Knowledge Impact on Information Quality, Service Quality and System Quality for Security of 1GovUC

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ARTICLE INFO	ABSTRACT
	The users play a crucial role in information system (IS) implementation. They are the ones who learned, utilized, and experienced the system. Studying and understanding user satisfaction are important since user satisfaction – along with the quality of the system, the utilization by the users, and the support the users received during the system implementation – are all important aspects that influenced the IS success. Despite the governments' growing investment in electronic services, e-government services do not always meet the expectations of the users. Therefore, measuring the success of management systems within an organisation is crucial to understand how the systems should be built and implemented in practice. Therefore, in this study, a MyGovUC implementation was developed to expose the essential implementation factors that may influence the usage of 1GovUC implementation. The relationship between their knowledge and the information, service, and system quality will be measured statistically using PLS-SEM.

I. INTRODUCTION

In today's style of work, everything moves very fast which include meetings as one of the communications ways between officers and staffs. Today's business communication requires business workers to communicate with others (either with other employees or customers) almost instantaneously, irrespective of their geographic locations [1]. It has been realized that speed in meetings is essential to achieve growth and profitability. The emerging of next-generation applications enable productivity gains in the government sectors and create new agility in communications among the government agencies.

In Malaysia, the use of ICT in public started in 2003 by the launching of Public Sector ICT Strategic Plan through the MyGovernment services as the main partner. The Malaysian Administrative Modernizations and Management Planning Unit (MAMPU) has been given the mandate to lead the MyGoverment project. Kerravala [2] has mentioned that the organizations' competitive advantage is no longer based on a single core competency but must stay ahead if their competitors can make critical decisions in the shortest time. In today's global business competition, people has changed their nature of work. People now are working differently where the requirement for faster decision-making dictates that project teams need to be smaller and nimbler.

MAMPU has launched 1GovUC project which can benefit all government departments and agencies in improving the productivity and reduce management costs. 1GovUC project currently used by 186

agencies with 296,802 active users. 1GovUC is a Unified Communication and Collaboration services that are centrally managed by MAMPU. The service combines channels of communication via e-mail, video, audio conferencing, and instant messaging. In addition to the above, 1GovUC enables sharing of information through the Collaborative Portal and 1GovUC portal. 1GovUC implemented as cost-saving measures through integrated collaborative communications which all public sector in Malaysia can liaise and undertake projects in communication systems offered by 1GovUC. There are 5 services of 1GovUC such as email (application that allows users to communicate with each other via e-mail), unified communication (UC) (allows users to communicate directly through text, voice call and sharing files online), portal and social media (consisting of 1GovUC portal, collaborative Portal and IMPS) and add-on value (1GovUC provide add-on value such as e-mail archiving, big mail transfer (BMT), Active Directory Right Management Service (ADRMS), e-mail relay (Simple Mail Transfer Protocol - SMTP) and secured e-mail).

II. LITERATURE REVIEW

The users play a crucial role in information system (IS) implementation. They are the ones who learn the system, utilize it, and experience the impact of the IS. Studying and understanding users' satisfaction are important since users' satisfaction – along with the quality of the system, the utilization of the system by the user, and the support user receive during the system implementation – are all important aspects that influence IS success. [3]-[7].

"The review of literature on IS has indicated that the majority of prior studies has attempted to develop summative evaluation frameworks rather than implementation frameworks [8], [9]. [10] and [11] also advocate that by assessing an existing system, the factors leading to implementation could be found. Nonetheless, it is more important to have all the necessary constituents leading to implementation success prior to evaluation." [12] and other researchers developed service quality measurement models, but these models have been developed for assessing private organization's service performance. It has been found that the area of service quality and measurement in the public sector has been less considered and the introduction of the service quality in the public sector is a more recent phenomenon. Despite the governments' growing investment in electronic services, e-government services do not always meet the expectations of users [13]. However, measuring the success of management systems within an organisation is crucial to understand how the systems should be built and implemented in practice [14]. Therefore, in this study, a MyGovUC implementation was developed to expose the essential implementation factors that may influence the usage of 1GovUC implementation.

With regard to IS implementation factors, numerous IS studies have been sought to identify factors related to IS implementation successes and failures, among others [15]- [17]. The importance of these factors cannot be ignored as they guide practitioners and researchers to focus on key areas during implementation. "Some researchers have observed that the factors research approach has little practicality in coping with IS problems [18]; the approach emphasizes the factors and their associated outcomes without much information to structure or implement them [19]. Also, it seems that most prior studies have discussed and identified factors only for successes and failures and the effect of these implementation factors are rarely tested [20]. Similarly, prior studies tend to list the implementation factors without giving any empirical evidence to support their findings."

