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Measuring user acceptance of e-government adoption in an Indonesian context: a study of the extended technology acceptance model

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Abstract: The City Office for Population Administration and Civil Registration (COPACR) in Surabaya, Indonesia, introduced KLAMPID (Kelahiran-Kematian-Pindah-Datang (in Bahasa), or Birth-Death-Immigratio-Emigration), an e-government system for residents to access administration services. To evaluate user acceptance and ensure sustainability, an extended technology acceptance model (TAM) was employed in this study. The research aims to provide a framework applicable to developing countries with municipal agencies adopting e-government systems. With Surabaya's unique challenges, the methodology involves a literature review, TAM application with additional variables, and questionnaires distributed to 363 respondents. Partial least square structural equation modelling (PLS-SEM) was used for analysis, revealing 15 supported hypotheses, 12 with positive correlations. Notably, trust, perceived risk, attitude towards use, and perceived usefulness demonstrated negative path coefficients. The extended TAM model effectively represents 60% of users' behavioural intentions in adopting KLAMPID, offering original insights applicable to similar research in developing countries with emerging e-governance systems.

Keywords: E-government; TAM; technology acceptance model; extended TAM; PLS-SEM; partial least square structural equation modelling.

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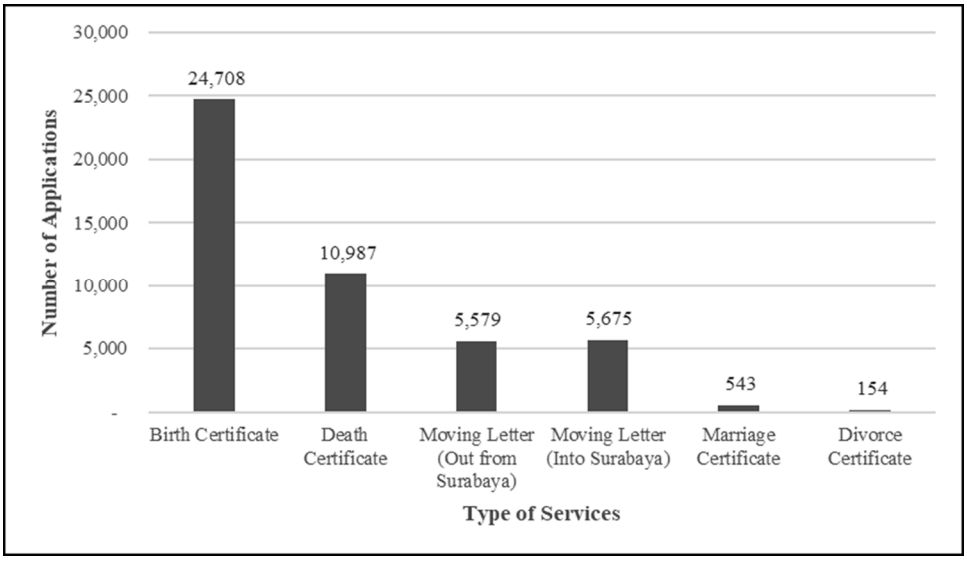
1 Introduction

E-government has emerged as a global priority, with all 193 United Nations member states striving to enhance public service delivery and government processes through digitalisation (United Nations, 2020). However, the adoption of e-government is particularly challenging in developing countries, marked by limitations such as rigid public organisations, scarce technological resources, low skills, managerial obstacles, and a substantial rural population (Heeks, 2008; Mutula, 2008; Shin et al., 2008; AlKabani et al., 2015). Surabaya, Indonesia, the second-largest city by population, stands out as a model for overcoming these challenges. The City Office for Population Administration and Civil Registration (COPACR) in Surabaya initiated e-government adoption in 2014, fully transitioning to the online KLAMPID portal system in March 2020. This digital platform enables residents to access and apply for various services, responding to the increased demand driven by a 3.94% annual population growth rate (BPS, 2020). With 241,145 registered accounts since its launch, KLAMPID has streamlined services, particularly during the COVID-19 pandemic, minimising face-to-face interactions and aligning with physical distancing measures (Anitysari and Sonhaji, 2021). The recorded applications, as shown in Figure 1, including 24,708 for birth certificate issuance in seven months, demonstrate active and diverse use of KLAMPID by Surabaya residents (Gitiyarko, 2020). This study illustrates how a developing city can successfully implement e-government solutions, offering valuable insights for similar contexts worldwide.

