

Impact of Information Quality, System Quality, and Service Quality on the Smart Government E-Service Quality in the Police of Dubai – Moderation of Awareness of Smart Government

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Abstract:

This study aimed to examine the moderation role of the awareness of smart government in modelling the E service quality based on the information system quality factors among the Dubai police officers. The proposed conceptual framework consists mainly of one main independent variable which is smart government system qualities that represented by five sub-variables which are information quality, system quality, and service quality. This model is trying to explain the variance of e service quality by measuring the impact of smart government system on the E service quality. Police of Dubai is chosen because of the advanced technologies that adopted in this organisation. Based on the recent reports from the UAE government (2021), a total of 17500 police officers are working in Dubai police and the sample size based on Morgan table, is 376. The technique used for selecting samples is stratified random sampling based on the departmental grouping. Two techniques will be used to assure that the target samples can be reached by the suitable method, the directed printed survey and the online electronic survey. The collected data was analysed by utilizing the software Statistical Package for the Social Sciences (SPSS 25) and SmartPLS 3.0.

Keywords: Smart Government System Qualities, Information Quality, System Quality, Service Quality, E Service Quality, Smart Government.

I. Introduction

The concept of e-service (electronic service) represents one prominent application of utilizing the use of information and communication technologies (ICTs) in different areas. E-services, a business concept developed by Hewlett Packard (HP), is the idea that the World Wide Web is moving beyond e-business and e-commerce into a new phase where many business services can be provided for a business or consumer using the Web (Stojković&Đuričić, 2012). As concerned to government e-service, government's agencies are the service provider and citizens as well as businesses are the service receiver. The channel of service delivery is the third requirement of e-service. Contemporary information system is the main channel of e-service delivery, which include the smart services offered by the government (Wirtz, Weyerer, &Schichtel, 2019). The smart government and E services are built upon the integration information systems and artificial intelligence capabilities; therefore, the factors of system quality for sure are playing a major role in the success of the smart government and E services (Alhashmi, Salloum, & Abdallah, 2019). Wang and Teo (2020) conceptualize the perceived value of the m-government based on the information quality, system quality and service quality.

Information quality, which focuses on the IS content issue, is measured based on the characteristics of the actual information generated by the IS, as well as the extent to which the information product meets user needs in terms of accuracy, timeliness, reliability, relevance, integrity, and simplicity. In the E government context, the services provided by governments can be divided into informational and transactional services;

moreover, information services are key to governmental IS, as access to information is the most common reason why citizens use an e-government website (Wang & Teo, 2020). This variable is increasingly important because today's primary economic activity is the provision of services rather than the production of goods, meaning that services are becoming more important than in previous decades. E government can be considered as an innovation that confers many advantages (mobility and localizability), which means that it conveys more value. For example, mobility is regarded as the most important technological trait of m-government (Wang, 2014), as it enables access to E government without time and distance limitations and can also provide time-critical services (such as mobile communication and mobile information searching) (Obedait et al., 2019).

The United Arab Emirates has been using and developing Smart Government for many years; however, in the last few years, the government is taking the first steps in changing the services provided by Smart Government. In 2013, His Highness Sheikh Mohammed bin Rashid Al Maktoum said, "we have to work hard to make the people satisfied with the services of the government; as the government starts to apply Smart Government, the UAE government must think creatively". In general, the people in the UAE and Gulf countries are open to the use of social network services. They view Smart Government as a benefit because they can accomplish their tasks online without having to leave home (Al-Jenaibi, 2016). The global efforts to acquire smart government are on the increase, but not all smart government programs around the world are successful, most notably in the developing countries (Manoharan, Ingrams, Kang, & Zhao, 2021). Smart Government initiatives have been launched to provide services to citizens by means of the Internet with different level of success (Jasimuddin et al., 2017). Due to this, the interactions between end-users and the public sector, in terms of lifestyles as well as business transactions have been changed (Almuraqab, Jasimuddin, & Mansoor, 2021).

Despite the large number of smart-government initiatives which have been launched in many parts of the world, the adoption of the smart government is not mapped with the ratio of smart technology diffusion especially in the developing countries (Almuraqab et al., 2021). In the domain of E government and smart services, it is noticed that the studies in the developed countries is much more than the studies in the developing countries (Dias, 2020). For instance, Almaiah&Nasereddin (2020) stated that "Future research could include other independent predictors such as trust, culture, and perceived awareness, and would provide a deeper insight into e-government service use"; and Glyptis et al. (2020) conducted a qualitative study to explore the project managers perspective for the E-government success initiatives; the results stated that while the information system design is essential, the employees' perceptions and knowledge is important and future studies have to empirically examined this factor. United Arab Emirate has faced rapid development in the last 40 years following the formation of the country from seven emirates. The smart government in UAE is mainly relying on the provision of ICT (Almuraqab&Jasimuddin, 2017). The UAE was ranked ninth in the Institute for Management Development IMD World Competitiveness Yearbook 2020. It is the only Arab country to have maintained its position among the top 10 competitive countries for 4 years in a row. The UAE was ranked 3rd in government efficiency, 4th in economic performance and 7th in business efficiency. The 3rd position in the government efficient is related to the smart government benchmarks (www.imd.org, 2021).

