

Assessing factors influencing people's intention to continuously use e-government systems

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ABSTRACT

This research aims to examine key factors influencing the intention to continuously use e-government systems. An online questionnaire was distributed to 251 users of e-government systems (Jogja Smart Service), and 231 respondents met the criteria. Researchers use PLS-SEM approach to examine the responses. The study found that system quality, service quality, information quality, and trust significantly positively affected user satisfaction. In comparison, self-efficacy has a positive but not significant effect on user satisfaction. Furthermore, user satisfaction significantly positively affects the intention to continue use. The continuous use of an e-Government service is proof of the success of a service. Hence, this paper identifies substantial factors for the continued use of e-government applications. This research modified previous research models by adding the factor of Trust, which is believed to be substantial for the continuous use of e-government systems.

Introduction

Information and communication technology has improved significantly, and the adoption of such technology by the public sector has been seen as a way to enhance service quality (Li & Shang, 2020; Alzahrani et al., 2017). In this age, E-Government has been a global trend that comes with a broader scope of benefits if applied at its maximum. Both developing and developed countries have invested in strategic planning to maximise the use of e-Government (Glyptis et al., 2020).

Meanwhile, in Yogyakarta, the government launched the application for *Jogja Smart Service* (JSS) (Diskominfo, 2018b). The application created using the concepts of *Single ID*, *Single Window* and *Single Sign-On* will bring easiness for people as the application combines many types of public services (Diskominfo, 2018a). It is expected that JSS will enable the people of Yogyakarta to access public service easily, starting from making a complaint, permission, health service, and other types of services.

The users of this application hit the number 82,948 by September 2021. Of the total number, 49,814 users are from the city of Yogyakarta (Diskominfo, 2020). It means the number of users increased in 2021 compared to 2020. Around 61,606 of them downloaded this application by 2020 (Diskominfo, 2020). Thus, the increased number of users reached 21,342. This indicates that the people in Yogya enthusiastically welcome this JSS. Interestingly, 33,134 users are from outside Yogya, which shows that JSS is well-perceived by Yogyakartaans and those from outside Yogya (for example, visiting tourists). Thus, this application indeed supports tourism and culture.

Gumilang (2019) conducted research on how Yogya city governance made an innovation to create *Smart and Liveable City* in Yogyakarta using JSS application, while (Novriando, 2020) in his research showed that JSS had effectively served the public in Yogyakarta and functioned as a bridge connecting people and government. Rochmah et al. (2021) found in their research that during the Covid-19 pandemic, JSS enabled people to access public services.

JSS is one of the e-government systems implemented by local governments in Indonesia. The tendency for local government to provide systems and so-called 'smart applications' for its stakeholders is growing. Let alone in the context of the COVID-19 pandemic, the trend is increasing significantly. Though research on JSS, in particular, and e-government systems, in general, have been made, research on evaluating the continuous use of e-government systems is currently lacking. Such research is vital as it can be the material for evaluation and considerations in developing systems for the government as a system provider. Current research aims to understand the factors influencing e-government systems' success. E-Government system success in this research is represented by user

satisfaction and the continuous use of e-government systems. Therefore, this research will contribute to the literature by providing a more comprehensive model for assessing the continuous use of e-government systems. This research is also significant for local government and systems developers in providing successful systems.

Literature Review

Information System Success

Delone and McLean (2003) and Jeyaraj (2020) suggested a model to measure the success of an information system by describing the relation between the quality of the system, information, service, usage, customer satisfaction and pure benefits. Many researchers have examined the model in many contexts, including e-government systems. The model by Delone and McLean (2003) was a result of a revised model by DeLone and McLean (1992). The updated model of 2003 involves the variable of "service quality" in addition to variables of "information quality" and "system quality". The updated model also uses the variable of "net benefit". However, both models only examine "intention to use" and "use".

Beştepe and Yildirim (2022), Santa et al. (2019), Wang and Liao (2008) found that the information quality, system quality, service quality, usage, and users' satisfaction, as well as pure benefit received by the users, are a valid measurement of the effectiveness of e-government. When evaluating e-government systems, those three qualities (information, service, and system) are essential in that the better the quality of information, service, and system, the better the service (Al-rahmi et al., 2022; Alshaher, 2020; Witarsyah et al., 2017; Khrais et al., 2019).

