities based on the manufacturers. This paper presents the satisfaction of users concerning mobile computing services that provide by the government through used holistic model. On the other hand, how governments can improve the m-government services. The researchers developed three hypotheses to deal with relationships between services satisfaction and its two components (service quality and efficient transactions). The researchers used literature review and quantitative approach to analyses the responses that obtained through the questionnaire. In terms of efficient transactions, study finds the (Speed, Privacy & Trust) are the main causes of attitude toward m-government services and in terms of service quality, the study also found (availability & accessibility, Reliability & Accuracy) are important elements to toward m- government services.*

**Keywords**— *M- government, service quality, efficient transactions, Smart Mobiles, Smart services*

## I. INTRODUCTION

In recent years, Smart mobiles entered the market and somehow replacing computer devices in some aspects governments focus its strategy on Speed adjustment with this technology. For the next stage of government strategies, there was a big leap from being E-governments serving citizens from web pages over the Internet to serving users from mobile devices. So is the M-government is an integral part of the e-government. M-government definition is the strategy to an exploitation of all resources kinds of services, applications, wireless mobile technologies and devices for providing benefits to the users of e-government [1].

The Telecommunication Regulatory Authority (TRA) report mentioned that UAE ICT development considered the fastest growing sector internationally moving from rank 45 to 33 in 2013 [2]. The UAE today is second to Bahrain in terms of mobile services readiness. The TRA confirmed that more than 85% of UAE population is using mobile services and accessing Internet from their smart devices. In 2013, mobile Internet subscribers were growing by a double digit (13% as stated in the TRA report). UAE Vision 2021: it's found out about the services that users want to get it and provide them easy services that exceed their expectations through mobile phones [3].

The satisfaction of users concerning mobile computing has many factors; one could be the ease of use while other categorized as quality, reliability and accessibility. Many of those factors affect user satisfaction directly and their intention to reuse the services indirectly. This paper reviews several frameworks to examine user satisfaction and provides insight on the intention of the user on reusing. On the other hand, how governments can improve the m-government services. The ability to

examining satisfaction on a quality model that can also highlight the user willingness to reuse the mobile services and identifying future improvements was essential to us. After further reviewing the literature and relating different satisfaction model we have used what we think a holistic model for getting the said results [4]. The later sections of this report will shed light on the analysis and the results of the report to validate the model.

## II. LITERATURE REVIEW

The advancement of information and communication technologies (ICT) over the years have influenced governments to adopt different initiatives to come up with new services that enhance the well-being of the society [5]. Most common projects that government across the world adapted after the internet era were providing their services over the internet in a form called electronic services [6]. E-government (electronic government) has evolved over the years providing a competitive edge for the government to offer improved services and gave citizens satisfaction by being an electronic enabler [7]. According to literature, the continued improvements in the field of ICT have enabled the government to provide information electronically which added more value to citizens and extra benefits for the institution [8].

### A. *The Transformation from e-Gov to m-Gov*

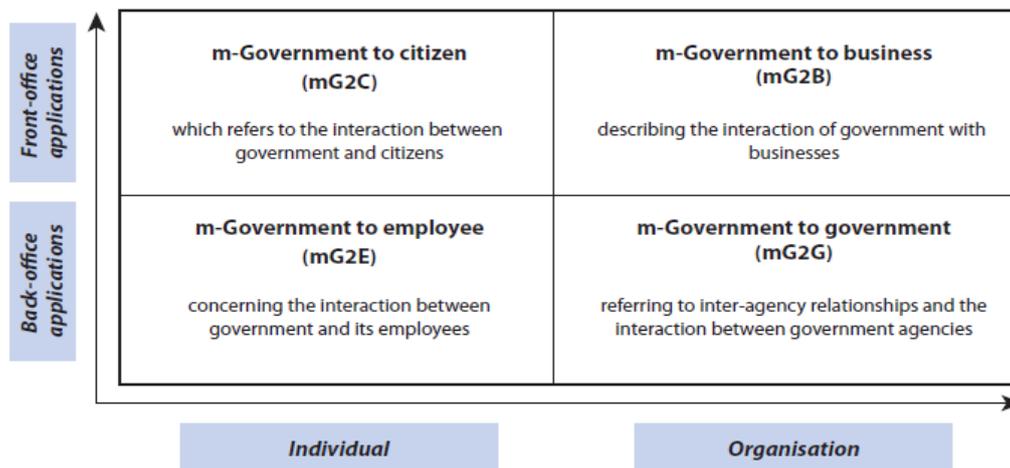
ICT development over the years did not only provide solutions to different domains but also helped to improve on mobile devices and wireless network, both of which enabled e-government to transform into m-governments[9]. The introduction of smart mobile devices and improved wireless coverage in urban cities has influenced the mobile government (m-government) transformation [10]. Many claims said that the transformation of government services to be mobile enablement is nothing but a subset of e-government [10], [11]. However [12] thinks otherwise and he considered that mobile services are equal to electronic services but offered by the different platform.

