The effects of system and information quality on acceptance of digital public service transportations

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C H R O N I C L E	A B S T R A C T
	The application of ICT in central and regional governments to cities in Indonesia seems to be the new face of the National bureaucracy, not least with digital public transportation services, Surabaya is a pilot application of smart cities because one of them implementing the Surabaya Smart Transportation System (SITS), this condition further strengthens that policy Public digital services are taken to make it easier for the public to monitor the crowd or the density of the highway, unfortunately, if you review the SITS comment column on Google Play, the negative sentiment is far big more than the positive sentiment. So, this study aims to capture the phenomenon of resistance by exploring the quality of information and system quality as predictors of public acceptance of the application of SITS. A result, empirically the quality of information and the quality of the system indirectly affect public acceptance of the application of SITS, as among the findings served that system quality is more dominant in influencing acceptance. So, it is highly recommended that the city government pays attention to the development of SITS applications based on system reliability.

1. Introduction

A country cannot be unseen from Information Technology globalization that offers numerous benefits. With broadening globalization, it affects information technology development that helps human living to be more effective and efficient in tasks and activity. In the past decades, many government institutions and bureau that apply digital government to improve their services for the people. Until today, almost every government institution has created innovation that is suitable to their needs. E-Government (G2C), from many service sectors (Faroqi, Suryanto, & Safitri, 2020; Pramatam et al., 2021), Surabaya is a metro city that applies G2C to transport service or SITS (Munawar & Sutanta 2015). Now, SITS service can be downloaded from the Play Store, looking into the review section in the Play Store, many users complain about this SITS application, such as *"Useless app. Before, it's work with less of cctv off, now after update, couldn't open the page"; "Signal is good with 4G but reload all the time and blank screen"; "Not smart way to go as the slogan"; "Bad look (blur), not enough angle, not enough light (dark)",* plus, the app rated low between 1-2 on the scale 1-5. So, this research purpose is to follow up the observation from user acceptance perceptive to service application G2C based on system quality, apart from this research also aim to newer measure model for G2C service performance measurement needs which is later called as Government Public Service Model (GPSM). This research using Technology Acceptance Model (TAM) approach (Davis & Venkatesh 2004; Davis & Venkatesh 1996; Davis, 1993; Marangunić & Granić 2014) and Information System Success Model (ISSM) (Teo, Srivastava, & Jiang, 2009; DeLone & McLean, 2002; Veronica & Suryawan, 2019; DeLone & McLean, 2003) that developed by Information System Management experts before.

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2. Literature Review

2.1 Goverment to Customer (B2C)

The current way of communication approaches that often used by the government is by digital. It is because it is easy to communicate with a wider range target information receivers. The example from this approach is *e-government* that has services such as G2C (*Government to Customer*). G2C is often used by the government as a way to deliver information technology tools for building and maintaining the connection between government to people and to keep the information process delivery so it stays one way, from government directly to public (Anggararia, Antoni, & Akbar 2018). Unwittingly, G2C presentations nowadays often find use in apps to websites that are owned and managed directly by the government. Many researches conducted linked to G2C information technology development for people such as *e-government* app making disaster response that makes people as user knows live up to date information regarding disaster in the vicinity (Delluza & Caballero 2018). With this, G2C gives positive feedback like controlling information transmission in order and highly contributes to fighting hoax among people (Rahmawati 2020). There are also negative effects if G2C is not applied evenly into a region, like only focusing on a certain area with a certain purpose, then it potentially causes a gap between people in that area so the development becomes stuck (Špaček et al., 2020).

2.2 Government Public Service Model Construct

Evaluation criteria on information technology such as websites and apps can be evaluated by many factors and one of them is how good is the system quality in that information technology (Dreheeb, Basir, & Fabil 2016). *System quality* is also an important factor that determines the interests of user satisfaction when using such information technology. This is why many methods' purpose is to measure information technology performance, also including *system quality* as evaluation factor. TAM is a performance measuring model of information technology which is often used in some famous research, also linked to the system quality factor on measuring it. Perceived Usefulness on TAM which considers how far users believe using such a system will improve the performance is highly affected by system quality as an external factor. Not only that, system quality also significantly affected the user attitude (Attitude Towards Using) when using the system and affecting Intention to Use. A good Quality System is system reliability in handling various requests from the users in high pace and precision so time needed to use that system can be optimal (Al Mulhem, 2020).

