

Examining the Impact of Dubai Smart Government Characteristics on User Satisfaction

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Abstract: Information and telecommunication technology (ICT) are today practiced in various public sectors and are considered as a cost-effective and convenient means to encourage openness, transparency, and to reduce corruption. It has also put innovation and ICT more than ever at the heart of smart development. Presently, this phenomenon has also been adopted by governments so as to cope with various problems created by increasing urban populations in their countries. The main objective of this study is to examine the influence of Dubai smart government characteristics on the user satisfaction. Online survey was used to collect data for this study, the sample size was determined as 250 users of Dubai smart government services, who are users who got the services from five major strategic or government partners of smart government establishment: Dubai Police, RTA, DEWA, DHA, and Dubai Municipality. PLS (Partial Least Squares) SEM-VB (Structural Equation Modelling-Variance Based) was employed to assess the research model by utilising the software SmartPLS 3.0. This paper adds to the existing literature of smart government characteristics (Information System Quality, Relationship with Public Agencies, Leadership, Accountability and Transparency, and Productivity) and user satisfaction (Usefulness, Awareness, Service Quality, Trust, and Social Influence). The results of this study have the potential to give further insights into Dubai government to improve their users' satisfaction.

Keywords: Dubai smart government; user satisfaction; Dubai; UAE.

I. INTRODUCTION

Information and telecommunication technology (ICT)s are today practiced in various public sectors and are considered as a cost-effective and convenient means to encourage openness, transparency, and to reduce corruption [1]. Moreover, it has created a new playing field for worldwide competition with an increasing premium for knowledge, learning, agility, and connectedness. It has made it possible to capture and deploy information and knowledge for all kinds of activity. It has also put innovation and ICT more than ever at the heart of smart development. Presently, this phenomenon has also been adopted by governments so as to cope with various problems created by increasing urban populations in their countries [2, 3].

One of the key goals of public management

or provision of government services is to improve citizen satisfaction with the government, particularly public service performance, efficiency, effectiveness, and responsiveness, among other performance dimensions. In addition, the growing information needs by different stakeholders, increasing urban population to a greater extent, the lack of effective and efficient communication channels between the government and residents, a lack of best knowledge management practices are a few critical issues that the UAE government is aiming to resolve through smart government initiatives in the country. Moreover, it is clear that the ultimate outcome of Dubai smart government initiatives is to enhance the quality of lives in the city, as well as happiness, leading to increased residents' satisfaction in Dubai towards the government or public services. Since the Dubai government has been developing, promoting and executing various smart government initiatives since May 2013, there is no empirical study or investigation whether they have effectively been adopted by the residents and affect the residents' satisfaction level.

In the view of Dubai Smart government establishment, it can be noted that public management is carried out through its strategic partners such as Dubai Electricity and Water Authority (DEWA); The Executive Council; Dubai Health Authority (DHA); Roads & Transport Authority (RTA); Dubai Tourism; Dubai Police; Dubai Municipality Department of Economic Development (DED) etc. Hence, it is clear that those government departments may directly or indirectly be able to influence the residents' satisfaction. Therefore, the importance of studying the significant association between residents' satisfaction and Dubai smart government establishment.

II. LITERATURE REVIEW

A. Dubai Smart Government Characteristics (DSG)

Smart governance is defined as a subset of the smart city domain where an open dialogue between citizens and city officials is enabled through an information and communications technology (ICT) platform

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[4]. Smart governance includes “the aspects of political participation, services for citizens as well as the functioning of the administration” [5]. By reviewing all of above definitions, this paper defines smart government as the promotion of smart city initiatives to serve its beneficiaries and public administration/management.

In order to derive the critical factors influencing smart government performance, several journal articles, as well as the researcher’s opinions could be used. According to literature review, it is found that there are several studies that investigated the success or failure factors of e-government and smart government [6-12]. Accordingly, following factors can be established as the critical factors affecting Dubai smart government performance [8, 12-15].

The integration of ICT with development projects can change the urban landscape of a city and offer a number of potential opportunities, they can enhance the management and functioning of a city [16]. According to Elkadi (2013) [11], information system factors directly impact the success or failure of e-government. As highlighted by DeLone & McLean (2013) [10], information system success factors encompasses several aspects including the quality of information, system, and services.