### B. *M-government Definition and Characteristics*

Several definitions emerged to explain what mobile government is and the united nation published a recent definition that says, a mobile government is nothing but collective services of governments which can be accessed by mobile devices or WI-FI devices anytime and anywhere that increase user satisfaction, decrease management bureaucracy and help achieved governmental strategic objectives [13]. A Simple definition of mobile government came from [14] who decreed mobile government as services powered by mobility to achieve high values for self and user. The success of m-government is being supported by the continued growing numbers of mobile subscribers around the world and the improved infrastructures that connect users to government services [5]. M-government was promoted by the high demand in the public for more responsive government institutions and it was noticed all around the world that the adaptation rate of mobile governments reached new trends [15]. The drivers for adoption of mobile services in urban governments are not only the availability of the ICT platforms but also the other tangible and intangible benefits that were summarized by [16] in five points:

- Regular dialog with users and continues prediction of expectations
- Promoting government services to achieve highly usability
- Keep users aware and informed about new matters concerns them
- Emergency management
- Residents provide recommendations for corrections and improvements.

In this context, it's safe to say that m-government provides strong support for the advancement of current services and delivery of new publish services while shifting the paradigm from the traditional e-government mindset that focused on commerce toward a more engaged society and improved internal operations [17]. The instant value achieved from mobile services contributes greatly to improvements of different angles of the government such as education, promote innovation, influence transparency and finally ensure both way communications [18]. M-government is not about offering services to end user to achieve excellence, value and cost reduction benefits but it also have other communication channels with different sectors within the same boundaries, (**Error! Reference source not found.**) provides brief details about the different mobile government concepts.



Source: Oui-Suk, Uhm (2010), *Introduction of m.Government & IT Convergence Technology*, KAIST Institute for IT Convergence.

Fig. 1 Mobile government concepts

### C. M-government user satisfaction

It's important in the field of m-government that user satisfaction is achieved or measured and improved [18]. In order to achieve m-government satisfaction measurements of a different factor should be emphasized and studied [19]. Several success factors have an emphasis on mobile services usage satisfaction and reusability [20]. Therefore, the services provided should not ignore the cost factor involved in conducting a service as suggested by reports from [21]. Hence, the reliability of m-government services depends highly on how the user perceived the benefits. The perceived usefulness is defined by how a user/employee see the m-government services add value to them when compared to other methods [22].

There is no clear model, which can evaluate user satisfaction with m-government and services provided. This limitation in literature forced us to consider similar approach used for E-services[23].The limitation in providing a conceptual model drove us to study different models and try to relate them to holistic model that we intend to use to measure user satisfaction and service reusability. With a primary focus on the quality of services rather than another important component most models we found had short comes that needed other framework to complement. The motivation behind the study was to understand factors affect users satisfaction and what factors encourage to reuse the service. We looked at models that will examine user awareness relating it to usability, quality of the service provided and quality of service provider (Table 1). Basing on theoretical cause and effect model we examined the link between awareness and satisfaction or usability, we also tried to link quality of the service with the satisfaction we expected to have a relationship between the constructs. This was also complemented by SWOT analysis, however, it only provides feedback on the internal matters of the services and not out the outside world looks like [24]. We also looked the SERVQUAL model where benefits were mainly looked at measured by user expectation and what was really achieved. It also focused on the reliability of the service, a speed of the service and trust 3 of the main factors we are looking to measure[25].The next model we look at was the traditional national satisfaction index (CSI) where perceived value is measured to understand user satisfactions which are similar to the SERVQUAL model. In few cases, the CSI was modified to tests user satisfaction on services [26]. Another two models we wanted to relate our study to where the information system (IS) and the Value measurement model both which the quality of the service, the expectation of users and the final satisfaction levels. However, none of those models provided a holistic evaluation of how user looks at a service and in our case mobile services on the government level. There was no clear focus on reliability and trust of service measurement in all models while others focus on overall quality rather than specific factors that provide major signification.

We concluded that the quality of mobile government should consist of several factors which affect the user expectations when attempting to use a service such as reliability, accessibility, security and responsiveness [8]. Those factors will determine the user satisfaction and willingness to reuse the service or not.

Therefore based on literature we recommend examining the following factors to ensure users satisfaction:

TABLE I  
USER SATISFACTION DIMENSIONS

Dimensions	Reason	Reference
Awareness	It opens the door toward usage of mobile services and overcome concern in the initial stage and during utilization of the services. It helps identify the level of understanding of available mobile services and how to be used.	[18], [27]–[33]
Availability and Accessibility	The services are available to wider range of people and are always reachable without interruption. The service should be easily performed and adds no obstacles when used. All major services should be used by different expert levels of mobile devices. The service should be highly redundant in terms of availability and users should not face any downtime problems.	[34] [35] [36] [18] [37]
Reliability	Ensuring the services is provided constantly and with accurate information. The sustainability of the mobile services is a success factor for high adoption rate.	[18], [37], [38]
Accuracy	The services should perform what is supposed to perform with little to no error at all.	[18], [37], [39]
Support	To ensure service users of immediate problem resolution and enquiry addressing. Creating a bond with the users of the service.	[18], [33], [40]
Privacy and trust	Ensuring that the user trust is obtained to avoid hindering the process of mobile services usage. This achieved by ensuring privacy on user data such as personal information. Ensuring protection of user personal information will guarantee increasing trust levels.	[18], [31], [32], [36], [37], [41]–[43]
Speed	Instant provision of services, should overcome traditional way of doing business with the assurance of accuracy and reliability. Should not be hindered by short comes in ICT.	[36], [44]
Usability	The ease of use and simplicity of mobile services and proper application design that satisfy users needs efficiently.	[18], [30], [32], [37]

### III. RESEARCH METHODOLOGY

#### A. Introduction

This research, in general, is quantitative in nature but the methodological approach adopted by researchers involves the use of two combined research approaches. First, using the exploratory research using the literature review to investigate the literature discussing measuring the citizen satisfaction of the smart services in general and focusing on the public sector. A literature review was used to identify and classify the smart services characteristics that proved to be effectively influencing the citizen perception of the smart services and its effect on the citizen satisfaction.