Table 1
Literature review for model construct comparation

Source	Research purpose	Conceptual Theory
Impact of System Quality, Information Quality, and Service Quality on Actual Usage of Smart Government (Ameen et al., 2019)	Describing the connection between some factor from model DeLone McLean and SEM to Smart Government use among Abu Dhabi investing authority employee	TAM, Information System Success Model (ISSM)
Assessing the Effects of Information System Quality and Relationship Quality on Continuance Intention in E-Tourism (Masri et al., 2020)	Suggesting an connection quality formation modelm SQ, perceived value, and CI on e-tourism	Information System Quality, Perceived Value, Relationship Quality, Continuance Intention
The influence of system quality, information quality, e-service quality and perceived value on Shopee consumer loyalty in Padang City (Putri & Pujani, 2019)	Testing the effect of SQ, IQ, e-service quality and perceived value to customer loyalty	System Quality, Information Quality, E-Service Quality, Perceived Value
Citizens Trust in Open Government Data a Quantitative Study about the Effects of Data Quality, System Quality and Service Quality (Purwanto et al., 2020)	Testing Open Government Data (OGD) using ISSM and SEM model	Data Quality, Systems Quality, Service Quality, Trust, ISSM, Citizen Engagement
Investigating the effects of quality factors and organizational factors on university students' satisfaction of e-learning system quality (Al Mulhem, 2020)	Developing DeLone McLean research model to investigate the quality effect and organization factor to student satisfaction	ISSM, Quality Factors, Organizational Factors
Factors affecting customer intention to use online food delivery services before and during the COVID-19 pandemic (Hong et al., 2021)	Testing the predictor that affects customer intentions to use online food delivery service (OFD) in the midst of COVID-19 pandemic	TAM, Service Attributes, Perceived Benefits, Perceived Vulnerability, Perceived Severity
Questioning the Real Citizen-Centricity of e-Government Development: Digitalization of G2C Services in Selected CEE Countries (Špaček et al., 2020)	findings of a pilot research study that focused on a selected area of e-government the digitalization of core government services to citizens (G2C)	Digitalization Services, e-Government Comparisons

3. Research Hypotesis and Model

This research studies the connection between variables in TAM which observed earlier by many experts (Davis & Venkatesh, 1996, 2004; Alavi 1984; Davis et al., 1992; Davis, 1989, 1993; Marangunić & Granić 2014) with external variable that is system quality (DeLone & McLean, 2002; William et al., 2003).
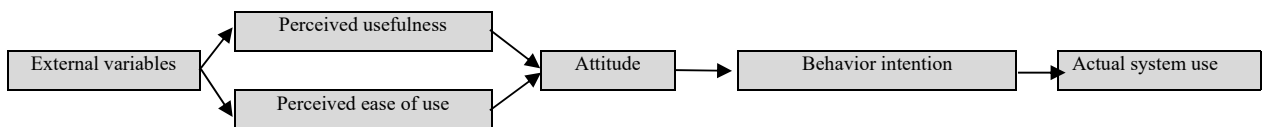

Fig. 1. The Technology Acceptance Model (TAM)

