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SYSTEM CONTINUANCE SUCCESS OF THE LOCAL ELECTRONIC GOVERNMENT IN INDONESIA

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Abstract. *The adoption and use of electronic government (e-government) services are still limited in most countries as they are largely guided by supply-side factors. However, one of the technology-enabled modernization issues is that decision-makers do not take user expectations and preferences. Referring that the citizens' needs have become the focus of attention, it makes sense to investigate the sustainability factors of the system from the perspectives of the users. This study aimed to determine the factors that influence the system continuance success of local e-government in Indonesia. We adopted, combined, and adapted the information system (IS) success model, the unified theory of acceptance and use of technology (UTAUT) model, the expectancy confirmation model (ECM) to develop the research model. Around 390 valid survey data were analyzed using the partial least square structural equation modeling (PLS-SEM) method. The findings showed that the user satisfaction, effort expectations, performance expectations, and system use factors affect system continuance success of the local e-government in Indonesia.*
Keywords: System continuance success, Local e-government, PLS-SEM, Indonesia

1. **Introduction.** Inevitably, one of the essential points of e-government adoption is to improve the relationship between governments, citizens, businesses, and related parties in terms of digital business strategy [1-3]. The challenges in adopting e-government services are based on the nature of the relationship between government, citizens, and technology [3-5]. In addition, the adoption and use of e-government services are still limited in most developing countries as they are largely guided by supply-side factors [5,6]. Like Indonesia, the United Nations e-government survey [7] in 2020 showed that the e-government development index (EGDI) of this country was 88 of 193 countries. This shows that e-government is a complex project that requires coordination and cooperation between actors and the need to share responsibilities between actors to support the sustainability of e-government projects in developing countries [6,8].

On the other hand, researchers measure success through monitoring the use and satisfaction of certain technologies [9]. Although identifying the factors that influence the adoption of a particular technology is an important indicator for the success of an information system (IS). It does not lead to the desired result unless using it continuously

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[10]. The success of long-term e-government implementation depends on the willingness of citizens and governments to adopt [8,11]. In addition, the success of e-government implementation is measured not only in the perceived quality of the system but also in its implicit comparison with previous expectations [8,10]. One of the implementation tendencies does not consider the user expectations. Thus, it makes sense to investigate the system continuance success factors from the user-oriented perspective. Therefore, this investigation is conducted to investigate the e-government users about their preferences for using the system services [11].

The aim was to determine the factors that influence the system continuance success of the local e-government in Indonesia. It was hoped that the findings become a practical consideration for related parties, as well as a basis for further the system continuance success for the local e-government studies in developing countries, like Indonesia. Theoretically, the findings may also have presented the extension of IS success model [10-12], in terms of system continuance success of local e-government in a developing country. Further, this article is structured in five sections. Besides the introduction section, the research method section elucidated the methodological issues. It is then followed by the results in the third section. The results are then discussed with the theoretical bases in the fourth section. Lastly, the article is closed by the conclusion section.

2. **Research Methods.** The research model was developed by (i) adopting the variables of the IS success model [13] (i.e., system quality [SYQ], service quality [SVQ], information quality [INQ], system use [SYU], user satisfaction [USF], net benefit [NBF]), UTAUT model [14] (i.e., performance expectations [PFX], effort expectations [EFX], social influence [SCI], and facilitation conditions [FCC]), and ECM [12] (i.e., user confirmation [UCF]); (ii) combining the variables in the context of input-process-output (IPO) logic of cognitive model development [15]; and (iii) adapting the model in the context of system continuance success. Here, NBF was adapted into system continuance success (SCS) based on previous studies [1,6,8,16]. Figure 1 presents the proposed model with 11 variables and 16 hypotheses adopted from prior models [12-14] in terms of IPO logic model [15].