The second phase, using quantitative research approach to validate the proposed model in the targeted population of UAE citizens' usage by conducting a self-administered electronic questionnaire, which designed to collect participants' demographic characteristics, a perception of service quality, efficiency, and their satisfaction with the UAE government smart services delivered through the mobile channels. The survey was distributed using mobile social media chat tools and email groups.

#### B. Research Questions

- What smart services characteristics are influencing the citizens' perception of the quality and efficiency of smart services delivered by government mobile channels?
- Which smart services characteristics are significantly influencing UAE citizens' satisfaction with the smart services?
- To which extent is satisfaction with the smart services significantly influencing UAE citizens' usage of smart services?

#### C. Who's the respondent

UAE citizens who access the Internet and mobile electronic channels

#### D. Population and Sample

This study is based on stratified purposive sampling, meaning that it will be selected from previously identified subgroups. The samples targeted are the UAE citizens using mobile and familiar with the social media tools and the use of internet aiming to give the sample the same characteristic [45]. The sampling does not need to be statistically representative, as the results will not be used to generalize to the population of UAE citizens using mobile government channels. Regarding sample size, the researchers planned to distribute the questionnaire electronically and personally aiming to collect 100 participants if applicable, considering the time limitation and likely a small number of UAE citizens already used the government smart services. It is vital to explain that in such research the number of participants is less important than the richness of data [46]. The study guaranteed the anonymity and privacy of the information for the participants and that the results will only be used for the purpose of the research and presented collectively.

### IV. STUDY INSTRUMENT

Researchers have evaluated UAE Mobile government smart services satisfaction using the Google forms electronic questionnaire. The used questionnaire has five points Likert-type scales scored from 1 represents “Strongly Disagree” to 5 which represents “Strongly agree”. A rating scale provides a range of 5 levels, in which the respondent can answer in neutrality over a question being asked and excluding the possibility of expressing opinions about UAE mobile government smart services satisfaction in a free-flowing manner. An electronic survey questionnaire was used to collect this data consisting of six sections including 42 questions. The first section includes six demographic questions: gender, age, education, location, nationality, and computer skills level of the respondents. The second section meant to get the respondents perception of the UAE mobile government quality of service (Awareness, Availability, Reliability, and Support) using a total number of 14 questions. Section 3 is meant to get the respondents perception of the UAE mobile government efficient transactions (Privacy & Trust, Speed, Usability) using a total number of 10 questions. Section 4 is meant to get the respondents perception of the UAE Mobile government service satisfaction using a total number of six questions. Finally, gets the respondents’ perception of the UAE Mobile government service usage using a total number of six questions.

#### A. Questionnaire administration

The questionnaire electronically administered as follows: First, the researchers used electronic questionnaire distributed to a limited number participant to collect a testing set. A reliability test was conducted using Cronbach’s alpha reliability coefficient, which ensure the consistency of the questionnaire constructs. Second, the researchers used electronic mail lists in one private university in Abu Dhabi for both students and faculty staff in addition to a government entity staff email list. Moreover, social networks messaging was used to distribute the survey to a different segment of users. The use of electronic distribution channels prevents the ability to calculate the respond rate. The data collection started in the last week of November 2015 and continued for 18-day collecting a total of 128 participants. The researchers dropped one incomplete response to end up with 127 complete responses.

#### B. Variables and measures

The researchers used two independent variables: Service Quality, Efficient Transactions, and Service Usage as the dependent variable. First variable “Service Quality” which consists of four dimensions (Awareness, Availability & Accessibility, Reliability & Accuracy and Support) based on previous research by [18]. Second variable “Efficient Transactions” which consists of three dimensions (speed, privacy & trust and Usability) the “Service satisfaction” based on previous research by [18] is the dependent variable. Meanwhile “Service satisfaction” considered as independent variable in relation to the dependent variable “Service usage”. **Error! Reference source not found.** shows the components of the proposed model and the independent variable service satisfaction two main components and their dimensions in relation to the effect on the usage of the smart services.



Fig. 2 Citizen Benefits from the smart services

#### V. HYPOTHESES DEVELOPMENT

The researchers have developed the proposed model using the intensive literature review as shown in (**Error! Reference source not found.**) where three general hypotheses were proposed in order to test the relationship between mobile services satisfaction and mobile service usage. The three hypotheses deal with relationships between services satisfaction and its two components (service quality and efficient transactions) on one hand, and mobile service usage on the other hand.

Therefore, the researchers developed hypotheses as follows:

**H<sub>1</sub>**: The higher rate of mobile services quality will positively affect the rate of mobile services satisfaction.

**H<sub>2</sub>**: The higher rate of mobile efficient transactions will positively affect the rate of mobile services satisfaction.