Figure 1 KLAMPID applications March – September 2020



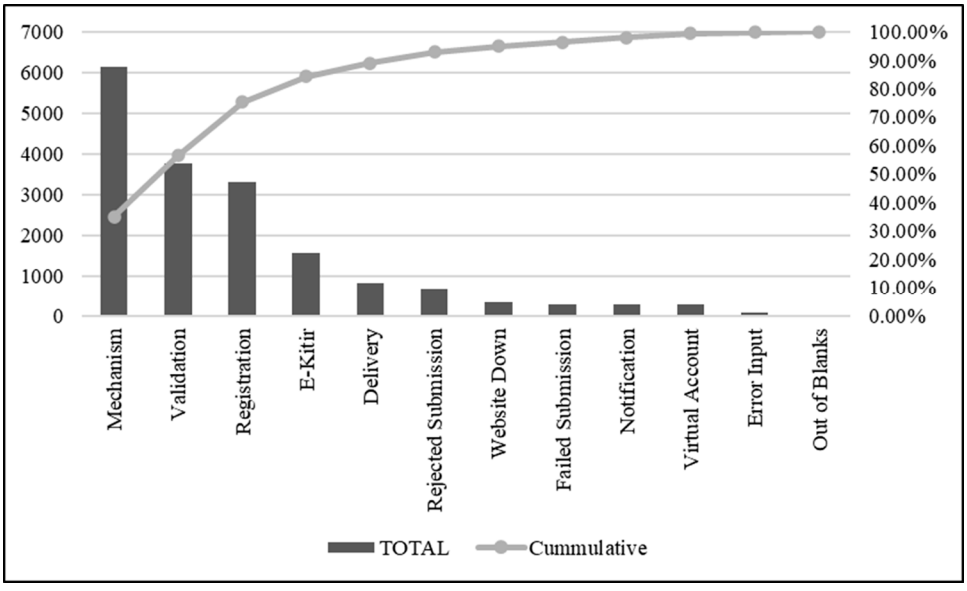
Even though the KLAMPID utilisation and number of registered accounts are high, it does not mean that the process is improved and better accepted compared to the traditional physical application process. Due to the variety of technological proficiencies users have, the implementation of the KLAMPID website portal system has led to several issues.

According to the data provided by COPACR, a total of 17,522 complaints were reported in seven months from November 2020 to May 2021. These complaints report a variety of issues faced by the KLAMPID user. From the users' complaints research as shown in Figure 2, about 80% of the complaints discuss problems related to KLAMPID mechanisms, document validation, and registration issues. These complaints are viewed from the point of view of the user when using the KLAMPID system. Those complaint categories are critical functions for KLAMPID. These findings show that there are a lot of improvements must be made by the COPACR for the KLAMPID system to properly accommodate users' needs. In the future, this website portal will still be a necessity for Surabaya residents to manage population documents, so it is pertinent to conduct user acceptance research for the KLAMPID system.

Initially, scepticism surrounded the digitalised KLAMPID system's introduction, with concerns about added complexity and resistance to change (Mahendra, 2021; Priambodho, 2021; Rahmat, 2021; Muana, 2021). Factors influencing these concerns range from user demographics to cultural resistance, prompting COPACR's upper management to prioritise citizen preferences and gauge Surabaya residents' acceptance of KLAMPID. Given the shared characteristics with other developing cities, this case study offers insights applicable to improving e-governance in similar contexts. The study addresses the challenge of understanding technology acceptance, recognising TAM's significance in explaining usage behaviour. Unlike previous studies, this research aims to comprehensively explore TAM structures and extend them to fit specific conditions,

focusing on factors influencing Surabaya residents' adoption of KLAMPID in e-government. Policymakers can leverage findings to understand citizens' decisions regarding KLAMPID as an e-government tool in Surabaya City.