The study conducted in 2000 by MAMPU found the majority of users were not aware of 1GovUC services and

Mohamed [21] argued that level of knowledge awareness and the use of e-Government services among citizens in this country are still low. This was in-line with Noraidah et al. [22] that the knowledge awareness among the Selangor people in the e-Government was still low. Erika [23] said that UC tools often go unused by employees. The reason he said that, because the irony for organization implementing UC services isn't very "unified" at all. The reality for organization turning to UC services to boost employee communication and collaboration is that these tools often sit dormant and unused on a worker's tablet, smart phone or laptop. He also added the employees must use different applications for different functions to make the video conferencing, messaging, presence and others service available. Other than that, the UC services should be designed to improve teamwork by bringing together individuals and workgroups and increase reachability through single applications access to communicate services. The apps need to be run on mobile devices that allow for employees to work from anywhere and on any network.

MAMPU conducted a survey about 1GovUC Impact on 2014 and it has been found that majority of users are still not knowledgeable with the 1GovUC services, especially in terms of using "Telepresence". The past research also showed that the level of awareness and the use of eGovernment services among the citizens are still low [24]-[27]. Although 1GovUC is the only integrated government communications projects that have been developed so far, there are still issues of global concern as expressed by Chon [29] where he found there are some loop holes in UCaaS, such as slow connection of email and teleconferences when the enterprises connect all UC applications to an integrated framework. Ashaari et al. [22] added that the use and awareness of e-Government among the people of Selangor who are not Internet users (56%) and non e-Government users (74%) was still low. Such statement was also supported by

[21],[26] and [27]. Therefore, in this study the attempt is to overcome this limitation by conducting an empirical study that tests the knowledge factor influencing user satisfaction (system quality, information quality, service quality). The study not only adapts the factors research approach, but also combines it with the DeLone and McLean IS model measurements to further examine and evaluate whether the implementation factors influence success or otherwise. The objective of this study is to determine the knowledge influence information quality, service quality and system quality of 1GovUC among government user. Therefore, this study develops a conceptual model of user satisfaction as shown in **Fig. 1**.
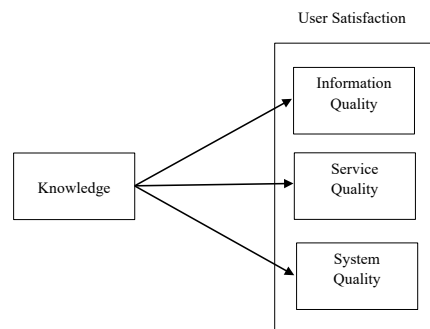

Fig. 1: Conceptual Model of the Study

Based on **Fig. 1**, three (3) hypotheses have been developed. There are:

H1: Knowledge is significant influence on information quality;

H2: Knowledge is significant influence on service quality; and

H3: Knowledge is significant influence on system quality.

III. METHODOLOGY

The target population in this study is government employees in 15 Ministries and 5 Government Agencies. The sampling method for this study was a stratified random sampling. To determine the number of participants that can represent an

adequate sample size, this study used the data on the total target population that is 2892. The recommended sample size 341 for the 2892 government employees was using the sample size as provided by [29]. Data was collected via, structured questionnaire using web application survey (*www.surveymonkey.com*). The questionnaires were distributed to selected sample of public organizations with the assistance of the information technology (IT) officers who provided the list of user email address in their organization.

A. Population and procedure

In this section the demographic profile of the research participants is presented.

TABLE 1 exhibits the respondents' profile. The respondents are classified according to six distinct categories; gender, age, education, nation, job grade and job experience. The survey results demonstrate that female respondents (34.4%) and the male respondents (65.6%), and that 68.9% of the respondents are 30 years to 39 years of age. This indicates that respondents are mostly from Generation Y where technology should not be an unknown topic to them. In terms of experience, 44% of respondents are have experience between 6 to 10 years. Regarding education level, 63.3% have at least a bachelor's degree. 72% of the respondents hold a 41-48 job grade which most of them are officers' position and most respondents (98.6%) are Malay.

