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Influence of Overall Quality and Innovativeness on Actual Usage of Smart Government: An Empirical Study on the UAE Public Sector

Fahad Al-Obthani and Ali Ameen
Lincoln University College, Malaysia

(Corresponding author: Fahad Al-Obthani)
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ABSTRACT: The revolution of information and communication technology has been found to shape different sectors of the world. In the 21st century, the idea to administer and govern has gone through a radical transformation and has led to adoption of new tools which would assist the government in their service enhancement. This study primarily aims at examining the facts impacting the actual usage of smart government among employees within the public sector. Random sampling method was adopted to select the employees who used smart government services. Only 260 respondents were considered with 60% rate of response, which was taken to be a healthier survey response rate. Partial Least Squares (PLS) Structural Equation Modelling-Variance Based (SEM-VB) method was deployed for assessing model of research by utilising the software SmartPLS 3.0. The results showed an overall quality (system quality, service quality, and information quality) based on f and innovativeness that significantly impacted the actual utilisation of smart government. The study outcome showed the potential to give further insights into smart government, its actual usage and the role of overall quality and innovativeness. The variance explained in actual usage was recorded at 62%.

Keywords: Overall Quality; Innovativeness; Smart Government; UAE.

I. INTRODUCTION

In the initial years, the Information and Communication Technology (ICT) revolution has very quickly spread around the world and influenced the public as well as private sectors. The concept of governance and administration has radically changed in the 21st century, as the organisations have started adopting new techniques and tools which would help the governments improve their services. Smart government is referred to as a government, which "implemented business processes and the related information technological tools for enabling the seamless flow of information across all governmental agencies and thereby providing better services to the citizens." A previous study [1] defined a smart government as a smart city component, which allowed the citizens and the city officials to have an open communication, with the help of ICT platform. In most of the contemporary organisations, adopting technology is not only used ICT for filling up some records and forms but rather it is also used as a tool that performs the functions to identify, accumulate, analyse, measure, prepare, interpret, and communicate the data and information that the management uses for planning [2-4]. It is used in evaluation and control within an organisation and to assure appropriate use and accountability for their resources [2, 5, 6].

A smart government is a service provider and it needs to make sure that its targeted population uses the provided services. It also determines whether the systems could affect the performance of the organisations and its employees. The variables which affect the actual use of the smart government should be tested and identified.

Many models and theories related to the information system were developed; however, they were based on western culture, particularly, USA. The various models and theories associated with management are not similar in all the contexts. Another study [7]stated that different cultures affected the results of social sciences. Unlike the western countries, UAE has a low individualism trait and higher power distance. Furthermore, the people in the UAE are less likely to take risks. The present automation and exchange of data trend has been observed in manufacturing technologies. It is inclusive of systems of cyber-physique, the things' internet, computing of cloud and cognition [8, 9]. On the other hand, they respect the order of hierarchy right from top to the bottom and always consider their friends, relatives and the general society. It is clear that the UAE is trying to become a leading technology centre based on the innovation strategy of the 4th Industrial Revolution [9, 10]. Many different global indicators will be helpful to understand UAE according to a set of steps having international identification [11, 13, 14].Thus, cultural traits affect the adoption and usage of new technologies and can enable or hinder the process. Therefore, the management models or theories have to be modified depending on the UAE's context.

In this study, the researchers assessed the usage of information technology (or smart government) based on the innovativeness and general quality of the public sector employees.

II. LITERATURE REVIEW

A. Overall Quality (QUL)

The problem of quality has plagued many researchers who have investigated the topic of Management Information System (MIS). The MIS practitioners are constantly trying to improve the IS quality so that it can handle the internal and external pressures and also react appropriately to the challenges regarding its growth and survivability. The IS researchers are always worried about the definitions of quality and related issues concerning the IS research [15]. Many scholars have highlighted the positive relationship that exists between the quality of IS and its usage. A few researchers noted that the quality of IS predicts its

actual usage. In this study, the researchers have proposed a 2nd-order construct, i.e. quality of the MIS, since it already consists of three 1st-order constructs, i.e. quality of information, quality of system, and quality of service. Hence, proposal of the below mentioned hypothesis was laid:

H1: Overall quality can positively affect the actual utilisation of smart government.

B. Innovativeness (INN)

Innovativeness was described as the extent to which the individual believed about him being positively inclined towards the utilisation of freshly developed system like a smart government. It is also defined as the openness of a specific social group to the use of novel products and systems.