Figure 2 KLAMPID user's complaint Pareto Chart November 2020–May 2021



2 Research methodology

This research uses the technology acceptance model (TAM) as its underlying model, which begins with literature studies related to TAM, particularly in the e-government context. After that, models are built to assess user acceptance. The model that will be used is an extended TAM from previous research that is extended with a computed self-efficacy, trust, risk, and subjective norm variable, in addition to the original variables namely perceived ease of use (PEOU), perceived usefulness (PU), attitude (A), and behavioural intention (BI).

From each latent variable mentioned previously, there are measured variables for each latent variable also known as manifest variables or indicators. Indicators are used to determine the value of the latent variable. The number of indicators in each latent variable may vary. Since this research uses partial least square structural equation modelling (PLS-SEM) indicators, as much as three are allowed and often used to measure latent variables (Hair et al., 2011). Generally, the more indicators, the better they will explain a variable. However, it may lead to redundancy and cause inconveniences for the respondents since they need to answer multiple indicators.

This study drew upon previous research, particularly the original TAM by Davis (1989) and TAM in the e-government context, to identify indicators for measuring latent variables. Examining literature, PEOU was assessed with 4 indicators by Lin et al. (2011), 3 by Xie et al. (2017), and 5 by Dahi and Ezziane (2015). Perceived usefulness (PU) in Mensah's 2017 study used five indicators, while Xie et al. (2017) used 3. Attitude

towards Use (A) varied, measured with 4 indicators in Xie et al. (2017) and 3 in Lin et al. (2011). Computer self-efficacy (CSE) indicators were derived from Dahi and Ezziane (2015) with 6 and Hung et al. (2013) with 3. Trust indicators were observed in Xie et al. (2017) and Dahi and Ezziane (2015), both with 3. Perceived Risk (PR) was studied with 3 indicators by Xie et al. (2017) and Hung et al. (2006). Subjective norms were examined in Hung et al. (2006) with 3 indicators and Dahi and Ezziane (2015) with 4. Behavioural intention was studied by Xie et al. (2017) with 3 indicators. Reflective indicators were used for all constructs, resulting in a model with 12 latent variables and 30 indicators, adjusted to align with the current research focus which resulted in latent variables and manifest variables as shown in Table 1.