II. Literature Review

A. Conceptual Framework

The research framework of this particular study has determinates of in smart government system qualities such as (information quality, system quality, and service quality) as independent variables that have a direct impact to E service quality while awareness of smart government as moderation (As seen in Figure 1).

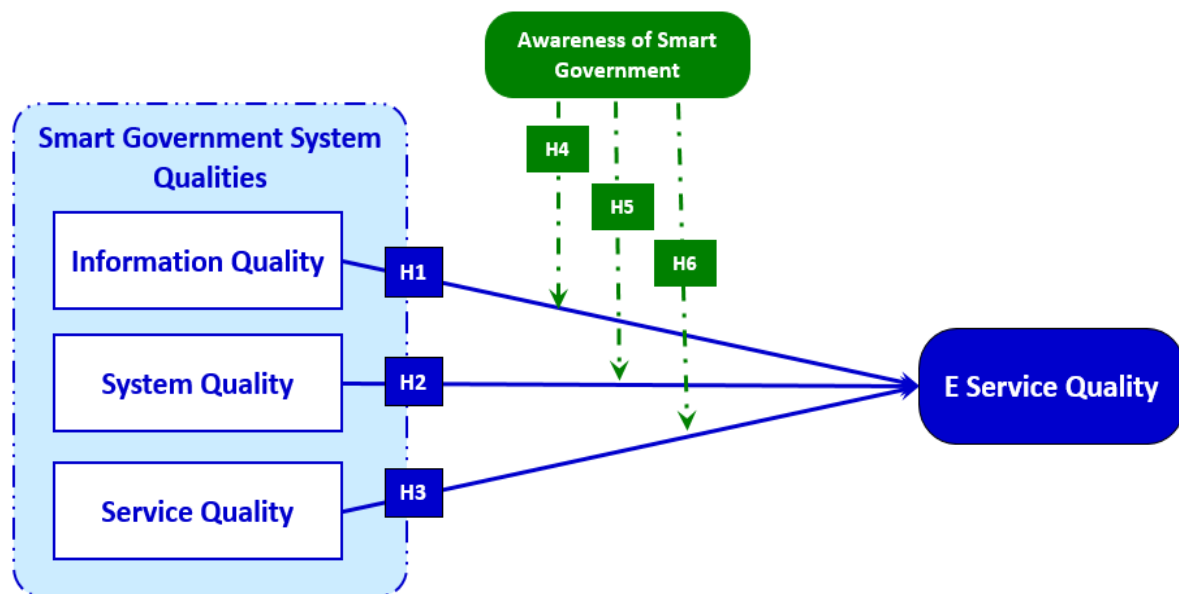


Figure 1: Research Framework

B. Relationship between information quality and E service quality

The most developed post-industrial societies live by information, and information and communication technologies keep them oxygenated (Veloso et al., 2020). So, the better the quality of the information exchanged, the more likely such societies and their members may prosper (Kaya et al., 2019). So, it required the Office of Management and Budget “to promulgate guidance to agencies ensuring the quality (Akdere et al., 2020), objectivity (Hong et al., 2020), utility (Ali et al., 2021), and integrity of information (including statistical information) disseminated by Federal agencies” (Lee et al., 2019). Lacking a clear and precise understanding of information quality properties causes costly errors (Monno et al., 2018), confusion (Adimalla&Taloor, 2020), impasse, dangerous risks and missed opportunities (Pasika&Gandla, 2020). Part of the difficulty lies in constructing the right conceptual and technical framework necessary to analyze and evaluate them (Chowdury et al., 2019). However, such results have had limited impact also because research concerning information quality has failed to combine and cross-fertilise theory and practice (Joanna et al., 2020). Furthermore, insufficient work has been done to promote the value-adding synthesis of academic findings and technological know-how (McGuire et al., 2018). Information quality helps the organizations to perform better and provide a better service and this affects E service quality among the Police of Dubai – UAE (Wamba et al., 2019). Theoretically; Information system success model suggests that a better information quality will help

provide a vital information to act a react fast in any situation (Cao & Deng, 2019). Studies have shown that there is a significant direct relationship between information quality and E service quality among the Police of Dubai – UAE (Aydiner et al., 2019).