TABLE 1: Demographic Characteristics of the Respondents

Items	Details	Frequency	Percentage
Gender	Male	279	65.6
	Female	146	34.4
Age	Below 20 years	6	1.4
	20 years – 29 years	37	11.1
	30 years – 39 years	293	68.9
	40 years – 49 years	72	16.9
	50 years and above	7	1.6
Education	Primary	6	1.4
	Secondary	17	4.0
	Diploma	82	19.3
	Bachelor	269	63.3
	Master/PhD	51	12.0
Nation	Malay	419	98.6
	Chinese	0	0
	Indian	0	0
	Others	6	1.4
Job Grade	Jusa/Turus	6	1.4
	52 – 54	6	1.4
	41 – 48	306	72.0
	17 – 40	104	24.5
	1 – 16	3	0.7
Job Experience	Below 1 years	12	2.8
	1 – 5 years	7	1.6
	6 – 10 years	187	44.0
	11 – 15 years	141	33.2
	16 years and above	78	18.4

B. Instrument

Quantitative data will be collected based on structured closed-ended questions. Six measures have been used in this study to test the proposed hypotheses. In total, the questionnaire comprised of seven (7) parts: Section A: Demographic Background, Section B: Individual Impact, Section C: Information Quality, Section D: Service Quality, Section E: System Quality, Section F: Knowledge and Section G: Usefulness. The questionnaire is using a five-point Likert-type scale, where 5= Strongly Agree, 4 = Agree, 3= neutral, 2= disagree, and 1= strongly disagree. The information quality, Service Quality and system quality developed by [4],[30]-[31].

Meanwhile knowledge developed by [32] and consists 4 items.

IV. DATA ANALYSIS

The researchers had tested the proposed conceptual model using PLS-SEM. The results were then interpreted. **Fig. 2** indicates the results of the proposed model used in this study. Knowledge is modelled as a reflective construct together with the information quality, service quality and system quality. The measured items loadings, composite reliability (CR), and average variance extracted (AVE) of all reflective constructs are presented in **TABLE 2.**

TABLE 2: Measurement of the Reflective Constructs

Construct & Measured Items	Factor Loading (< 0.50)	Composite Reliability (> 0.70)	Average Variance Extracted (> 0.50)
Knowledge		0.885	0.659
KN1	0.827		
KN2	0.850		
KN3	0.752		
KN4	0.814		
Information Quality		0.936	0.830
IQ3	0.873		
IQ4	0.915		
IQ12	0.944		
Service Quality		0.897	0.500
SQ10	0.760		
SQ2	0.647		
SQ3	0.730		
SQ4	0.752		
SQ5	0.674		
SQ6	0.707		
SQ7	0.692		
SQ8	0.666		
SQ9	0.690		
System Quality		0.923	0.548
SYQ10	0.784		
SYQ11	0.710		
SYQ12	0.753		
SYQ2	0.695		
SYQ3	0.623		
SYQ5	0.759		
SYQ6	0.806		
SYQ7	0.668		
SYQ8	0.753		
SYQ9	0.823		

Factor Loadings. In PLS-SEM, the loading estimates should be 0.50 or higher [33] and it is a good rule thumb. Analyses have shown that, some items are low loadings which is below then 0.50 and it has been deleted. Then the convergence validity of the items has been measured.

Composite Reliability. In PLS-SEM, the composite reliability (CR) should be equal or greater than 0.70 [34]. This study found that all CR values are greater than 0.70 thus indicating an acceptable range of reliability.
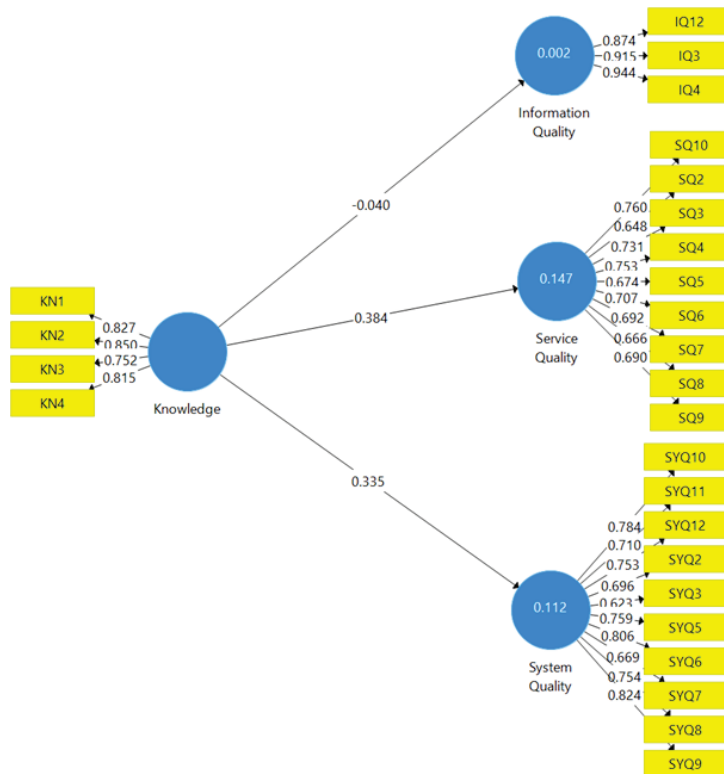

Fig. 2: Result of the Proposed Conceptual model Using SEM PLS

Average Variance Extracted (AVE). The rule of thumb of AVE is 0.50 or higher to indicate adequate convergence of each construct [35]. This study achieved that all AVE values are greater than 0.50, suggesting the convergence validity of the construct.