Table 1 List of latent and manifest variables (indicators) in this extended TAM

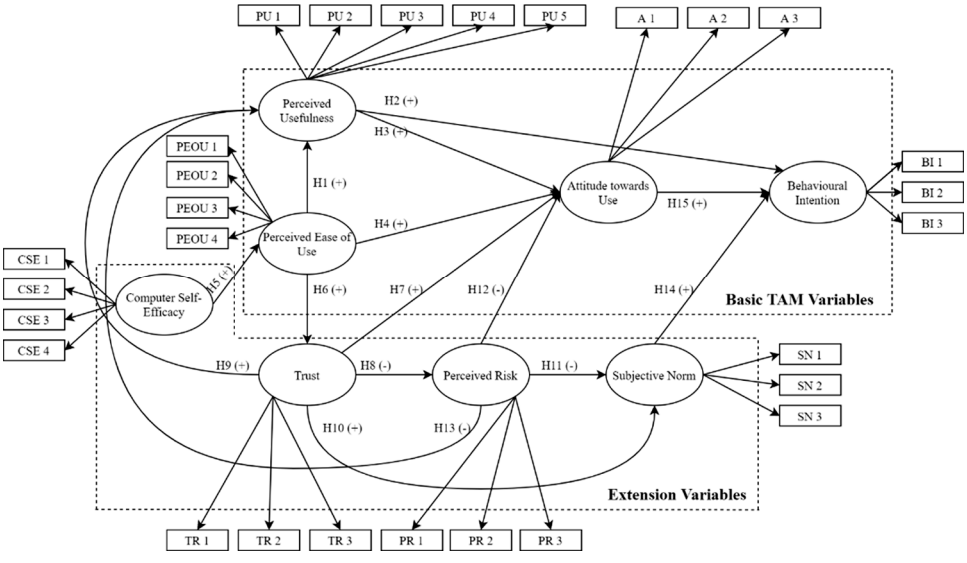
Indicators measuring latent variables	
Perceived ease of use (*adapted from Davis, 1989; Dahi and Ezziane, 2015; Xie et al., 2017*)	
PEOU1	Learning to use KLAMPID is easy for me
PEOU2	Becoming accustomed to using KLAMPID application was easy for me
PEOU3	KLAMPID application is easily intuitive and unambiguous
PEOU4	Flow and procedures for filing in the KLAMPID application is easily understood
Perceived usefulness (*adapted from Davis, 1989; Carter and Belanger, 2005; Dahi and Ezziane, 2015; Xie et al., 2017*)	
PU1	Using the KLAMPID application increases my productivity and efficiency
PU2	KLAMPID application simplifies access COPACR services
PU3	KLAMPID application allows me to get the services of COPACR quickly
PU4	I get enough information for a service that I want to access in KLAMPID application
PU5	Data processed through the KLAMPID application is accurate (minimal errors, typos, etc.)
Attitude (*adapted from Davis, 1989; Xie et al., 2017*)	
A1	I support COPACR converting services to an online platform (via KLAMPID application)
A2	Using the KLAMPID application (digitising service) is a bad idea
A3	Using KLAMPID application will be a pleasant experience for me
Computer self-efficacy (*adapted from Dahi and Ezziane, 2015; Xie et al., 2017*)	
CSE1	I am confident in my ability to operate a computer / gadget
CSE2	I usually find it easy to learn how to use a new technology
CSE3	I am confident in using KLAMPID even though there is nobody to guide me
CSE4	I feel confident using the new application that I had never tried before
Trust (*adapted from Wu and Chen, 2005; Dahi and Ezziane, 2015; Xie et al., 2017*)	
TR1	KLAMPID application from COPACR is trustworthy
TR2	I believe the documents and the data I entered on KLAMPID Applications will not be misused
TR3	I believe that the KLAMPID Applications is reliable

Table 1 List of latent and manifest variables (indicators) in this extended TAM (continued)

Perceived risk (*adapted from Hung et al., 2013; Xie et al., 2017)*	
PR1	Using the KLAMPID application a risky choice
PR2	Providing personal information to the KLAMPID application a risky action
PR3	In general, access to public services through online platform is risky
Subjective norms (*adapted from Hung et al., 2006; Dahi and Ezziane, 2015*)	
SN1	People who are close to me would think that I would use KLAMPID
SN2	People who are important to me would advise me to use KLAMPID
SN3	I would use KLAMPID if my friends and colleagues used it
Behavioural Intention (*adapted from Davis, 1989; Venkatesh, 2000*)	
BI1	I will use KLAMPID application soon
BI2	I would prefer to access the KLAMPID application rather than access COPACR services any other way
BI3	It is likely that I will reuse KLAMPID

After determining which variables will be included in the model, the following step was to construct the model. Using the online graphic platform draw.io, the model is depicted using a path diagram that adheres to the SEM standard which can be seen in Figure 3. It demonstrates the relationship among the studied variables.

Figure 3 Completed model of extended TAM



The hypotheses that describe the structural model are then listed. According to the model developed, there are 13 relationships between the latent variables. Because of this, the number of hypotheses constructed for this study are 13 hypotheses. The recapitulation of the hypotheses can be seen in Table 2.