Based on the model of Information System Success and previous research, our hypotheses are as follows:

H₁: System quality has a positive effect on user satisfaction

H₂: Service quality has a positive effect on user satisfaction

H₃: Information quality has a positive effect on user satisfaction

Expectancy and Confirmation Model

In addition to DeLone and McLean Model, this research incorporated expectancy and confirmation model (ECM). The base of this ECM is the confirmation expectancy to measure to what extent the satisfaction of users as satisfaction will influence the intention to repeat using a service (Bhattacharjee, 2001). Thus, if the users are satisfied, they will continuously use, and if they are not, they may stop using it (Oghuma et al., 2016).

Meanwhile, self-efficacy in the technology of information and communication relates to the extent of one's ability to access technology of information and communication (Alshaher, 2020; Zhang et al., 2020; Xiang et al., 2022; Shiau et al., 2020; Choi et al., 2021; Ofori et al., 2021; Malik & Rao, 2019; Alzahrani & Seth, 2021). By experiencing self-efficacy and satisfaction, in line with qualified online services, people may continue using the e-government system service online. It is clear that these factors affect its continuous use (Li & Shang, 2020; Bhattacharjee, 2001; Xia et al., 2022; Ramayah et al., 2016). Indeed, previous experience can be the standard to measure users' satisfaction (Oliver, 1980; Malik & Rao, 2019; Alzahrani & Seth 2021; Shiau et al. 2020). Satisfaction toward the service system can affect the decision to continuously use the service (Bhattacharjee & Chakrabarti, 2015; Bhattacharjee, 2001; Kalamatianou 2018; Khrais et al., 2019; Al-rahmi et al., 2022; Alshaher., 2020).

On the other hand, the low intention to continue use will become a big challenge for e-government development (Li & Shang, 2020). Alruwaie et al. (2020) believed that people will tend to continuously use the e-government system once they gain better results than using the traditional way. In contrast, people will stop using the e-government if they receive bad service (Al-Hujran et al., 2015).

Based on the model of Information System Success, ECM, and previous research, our hypotheses are as follows:

H₄: System quality has a positive effect on self-efficacy

H₅: Service quality has a positive effect on self-efficacy

H₆: Information quality has a positive effect on self-efficacy

H₇: Self-efficacy has a positive effect on user satisfaction

H₈: User satisfaction has a positive effect on the continuous use

Trust

Alruwaie et al. (2020) only emphasised result expectancy, self-efficacy, and satisfaction. What differs from the previous research with this research is its variable of "trust". Trust is an alternative variable which needs more exploration and clarification to see its role in the behaviour of adopting information systems, and e-government system in particular (Santa et al., 2019; Rooks & Matzat, 2010; Xia et al., 2022; Lien et al., 2017; Dowling et al., 2019; Warkentin et al., 2018). The success of the system can be measured from the level of trust on certain service. Therefore, it is essential for any government to build trust from the users to the provided or the given e-government (Warkentin et al., 2018). The adding of trust variable is expected to influence the intention of the

users to continuously use the JSS application. The result of the research will be useful for local government to evaluate their service through e-government, thus, to develop the application and build the good interaction between people and government.

Based on the model of Information System Success, ECM, Trust, and previous research, our hypotheses are as follows:

H₉: System quality has a positive effect on trust

H₁₀: Service quality has a positive effect on trust

H₁₁: Information quality has a positive effect on trust

H₁₂: Trust has a positive effect on User satisfaction

Research Method

This research used primary data. The population of this research was all users of the application. The criteria of the respondents were all who had used the JSS application. In selecting the sample, the strategy used was convenience sampling as it was considered easy to reach the respondents.

As the Covid-19 pandemic hit, the researcher and respondent avoided direct contact and therefore, data collection was conducted online by distributing the questionnaire. The questionnaires were distributed through social media such as Instagram, WhatsApp, and TikTok. The questionnaires had been approved by Yogyakarta government as the service provider of the application. Meanwhile, as information and communication technology has significantly developed, the public sector has been seen to adopt this technology more often to increase the quality of their service (Choudrie et al., 2017). In fact, nowadays, E-Government has been a global trend as it is beneficial if applied at its best. Both developing and developed countries have invested in developing a strategy to maximise the implementation of e-government in their country (Glyptis et al., 2020).