Furthermore, though smart government initiatives are implemented in various governmental departments, such initiatives will not be successful as long as there is no strong relationship between governmental departments and people or beneficiaries. According to Al-Shafi & Weerakkody (2010) [6], a poor trust relationship between people and public agencies has led to the failure of some smart government initiatives in Qatar, a neighboring state of the UAE. Hence, it can be conceptualized that the government’s strong trust relationship between people and public agencies or governmental departments positively affect smart government performance.

Moreover, Leadership and management is the most crucial dimension affecting the successfulness of smart government initiatives. As part of the leadership’s mandate, SDG is entrusted with many tasks and powers including: proposing the general strategy of the smart government; overseeing smart transformation processes at the level of government entities; reviewing government entities’ plans and budgets related to smart transformation, IT, smart services and infrastructure; and proposing the legislation necessary for easing the smart transformation process [17]. Hence, it can be argued the degree to which those activities are led and managed will be determinants of Smart Dubai Government Establishment.

Additionally, in governance, accountability is referred to answerability, blameworthiness, liability, and the expectation of account-giving, according

to Dykstra (1939) [18]. Empirical studies indicate that the governance model of Smart Cities initiatives follow the same principles of the governance model preconized by e-government research area [7, 19, 20] that is, being transparent and accountable.

Finally, economic development can be concerned as the critical external factor affecting the success of smart government initiatives. Economy is the major driver of smart city initiatives, and a city with a high degree of economic competitiveness is thought to have one of properties of a smart city, and thereby smart government [9]. Smart City Indicator survey in 2017 conducted by Johnson Controls amongst 150 smart city leaders found that economic development was one of the critical drivers of smart city initiatives [21]. Hence, it can be assumed that there is a direct association between successfulness of smart government and Dubai’s economy performance. Consequently, the following hypotheses are proposed:

H1: Dubai smart government characteristics has a positive effect on Users’ satisfaction.

B. User Satisfaction (SAT)

In the context of this study, beneficiaries’ satisfaction is defined as noted in the study of Chatfield & Alanazi (2013) [22] who defined it as a pleasurable or positive emotional state resulting from the appraisal of using transactional e-government self-services delivery options to achieve the citizen’s personal task such as seeking conference travel, and reimbursement from government. However, it should be noted that such definition has been linked with e-government and smart government [13, 15].

By considering different models of user satisfaction such as technology acceptance model Davis (1989) [23], end users’ adoption model [24], and trust and risk model [25], following factors have been integrated into the variable of beneficiaries’ satisfaction included in the current study’s model.

Perceived usefulness is one of the strongest signs of technology adoption as it reflects a significant effect across many technologies and applications, according to Thunibat, Azan Mat Zain, & Ashaari (2011) [26]. Also, the relevant studies have found out that perceived usefulness has a significant effect on the intention to use or the adoption of m-government or e-government services [24, 27]. Accordingly, it is arguably clear that perceived usefulness have a positive impact on beneficiaries’ intention to use smart government platforms and thereby on their satisfaction level.

Moreover, awareness is knowledge of people as to technology and the

availability of electronic services [28]. Abdelghaffar & Magdy (2012) [29] implies that awareness is the first step towards users knowing that the government provides its services over the Internet technology. The lack of awareness has a negative impact on citizens' intentions to adopt e-government and m-government services [24]. In view of that, it can arguably said that the lack of awareness leads to a decline in interest in smart government services, and thereby users' satisfaction.

Furthermore, the quality of information, system, and services provided by smart government initiatives are said to be having a remarkable impact on end users' intention to use and their satisfaction [30]. This is clearly evident from information system success model developed by a study [10].

In addition, trust and public safety can be concerned as a crucial determinant of the satisfaction of beneficiaries of smart government services. Smart City Indicator survey conducted by Johnson Controls, point out the trust and public safety as one of the important drivers of smart city initiatives all over the world. A model of

trust and risk in e-government adoption, which was proposed by [25] can be used to review the above claim.