This was developed in research cases in various countries such as Gambia (Lin, Fofannah, & Liang 2011), Jordan (Al-Hujran et al., 2015), U.S and U.K (Carter et al., 2016), and Spain (Belanche, Casaló, & Flavián 2012). This research uses a quantitative approach, SEM-PLS with path analysis method so it can give description of the connection between variables. The research subject is G2C service users which already use / operate SITS Surabaya at least once, while sampling technique is random sampling non-probability. The minimum amount of sample according Slovin principle (Ratnawati et al., 2020; Pratama, Lestari, & Aini 2019) therefore, the minimum amount of respondent used is 400 respondent, however, this research using all the answer that went into Google Form is about 499 respondent, means, the questionnaire processed is far more than recommended. The questionnaire is designed with a likert scale with five points, so it can be classified as interval data. The path analytic testing in this research using Structural Equation Model (SEM) with Partial Least Square (PLS) approach like researches before (Sun, Ji, & Ye, 2018; Nunkoo et al., 2020; Chaouali, Souiden, & Ringle, 2021). Applied model use as proposal for this research hypothesis:
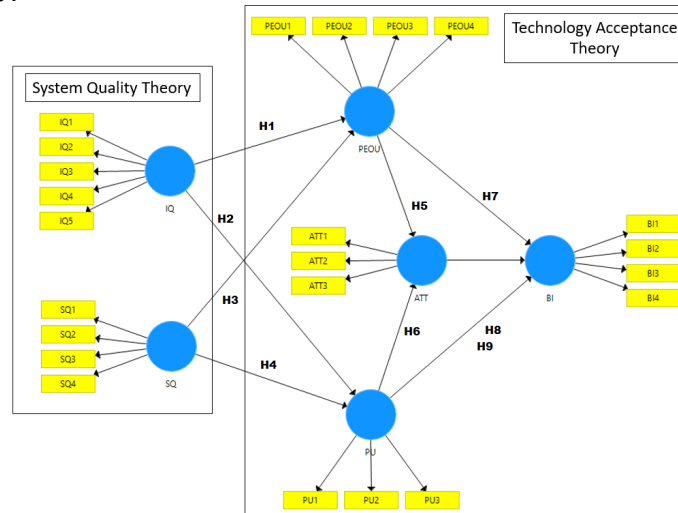

Fig. 2. Research Hipotesis Model

This model generated from research needs which to obtain empiric description about indirect effect system quality to user behaviour

H₁: *Information quality of the G2C system positively affects perceived ease of use.*
H₂: *Information quality of the G2C system positively affects perceived usefulness.*
H₃: *System quality of the G2C system positively affects perceived ease of use.*
H₄: *System quality of the G2C system positively affects perceived usefulness.*
H₅: *The perceived ease of use of G2C has a positive effect on attitudes toward the use G2C system.*
H₆: *The perceived usefulness of G2C has a positive effect on attitudes toward the use G2C system.*
H₇: *The perceived ease of use of G2C has a positive effect on user behavior intentions.*
H₈: *The perceived usefulness of G2C has a positive effect on user behavior intentions.*
H₉: *The perceived attitudes toward G2C has a positive effect on user behavior intentions.*

This model hypothesis is developed from TAM observing (Molinillo et al., 2020; Suryanto et al., 2019; Teo et al., 2009; Wang, 2020) and ISSM (DeLone & McLean, 2002; DeLone & McLean, 2003; Faroqi et al., 2020; Krasniqi et al., 2019; Pratama et al., 2021; Veronica & Suryawan, 2019).

4. Result and Discussion

Analytic approach using the result of SmartPLS 5.0. data processor. As for the important data process result to show is outer model and inner model, outer model covers konvergen validity, discriminant validity and reliability. While the inner model covers multicollinearity, R-Square, and inferential model. This shows the result of processed data.

4.1 Convergent Validity and Discriminant Validity

Observing outer value loading and average value extracted variance (AVE). An indicator can be said fulfills convergent validity if the outer value loadings above 0.70, however with explanatory research model outer loadings value 0.50 – 0,60 is still accepted (Sun, Ji and Ye 2018). A model is good if the AVE value on each construction has more value than 0,50, therefore the data processed result on outer loadings said qualified, this shows that on average, a construct can explain more than half of the varians in each indicator.