**H<sub>3</sub>**: The higher rate of mobile services satisfaction will positively affect the mobile services usage.

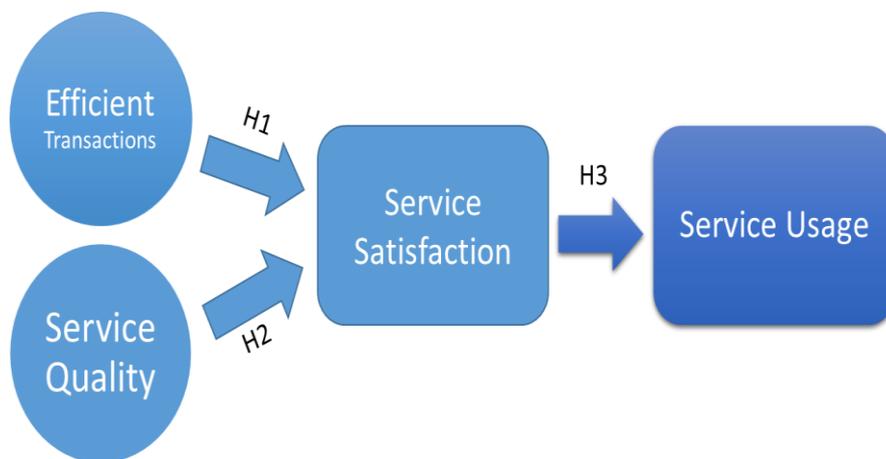


Fig. 3 Model of study

**VI. DATA ANALYSIS**

This section of the paper provides a comprehensive analysis and discussion of the results. The researchers used the IBM SPSS statistical package in order to analysis the data in this study. The analysis process includes descriptive statistical analysis, ANOVA analysis, reliability analysis, Correlation analysis and regression analysis.

*A. Sample demographic profile*

The sample demographics statistics summarized in (**Error! Reference source not found.**). Showing that out of 127 participants the males representing (64.5%) while females were (35.4%), shows that males were more willing to participate in the survey. The age groups were grouped into three groups after combining participants of age from 18 to 24 in one group (7.9%), participants in age 25 to 34 (50.4%) in the second group, the third group includes participants of age 35 and above (41.7%). The majority of participant have colleague degree or higher (79.5%) while participant studying in a colleague or high school (20.5%). When it comes to the location of the participant they mostly come from Dubai (55.9%) and Abu Dhabi (36.2%) while very few were from Northern Emirates (7.8%). As for the sample distribution by nationality, other non-Arab nationalities with the majority of Asian represent (38.6%) nearly followed by UAE national (34.6%) while Arabs had their presence also by (26.8%). Finally, participant knowledge of using Smartphone and PC, the majority of participant have the advance level (40.2%) and expert computer users (31.5%) while beginner & intermediate users represent (28.3%). In order to investigate the relation between demographic information and the study variables, several one-way ANOVA tests were performed, results show a significant difference between citizens with different computer skills and their perception of UAE mobile government smart services regarding Awareness, Reliability & Accuracy, Privacy & Trust, Speed and Usability at the following significance levels 0.03, 0.03, 0.01, 0.03 and 0.03, respectively. Which indicate the significant importance of the citizen’s computer skill level on the perception of the mentioned services characteristics dimensions.

TABLE II  
STUDY SAMPLE DESCRIPTIVE STATISTICS

	Gender	Age	Education	Emirates	Nationality	Computer Skills
Male	82 (64.6%)					
Female	45 (35.4%)					
18-24 years		10 (7.9%)				
25-34 years		64 (50.4%)				
35+ years		53 (41.7%)				
High school			10 (7.9%)			
Partial college or university			16 (12.6%)			
College or university			54 (42.5%)			
Post-Grad or Higher			47 (37.5%)			
Abu Dhabi				46 (36.2%)		
Dubai				71 (55.9%)		
Northern Emirates				10 (7.9%)		
UAE National					44 (34.6%)	
Arab Countries					34 (26.8%)	
Others					49 (38.6%)	
Beginner & Intermediate						36 (28.3%)
Advanced						51 (40.2%)
Expert						40 (31.5%)
	127	127	127	127	127	127

*B. Reliability test*

Reliability analysis was done for each of the four-item sets representing the four dimensions constructing the Service Quality global variable. **Error! Reference source not found.** reports the Cronbach’s alpha reliability coefficient for each dimension indicating a high level of reliability (between .88 - .93), which is satisfactorily high and does not require further improvements. **Error! Reference source not found.** also reports overall alpha reliability coefficient (that is, .96) which indicate a high level of internal consistency for the questionnaire part that investigates the Service Quality as a whole.

Table III  
Reliability test for Service Quality

	Items	Cronbach’s $\alpha$
Awareness	4	0.88
Availability & Accessibility	4	0.93
Reliability & Accuracy	4	0.93
Support	2	0.90
Service Quality Overall	14	0.96

TABLE IV  
RELIABILITY TEST FOR EFFICIENT TRANSACTIONS

	Items	Cronbach’s $\alpha$
Privacy & Trust	4	0.95
Speed	3	0.97
Usability	3	0.91
Efficient Transactions Overall	10	0.96

Reliability analysis was also done for each one of the three-item sets representing the three dimensions constructing the Efficient Transactions global variable. **Error! Reference source not found.** reports the Cronbach’s alpha reliability coefficient for each dimensions indicating a high level of reliability (between, .91 - .95), which is satisfactorily high and does not require further improvements. **Error! Reference source not found.** also reports overall alpha reliability coefficient (that is, .96) which indicate a high level of internal consistency for the questionnaire part that investigates the Efficient Transactions as a whole. Reliability analysis was also done for items sets representing the Satisfaction and Usage global variable. **Error! Reference source not found.** reports the Cronbach’s alpha reliability coefficient for each variable indicating a high level of reliability .96, .94, respectively. All Cronbach’s alpha reliability coefficient of 0.7 or above indicates consistency. Meaning that, the questions constructing the scale are measuring the same thing [47].