Finally, according to Almuraqab & M. Jasimuddin (2017) [24], social influence is the degree to which an individual perceives important that other people such as family and friends believe he or she should use the new system. It is vital to realize the importance of the influence of friends and family on decisions to use a technology. Social influence is emerging as a factor in the intention to use smart government services as the communities are increasingly used advanced ICTs in their daily activities. Hence, such factors can be categorized as another dimension influencing the level of user's satisfaction over smart government services [27].

III. RESEARCH METHOD

A. Overview of the Proposed Conceptual Framework

In figure 1, conceptual model to theoretically represent how Dubai smart government can influence the users' satisfaction. The model is developed and operationalized by reviewing the possible determinants of Dubai smart government characteristics and users' satisfaction.

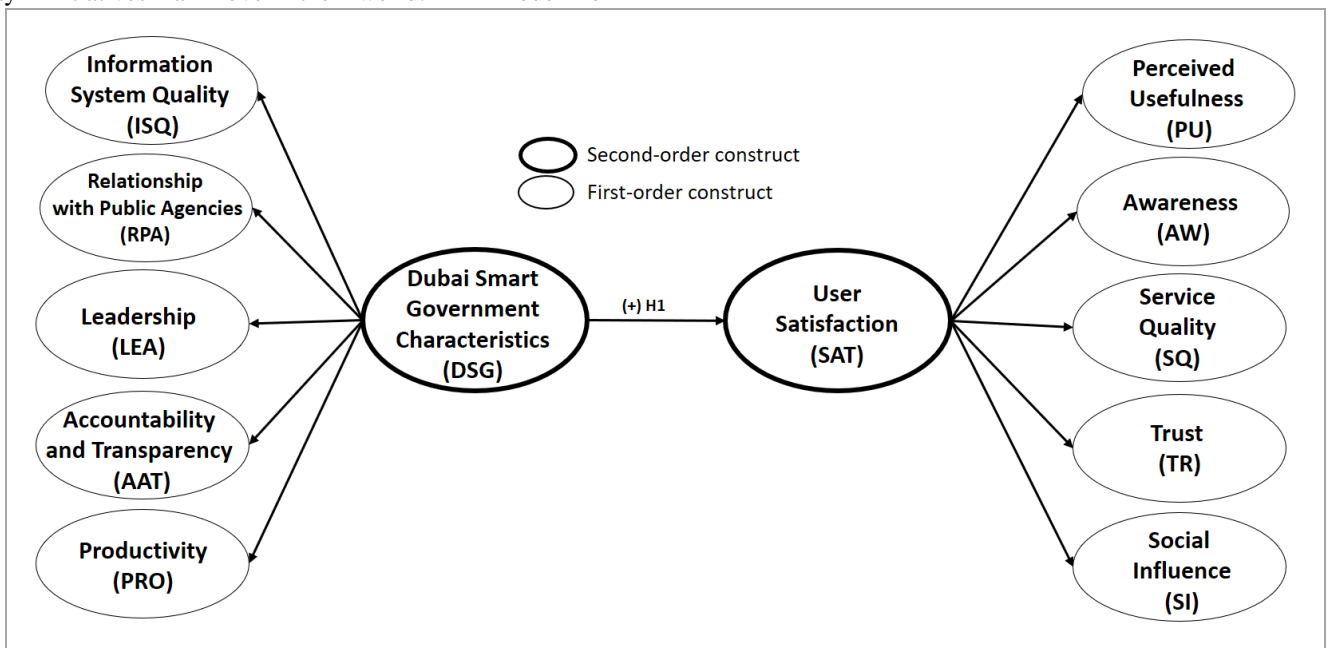


Fig.1. The proposed conceptual framework

B. Development of Instrument and Data collection

Online survey was found as the most suitable tool as smart government are directly operated through ICT and artificial platforms where the internet tool is necessary for both service provider and users. Variables were measured using a Likert Scale which recommended in the previous studies [31, 32]. Random sampling method was adopted to select the beneficiaries of Dubai smart government services. The sample size was determined as 250 users of Dubai smart government services, who are users who got the services from five major strategic or government partners of smart government establishment: Dubai Police, RTA, DEWA,

DHA, and Dubai Municipality. Accordingly, with the permission of Dubai smart office, 400 email addresses of beneficiaries of Dubai smart government initiatives were randomly collected in line with the above criteria. The questionnaire, which was designed through Google Forms, was sent to selected email until the sample size was met. However, only 231 respondents were achieved a response rate of 92.4%, which is considered to be a healthier survey response rate.