Smart PLS was chosen to explain the relations among variables. PLS SEM was considered the right choice for research aimed at theory development in addition to its capability to work efficiently with the adequate number of samples. This is to see the relation or influence among the constructs (Hair et al., 2011).

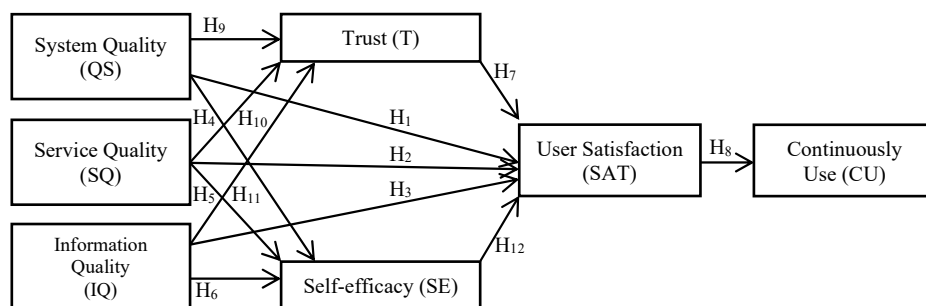


Figure 1. Proposed Research Model

This research uses a questionnaire whose question items refer to previous research. Table 1 shows the reference of each variable.

Table 1. Measurement of Variables

Variables	Reference
System Quality (QS)	Santa et al. (2019)
Service Quality (SQ)	Alruwaie et al. (2020)
Information Quality (IQ)	Alruwaie et al. (2020)
User Satisfaction (SAT)	Alruwaie et al. (2020)
Self-Efficacy (SE)	Alruwaie et al. (2020)
Trust (T)	Santa et al. (2019), Teo et al. (2009)
Continuously Use (CU)	Alruwaie et al. (2020)

Results and Discussion

The validity test is conducted to measure the indicators which build the variables, whilst the reliability test is used to test variables building the model (Hair et al., 2011). The validity test was conducted by measuring the value of Loading Factor (FL), Average Variance Extracted (AVE), Fornell-Larcker criteria, and Cross Loading. The subsequent measurement on the outer model is on the reliability test on each variable. The reliability covered Cronbach's Alfa (CA) and Composite Reliability (CR).

Convergent Validity is the type of test on each indicator against the construct. It is considered reliable if the correlation value is above 0.7. However, for loading value scale development, the loading values scale from 0.5 to 0.6 is acceptable (Kaya et al., 2020; Mikalef & Pateli 2017). Loading Factor has met the criteria of convergent validity as the values of the loading factor >0.5. The higher the correlation value is, the better the validity (Valaei et al., 2017). This explains that the level of validity of this research is valid.

Table 2. AVE

Variables	AVE
System Quality (QS)	0.762
Service Quality (SQ)	0.555
Information Quality (IQ)	0.758
User Satisfaction (SAT)	0.826
Self-Efficacy (SE)	0.752
Trust (T)	0.569
Continuously Use (CU)	0.805

The higher the value of AVE, the better the validity construct and its reliability. The criterion for AVE is >0.5 (Kaya et al., 2020). Table 2 shows the values of AVE for each variable above 0.5.

Table 3. Criteria of Fornel-Larcker

Variable	SE	T	SAT	IQ	SQ	QS	CI
Self-Efficacy (SE)	0.867						
Trust (T)	0.706	0.754					
User Satisfaction (SAT)	0.738	0.643	0.909				
Information Quality (IQ)	0.763	0.643	0.807	0.871			
Service Quality (SQ)	0.714	0.598	0.734	0.682	0.745		
System Quality (QS)	0.666	0.550	0.795	0.760	0.692	0.873	
Continuously Use (CU)	0.654	0.570	0.650	0.672	0.584	0.673	0.897