TABLE 3: Construct Correlations

	Information Quality	Knowledge	Service Quality	System Quality
Information Quality	**0.915**			
Knowledge	-0.040	**0.812**		
Service Quality	-0.044	0.382	**0.703**	
System Quality	-0.008	0.334	0.489	**0.740**

Discriminant Validity. The discriminant validity is to identify the correlation between each construct. It can be seen by comparing the square root of a given construct AVE with the correlation of each construct. As shown in **TABLE 3**, the square root of each AVE is greater than the construct correlations. It indicates acceptable discriminant validity for all constructs.

Fig. 2 indicates the results of the SEM-PLS path analysis and all three hypotheses (H1, H2, H3) were measured. The first hypothesis, H1 assumed that the knowledge has a significant effect on information quality. **TABLE 4** indicates that a no significant effect can be traced between the knowledge and information quality (PC = -0.040, T-statistic = 0.668 and p = 0.5040). Therefore, H1 is not accepted. The second hypothesis, H2 assumed that the knowledge significantly affects the service quality. Analyses have shown that, the path coefficient and T-statistic above 1.96,

indicate significant values (PC = 383, T-statistic = 8.651, and p = 0.00). The values demonstrate that knowledge has significant effect on the service quality. Hence, H2 can be accepted. The third hypothesis, H3 presumed that the knowledge has a significant effect on system quality. Based on the analysis, H3 can be described the T-statistic value is below 1.96 (PC = 0.334, T-statistic = 7.712 and p = 0.00). The values demonstrate that knowledge has significant positive effect on the system quality Therefore, H3 is accepted within the context Malaysian.
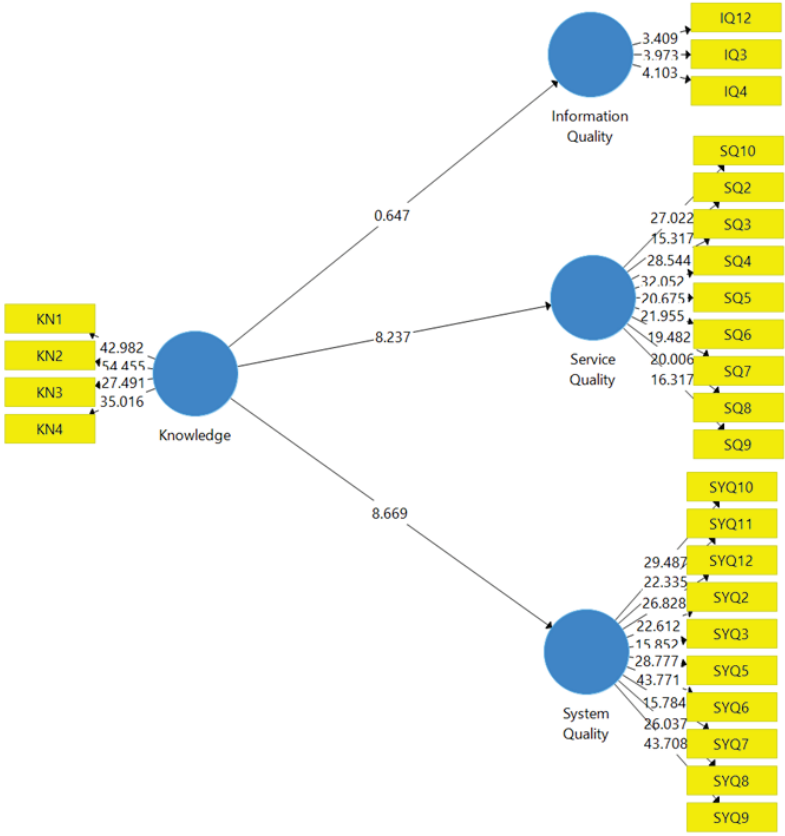

Fig. 3: Bootstrapping Result

TABLE 4: Structural Estimates of the Model

Hypothesis	Path	Path Coefficient	T-stat (>1,96)	P
H1	Knowledge →Information Quality	-0.040	0.668	0.50
H2	Knowledge → Service Quality	0.383	8.651	0.00
H3	Knowledge → System Quality	0.334	7.712	0.00