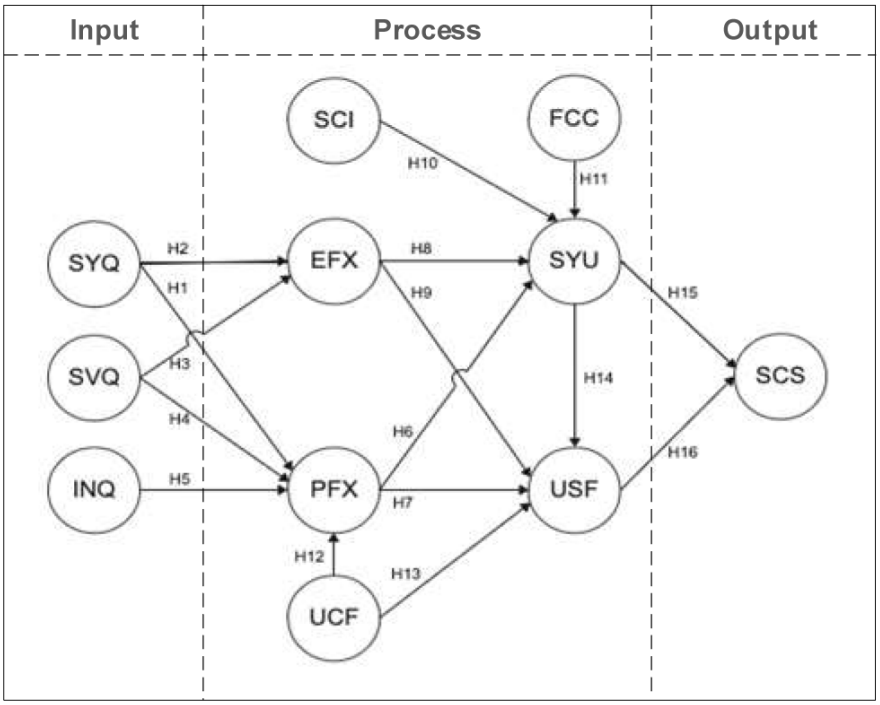

FIGURE 1. Research model

Table 1. List of indicator items and each measurement [12-14]

Items	Name	Measurement items
SYQ1	Easy to use	The system is easy to use.
SYQ2	Maintainability	The system is easy to be maintained.
SYQ3	Response time	The system can respond quickly.
SYQ4	Functionality	The system can perform all functions.
SYQ5	Safety	The system is safe in its use.
SVQ1	Responsiveness	The system provides services quickly.
SVQ2	Flexibility	The system provides flexible services.
SVQ3	Security	The system provides safe services.
SVQ4	Functionality	The system meets the service requirements.
SVQ5	The extension	The system provides more services.
INQ1	Accuracy	The system produces information accurately.
INQ2	Timeliness	The system produces information on time.
INQ3	Completeness	The system produces complete information.
INQ4	Consistency	The system produces information consistently.
INQ5	Relevance	The system produces relevant information.
PFX1	Perceived usefulness	The system improves my work performance.
PFX2	Extrinsic motivation	The system increases my productivity.
PFX3	Job-fit	The system can effectively increase my work.
PFX4	Relative advantage	The system easily makes my work.
PFX5	Outcome expectations	The system improves the quality of capabilities.
EFX1	Perceived ease of use	The system makes users skilled.
EFX2	Complexity	The system provides various services.
SCI1	Subjective norm	Important system to use.
SCI2	Social factors	The system is supported by government use.
SCI3	Image	The system increases the prestige of the user.
FCC1	Perceived behavioral control	The user has the knowledge to use the system.
FCC2	Facilitating conditions	Availability of help and user manual.
FCC3	Services provided	The system is compatible with all services.
UCF1	Experience using	The system provides a better experience.
UCF2	Innovation perceived	The system provides gain performance.
UCF3	Services provided	The system provides better service.
UCF4	Services required	The system can meet service requests.
UCF5	Overall, using confirmed	Overall, the system meets expectations.
SYU1	The frequency of use	The system has a high frequency of use.
SYU2	The intensity of use	The system has a high intensity of use.
SYU3	The extent of use	The system satisfies further needs.
SYU4	The thoroughness of use	The system fulfills the required service.
SYU5	Appropriate use	The system provides the right service.
USF1	Efficiency	The system provides efficient service.
USF2	Effectivity	The system provides effective service.
USF3	Flexibility	The system provides flexible services.
USF4	Adequately	The system provides sufficient service.
USF5	Overall satisfaction	The system meets service performance.
SCS1	Continuity of usability	The system will always be useful.
SCS2	Continuance of services	The system will always meet service.
SCS3	Continuation of usage	This system continues to be used in the future.
SCS4	System continuation	The system is recommended to remain in use.
SCS5	Promote of service	The system is promoted as a form of service.