Table 4. Cross Loading

	SE	T	SAT	IQ	SQ	QS	CU
CU1	0.628	0.557	0.618	0.611	0.522	0.642	0.920
CU2	0.587	0.512	0.593	0.613	0.531	0.609	0.936
CU3	0.551	0.476	0.532	0.610	0.513	0.557	0.830
CU4	0.578	0.499	0.587	0.580	0.531	0.602	0.899
IQ1	0.639	0.515	0.688	0.822	0.568	0.619	0.536
IQ2	0.676	0.561	0.725	0.895	0.600	0.692	0.627
IQ3	0.629	0.554	0.706	0.876	0.617	0.675	0.553
IQ4	0.709	0.609	0.691	0.889	0.593	0.662	0.621
QS1	0.604	0.491	0.680	0.675	0.610	0.878	0.663
QS2	0.536	0.462	0.670	0.633	0.543	0.851	0.539
QS3	0.601	0.487	0.731	0.682	0.655	0.889	0.559
SAT1	0.661	0.587	0.897	0.713	0.689	0.684	0.596
SAT2	0.664	0.523	0.890	0.777	0.632	0.755	0.553
SAT3	0.676	0.626	0.916	0.707	0.677	0.726	0.624
SAT4	0.679	0.597	0.931	0.737	0.669	0.725	0.590
SE1	0.879	0.634	0.663	0.724	0.634	0.627	0.553
SE2	0.867	0.661	0.643	0.645	0.593	0.559	0.566
SE3	0.880	0.580	0.680	0.651	0.642	0.626	0.591
SE4	0.843	0.572	0.567	0.621	0.607	0.487	0.561
SQ1	0.671	0.506	0.665	0.618	0.779	0.668	0.538
SQ2	0.456	0.360	0.384	0.439	0.683	0.429	0.335
SQ3	0.500	0.388	0.562	0.436	0.779	0.447	0.376
SQ4	0.461	0.504	0.525	0.509	0.734	0.473	0.454
T1	0.159	0.517	0.233	0.191	0.216	0.149	0.212
T2	0.206	0.562	0.221	0.216	0.144	0.213	0.223
T3	0.717	0.926	0.656	0.641	0.611	0.558	0.555
T4	0.715	0.914	0.605	0.639	0.583	0.531	0.556

Table 4 shows that the loading factor value for each indicator from the latent variable has a more significant value than the loading factor if related to other latent variables. It shows that the variable has good discriminant validity seen from the more significant loading factor.

Table 5. Reliability Assessment

Variables	Cronbach's Alpha	Composite Reliability
Self-Efficacy (SE)	0.890	0.924
Trust (T)	0.774	0.832
User Satisfaction (SAT)	0.930	0.950
Information Quality (IQ)	0.893	0.926
Service Quality (SQ)	0.735	0.832
System Quality (QS)	0.843	0.906
Continuously Use (CU)	0.918	0.943

The reliability test was conducted by using Cronbach's alpha and composite reliability. The value for Cronbach's Alpha is ≥ 0.5 , while the value for composite reliability is ≥ 0.6 and they were used to calculate internal consistency. Table 5 indicates that the value of Cronbach's Alpha from each variable was above 0.5 and for composite reliability value was above 0.6. This proves that each variable of this research is valid.

Table 6. Adjusted R²

Variables	Cronbach's Alpha
Self-Efficacy (SE)	0.652
Trust (T)	0.400
User Satisfaction (SAT)	0.758
Continuously Use (CU)	0.433

Table 6 presents the results of the R² test. According to the results, R² for the variable of User Satisfaction has the highest result (0.758), which means that the User Satisfaction is 75.8% or strongly influenced by variables other than variables of Continuously Use. However, the variable of Continuously Use has R² of 43.3%, or in other words, the rest of 56.7% is influenced by other variables or factors than variables in this research.

The purpose of this research is to find out what factors that can affect the intention to continuously use e-government systems. Overall, 12 hypotheses were tested, of which some were not supported significantly by the data. The total number of respondents was 231. The t-table df=231 was determined by using $\alpha = 0.05$. The value of the t-table was 1.652. The values of self-efficacy were $\gamma = 1.198$, meaning it has a positive effect on customers' satisfaction yet is insignificant. Likewise, the system quality has a value as much as $\gamma = 0.289$, meaning that it has a positive influence on the trust yet is insignificant. Lastly, there is a positive influence of the quality of the system on self-efficacy, yet it is insignificant as the value was as much as $\gamma = 0.796$. Another hypothetical test was influential and significant as the t-count > t-table.