Table 2
Loading Value

	ATT	BI	IQ	PEOU	PU	SQ	Nilai AVE
ATT1	0.829						
ATT2	0.783						0.658
ATT3	0.821						
BI1		0.827					
BI2		0.791					0.659
BI3		0.830					
BI4		0.798					
IQ1			0.791				
IQ2			0.872				
IQ3			0.880				0.709
IQ4			0.828				
IQ5			0.836				
PEOU1				0.783			
PEOU2				0.797			0.644
PEOU3				0.841			
PEOU4				0.787			
PU1					0.850		
PU2					0.846		0.706
PU3					0.824		
SQ1						0.807	
SQ2						0.859	0.668
SQ3						0.790	
SQ4						0.812	

Table 3
Cross Loading Value

	ATT	BI	IQ	PEOU	PU	SQ
ATT1	0.829					
ATT2	0.783					
ATT3	0.821					
BI1		0.827				
BI2		0.791				
BI3		0.830				
BI4		0.798				
IQ1			0.791			
IQ2			0.872			
IQ3			0.880			
IQ4			0.828			
IQ5			0.836			
PEOU1				0.783		
PEOU2				0.797		
PEOU3				0.841		
PEOU4				0.787		
PU1					0.850	
PU2					0.846	
PU3					0.824	
SQ1						0.807
SQ2						0.859
SQ3						0.790
SQ4						0.812

Cross loadings value and Fornell-Larcker criterion shows that loading value from each item to the construct is bigger than cross loading value so analysis result shows if there is no discriminant validity problem (Sun, Ji, and Ye 2018). The Fornell-Larcker criterion table shows AVE roots value on each construct needs to be bigger than r-square value (0,518). So, all variables can be said to be valid and can be used for next testing.

4.2 Reliability

Cronbach's alpha and composite reliability, a construct that said reliable if composite reliability value and Cronbach's alpha over 0,70 (Sun, Ji, & Ye 2018). And data processed Cronbach's alpha and composite reliabilities result value is over 0.70, therefore the construct has good reliability.

Table 4
Cronbach's Alpha and CR Value

Variabel	Cronbach's Alpha	Composite Reliability
ATT	0.740	0.852
BI	0.828	0.885
IQ	0.897	0.924
PEOU	0.815	0.878
PU	0.792	0.878
SQ	0.834	0.889

4.3 Multicollinearity

Multicollinearity is a situation that shows a correlation or strong connection between two free variables or more in a model, if VIF value more than 10, so it shows there is multicollinearity problem between predictor variables, in other words VIF value < 10 (Sun, Ji, & Ye 2018).

Table 5
VIF and R-square

	ATT	BI	PEOU	PU	R-Square
ATT		2.054			0.513
BI					0.518
IQ			1.415	1.415	
PEOU	1.719	2.052			0.464
PU	1.719	2.027			0.404
SQ			1.415	1.415	

ATT construct interpreted 51,3% can affect the model to 48.7% affected by other factor outside the variable itself. R-square value for ATT latent variable, PEOU, PU affected BI variable in structural model have r-square value as 0.518 that interpreted 51.8% while 48.2% affected by other factor outside that variable. R-square value for ATT latent, BI, PU variables affect PEOU in structural model have r-square value as 0,404 which interpreted as 40.4% so 59.6% affected by other factor outside that variable. R-square model for ATT latent, BI, and PEOU variable affect PU variable in structural model have R-square value as 0.464 that interpreted 46.4% so 53.6% affected by other factor outside that variable. R-Square shows the magnitude of the variance of the construct described by the model. The greater the R-Square value, the greater the percentage of variance that can be explained. PLS model evaluation can also be done with Q-Square (Q^2). If the value of Q^2 is greater than 0, then the model has predictive relevance. The value of Q^2 is obtained as follows:

$$Q^2 = 1 - ((1 - ATT)(1 - BI)(1 - PU)(1 - PEOU))$$
$$Q^2 = 1 - ((1 - 0.513)(1 - 0.518)(1 - 0.404)(1 - 0.464)) = \mathbf{0.925}$$

The results of the Q-Square calculation in this study are 0.925 or 92%, thus it can be said that the model in this study has a relevant predictive value, the model can explain the information contained in the research data by 92%. looking at this value, it can be said that this study has a good observation value because the value of $Q^2 > 0$ (Chin et al., 1998).