V. DISCUSSION

The importance of knowledge towards an information system and IS has been asserted in many studies. Several studies found a significant relationship between knowledge and IS [36]-[39]. However, the quantitative findings of this study suggested *knowledge* as an antecedent for *system quality*. In addition, *knowledge* is statistically found to have a significant positive relationship with *service quality*. This finding confirmed the earlier study about the importance of knowledge within the phenomenon of the 1GovUC effectiveness. Practically, knowledge needs to be applied in order to get an outcome from it. Knowledge is often discussed as having an impact on system usage [40] suggested that the enhancement of system user's knowledge is important for better utilisation of the 1GovUC. However, insufficient knowledge among the IS users is one of the challenges in the IS field [41]. In practice, the 1GovUC users have to be equipped with adequate knowledge in order to gain benefits from the system [42]. The impact of knowledge on the system usage is also mentioned by [43], in which an inadequacy of knowledge may cause inefficiency of the 1GovUC usage. It is found that the knowledge is influence towards service quality and system quality. Nevertheless, the result reported the insignificance of knowledge to influence the information quality. Knowledge is also important for security matters in 1GovUC as mentioned by [44]. The cloud computing security has become a basic necessity nowadays. In is important to have the knowledge about vulnerabilities, attack, activities of attacker and tools to secure it.

VI. CONCLUSION

The advancement of technology in the last decades has enabled the capability of the 1GovUC to offer various outcomes beyond its traditional purpose (i.e. providing information to support the decision-making process). The findings of this study provide substantial contributions to the understanding about the phenomenon of the factors of 1GovUC effectiveness. Quantitative methods used in this study allowed quantitative findings, which have enlightened the understanding of the phenomenon currently happening. As a result, this study presented a comprehensive knowledge on the factors influencing user satisfaction in measuring the 1GovUC effectiveness that is constituted by three dimensions: system quality; information quality; and service quality of the system and the effect on individual impact. In spite of thorough methods applied in this study and its detailed analysis, there are some limitations that should be noted. First, this study applied a quantitative methods approach, in which the research model and the survey instrument are developed based on the review. Thus, the proposed variables and its measurements are limited to the findings from the quantitative fieldwork and the literature review. There might be other variables not discovered in the literature, due to the context of the no interviewees are conducted. Therefore, future studies may wish to consider a comprehensive qualitative method that includes the accounting office and the responsibility centre.

Second, the data of this study were solely obtained from individuals' opinion. As such, bias in opinions might be present because opinions are easily influenced by other factors, such as experience, background and environment. However, totally neglecting their opinions might not reflect the real phenomenon. In addition, individuals' opinion and rating on the 1GovUC effectiveness and other factors in the research model are depending on personal judgement, which may or may not be accurately disclosed by the respondents. Thus, the findings of this study, which is subject to individuals' opinion towards the system, may reflect situational bias. In reality, individual bias is impossible to eliminate. Nevertheless, critical

consideration has been taken during the selection of targeted sample for this study in order to minimise the irrelevant opinions. Therefore, future studies may consider mixing opinions and technical evaluations, using a mixed methods approach. For example, knowledge can be evaluated technically through a test of the related questions or user commitment can be assessed through an observation of the system's user on how he or she uses the system.

Third, the context of this study is limited to the Malaysian Federal Government. In addition, it focused on user for its participants. Non-user involved in data recording or personnel that develop or technically maintain the technology related to the system, such as those from the IT department, might have different opinions towards the studied phenomenon. Moreover, other contexts such as the private sector, Small and Medium-sized Enterprises (SME), public listed companies and so on, might lead to different findings due to the different nature of their business and environment. As such, future studies may wish to apply the methods, research model and survey instrument of this study to other contexts of study.

Fourth, system usage in the context of this study is mandatory. Voluntary usage of the system may discover other variables or result in different findings from this study. In the case of voluntary use, the users' willingness to use the system depends on what they thought as the best practice. Thus, the antecedents for their commitment might be different from the findings of this study. Hence, selecting a voluntary usage context in a future study by using the method and instrument of this study can be a basis that permits a comparison between studies of mandatory and voluntary usage of the system.

As a conclusion, it is believed that the findings of this study could foster a strategic plan for the achievement of 1GovUC effectiveness. Additionally, this study sheds light on the issue of various measures for 1GovUC effectiveness, as well as too many factors influencing the system's effectiveness in the literature. Therefore, the researchers are encouraged to further examine the relationships within the presented phenomenon based on the research model and the survey instrument of this study, in other contexts, to enable comparison between studies.

VII. REFERENCES

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