TABLE V  
RELIABILITY TEST FOR SATISFACTION & USAGE GLOBAL VARIABLES

	Items	Cronbach’s $\alpha$
Satisfaction	6	0.96
Usage	6	0.94

*C. Study variables relationship*

Pearson's correlation coefficients were computed for all dimensions in order to understand the nature and the significance of relationships among study dimensions. **Error! Reference source not found.** shows the high positive significant relationship between all dimensions, the support and Reliability & Accuracy have the highest positive relation (.897), which indicates the important role of support to increase the citizen perception of Reliability & Accuracy of service. Also shows a very high positive relation between the speed of applications and the perception of availability & accessibility and reliability & accuracy (.828, .877) respectively. The perception of privacy & trust and perception of service quality components (Awareness, Availability & Accessibility, reliability & accuracy and Support) are highly positively related (.667, .741, .854 and .802) which supports [48] findings.

TABLE VI  
PEARSON'S CORRELATION COEFFICIENTS AMONG RESEARCH DIMENSIONS

	Awareness	Availability & Accessibility	Reliability & Accuracy	Support	Privacy & Trust	Speed	Usability
1. Awareness	1	.786**	.773**	.760**	.667**	.761**	.729**
2. Availability & Accessibility		1	.846**	.805**	.741**	.828**	.826**
3. Reliability & Accuracy			1	.897**	.854**	.877**	.784**
4. Support				1	.802**	.876**	.774**
5. Privacy & Trust					1	.787**	.681**
6. Speed						1	.772**
7. Usability							1

\*\* . Correlation is significant at the 0.01 level (1-tailed).

Pearson's correlation coefficients were computed for service satisfaction and its constructing factors service quality and efficient transactions. **Error! Reference source not found.** shows that service quality and service satisfaction are highly significantly and positively related .823 (sig. level 0.01). This means that the positive the perception of smart services quality in UAE the higher the citizen satisfaction. On the other hand, the efficiency of transactions and service satisfaction, are more highly significant and positively related .846 (sig. level 0.01). This means that the positive the citizens perception of smart services efficiency of transactions the higher the satisfaction. The relation between both service quality and service efficiency of transactions is very high and positive .939 (sig. level 0.01) which means the positive and tight relation between the components of the service satisfaction.

TABLE VII  
PEARSON'S CORRELATION COEFFICIENTS AMONG RESEARCH VARIABLES

	Service satisfaction	Service Quality	Efficient Transactions
Service Satisfaction	1	.823**	.846**
Service Quality		1	.939**
Efficient Transactions			1

\*\* . Correlation is significant at the 0.01 level (1-tailed).

#### D. Regression analysis (Service Satisfaction)

Regression analysis is used here to empirically test the first two formulated hypotheses (H1, H2). The regression analysis results shown in (**Error! Reference source not found.**) indicate that the “F” value for this model is highly significant, R2 (.719) and adjusted R2 (.715). Which means that this model is accepted with high strength between services Satisfaction and independent variables, also indicate that 72% of the variation in the service satisfaction is explained by the independent variables (Service Quality, Efficient Transactions). The Service Quality “B” value (.335) is positive and the associated significance (0.01) is less than (0.05), which means that the data support H1 “The higher rate of mobile Services Quality will positively affect the rate of mobile services Satisfaction”. Also, Efficient Transactions “B” value (.525) is positive and associated significance (0.000) is less than (0.05), which means that the data supports H2 “The higher rate of mobile Efficient Transactions will positively affect the rate of mobile services Satisfaction”. The analysis also indicates that “Beta” value for the Efficient Transactions (.53) is high than the Service Quality (.332), which mean that the effect of the citizen perception of services efficient transactions on service satisfaction is stronger than the effect of service quality perception.

TABLE VIII  
SATISFACTION REGRESSION ANALYSIS COEFFICIENTS AND THEIR STATISTICAL SIGNIFICANCE

#### Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.848a	0.719	0.715	0.5687

a. Predictors: (Constant), Efficient Transactions, Service Quality  
ANOVAa

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	102.826	2	51.413	158.966	.000b
	Residual	40.104	124	0.323		
	Total	142.93	126			

a. Dependent Variable: Satisfaction

b. Predictors: (Constant), Efficient Transactions, Service Quality

Model 1	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	0.73	0.182		4.016	0
Service Quality	0.335	0.132	0.332	2.542	0.012
Efficient Transactions	0.525	0.129	0.53	4.062	0

a. Dependent Variable: Satisfaction

### E. Regression analysis (Service Usage)

The relation between service satisfaction and services usage measured using Pearson's correlation coefficients (.783) is highly positively significant at (0.000), which indicates a strong relation between both variables. Meanwhile, the regression analysis is used here to empirically test the H3 hypothesis. The results shown in (**Error! Reference source not found.**) indicate that the “F” value for this model is highly significant, R2 (.612) and adjusted R2 (.609). Which means that this model is accepted with high strength between services usage and service satisfaction, also indicate that 61% of the variation in the service usage is explained by the service satisfaction. The service satisfaction “B” value (.864) is positive and the associated significance (0.000) is less than (0.05), which means that the data support H3 “The higher rate of mobile Services Satisfaction will positively affect the mobile Services Usage” and that the effect of the citizen services satisfaction of the UAE government mobile smart services will increase their usage of the services.