The population consisted of citizens of the districts which have adopted e-government in Indonesia. The samples were selected using the convenience sample [17]. The instrument was a questionnaire set with five respondent profile questions and 48 five-Linkert questions. Table 1 shows the assessment questions based on each indicator definition. The researchers collected about 390 valid online data. The data analysis phase was carried out using the PLS-SEM method with SmartPLS 3.0 [17]. The interpretation phase was carried out by comparing the analysis results with the theoretical basis, previous literature, and methodological points used in this study. Moreover, the phase was focused on the hypothetical points following the research objective determined in the early of the study.

3. **Results.** The respondents were dominated by men (51.54%), people 21-30 years old (46.67%), users who experienced using the local e-government with good experience level (60.77%) within two to five years (34.87%), and citizens who know e-government innovation (60.77%). The following descriptions are the inferential result descriptions.

First, the measurement model assessments presented the psychometric property of the outer model without rejection. Table 2 presents that overall indicator items fulfilled the threshold values of the cross-loading, composite reliability (CR), and the average variance extracted (AVE) at least 0.7, 0.7, and 0.5, respectively. Lastly, the cross-loading assessments of the AVE's square roots were also fulfilled (Table 3).

Second, the structural model assessments demonstrate: (i) the determinant coefficients (R^2) of SCS, PFX, USF, EFX, and SYU were 0.70 (substantial), 0.49 (moderate), 0.55 (moderate), 0.04 (weak), and 0.3 (weak) respectively; (ii) the path coefficients (β) of INQ→PFX, PFX→SYU, EFX→USF, SCI→SYU, FCC→SYU, UCF→PFX, SYU→USF, SYU→SCS, and USF→SCS were the significant paths; (iii) the effect sizes (f^2) of INQ→PFX, SYU→USF, and USF→SCS were identified in large effect sizes. Meanwhile, FCC→SYU, UCF→PFX, and SYU→SCS were identified at small effect sizes, and the rest paths were identified at negligible effect sizes [13]; and (iv) the t-test using a threshold level of 5% (two sides, t value = 1.96) [18] revealed that only nine of 16 hypotheses were accepted (Figure 2). In detail, Table 4 elucidates the above-mentioned results.