Table 2 Recapitulation of hypothesis from the extended TAM

Hypothesis	*Explanation*	*Supporting Studies*
H1 (+)	Perceived ease of use has a positive effect on perceived usefulness	Davis (1989), Taylor and Todd (1995)
H2 (+)	Perceived usefulness has positive effect on behavioural intention	
H3 (+)	Perceived usefulness has positive effect on attitude towards use	
H4 (+)	Perceived ease of use has positive effect on attitude towards use	
H5 (+)	Computer self-efficacy will positively influence perceived ease of use	Dahi and Ezziane (2015)
H6 (+)	Perceived ease of use will positively influence user's trust	Xie et al. (2017)
H7 (+)	Trust has positive effect on attitude towards use	Wu and Chen (2005) and Gefen et al. (2002)
H8 (–)	Trust will have a negative impact on perceived risk	Xie et al. (2017)
H9 (+)	Trust will have a positive impact on perceived usefulness	
H10 (+)	Trust will have a positive impact on subjective norms	
H11 (–)	Perceived risk will negatively influence subjective norms	
H12 (–)	Perceived risk will negatively influence attitude towards use	Gefen et al. (2002) and Xie et al. (2017)
H13 (–)	Perceived risk will negatively influence perceived usefulness	Xie et al. (2017)
H14 (+)	Subjective norms have positive effect on behavioural intention	Ajzen and Fishbein (1980)
H15 (+)	Attitude has positive effect on behavioural intention	Ajzen and Fishbein (1980), Taylor and Todd (1995)

This study employed questionnaires as data collection tools, aligning item content with the proposed model's variable indicators. The 28 items in the statements were derived from the basic TAM model and extension variables from prior literature. Translated into Bahasa Indonesia for targeted respondents, the Likert scale (1-5) gauged agreement levels. Online surveys were conducted via Google Form, with responses automatically compiled in Google Drive. Criteria for data processing in PLS SEM included Surabaya residents over 17 years who had used the KLAMPID website at least once. Of the 645 gathered responses, 363 met the criteria for PLS SEM. The PLS-SEM method assessed the implemented model, scrutinising both measurement and structural components to validate constructed hypotheses.

3 Result and discussion

As many as 363 responses were collected and further processed in this research, with 279 respondents filling out the online questionnaires and 84 submitting their responses offline. Respondents are grouped based on their gender, age, frequency of using KLAMPID, education, ethnicity, and occupation. The recapitulation of respondents' demography is presented in Table 3.

Table 3 Respondent profile collected from the questionnaire

		Online questionnaires		*Offline questionnaires*		*Total*	
Question	*Answer*	*n*	*%*	*n*	*%*	*n*	*%*
Gender	Male	136	48.75%	46	54.76%	182	50.14%
	Female	143	51.25%	38	45.24%	181	49.86%
	Total	279	100.00%	84	100.00%	363	100.00%
Age	17–26 (Millenials)	77	27.60%	19	22.62%	96	26.45%
	27–40 (Gen Y)	156	55.91%	39	46.43%	195	53.72%
	41–56 (Gen X)	42	15.05%	20	23.81%	62	17.08%
	> 56 (Baby Boomers)	4	1.43%	6	7.14%	10	2.75%
	Total	279	100.00%	84	100.00%	363	100.00%
Frequency	1st timer	74	26.52%	41	48.81%	115	31.68%
	2–3 time	76	27.24%	26	30.95%	102	28.10%
	3–5 time	36	12.90%	9	10.71%	45	12.40%
	>5 time	93	33.33%	8	9.52%	101	27.82%
	Total	279	100.00%	84	100.00%	363	100.00%
Education	SD	3	1.08%	5	5.95%	8	2.20%
	SMP	8	2.87%	7	8.33%	15	4.13%
	SMA/SMK	100	35.84%	40	47.62%	140	38.57%
	S1	129	46.24%	23	27.38%	152	41.87%
	S2	19	6.81%	4	4.76%	23	6.34%
	S3	2	0.72%	0	0.00%	2	0.55%
	Diploma	18	6.45%	5	5.95%	23	6.34%
	Total	279	100.00%	84	100.00%	363	100.00%
Ethnicity	Javanese	238	85.30%	74	88.10%	312	85.95%
	Maduranese	13	4.66%	5	5.95%	18	4.96%
	Chinese	18	6.45%	3	3.57%	21	5.79%
	Bataknese	5	1.79%	0	0.00%	5	1.38%
	Other	5	1.79%	2	2.38%	7	1.93%
	Total	279	100.00%	84	100.00%	363	100.00%