- Hypothesis 1: Information quality has a significant positive influence on the E service quality among the Police of Dubai – UAE.

C. *Relationship between system quality and E service quality*

There is no doubt that a good system in the organizations will produce good information and this information will effect on the organization as a whole (Alghawi et al., 2019). According to Glybovets& Mohammad, (2017) system quality and information quality are measures of information systems quality (Chatfield & Reddick, 2019). The system quality represents the quality of information processing itself, which is characterized by employment of state-of-the-art technology (Wirtz et al., 2019), a system offering key functions and features , and software that is user friendly (Bordne et al., 2020), easy to learn (Morales-Sánchez et al., 2020), and easily maintainable (Perry et al., 2019). Information quality (Halim, 2019), a concept that is related to the quality of information system outputs, can be described in terms of outputs that are useful for business users, relevant for decision making and easy-to-understand (representing IS quality as value) as well as outputs that meet users' information specifications (representing IS quality as conformance to specification) (Johnson et al., 2020). Information quality has become a critical concern of organizations and an active area of information systems research (Mondal et al., 2019). Therefore, it is important to any organization to attention on the system quality to the improve the quality of information produced as well as the improvement of the organizational performance of the organization (Cho et al., 2020). System quality increases the efficiency and effectivity of the organizations operations and this affects E service quality among the Police of Dubai – UAE (Liu et al., 2018). Theoretically; Information system success model suggests that a better System quality will help improving the overall organization performance (Patel et al., 2020). Studies have shown that there is a significant direct relationship between System quality and E service quality among the Police of Dubai – UAE (Marliyah et al., 2021).

- Hypothesis 2: System quality has a significant positive influence on the E service quality among the Police of Dubai – UAE.

D. *Relationship between service quality and E service quality*

The term Service Quality is an association of two different words; service" and quality (D. Li et al., 2019). Service means "any activity or benefit that one party can offer to another that is essentially intangible and does not result in the ownership of anything" (Min, 2021). Service quality means the ability of a service provider to satisfy customer in an efficient manner through which he can better the performance of business. In the service sector too „quality" is an important element for the success of business (Al-Haddad et al., 2019). It is because of the realization of its positive link with profits (Jawabreh, 2019), increased market share, customer satisfaction (Mehri et al., 2018). Several earlier studies and authors pointed out that quality concept in service is different from the concept prevalent in the goods sector (von Lucke, 2017). The reasons for such a treatment are inherent features of services like intangibility, inseparability

from the provider, heterogeneous. Hence there is a distinct frame work for quality explication and measurement (Khalili et al., 2019). Service quality increases the efficiency and effectivity of the organizations operations and this affects E service quality among the Police of Dubai – UAE (Alonaizi& Manuel, 2021). Theoretically; Information system success model suggests that a better service quality will help improving the overall organization performance (Albreiki&Bhaumik, 2019). Studies have shown that there is a significant direct relationship between service quality and E service quality among the Police of Dubai – UAE (Choenni et al., 2020).

- Hypothesis 3: Service quality has a significant positive influence on the E service quality among the Police of Dubai – UAE.

E. Relationship between smart government system qualities and E service quality

Digitalization is crucial if public administration is to thoroughly modernize. Sophisticated technologies such as the internet of things (IoT) (von Lucke, 2019), sensor systems, big data analytics, and artificial intelligence (AI) have become increasingly important (Schedler&Demaj, 2017). Many digital initiatives that use these technologies in the public sector are launched under the umbrella term smart government (Alonaizi& Manuel, 2021), with the purpose of establishing new service delivery models by connecting and integrating physical (Albreiki&Bhaumik, 2019), digital, public, and private environments (Gil-Garcia, 2012). These approaches go one important step further than past digitalization endeavors, asking how the relationship between public administration and its stakeholders could be rethought by using new technologies (Bright & Margetts, 2016). Terms such as Virtual State (Fountain, 2001) or NetState (Lawson, 1998) refer to this phenomenon (Choenni et al., 2020). With the emergence of portable devices and the widespread availability of broadband wireless networks (Alghawi et al., 2019), the era of m-government has transferred such a “going online” of government from desktops to mobile device screens, without changing any other process parameters or service logics (Albeshar& Stone, 2016). In contrast to e-government and government (Lemke et al., 2019), smart government not only wants to digitalize processes, but to fundamentally rethink the way government works. While e-government and m-government are forerunners of smart government (AlEnezi et al., 2018), open government initiatives are a precondition for it (Jimenez et al., 2014). The smart government system qualities have a moderation interaction on the relationship towards e service quality from smart government system qualities (Althammer et al., 2019).