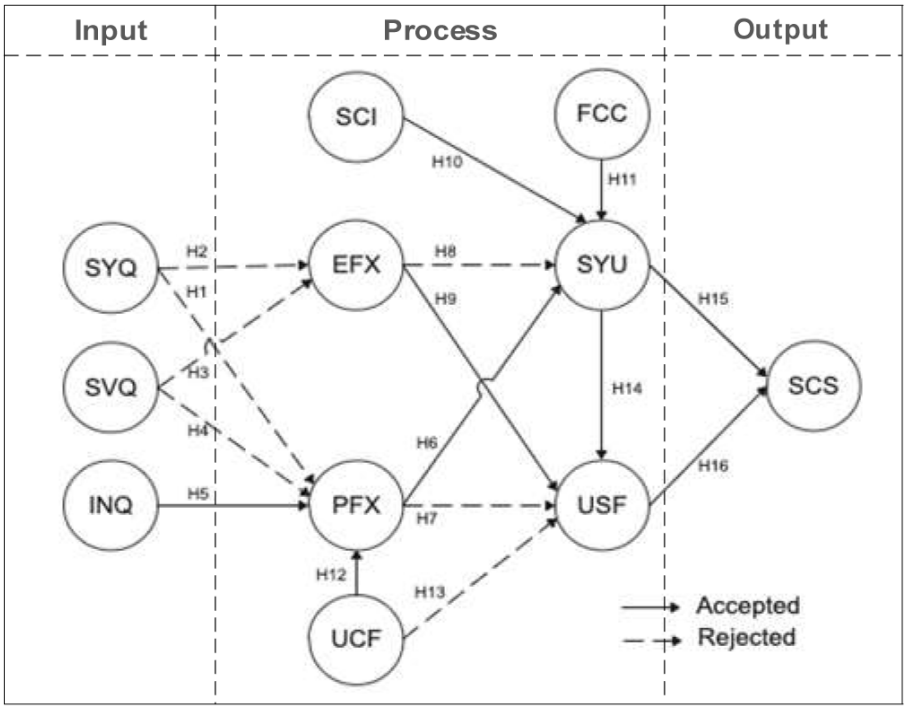

FIGURE 2. Results of the hypothetical assessment

Table 2. Results of the measurement model assessments

Code	Cross loadings											CR	AVE	R^2
	SYQ	SVQ	INQ	PFX	EFX	SCI	FCC	UCF	SYU	USF	SCS			
SYQ1	0.88	0.64	0.47	0.28	0.22	0.28	0.23	0.25	0.33	0.37	0.34	0.97	0.86	
SYQ2	0.92	0.71	0.48	0.22	0.15	0.19	0.17	0.20	0.25	0.29	0.25			
SYQ3	0.95	0.90	0.51	0.23	0.16	0.11	0.08	0.10	0.16	0.20	0.16			
SYQ4	0.95	0.90	0.52	0.24	0.16	0.12	0.09	0.11	0.17	0.21	0.18			
SYQ5	0.93	0.93	0.55	0.25	0.16	0.08	0.04	0.07	0.13	0.17	0.14			
SVQ1	0.91	0.95	0.55	0.25	0.16	0.09	0.05	0.07	0.12	0.16	0.13	0.98	0.88	
SVQ2	0.90	0.96	0.56	0.25	0.16	0.10	0.05	0.07	0.13	0.17	0.13			
SVQ3	0.90	0.95	0.56	0.26	0.16	0.08	0.04	0.06	0.13	0.16	0.12			
SVQ4	0.75	0.95	0.66	0.33	0.20	0.12	0.08	0.12	0.14	0.16	0.20			
SVQ5	0.71	0.92	0.71	0.34	0.22	0.14	0.10	0.09	0.10	0.13	0.16			
INQ1	0.62	0.78	0.79	0.39	0.22	0.14	0.12	0.12	0.11	0.13	0.16	0.94	0.75	
INQ2	0.50	0.64	0.90	0.51	0.30	0.25	0.22	0.21	0.19	0.11	0.20			
INQ3	0.48	0.62	0.90	0.51	0.29	0.21	0.19	0.18	0.18	0.08	0.18			
INQ4	0.45	0.51	0.90	0.62	0.35	0.23	0.18	0.17	0.34	0.29	0.37			
INQ5	0.38	0.41	0.85	0.64	0.37	0.25	0.20	0.17	0.28	0.23	0.31			
PFX1	0.22	0.28	0.64	0.81	0.51	0.34	0.30	0.28	0.37	0.29	0.38	0.95	0.80	0.49
PFX2	0.27	0.31	0.60	0.90	0.67	0.47	0.40	0.37	0.32	0.23	0.32			
PFX3	0.24	0.28	0.56	0.93	0.72	0.51	0.41	0.38	0.32	0.21	0.30			
PFX4	0.23	0.28	0.54	0.94	0.72	0.51	0.41	0.36	0.31	0.20	0.29			
PFX5	0.21	0.20	0.46	0.88	0.71	0.53	0.43	0.38	0.31	0.20	0.29			
EFX1	0.15	0.17	0.33	0.72	0.94	0.69	0.55	0.47	0.39	0.32	0.42	0.95	0.90	0.04
EFX2	0.21	0.20	0.35	0.69	0.95	0.72	0.58	0.47	0.41	0.35	0.44			