Several researchers have examined the impact of innovation on the actual usage of IS in various applications. The various factors of innovativeness which positively and significantly predicted the actual usage included personal, web and consumer innovativeness [31]. Hence, they proposed the following hypothesis:

H2: Innovativeness can positively affect the actual utilisation of smart government.

C. Actual Usage of Smart Government (USE)

The real utilisation of smart government includes frequency, nature, extent, appropriateness, amount and purpose of the usage [15]. A previous study [16] stated that this reflected the usage frequency and utilisation time of the technology. Moreover, the actual utilisation was defined as the use of IS or its output with regard to the actual or self-reported usage [17].

Here, the researchers defined usage as the degree to which the employees used smart governmental activities. The actual usage was seen to be an important construct in IS. The literature includes many studies which applied the actual usage in various applications and contexts. A previous study [18] stated the IS in Mexico and noted that the usage construct showed a positive correlation with many organisational results. Another study [19] noted that usage could significantly affect personal performance. The actual usage was seen to significantly affect user satisfaction and the performance of technology [20]. A study [21] investigated the e-government system in Serbia and noted that usage could influence the net benefits.

III. RESEARCH METHODOLOGY

A. Overview of the Proposed Conceptual Framework

The proposed model described the hypothesised relationships between the proposed extensions of the UTAUT. Figure 1 presents the research conceptual framework based on the UTAUT that is a very popular theory used in any IS [22]. Furthermore, the overall quality was used in several models.

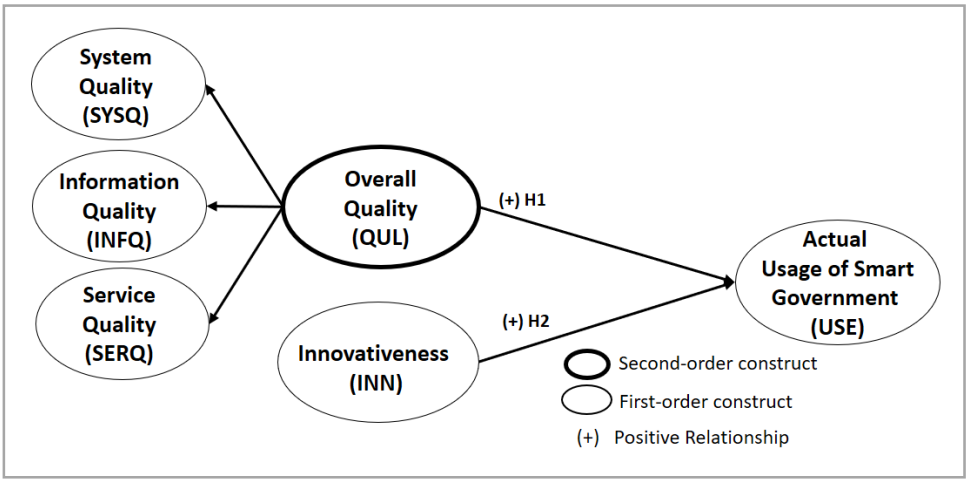

Fig. 1. The proposed conceptual framework.

B. Instrument Development and Collection of Data

In this study, the researchers used survey questionnaires for determining the usage of smart government activities. The smart governments were operated using the ICT and other artificial platforms as the internet was seen to be an important and vital tool for the users and the service providers. Furthermore, they used the random sampling technique for selecting the employees who used the smart government services. Using this technique, they selected a sample population of 250 people and made use of services offered by smart government in the UAE. Similarly, 400 things that benefitted the smart government initiatives were also randomly selected using the above criteria. Out of these 400, only 260 people responded, leading to a healthy response rate of 60%.

IV. DATA ANALYSIS AND RESULTS

Partial Least Squares (PLS) Structural Equation Modelling-Variance Based (SEM-VB) method was employed for assessing the model of research by utilising the software SmartPLS 3.0 [23]. A two-phase analytical technique was implemented which included measurement model analysis and analysis of the model of structure [24].

A. Descriptive analysis

Table 1 shows each variable's standard and mean deviation in the present study. The people who responded stated their opinion relating to the overall quality, innovativeness, and actual utilisation of smart government on the basis of a scale of 5 point that ranged from 1 (strongly disagree) to 5 (strongly agree). Quality of system showed the highest score with mean 3.907 out of 5.0, with a standard deviation of 1.044.