IV. DATA ANALYSIS AND RESULTS



PLS (Partial Least Squares) SEM-VB (Structural Equation Modelling-Variance Based) was employed to assess the research model by utilising the software SmartPLS 3.0 [33]. A two-phase analytical technique Hair, Hult, Ringle, & Sarstedt, (2017) [34] consisting of (i) measurement model analysis (reliability and validity) and (ii) structural model analysis (examining the conceptualised relationships) was employed after performing the descriptive assessment. This two-phase analytical technique consisting of a structural and a measurement model assessment is better than a single phase assessment [35]. While the model of measurement explains each parameter’s measurement, the structural model describes the correlation between the parameters in this model [34]. The main reasons for choosing SEM as a statistical method for this study is that SEM offers a simultaneous analysis which leads to more accurate estimates [31, 32].

A.Descriptive analysis

Table 1 presents the mean and standard deviation of each variable in the current study. The respondents were asked to indicate their opinion in relation to transformational leadership and human capital based on a 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree). Service quality scores the highest with mean 4.415 out of 7.0, with a standard deviation of 0.808.

B. Measurement Model Assessment

Construct reliability as well as validity (comprising discriminant and convergent validity) were used to examine the measurement model. The particular alpha coefficients of

Cronbach were tested to determine the reliability of every core parameter in the measurement model (construct reliability). The quantities of all the unique alpha coefficients of Cronbach in this research ranged from 0.818 to 0.901, which went beyond the proposed value of 0.7. Moreover, for inspecting construct reliability, all the CR (composite reality) values ranged from 0.892 to 0.938, which went beyond 0.7. Thus, as Table 1 shows, construct reliability has been fulfilled as Cronbach’s CR and alpha were rather error-free for all the parameters.

Analysis of indicator reliability was conducted by utilising factor loadings. When the related indicators are very similar, this is reflected in the construct and signified by the construct’s high loadings [34]. As per Joseph F. Hair Jr, William C. Black , Barry J. Babin, (2010) [35], the exceeding of values beyond 0.70 suggests substantial factor loadings. Table 1 displays that all articles in this research had factor loadings greater than the suggested value.

AVE (average variance extracted) was employed in this study to analyse convergent validity, which represents the degree to which a measure is correlated positively with the same construct’s other measures. All the AVE values ranged from 0.734 and 0.835, which went beyond the proposed value of 0.50 [35]. Thus, all constructs have complied with the convergent validity acceptably, as shown in Table 1.

Table 1: Mean, standard deviation, loading, cronbach’s Alpha, CR and AVE

Constructs	Item	Loading (> 0.7)	M	SD	α (> 0.7)	CR (> 0.7)	AVE (> 0.5)
Information System Quality (ISQ)	ISQ1	0.851	4.16	0.82	0.827	0.896	0.742
	ISQ2	0.880					
	ISQ3	0.853					
Relationship with Public Agencies (RPA)	RPA1	0.819	4.23	0.84	0.818	0.892	0.734
	RPA2	0.895					
	RPA3	0.855					
Leadership (LEA)	LEA1	0.844	4.21	0.83	0.829	0.898	0.745
	LEA2	0.877					
	LEA3	0.869					
Accountability and Transparency (AAT)	AAT1	0.833	4.17	0.84	0.829	0.898	0.746
	AAT2	0.897					
	AAT3	0.861					
Productivity (PRO)	PRO1	0.853	4.16	0.80	0.826	0.896	0.742
	PRO2	0.865					
	PRO3	0.867					
Perceived Usefulness (PU)	PU1	0.878	4.30	0.73	0.822	0.893	0.737
	PU2	0.827					
	PU3	0.869					
Awareness (AW)	AW1	0.877	4.22	0.81	0.854	0.912	0.774
	AW2	0.896					
	AW3	0.867					

Service Quality (SQ)	SQ1	0.920	4.41 5	0.80 8	0.901	0.938	0.835
	SQ2	0.917					
	SQ3	0.904					
Trust (TR)	TR1	0.909	4.32 0	0.80 6	0.885	0.929	0.813
	TR2	0.901					
	TR3	0.895					
Social Influence (SI)	SI1	0.897	4.40 6	0.81 4	0.871	0.921	0.795
	SI2	0.915					
	SI3	0.862					

Note: M=Mean; SD=Standard Deviation, α = Cronbach’s alpha; CR = Composite Reliability, AVE = Average Variance Extracted.