4.3 Inferential Model

Correlation between variables which had been hypotesed and counted structurally model and the result from inferential model shows that correlation between attidtude forward using with behavioral intention to use is significant with t-statistic value 3.570. Original sample value is 0.278 which shows correlation direction between attitude toward using with behavioral intention to use is positive. Correlation between information quality with perceived ease of use is significant with t-statistic value 3.351. Original sample estimate value is 0.194 which shows that the correlation direction between information quality with perceived ease of use is positive. Correlation between perceived ease of use with attitude toward using is significant with t-statistic value 5.395. Original sample estimate valiue is 0.402 which shows correlation direction perceived ease of use with attitude toward using is positive. Correlation between perceived ease of use with behavioral intention is significant with t-statistic value 4.107.

Table 6
Direct Effect Research Result

Hypotesis		Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	P Values
H1	IQ → PEOU	0.194	0.192	0.058	**0.001**
H2	IQ → PU	0.112	0.114	0.045	**0.014**
H3	SQ → PEOU	0.509	0.509	0.058	**0.000**
H4	SQ → PU	0.613	0.607	0.053	**0.000**
H5	PEOU → ATT	0.402	0.393	0.075	**0.000**
H6	PU → ATT	0.387	0.393	0.071	**0.000**
H7	PEOU → BI	0.285	0.285	0.069	**0.000**
H8	PU → BI	0.26	0.261	0.077	**0.001**
H9	ATT → BI	0.278	0.276	0.078	**0.000**

The results of the inner model hypothesis show that all research hypotheses are accepted with p-value < 0, following the findings of the study. Empirically, the quality of information affects perceptions of usefulness and perceived convenience with coefficient values of 0.194 and 0.112. This finding shows that the quality of information presented by public digital services has an effect on perceptions of usefulness and perceived convenience. The next finding is the quality of the system that affects the perception of usefulness and perceived convenience with coefficient values of 0.509 and 0.613. This means that between the quality of the system and the quality of information on public digital transportation services, SITS is very much influenced by the reliability of the system, this condition is in line with research Purwanto, Zuiderwijk, & Janssen (2020) and Putri and Pujani (2019), this is because SITS services are not actually an application that reports road conditions

in writing, but with CCTV that has been installed on the highway, thus the reliability of the device is the main capital in providing the actualization of digital public transportation services through SITS.

The second finding, perceived convenience and perceived usefulness that affect behavior with coefficient values of 0.402 and 0.387 mean that public digital services should be easy and have usefulness values for the general public, this finding is in line with Suryanto (2018), Hasanah et al. (2019) and (Natalia, Bianca, & Pradipta 2019) these findings further strengthen the reasons why it is easy to obtain applications, access services, and is useful in implementing them. SITS applications that are real-time traffic, of course, the usefulness of the application will be determined by the ability of the application to provide impressions that can be accessed at any time.

The last finding, namely user behavior, perceived convenience, and perceived usefulness can directly affect a person's intention to use public digital services, from various previous studies these findings are widely supported (Hasanah, Wati, & Riana, 2019; Aeni Hidayah et al., 2020; Suryanto, Fauzi, & Faroqi 2019; Manesha Peiris et al., 2015; Hendrani & Tanamal, 2017; Natalia, Bianca, & Pradipta, 2019; Al-Hujran et al., 2015). These findings mean that SITS as a public digital service can be accepted in many conditions ranging from the reliability of the system to how users perceive it to be useful when implementing it. This study also produces a value of $Q^2 = 92\%$, which means that the observations in this study can be stated as good but still require additional variables representing the urgency of the community to use public digital services or also public trust in clean digitized public services.

5. Conclusion

This study has been set out to explore information quality and system quality as external variables to the TAM model, so that it is expected to answer the problem of resistance to the application of SITS. As a result, the quality of information affects public acceptance of the application of SITS, as well as the quality of the system that has an influence on public acceptance of the application of SITS. These two factors are the determining factors for public acceptance of the implementation of digital public services. Research to choose the appropriate model is 92%, but it is advisable to suggest to have a wider range by multiplying respondents, not only in one city as has been done in this study, and it is also recommended to add variables that represent the urgency of the community to use factors digital public services or it can also add public trust in digitally clean public services. However, this research contributes to research in the field of G2C information technology performance measurement.

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