- Hypothesis 4: Awareness of smart government moderates the relationship between information quality and E service quality among the Police of Dubai – UAE.
- Hypothesis 5: Awareness of smart government moderates the relationship between system quality and E service quality among the Police of Dubai – UAE.
- Hypothesis 6: Awareness of smart government moderates the relationship between service quality and E service quality among the Police of Dubai – UAE.

III. Methodology

The target population refers to the entire group of individuals to which researchers are interested in generalizing the conclusions. Whereas, the accessible population refers to the population of study which the researchers can apply their conclusions and draw

their sample size. the target population for this study is the entire staffs of the police force in Dubai. Police of Dubai is chosen because of the advanced technologies that adopted in this organisation; besides, to the possible differences in the technology adoption compared to another emirate such as Ajman. In addition, Dubai police is chosen due to their strong commitment to the year 2030 ambition to have 25% of the force consist of robotic officers and to operate a smart police station that won't require human employees. The Dubai police force has three major departments which are a department of general operation, department of artificial intelligence, and department of a criminal investigation. Based on the recent reports from the UAE government (2021), a total of 17500 police officers are working in Dubai police and the sample size based on Morgan table, is 376. The unit of analysis is the individual staffs of UAE police force. The study ensures that necessary precautions will be taken into consideration to acquire the needed data and information and adequate response will be achieved for this study. The instrument used for collecting the primary data is a set of structured self-administered questionnaire, which is adapted from multiple previous studies Information Quality (Sausi, Kitali, & Mtebe, 2021), System Quality (Sausi et al., 2021), Service Quality (Sausi et al., 2021), Awareness of Smart Government (Alawneh, Al-Refai, & Batiha, 2013), E Service Quality (Alawneh et al., 2013). The main software package is SmartPLS 3.0; however, the SPSS software package is used in the early stage of data analysis for data cleaning, frequency analysis, and descriptive statistics. In this study, data will be analysed by using Partial Least Squares Structural Equation Modelling (PLS SEM) technique, which will be conducted by the Smart PLS 3.0 software package. Researchers are using the PLS SEM method in order to measure the estimation that relates to the relationship in the field of path models involving latent constructs. There are two stages in the PLS SEM analysis, namely measurement model and structural model. In the structural model, reliability and validity of the data are measured; and in the measurement model, relationships and hypotheses testing are measures.

IV. Findings

A. Validity and Reliability of Constructs

Outer loading and cross loading for every item is estimated to test it with its associated variable. Every item must have sufficient loading within its associated variable. Any loading above the threshold of 0.708 is sufficient and any loading below the threshold of 0.4 is inadequate. Any measure between 0.4 and 0.7 is suspected and can be deleted or kept based on the unique conditions for every study (Hair Jr et al., 2016; Hulland, 1999). Cross Loading, scale is used to assure that for every item, its loading within the associated construct is higher than any other loading in the remaining constructs (Hair Jr et al., 2016; Hulland, 1999). The proposed design model with all the items have proper loading above 0.708 except five items, which are labelled as ASG6, ESQ1, FQ6, IQ4, and SQ1, which belongs to five different variables. The weak items were deleted and all the loading after that are at proper loading situation. For composite reliability, all the values are within the range between 0.900 and 0.946, which shows an adequate internal consistency. For Cronbach's Alpha reliability, the valued are ranged from 0.870 to 0.935, which shows adequate level of internal consistency. For composite reliability, all the values are within the range between 0.900 and 0.946, which shows an adequate internal consistency. For Cronbach's Alpha reliability, the valued are ranged from 0.870 to 0.935, which shows adequate level of internal consistency.

Table 1: Constructs Reliability and Validity

construct	Item	Loading	AVE	Cronbach's alpha
Information quality (IQ)	IQ1	0.878	0.907	0.870
	IQ2	0.859		
	IQ3	0.756		
	IQ4	x		
	IQ5	0.794		
	IQ6	0.768		
System quality (SQ)	SQ1	x	0.921	0.891
	SQ2	0.887		
	SQ3	0.917		
	SQ4	0.881		
	SQ5	0.751		
	SQ6	0.733		
Service quality (VQ)	VQ1	0.756	0.900	0.866
	VQ2	0.856		
	VQ3	0.777		
	VQ4	0.802		
	VQ5	0.736		
	VQ6	0.713		
E service quality (ESQ)	ESQ1	x	0.946	0.935
	ESQ2	0.721		
	ESQ3	0.715		
	ESQ4	0.901		
	ESQ5	0.903		
	ESQ6	0.876		
	ESQ7	0.840		
	ESQ8	0.785		
	ESQ9	0.781		
	ESQ10	0.781		
Awareness of Smart Government (ASG)	ASG1	0.719	0.912	0.877
	ASG2	0.915		
	ASG3	0.826		
	ASG4	0.827		
	ASG5	0.808		
	ASG6	x		