B. Measurement Model Assessment

Reliability and validity of construct (comprising discriminant and convergent validity) were used for examining the measurement model. The particular alpha coefficients of Cronbach were tested to determine how reliable each core parameter was in the model of measurement (construct reliability). The quantities of all the unique alpha coefficients of Cronbach in this research were in a range of 0.896 to 0.952, which went beyond the proposed value of 0.7 [25]. Moreover, for inspecting construct reliability, all the composite reality (CR) values ranged from 0.934 to 0.969, which went beyond 0.7 [26-28]. Thus, as Table 1 shows construct reliability has been fulfilled as Cronbach's CR and alpha were rather free of error for all the parameters.

Analysis of reliability of indicator was conducted by utilising loadings of factor. When the related indicators were very similar, this was reflected in the construct and signified by the construct's high loadings. Accordingly, the exceeding values beyond 0.70 suggested substantial factor loadings. Table 1 displays about each item in this research carrying factor loadings higher than the suggested value.

AVE was set up in this study to analyse convergent validity, which represented the extent upto which a measure has positive correlation with the construct similar to other of its measures. All the AVE values ranged from 0.826 and 0.912, which went beyond the proposed value of 0.50. Thus, all constructs have complied with the convergent validity acceptably, as shown in Table 1.

Table 1: Measurement model assessment.

Constructs	Item	Loading (> 0.7)	M	SD	α (> 0.7)	CR (> 0.7)	AVE (> 0.5)
System Quality (SYSQ)	SYSQ1 SYSQ2 SYSQ3	0.953 0.953 0.932	3.907	1.044	0.942	0.962	0.895
Information Quality (INFQ)	INFQ1 INFQ2 INFQ3	0.954 0.951 0.960	3.671	1.087	0.952	0.969	0.912
Service Quality (SERQ)	SERQ1 SERQ2 SERQ3	0.914 0.891 0.921	3.587	1.062	0.895	0.934	0.826
Innovativeness (INN)	INN1 INN2 INN3	0.926 0.942 0.941	3.744	0.988	0.930	0.955	0.877
Actual Usage of Smart Government (USE)	USE1 USE2 USE3	0.936 0.946 0.844	3.574	1.075	0.896	0.935	0.828

Table 2: The Hetero Trait-Mono Trait (HTMT) criterion.

	INN	*QUL*	*USE*
INN			
QUL	0.554		
USE	0.726	0.76	

The degree to which the articles distinguished among concepts or measured different constructs was demonstrated by discriminant validity. The heterotrait-monotraitratio (HTMT) had its employment to analyse the measurement model's discriminant validity. The HTMT of correlations was found out on the basis of multitrait-multi-method matrix. HTMT has been used to test discriminant validity in this study. The validity of discriminant poses certain issues when the HTMT value is higher than that of the HTMT 0.90 value of 0.90 or HTMT 0.85 value of 0.85 [27]. Table 2 shows that all the HTMT values were less than 0.85, hence fulfilling the discriminant validity requirement.

C. Structural Model Assessment

The SM can be examined by computing beta (β), R^2, and the corresponding t-values through a procedure of bootstrap with a resample of 5,000.

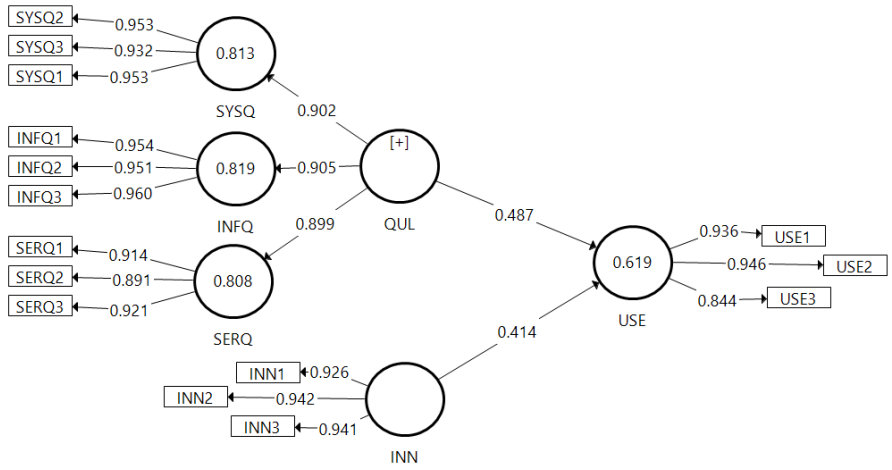

Fig. 2. PLS algorithm results.

Table 3: Structural path analysis result.