TABLE IX

SATISFACTION REGRESSION ANALYSIS COEFFICIENTS AND THEIR STATISTICAL SIGNIFICANCE

#### Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.783a	0.612	0.609	0.73473

a. Predictors: (Constant), Satisfaction Factor

#### ANOVA\*

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	106.658	1	106.658	197.576	.000b
	Residual	67.479	125	0.54		
	Total	174.136	126			

a. Dependent Variable: Usage Factor

b. Predictors: (Constant), Satisfaction Factor

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	
	B	Std. Error	Beta			
1	(Constant)	0.14	0.245		0.572	0.568
	Satisfaction Factor	0.864	0.061	0.783	14.056	0

a. Dependent Variable: Usage Factor

## VII. DISCUSSION OF RESULTS AND CONCLUDING REMARKS

The study found that awareness is significantly and positively affects the citizen service quality perception increasing the users satisfaction leading to the increase of use supporting Abdelghaffar & Magdy finding in there study in Egypt [32]. Availability and accessibility of services proved by other researchers to affect the user satisfaction of the E-government and M-government in several literatures [33], [49], [50], which is also supported by our findings. Furthermore we found that Reliability & Accuracy also positively influence the perception of service quality supporting literatures [43], [48]. Althunibat *et al.*, said that services that deliver citizen support increase the quality of m-government [51], which we found supported in our study in UAE government case and literatures [33]. The finding of service quality significant positive influence on the users satisfaction supports previous research findings [37], [43], [52], [53] while Althunibat *et al.*, found a significant positive influence of service quality as the strongest influencer on m-government acceptance in Malaysia [51]. The finding of service efficiency of transactions significantly and positively influences the users satisfaction and the use of services which supports previous research findings as Hung *et al.*, found that Trust, Interactivity (speed) and ease of use (usability) are the main causes of attitude toward m-government services acceptance in Taiwan [54] and Afshar Jahanshahi *et al.*, study in Iran case study [37]. While Naqvi., also concluded in his study for M-services Adoption in Oman that the easy to use (usability) is one of the main influencers on users acceptance of mobile services which leads to the adaption and use of M-government services [50]. Our study findings indicate highly positive significant relationship between service satisfaction and usage of service influenced by the citizen perception of the high quality and effective transaction of UAE mobile government smart services, moreover we found out that the more the citizen satisfaction of services the more the use of mobile services and we believe that the usage also increase the satisfaction and increase the tendency to reuse the services. Our findings are also consistent with previous research [48], [52], [53], [55].

### VIII. LIMITATIONS AND FUTURE RESEARCH

The study conducted using online survey limiting the study scope to users with computer and Internet usage skills and didn't has the needed geographic coverage of UAE citizens as the majority of study sample concentrated in Abu Dhabi and Dubai, which limit the theoretical capability of generalizing the results of the study. The study is limited to identifying the most important factors that predict user satisfaction more important factors should be included to study the citizen perception of the value of mobile government services including as example the cost of money and time [23], [56], in addition to the need of extending the sample size and representation of the UAE population a further advanced module need to be implemented and statistically validated to incorporate the complexity of factors influencing the citizen satisfaction. Further future study is needed implementing data mining and mobile analytics to provide dynamic insight of the user usage of services to support government decision makers.

### REFERENCES

- [1] I. F. Zamzami and M. Mahmud, "User Satisfaction with M-Government Sites: An Empirical Investigation," *SSRN Electron. J.*, pp. 1–11, 2014.
- [2] TRA, "UAE Telecommunications Sector Developments & Indicators , 2010 – 2013," *5th Annual Sector Review*, 2014. [Online]. Available: <http://www.tra.gov.ae/en/open-data/annual-market-review.aspx>. [Accessed: 15-Oct-2015].
- [3] Emirates Identity Authority, "93% satisfaction rate of mobile government services in the UAE," 2014. [Online]. Available: <http://www.id.gov.ae/en/media-centre/news/2014/2/9/93-satisfaction-rate-of-mobile-government-services-in-the-uae.aspx>. [Accessed: 15-Dec-2015].
- [4] P. Bellavista, G. Cardone, A. Corradi, and L. Foschini, "Convergence of MANET and WSN in IoT urban scenarios," *IEEE Sens. J.*, vol. 13, no. 10, pp. 3558–3567, 2013.
- [5] G. C. Misuraca, "e-Government 2015: exploring m-government scenarios, between ICT-driven experiments and citizen-centric implications," *Technol. Anal. Strateg. Manag.*, vol. 21, no. 3, pp. 407–424, Apr. 2009.
- [6] F. A. Zeleti and O. Uusitalo, "ICT Influencing eGovernment network externalities: Is the government social networking system the road to edemocracy and trust?," in *Proceedings of the European Conference on e-Government, ECEG*, 2012, pp. 29–37.
- [7] C. E. Koh, V. R. Prybutok, and X. Zhang, "Measuring e-government readiness," *Inf. Manag.*, vol. 45, no. 8, pp. 540–546, 2008.
- [8] H. Sheng and S. Trimi, "M-government: technologies, applications and challenges," *Electron. Gov. An Int. J.*, vol. 5, no. 1, pp. 1–18, 2008.
- [9] S. M. Mutula, "Comparison of sub-Saharan Africa's e-government status with developed and transitional nations," *Inf. Manag. Comput. Secur.*, vol. 16, no. 3, pp. 235–250, 2008.
- [10] I. Kushchu, "From E-government to M-government : Facing the Inevitable," *Proc. 3rd Eur. Conf. eGovernment*, pp. 1–13, 2004.
- [11] M. K. Bergman, "White Paper: The Deep Web: Surfacing Hidden Value," *J. Electron. Publ.*, vol. 7, no. 1, pp. 1–17, 2001.
- [12] G. Song, "Transcending e-Government : a Case of Mobile Government in Beijing," in *The First European Conference on Mobile Government*, 2005, no. July, pp. 1–9.
- [13] Organização das Nações unidas, *E-Government Survey: e-Government for the Future We Want*. 2014.
- [14] T. Zefferer, A. Tauber, B. Zwattendorfer, and K. Stranacher, "Qualified PDF Signatures On Mobile Phones," *Electron. Gov. Electron. Particip. Jt. Proc. Ongoing Res. Proj. IFIP EGOV IFIP ePart 2012*, vol. 39, pp. 115–126, 2012.
- [15] S. Trimi and H. Sheng, "Emerging trends in M-government," *Commun. ACM*, vol. May, no. 5, pp. 53–58, 2008.
- [16] M. Marković and G. Đorđević, "One Possible Model of Secure e/m-Government System," *Inf. Syst. Manag.*, vol. 27, no. 4, pp. 320–333, 2010.
- [17] Y. Kumar, "Conceptualising m-government implementation in the state of Jharkhand," *Int. J. Electron. Gov.*, vol. 3, pp. 85–98, 2010.
- [18] T. El-Kiki and E. Lawrence, "Mobile User Satisfaction and Usage Analysis Model of mGovernment Services," *2nd European Mobile Government Conference (Euro mGov 2006)*, no. 2004, pp. 91–102, 2006.