The Fornell&Larcker criterion matrix. The matrix is a refined matrix of the latent variable's correlations. The highest value detected here is SQ0.837, which is for the variable effectiveness of internal control. The lowest value assigned in the table is for the variable information and communication with a value of VQ0.775. Table 2 shows the results, in which all diagonal scores are higher than other scores in the same row and column; therefore discriminant validity is achieved.

Table 2: Discriminant validity – Fornell-LarckerCriterion

	IQ	SQ	VQ	ASG	ESQ
Information quality (IQ)	0.813				
System quality (SQ)	0.373	0.837			
Service quality (VQ)	0.362	0.467	0.775		
Awareness of smart government (ASG)	0.348	0.458	0.449	0.821	
E service quality (ESQ)	0.631	0.596	0.487	0.522	0.814

B. Relationships Examinations and Discussions

Results of the main dependent variable, E service quality (ESQ), illustrate a moderate predictive power and a large predictive relevance. The related R square value is 0.631 (a power of 63.1%) and the related Q square is 0.415 (a relevance of 45.1%). The prediction constructs (information quality, system quality, service quality, and awareness of smart government) can explain 63.1% of the variance in the dependent variable, E service quality (ESQ).

Table 3: Predictive Power and Predictive Relevance of Proposed Model

	Predictive Power		Predictive Relevance	
	R Square	Status	Q Square	Status
E service quality	0.631	moderate	0.415	Large

The T statistics estimates of the research designed model and the path coefficient assessment with the values of T Statistics and Beta values for the outcome variable E service quality (ESQ). All the three antecedents have significant relations, in which the p value scores are above 0.05 and the t statistics scores are above 1.98. The precedence for the relations based on the path coefficient value is information quality (0.351), system quality (0.222), and service quality (0.108).

Table 4: Path Coefficient Assessment of the Study Variables

H	Relationship	Path Coeff	Standard Deviation	T Statistics	P Value	Status
H1	IQ → ESQ	0.351	0.036	9.852	0.000	Significant
H2	SQ → ESQ	0.222	0.047	4.713	0.000	Significant

H3	VQ→ESQ	0.108	0.041	2.674	0.008	Significant
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The relationship between information quality and E service quality is moderated by the awareness of smart government with a change in the path coefficient equal to 0.237; the relationship between system quality and E service quality is moderated by the awareness of smart government with a change in the path coefficient equal to 0.100 (Table 5).

Table 5: Moderating effects of Awareness of smart government

H		Path Coefficient	Standard Deviation	T Statistics	P Values	Status
H6	ASG (IQ->ESQ)	0.237	0.048	4.907	0.000	Significant
H7	ASG (SQ->ESQ)	0.100	0.049	2.024	0.044	Significant
H8	ASG (VQ->ESQ)	-0.001	0.041	0.014	0.989	Non Significant

V. Contributions and Recommendations

This study proposed a developed model with new constructs and relations. While the model was assessed successfully, but further research is needed to assess the model in different environments. One of the constraints is the limited approach of implementation, which reduces the generalization, therefore replicating the same study of the police services that offered online in other countries is recommended to get a better understanding and generalization. Another constraint is the participants' types and selection of the police offices as users of the system, which reduce the generalization, therefore replicating the same assessment in other E services and by surveying different populations such as municipals users or users in different countries, will provide different empirical results to generalize and compare the results for having the best practices. Recommendations are extended, to test the model and the instrument in other sectors or even to test whether this model can be suitable for other information systems such as the online banking. Simply, the recommendation is for testing the model in different scenarios and conditions to enhance the generalization of the theory. Findings show that the proposed model or the prediction constructs related to the variable can explain more 63% of the E service quality variance. However, the complement percentage (more than 37%) shows that some other variables maybe causing this uncovered variance. Therefore, further studies must focus in exploring, and examining additional factors, other than IS system qualities. Form the quantitative analysis, the moderation of smart government awareness show that it have no significance moderating effects on relationships, which are associated to the variables service quality. Additional explanation is recommended by interviewing experts or by providing open end questions to the users and make semantic analysis.

VI. References

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