Key: ISQ: information system quality; RPA: relationship with public agencies; LED: leadership; AAT: accountability and transparency; PRO: productivity; PU: perceived usefulness; AW: awareness; SQ: service quality; TR: trust; SI: social influence.

The degree to which the articles distinguish among concepts or measure different constructs is demonstrated by discriminant validity. Fornell-Larcker was employed to analyse the measurement model’s discriminant validity. Table 2 shows the outcomes for discriminant validity by employing the Fornell-Larcker condition. It was discovered that the AVEs’ square root on the diagonals (displayed in bold) is bigger than the correlations among constructs

(corresponding row as well as column values), suggesting a strong association between the concepts and their respective markers in comparison to the other concepts in the model [36, 37]. According to Hair et al., (2017) [34], this indicates good discriminant validity. Furthermore, the exogenous constructs have a correlation of less than 0.85 [38]. Therefore, all constructs had their discriminant validity fulfilled satisfactorily.

Table 2: Results of discriminant validity by Fornell-Larcker criterion

	AAT	AW	ISQ	LEA	PRO	PU	RPA	SI	SQ	TR
AAT	0.864									
AW	0.525	0.880								
ISQ	0.758	0.442	0.862							
LEA	0.787	0.487	0.750	0.863						
PRO	0.756	0.514	0.656	0.696	0.862					
PU	0.556	0.728	0.502	0.559	0.539	0.858				
RPA	0.783	0.474	0.774	0.749	0.720	0.570	0.857			
SI	0.514	0.730	0.438	0.488	0.491	0.738	0.489	0.892		
SQ	0.540	0.791	0.486	0.504	0.491	0.785	0.488	0.791	0.914	
TR	0.520	0.765	0.441	0.453	0.485	0.738	0.477	0.703	0.802	0.902

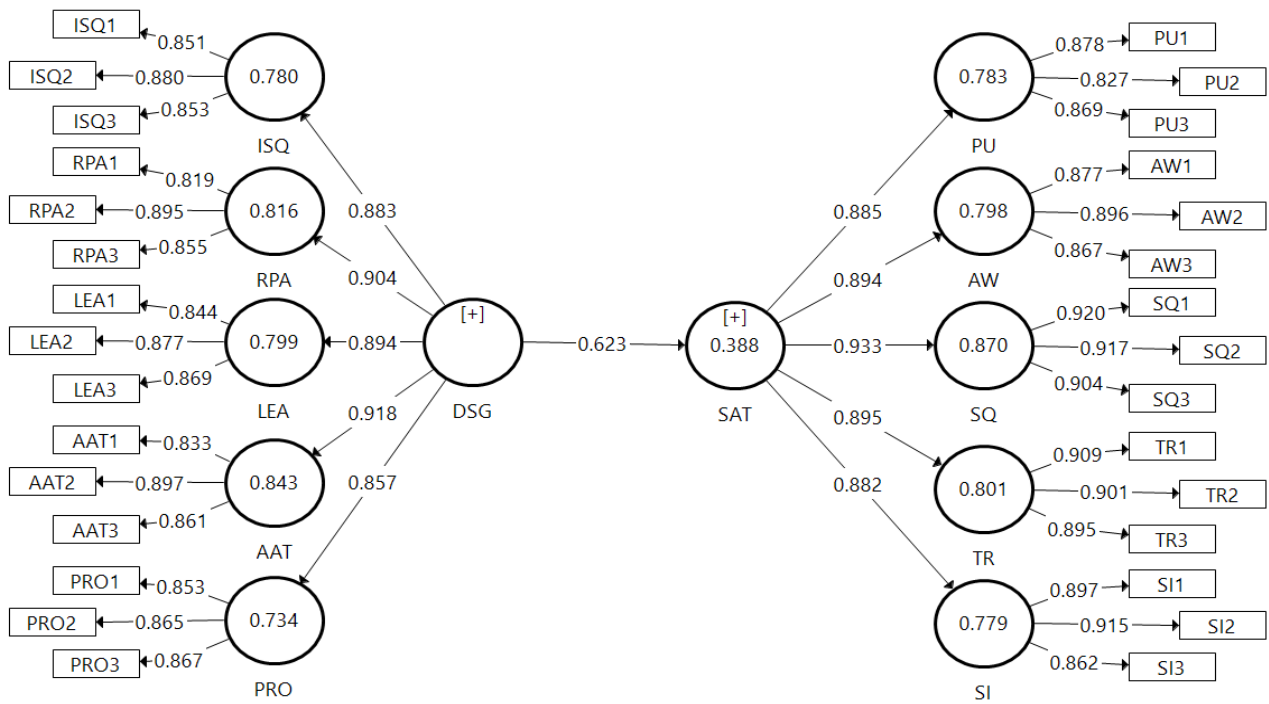
Note: Diagonals represent the square root of the average variance extracted while the other entries represent the correlations.