- [19] P. J. H. Hu, H. Chen, H. F. Hu, C. Larson, and C. Butierez, "Law enforcement officers' acceptance of advanced e-government technology: A survey study of COPLINK Mobile," in *Electronic Commerce Research and Applications*, 2011, vol. 10, no. 1, pp. 6–16.
- [20] L. Dabbish and R. Kraut, "Awareness displays and social motivation for coordinating communication," *Inf. Syst. Res.*, vol. 19, no. 2, pp. 221–238, 2008.
- [21] VentureLine, "The profitability of providing public services in C2B, Electronic references," 2005. .
- [22] F. D. Davis, "Perceived Ease of Use, and User Acceptance of Information Technology," *MIS Q.*, vol. 13, no. 3, pp. 319–340, 1989.
- [23] I. H. Osman, A. L. Anouze, Z. Irani, B. Al-Ayoubi, H. Lee, A. Balc, T. D. Medeni, and V. Weerakkody, "COBRA framework to evaluate e-government services: A citizen-centric perspective," *Gov. Inf. Q.*, vol. 31, no. 2, pp. 243–256, 2014.
- [24] O. Jurevicius, "Apple SWOT analysis 2013 | Strategic Management Insight," *Strategic Management Insight*, 2013. .
- [25] M. A. Alanezi, A. K. Mahmood, and S. Basri, "A proposed model for assessing E-government service quality: An E-S-QUAL approach," in *2012 International Conference on Computer and Information Science, ICCIS 2012 - A Conference of World Engineering, Science and Technology Congress, ESTCON 2012 - Conference Proceedings*, 2012, vol. 1, pp. 130–135.
- [26] M. A. Wimmer, R. Traunmüller, Å. Grönlund, and K. V. C. N.-J. A. E. 2005 352. 380285467. Andersen, "Electronic government : Fourth international conference, EGOV 2005, Copenhagen, Denmark, August 22-26, 2005 : proceedings," *Lecture notes in computer science*, vol. 3591. p. xiii, 316 p., 2005.
- [27] R. Heeks and C. Stanforth, "Understanding e-Government project trajectories from an actor-network perspective," *European Journal of Information Systems*, vol. 16, no. 2. pp. 165–177, 2007.
- [28] R. Cullen, "E-Government, A Citizen's Perspective," *Journal of E-Government*, vol. 1, no. 3. pp. 5–28, 2004.
- [29] M. A. Shareef, V. Kumar, U. Kumar, and Y. K. Dwivedi, "E-Government Adoption Model (GAM): Differing service maturity levels," *Gov. Inf. Q.*, vol. 28, no. 1, pp. 17–35, Jan. 2011.
- [30] S. AlAwadhi and A. Morris, "Factors influencing the adoption of e-government services," *J. Softw.*, vol. 4, no. 6, pp. 584–590, 2009.
- [31] S. I. Mofleh and M. Wanous, "Understanding factors influencing citizens' adoption of e-government services in the developing world: Jordan as a case study," *INFOCOMP J. Comput. Sci.*, vol. 7, no. 2, pp. 1–11, 2008.
- [32] H. Abdelghaffar and Y. Magdy, "The adoption of mobile government services in developing countries: The case of Egypt," *Int. J. Inf. Commun. Technol. Res.*, vol. 2, no. 4, pp. 333–341, 2012.
- [33] V. Venkatesh, F. K. Y. Chan, S. a Brown, P. J. Hu, K. Y. Tam, and J. Thong, "Modeling Citizen Satisfaction with Mandatory Adoption of an E-Government Technology Modeling Citizen Satisfaction with Mandatory Adoption of an E-Government Technology," *J. Assoc. Inf.*, vol. 11, no. October, pp. 519–549, 2010.
- [34] T. Neutens, M. Delafontaine, T. Schwanen, and N. van de Weghe, "The relationship between opening hours and accessibility of public service delivery," *J. Transp. Geogr.*, vol. 25, pp. 128–140, 2012.
- [35] T. S. Parikh, "Mobile phones may be the right devices for supporting developing world accessibility, but is the WWW the right service delivery model?," *Proc. 2006 Int. cross-disciplinary Work. Web Access. Build. Mob. web rediscovering Access. - W4A*, no. May, p. 143, 2006.
- [36] M. A. Alanezi, A. K. Mahmood, and S. Basri, "Conceptual model for measuring e-government service quality," *2011 IEEE Conf. Open Syst.*, pp. 411–416, 2011.