Table 7. Hypotheses Assessments

	Hypotheses	t-Statistics	Results
H ₁	QS → SAT	3.442	Supported
H ₂	SQ → SAT	2.495	Supported
H ₃	IQ → SAT	3.858	Supported
H ₄	QS → SE	0.796	Rejected
H ₅	SQ → SE	4.223	Supported
H ₆	IQ → SE	6.639	Supported
H ₇	SE → SAT	1.198	Supported
H ₈	SAT → CU	13.483	Supported
H ₉	QS → T	0.289	Rejected
H ₁₀	SQ → T	3.443	Supported
H ₁₁	IQ → T	5.134	Supported
H ₁₂	T → SAT	1.784	Supported

This research finds that the quality of the system has a positive influence on both trust and self-efficacy. These show that the e-government systems can boost the interaction between people and city government. Yet

the quality of the system has not been strong enough to improve their trust and self-efficacy. Related to this, the weak ability to access e-government systems and the public service, which are not supported by any application, leads to the low values quality of e-government quality of the system. Then, the city government, as the developer of e-government systems, needs to maximise the function of public service and disseminate the e-government systems to the public to increase their trust (Santa et al., 2019).

The quality of service has a positive impact and is significant to users' trust, self-efficacy, and satisfaction. This proves that e-government systems can help customers find what they need. There is one particular service of this application that protects the customer's privacy, and this leads to higher trust. With 24-hour easy access and a minimum case of problems, the customer's self-efficacy can be fully maximised during the use of this application. The overall quality of the e-government systems is considered good, and thus the users are satisfied.

The quality of information positively and significantly affects the users' trust, self-efficacy, and satisfaction. This shows that the provided information assists the users when accessing the e-government systems. The quality of the information in this application is constantly updated and reliable, and this makes the users accept the information on time. In other words, the quality of information leads to trust, good self-efficacy, as well as satisfaction among the users and this will affect their decision to continuously use the application (Alruwaie et al., 2020).

Related to this, trust has a significantly positive influence on users' satisfaction. The qualified service and information will influence the trust of the e-government systems. Both the service and data security of the e-government systems users make this application reliable. This proves that the users' trust in this application is relatively high. The users' level of trust in the e-government systems will affect the level of satisfaction among the users (Hooda et al., 2022).

Self-efficacy has a positive impact on the satisfaction of the users, yet it is insignificant. The lower ability of the users to use e-government systems causes low self-efficacy of the users, which results in low satisfaction of the users. In addition, the low self-confidence to access the e-government systems has been a factor in the low satisfaction of the users. In fact, an excellent ability to use technology will ease the users to use any type of service (Alshaher, 2020). Therefore, the dissemination of using the e-government systems needs to be intensified. The addition of services such as tutorial videos of any service will assist the users in improving their ability to use and access the e-government systems.

User satisfaction has significantly influenced its continuous use. The good quality of the system will also influence the satisfaction of the users. The easiness of the users will lead to their satisfaction. The quality of the service has been one of the important factors influencing user satisfaction. Providing accurate service and minimising the problem will make the users comfortable. The reliable and clear information will affect the satisfaction of the users. The better the quality of the system, service and information will increase the trust of the users. The trust of the users in any service has been the success key of the service. Qualified e-government systems will lead to a high level of satisfaction among the e-government systems users. The high level of satisfaction among the users will make them continuously use e-government systems in the future (Guo & Luo, 2022).

Conclusion

Users will use the e-government systems again if they are satisfied with the provided service while gaining a positive impact simultaneously. The behaviour of the application users can be evaluated based on their trust and ability when using the e-government systems. Therefore, the continues evaluation will increase the system quality, service quality and provided information. The qualified e-government systems will lead to the improved trust as well as the self-efficacy of the users. The improved trust and self-efficacy will enhance the satisfaction, which brings the decision to continue use of the application. In conclusion, the user satisfaction is the key success to influence the intention of the users to continue using the application. The findings of the research are important to endorse the continuity the use of e-government systems.

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