Table 3 Respondent profile collected from the questionnaire (continued)

		Online questionnaires		*Offline questionnaires*			
Question	*Answer*	*n*	*%*	*n*	*%*	*n*	*%*
Occupation	Private employees	144	51.61%	40	47.62%	184	50.69%
	Students	28	10.04%	7	8.33%	35	9.64%
	Entrepreneur	23	8.24%	7	8.33%	30	8.26%
	Government employees	20	7.17%	8	9.52%	28	7.71%
	Doctor	1	0.36%	1	1.19%	2	0.55%
	Indonesian National Army	1	0.36%	1	1.19%	2	0.55%
	Others	62	22.22%	20	23.81%	82	22.59%
	Total	279	100.00%	84	100.00%	363	100.00%

4 Measurement model

The first step needed to evaluate the measurement model is testing the outer loading or indicator loading. This test is used to evaluate whether the indicators used are sufficient as a representation to measure the latent variables. The minimum value to show that the construct expresses more than 50% of the indicator variance, demonstrating acceptable item reliability is 0.708. The result of the indicator loadings shows that there are three indicators that have values below 0.708 as shown in Table 4. Those indicators are A2, CSE2, and SN3. This suggests that those indicators need to be removed from the model as they do not exhibit valid items to measure the latent variables.

Table 4 Indicator loading result, with 3 indicators are under the standard parameter and will be removed (see online version for colours)

Indicators	*A*	*BI*	*CSE*	*PEOU*	*PR*	*PU*	*SN*	*TR*
A1	0.893							
A2	**0.506**							
A3	0.857							
BI1		0.874						
BI2		0.879						
BI3		0.866						
CSE1			0.866					
CSE2			**0.556**					
CSE3			0.888					
CSE4			0.904					
PEOU1				0.93				
PEOU2				0.922				
PEOU3				0.912				
PEOU4				0.854				

Table 4 Indicator loading result, with 3 indicators are under the standard parameter and will be removed (see online version for colours) (continued)

Indicators	*A*	*BI*	*CSE*	*PEOU*	*PR*	*PU*	*SN*	*TR*
PR1					0.936			
PR2					0.917			
PR3					0.81			
PU1						0.886		
PU2						0.895		
PU3						0.885		
PU4						0.812		
PU5						0.812		
SN1							0.844	
SN2							0.919	
SN3							**0.477**	
TR1								0.904
TR2								0.868
TR3								0.919

The next step in the measurement model is to evaluate the internal consistency reliability. There are several measures that can be used to evaluate internal consistency reliability. In this study, the parameters used are composite reliability (CR) and Cronbach's Alpha. Both parameters have similar thresholds, higher values generally indicate a higher level of reliability. However, the recommended value is between 0.70 and 0.90. Results higher than 0.95 indicate that the items or the variables might be redundant and will reduce the construct validity, thus considered problematic (Diamantopoulos et al., 2012). The result of this study indicates that all variables fall in the recommended values. Details of the CR and Cronbach's Alpha results from the SmartPLS Software can be seen in Table 5.