Key: ISQ: information system quality; RPA: relationship with public agencies; LED: leadership; AAT: accountability and transparency; PRO: productivity; PU: perceived usefulness; AW: awareness; SQ: service quality; TR: trust; SI: social influence.

C. Structural Model Assessment

The structural model can be tested by computing beta (β), R^2 , and the corresponding t-values via a bootstrapping procedure with a resample of 5,000 [34].

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Key DSG: Dubai smart government characteristics; ISQ: information system quality; RPA: relationship with public agencies; LED: leadership; AAT: accountability and transparency; PRO: productivity; SAT: user satisfaction; PU: perceived usefulness; AW: awareness; SQ: service quality; TR: trust; SI: social influence

Fig 2: PLS algorithm results

Figure 2 and Table 3 depict the structural model assessment, showing the results of the hypothesis tests. Dubai smart government characteristics positively influence user satisfaction. Hence, H1 is accepted with ($\beta = 0.623, t = 6.942, p < 0.001$). Thirty-nine percent of the

variance in user satisfaction is explained by Dubai smart government characteristics. The values of R^2 have an acceptable level of explanatory power, indicating a substantial model [37].

Table 3: Structural path analysis result

Hypothesis	Relationship	Std Beta	Std Error	t-value	p-value	Decision	R ²
H1	DSG → SAT	0.623	0.090	6.942	0.000	Supported	0.39

Key: DSG: Dubai smart government characteristics; SAT: user satisfaction.

V. DISCUSSION

The main objective of this study is to address the impact level of Dubai smart government characteristics on the user satisfaction. The suggested hypothesis was supported with ($\beta = 0.623, t = 6.942, p < 0.001$). This indicates that there is a positive direct impact of Dubai smart government characteristics on the user satisfaction. This result is explained by the fact that the more quality of Dubai smart government programs system is high and reliable, Dubai government effectively coordinates and collaborates its smart government establishment with its all public agencies, The leadership Smart Dubai Government Establishment is visionary and effective, Smart Dubai Government Establishment facilitates access to information, economic activity and conduct of business, Smart Dubai Government Establishment improves the productivity in the state; the more the users perceive that smart Dubai government establishment is useful or beneficial to them, The users are aware of smart government services being provided in Dubai, The users find

that Dubai smart government systems demonstrate the quality features, The users of Smart Dubai Government services trust in Dubai government, and The users are influenced to use smart government services by their families, friends, and communities with which they live. Overall, H1 was supported and indicates that there is a positive direct impact of Dubai smart government characteristics on the user satisfaction of smart Dubai government services.

VI. IMPLICATIONS, LIMITATIONS AND FUTURE DIRECTIONS

At the beginning, the study is significant to Dubai government as its smart government initiatives primarily aim to enhance happiness of people living in Dubai. Enhancing happiness of residents denotes the satisfaction of residents' as to overall initiatives of Dubai Smart Government establishment, and thus, the measurement and evaluation of the level of residents' satisfaction, which arises as a consequence of Dubai Smart Government establishment is vital.

Accordingly, the findings of this study in relation to Dubai Smart Government establishment facilitate the government to make decisions in relation to their initiatives. For example, the findings of this paper will enable Dubai government to identify whether Dubai Smart Government initiatives have significantly been able to influence the residents' satisfaction level by which their ultimate outcome of increasing happiness of people can be assessed.