SCI1	0.15	0.11	0.27	0.59	0.78	0.90	0.72	0.59	0.50	0.42	0.48	0.95	0.87	
SCI2	0.18	0.12	0.24	0.44	0.66	0.95	0.86	0.73	0.47	0.42	0.48			
SCI3	0.17	0.09	0.20	0.42	0.63	0.94	0.89	0.75	0.48	0.42	0.48			
FCC1	0.16	0.09	0.22	0.45	0.65	0.93	0.93	0.76	0.51	0.42	0.48	0.96	0.88	
FCC2	0.15	0.08	0.20	0.39	0.53	0.77	0.96	0.84	0.49	0.37	0.39			
FCC3	0.07	0.02	0.17	0.38	0.48	0.77	0.93	0.82	0.47	0.35	0.36			
UCF1	0.12	0.04	0.17	0.38	0.49	0.78	0.91	0.88	0.49	0.35	0.38	0.95	0.80	
UCF2	0.16	0.10	0.20	0.38	0.48	0.75	0.85	0.94	0.57	0.43	0.45			
UCF3	0.16	0.10	0.20	0.38	0.48	0.73	0.84	0.95	0.58	0.44	0.46			
UCF4	0.17	0.10	0.17	0.32	0.44	0.57	0.70	0.90	0.66	0.50	0.50			
UCF5	0.11	0.06	0.14	0.30	0.34	0.51	0.57	0.81	0.69	0.43	0.45			
SYU1	0.18	0.10	0.15	0.31	0.36	0.51	0.57	0.76	0.83	0.49	0.46	0.95	0.76	0.30
SYU2	0.23	0.11	0.26	0.33	0.33	0.42	0.45	0.59	0.93	0.63	0.60			
SYU3	0.22	0.12	0.24	0.34	0.35	0.42	0.43	0.58	0.93	0.62	0.60			
SYU4	0.22	0.12	0.26	0.33	0.43	0.48	0.45	0.55	0.91	0.70	0.69			
SYU5	0.19	0.11	0.25	0.33	0.39	0.48	0.42	0.51	0.83	0.77	0.74			
USF1	0.26	0.17	0.24	0.29	0.39	0.49	0.42	0.49	0.77	0.90	0.81	0.97	0.86	0.55
USF2	0.26	0.14	0.19	0.23	0.30	0.41	0.36	0.45	0.69	0.96	0.75			
USF3	0.25	0.15	0.17	0.22	0.32	0.41	0.38	0.44	0.66	0.94	0.76			
USF4	0.26	0.15	0.17	0.21	0.32	0.37	0.34	0.41	0.64	0.94	0.75			
USF5	0.23	0.14	0.16	0.23	0.31	0.41	0.37	0.44	0.64	0.90	0.74			
SCS1	0.25	0.18	0.28	0.33	0.42	0.50	0.42	0.48	0.67	0.85	0.91	0.97	0.85	0.70
SCS2	0.20	0.11	0.25	0.30	0.38	0.45	0.39	0.47	0.67	0.77	0.94			
SCS3	0.18	0.11	0.24	0.31	0.41	0.45	0.40	0.46	0.64	0.73	0.93			
SCS4	0.26	0.18	0.32	0.37	0.46	0.47	0.40	0.45	0.66	0.74	0.94			
SCS5	0.21	0.15	0.27	0.35	0.42	0.51	0.41	0.46	0.64	0.69	0.90			