Hypothesis	Relationship	Std. Beta	Std. Error	t-value	p-value	Decision	R^2
H1	QUL→USE	0.487	0.049	9.948	0.000	Supported	0.62
H2	INN→USE	0.414	0.049	8.398	0.000	Supported	

Fig. 2 and Table 3 shows the assessment of structural model, along with the results of hypothesis tests. Overall quality and innovativeness positively influenced the actual usage of smart government. Hence, H1 and H2 are accepted with ($\beta = 0.487$, $t = 9.948$, $p < 0.001$) and ($\beta = 0.414$, $t = 8.398$, $p < 0.001$) respectively. Sixty-two percent of the variance in real utilisation of smart government has been explained by overall quality and innovativeness. The values of R^2 have a level of explanatory power that is acceptable, indicating a substantial model [30].

V. DISCUSSION

This study was carried out for investigating the factors which affected the actual usage of the smart government amongst the employees of public sector in the UAE. This framework was tested and results have been discussed below.

In this paper, Hypothesis 1 was tested to determine the impact of the overall usage quality of the smart government. The results highlighted the positive effect of the overall quality on the actual usage of smart government initiatives ($\beta = 0.487$, $t = 9.948$, $p < 0.001$) amongst the UAE public sector employees. Thus, H1 was supported. Many earlier studies have also investigated this effect. They stated that as the various parameters of determining the quality of government systems improved with regards to their accuracy, flexibility, easy of usage, relevance, up-to-date, functionality, comprehensiveness, responsiveness and interactivity, there would be an increase in the frequency and duration of usage of the smart government initiatives amongst the UAE public sector employees. On the other hand, these results were contradictory to some of the other studies which noted an insignificant link between the service and system quality and the actual usage of smart government activities. These paradoxical results supported the claims that the models and theories related to the technology usage would not be similar across all the contexts [20].

Thereafter, the researchers formulated another hypothesis for determining the effect of innovativeness on the usage of a smart government in UAE ($\beta = 0.414$, $t = 8.398$, $p < 0.001$). These results were based on the fact that when the employees seek different methods for experimenting with the novel technologies, following the exploration of new information technologies, there was limited hesitation in trying new technologies, with increased duration and frequency of the smart government usage amongst the UAE public sector employees.

VI. IMPLICATIONS, LIMITATIONS AND FUTURE DIRECTIONS

The researchers validated the 2nd-order overall quality model for determining the actual usage of smart governments. This model included three 1st-order constructs, i.e. quality of information, quality of system, and quality of service. This study could explain 62% of the variance associated with smart government usage.

Furthermore, the results could be encouraging and supportive towards future policies' development, at national and organisational levels. If the government utilised the results through strategized development for promoting its services by the application of smart governments, it could improve the personal development, professional practices and quality of professional life of all employees. It could also encourage the employees to make use of the internet constantly during their work.

Though this study has offered positive insights into theory and practice, it did have some limitations. One of the primary limitations was that the study population consisted of public sector employees only, and it did not consider the private sector employees. Future studies must take into consideration all the employees.

VII. CONCLUSION

The researchers have determined impact of various quality-related factors like that of quality of information, system and service, and innovativeness on the actual usage of smart government. The model proposed in this paper helped in understanding the actual usage of the smart government based on the usage of the overall quality in the 2nd order. Descriptive analysis results presented a direct and positive effect of the overall quality and innovativeness on the actual smart government usage. The UAE government must improve the overall smart government quality, as it could increase the usage of all governmental services. The researchers have discussed the implications of the study based on the viewpoints of the practitioners and academicians, along with all possible limitations with certain futuristic directions for further work.

APPENDIX

Appendix A

Instrument for variables

Variable	***Measure***
SYSQ	SYSQ1: I find the Smart Government system usage easy to use. SYSQ2: I find the Smart Government system usage flexible to interact with. SYSQ3: My interaction with the Smart Government system is clear and understandable.

INFQ	INFQ1: The Smart Government system provides up-to-date information. INFQ2: The Smart Government system provides accurate information. INFQ3: The Smart Government system provides relevant information.
SERQ	SERQ1: I could use the Smart Government system services at anytime, anywhere I want. SERQ2: The Smart Government system offers multimedia (audio, video, and text) types of services content. SERQ3: The Smart Government system enables interactive communication.
Innovativeness (INN)	INN1: If I heard about new information technology, I would look for ways to experiment with it. INN2: Among my peers, I am usually the first to explore new information technologies. INN3: In general, I would not hesitate to try new things.
Actual Usage of Smart Government (USE)	USE1: I regularly use Smart Government. USE2: I prefer to do my job through the Smart Government. USE3: I promote the use of Smart Government to my colleagues.

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