- [37] A. A. Jahanshahi, S. M. S. Khaksar, N. M. Yaghoobi, and K. Nawaser, "Comprehensive model of mobile government in Iran," *Indian J. Sci. Technol.*, vol. 4, no. 9, pp. 1188–1197, 2011.
- [38] B. W. Schay, M. E. Beach, J. A. Caldwell, and C. LaPolice, "Using standardized outcome measures in the federal government," *Hum. Resour. Manage.*, vol. 41, no. 3, pp. 355–368, 2002.
- [39] N. Mallat, M. Rossi, and V. K. Tuunainen, "Mobile Banking Services," *Communications of the ACM*, vol. 47, no. 5. pp. 42–46, 2004.
- [40] T. Christensen and P. Laegreid, "New Public Management: Puzzles of Democracy and the Influence of Citizens," *J. Polit. Philos.*, vol. 10, no. 3, pp. 267–295, 2002.
- [41] A. S. Lee, "A Scientific Methodology for MIS Case Studies," *MIS Q.*, vol. 13, no. 1, pp. 33–50, 1989.
- [42] D. L. Hoffman, T. P. Novak, and M. Peralta, "Building Consumer Trust Online," *Commun. ACM*, vol. 42(4), no. 4, pp. 80–85, 1999.
- [43] M. N. Usman, A. Thoyib, and B. W. Otok, "E-Government Moderator in Reliability on Satisfaction and Its Implications Toward Citizen Loyalty in Government Public Service of Surabaya City," *Int. J. Acad. Res.*, vol. 6, no. 5, pp. 261–266, 2014.
- [44] T. Wallin Andreassen and B. Lindestad, "Customer loyalty and complex services," *International Journal of Service Industry Management*, vol. 9, no. 1. pp. 7–23, 1998.
- [45] J. Neyman, "On the two different aspects of the representative method : The method of stratified sampling and the method of purposive selection," *J. R. Stat. Soc.*, vol. 97, no. 4, pp. 558–625, 1934.
- [46] S. Al-khamayseh, E. Lawrence, and A. Zmijewska, "Towards understanding success factors in interactive mobile government," *Proc. Second Eur. Conf. Mob. Gov. (Euro mGov) – Oppor. eGovernment Adapt. to Mob. Ubiquitous Bus.*, pp. 3–5, 2006.
- [47] M. Saunders, P. Lewis, and A. Thornhill, *Research methods for business students*, 5th ed. Harlow, England: Pearson, 1997.
- [48] T. Zhou and Y. Lu, "Examining Postadoption Usage of Mobile Services From a Dual Perspective of Enablers and Inhibitors," *Intl. J. Human-Computer Interact.*, vol. 27, no. 12, pp. 1177–1191, 2011.
- [49] A. Abanumy and P. Mayhew, "M-government Implications For E-Government In Developing Countries: The Case Of Saudi Arabia," *EURO mGOV 2005*, pp. 1–6, 2005.
- [50] S. J. Naqvi, "M-services Adoption in Oman Using Technology Acceptance Modeling Approach," *Commun. IBIMA*, vol. 2012, pp. 1–10, 2012.
- [51] A. Althunibat, N. A. M. Zain, and N. S. Ashaari, "Modelling the factors that influence mobile government services acceptance," *African J. Bus. Manag.*, vol. 5, no. 34, pp. 13030–13043, 2011.
- [52] C. Wu, S. Sun, S. C. Lung, and H. Fang, "User Satisfaction Toward Mobile Dynamic Ship Reporting Systems," *Int. J. Electron. Bus. Manag.*, vol. 12, no. 3, pp. 159–166, 2014.
- [53] Z. Deng, Y. Lu, K. K. Wei, and J. Zhang, "Understanding customer satisfaction and loyalty: An empirical study of mobile instant messages in China," *Int. J. Inf. Manage.*, vol. 30, no. 4, pp. 289–300, Aug. 2010.
- [54] S. Y. Hung, C. M. Chang, and S. R. Kuo, "User acceptance of mobile e-government services: An empirical study," *Gov. Inf. Q.*, vol. 30, no. 1, pp. 33–44, Jan. 2013.
- [55] D. Lee, J. Moon, Y. J. Kim, and M. Y. Yi, "Antecedents and consequences of mobile phone usability: Linking simplicity and interactivity to satisfaction, trust, and brand loyalty," *Inf. Manag.*, vol. 52, no. 3, pp. 295–304, Apr. 2015.
- [56] T. El-Kiki, E. Lawrence, and R. Steele, "A management framework for mobile government services," *Proc. Collect. ....*, 2005.