Table 3. The square roots of the AVEs

	SYQ	SVQ	INQ	PFX	EFX	SCI	FCC	UCF	SYU	USF	SCS
SYQ	0.93										
SVQ	0.87	0.95									
INQ	0.54	0.65	0.87								
PFX	0.27	0.31	0.63	0.89							
EFX	0.19	0.19	0.36	0.74	0.95						
SCI	0.18	0.11	0.25	0.52	0.74	0.93					
FCC	0.14	0.07	0.21	0.43	0.59	0.88	0.94				
UCF	0.16	0.09	0.20	0.39	0.50	0.74	0.86	0.90			
SYU	0.23	0.13	0.26	0.37	0.42	0.52	0.52	0.67	0.89		
USF	0.27	0.16	0.20	0.26	0.36	0.45	0.40	0.48	0.74	0.93	
SCS	0.24	0.16	0.30	0.36	0.45	0.51	0.44	0.50	0.71	0.82	0.92

Table 4. Results of the inner model assessments

Code	β	R^2	f^2	t-test	Analyses			
					β	R^2	f^2	t-test
H1	−0.03	0.49	0.00	0.37	Not supported	Moderate	Ignored	Rejected
H2	0.07	0.04	0.00	0.72	Not supported	Weak	Ignored	Rejected
H3	0.13	0.04	0.00	1.22	Not supported	Weak	Ignored	Rejected
H4	−0.14	0.49	0.01	1.71	Not supported	Moderate	Ignored	Rejected
H5	0.69	0.49	0.51	13.19	Supported	Moderate	Large	Accepted
H6	0.14	0.30	0.01	2.23	Supported	Weak	Ignored	Accepted
H7	−0.10	0.55	0.01	1.80	Not supported	Substantial	Ignored	Rejected
H8	0.01	0.30	0.00	0.14	Not supported	Weak	Ignored	Rejected
H9	0.14	0.55	0.02	2.12	Supported	Substantial	Ignored	Accepted
H10	0.20	0.30	0.01	2.01	Supported	Weak	Ignored	Accepted
H11	0.28	0.30	0.02	2.80	Supported	Weak	Small	Accepted
H12	0.27	0.49	0.14	5.67	Supported	Moderate	Small	Accepted
H13	−0.04	0.55	0.00	0.72	Not supported	Substantial	Ignored	Rejected
H14	0.74	0.55	0.66	12.98	Supported	Substantial	Large	Accepted
H15	0.23	0.70	0.08	3.87	Supported	Substantial	Small	Accepted
H16	0.65	0.70	0.66	10.47	Supported	Substantial	Large	Accepted

4. **Discussion.** First, it can be seen that the outer part of the proposed model has statistically psychometric properties referring to the previous studies which used the PLS-SEM method [15,19]. The statistical status was the essential point for the further inner model assessments [15,19]. Second, despite the R^2 of PFX→USF and UCF→USF were substantial, SYQ→PFX and SVQ→PFX were moderate, their β were significantly negative, f^2 were ignored, and the hypothetical relationships were also rejected. It is inconsistent with the theoretical basis used in the model development, especially the model combination [15]. Third, the R^2 of SCS was substantial. Meanwhile, the R^2 on the endogenous PFX, USF constructs were moderate and the endogenous EFX, SYU constructs were weak. This is following the theoretical basis of model development [10,11,13,14]. Fourth, the large f^2 (> 0.35) of INQ→PFX, SYU→USF, and USF→SCS may illustrate that user satisfaction, effort expectations, performance expectations, and system use affect the system continu-

ance success of the local e-government in Indonesia [10,12,20].

In the context of the proposed question in the study, the two underlined discussion points are (i) all of the related paths with SYQ and SVQ were the rejected paths and INQ was only the accepted variable of the input dimension which affects indirectly the SCS in terms of IPO logic [15]. This may be a trend that decision-makers do not consider user expectations and preferences. Moreover, referring to the system creation domain of IS success model [13] of local e-government, INQ may be a more essential factor rather than the SYQ and SVQ factors based on the sampled people in the study, and (ii) although both SYU and USF variables affected SCS, the influence of USF was larger rather than the SYU's effect. It is consistent with previous UTAUT studies [21,22] about user satisfaction issues. Therefore, given that citizens' needs have become the focus of attention, it makes sense for decision makers to consider improving perceived quality based on user expectations and preferences.

5. **Conclusions.** E-government adoption has inevitably improved the relationship between government and citizens, businesses, and other activities. On the other hand, it is also a common issue that the user expectations and preferences in the technology adoption were not the main attention of the stakeholders. In this study, the factors affecting the system continuance success of the local e-government in Indonesia were assessed by adopting, combining, and adapting the variables of the IS success model, UTAUT model, and ECM based on the IPO model development logic. The findings elucidated that SYQ and SVQ are the two rejected variables of the model and the eight variables (i.e., INQ, SCI, EFX, PFX, UCF, FCC, SYU, and USF) have effects on SCS. The adoption, combination, and adaptation of the proposed model may be one of the references for further system continuance studies. In the context of the local e-government adoption, the findings of this study may also be one of the practical considerations for the stakeholders of the technology adoption in the country. Of course, the findings cannot be generalized into the other research phenomena. It is related to the use of the different data and methodology used among studies. Therefore, it is suggested that some of the limitations contained in this study can be considered for further studies.

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