On the other hand, the typical assessment by using feedback of the systems will not always reflect the reality with respect to the level of residents' satisfaction as it does not account for residents who have not used or are unable to use such smart government applications. Thus, such assessment may extravagate the benefits of such initiatives. However, the current study targeted to survey randomly selected residents of Dubai to measure and approximate the level of residents' satisfaction towards Dubai Smart Government initiatives, and thus relatively a larger audience, which can include many types of users of smart government applications could be used for the research.

VII. CONCLUSION

The main objective of this study was to define antecedents that affect the user satisfaction of Dubai smart government services. The findings have shed encouraging lights on some characteristics such as (Information System Quality, Relationship with Public Agencies, Leadership, Accountability and Transparency, and Productivity) that influence the user satisfaction. The results from the statistical analysis showed that there is a positive direct impact of Dubai smart government characteristics on the user satisfaction. These characteristics will improve the Perceived Usefulness, Awareness, Service Quality, Trust, and Social Influence, as the user satisfaction indicators. Nevertheless, of the limitations of this study, results have managed to shed some lights on the impact of Dubai smart government characteristics on the user satisfaction, which is encouraging results. In summary, Dubai government needs to improve the characteristics of Dubai smart government to reach the ultimate user satisfaction.

APPENDIX

Appendix A Instrument for variables

Variable	Measure	Source
Information System Quality (ISQ)	ISQ1: The quality of Dubai smart government programmes system is high and reliable.	
	ISQ2: The quality of information provided by Dubai smart government programmes is high.	[10, 11]
	ISQ3: The quality of the service and support that system users receive from Dubai smart government programmes is high.	
Relationship with Public Agencies (RPA)	RPA1: Dubai smart government initiatives have a strong trust relationship with people	
	RPA2: Dubai smart government initiatives have a strong trust relationship with public agencies	[6]
	RPA3: Dubai government effectively coordinates and collaborates its smart government establishment with its all public agencies	
Leadership (LED)	LE1: The leadership Smart Dubai Government Establishment is visionary and effective.	
	LE2: The vision and mission of Smart Dubai Government Establishment are well communicated over the governmental departments.	[39]
	LE3: The changes in the external and internal environment is promptly and effectively responded.	
Accountability and Transparency (AAT)	AAT1: Dubai smart government's decision-making and operations are more transparent.	
	AAT2: Smart Dubai Government Establishment facilitates access to information, economic activity and conduct of business.	[19, 20]
	AAT3: Smart Dubai Government Establishment increase accountability and reduce corruption.	
Productivity (PRO)	PRO1: Dubai's economy is smart and features global competitiveness.	[9]
	PRO2: Smart Dubai Government Establishment improves the productivity in the state.	
	PRO3: There is a direct association between Dubai's smart economy and smart government concepts.	

Perceived Usefulness (PU)	PU1: The users perceive that smart Dubai government establishment is useful or beneficial to them. PU2: The users perceive that smart Dubai government establishment is easy to use. PU3: The perceived usefulness & ease of use were actually featured when receiving Dubai smart government services.	[23]
Awareness (AW)	AW1: The users are aware of smart government services being provided in Dubai. AW2: The users are well aware of how to use smart government systems. AW3: Awareness increases the level of intention to use smart government services.	[28, 29]
Service Quality (SQ)	SQ1: The users find that Dubai smart government systems demonstrate the quality features. SQ2: The users find that information and data provided by Dubai smart government systems and services demonstrates acceptable and reliable. SQ3: The users receive quality services from Dubai smart government information systems.	[10]
Trust (TR)	TR1: The users of Smart Dubai Government services trust in the internet. TR2: The users of Smart Dubai Government services trust in Dubai government. TR3: The critical issues relating to public safety was not encountered by the users of the services.	[25]
Social Influence (SI)	SI1: The users believe and consider the perceptions of their families, friends, and colleagues regarding smart government services in Dubai. SI2: The users are influenced to use smart government services by their families, friends, and communities with which they live. SI3: The users are likely to use smart government system in the future if their friends and colleagues use it.	[27]

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