Table 5 Internal consistency reliability result

Latent variables	*Cronbach's Alpha*	*Composite reliability*
Attitude towards use (A)	0.757	0.892
Behavioural intention (BI)	0.845	0.906
Computer self-efficacy (CSE)	0.881	0.927
Perceived ease of use (PEOU)	0.926	0.948
Perceived risk (PR)	0.879	0.912
Perceived usefulness (PU)	0.911	0.933
Subjective norms (SN)	0.757	0.891
Trust (TR)	0.879	0.925

The next phase in to evaluate the convergent validity. It is defined as the extent to which a construct converges to explain the variance of its indicators. The parameter used in convergent validity is called average variance extraction (AVE). AVE can be calculated

by squaring each indicator loading in one latent variable and computing the average of it (Hair et al., 2019). Using the SmartPLS 3.0 Software, it can be calculated directly. The recommended value of AVE is more than 0.5. It indicates that the construct describes at least 50% of the variance of its items (Hair et al., 2019). Based on the result of this model, all latent variables have an AVE value above the threshold, indicating that all latent variables are valid.

The next step in measurement model is to assess the discriminant validity. Discriminant validity is defined as how distinct a construct is experimentally from other constructs in the structural model. The Fornell-Larcker criterion is used to assess the discriminant validity between latent variables. Assessing discriminant validity can be done using the SmartPLS 3.0 Software after calculating the PLS Algorithm. The Fornell-Larcker criterion is determined by assessing the value correlation of each latent variable. The correlation value between latent variables and itself must be higher than the correlation with other latent variables. Based on this result, all the variables have passed the Fornell-Larcker Criterion and are considered valid.

5 Structural model

After the measurement model assessment is completed, the next step is to evaluate the structural model or inner model. The inner model is evaluated by examining the latent variables relationship.

The first step to evaluate the structural model is by examining the collinearity. The collinearity assessment is done by estimating a sequence of regression equations which gives the structural model coefficients for the relationships between the constructs. Collinearity must be checked before examining structural relationships to ensure that it does not influence the regression results (Hair et al., 2019). It can be checked using the variance inflation factor (VIF). The VIF values are calculated using the latent variable scores of the predictor constructs in a partial regression, which is comparable to assessing formative measurement models. VIF values greater than 5 indicate that the predictor constructs are likely to be collinear (Becker et al., 2015). Based on the result, all indicators have VIF values below the threshold. It indicates that there are no collinearity issues in the model.

If collinearity is not an issue, the next step in the structural model evaluation is to examine the R^2 value of the endogenous latent variable constructs. The R^2 is a measure of the model's explanatory power because it measures the variance that is explained in each endogenous construct. In-sample predictive power is another name for the R^2. R^2 is a measure of explanatory power that runs from 0 to 1, with higher values indicating stronger explanatory power. R^2 values of 0.75, 0.50, and 0.25 are regarded as substantial, moderate, and weak, respectively.

In this extended TAM, there are seven endogenous variables. However, there is only one that is purely endogenous, which is the behavioural intention (BI). R^2 values of all endogenous variables can be seen in Table 6. Like the discriminant validity, this R^2 value is obtained using the SmartPLS 3.0 Software.

As show in Table 6, the R^2 values from each endogenous variable vary. Behavioural intention (BI) as the only pure endogenous variable has an R^2 value of 0.60. It indicates that 60% of BI in this model is explained by the variables involved. Since the model BI is influenced directly by perceived usefulness (PU), attitude towards use (A), and

Subjective Norms (SN), it can be inferred that the variables explain 60% variance of BI ($R^2 = 0.60$). The same interpretation can be done with other endogenous variables, which are Attitude towards Use ($R^2 = 0.545$), perceived ease of use ($R^2 = 0.395$), Perceived Risk ($R^2 = 0.031$), Perceived Usefulness ($R^2 = 0.731$), Subjective Norms ($R^2 = 0.335$), and Trust ($R^2 = 0.388$).

Table 6 R square result from the extended TAM endogenous variables

Endogenous variables	*R Square*
Attitude towards use (A)	0.545
Behavioural intention (BI)	0.60
Perceived ease of use (PEOU)	0.395
Perceived risk (PR)	0.031
Perceived usefulness (PU)	0.731
Subjective norms (SN)	0.335
Trust (TR)	0.388

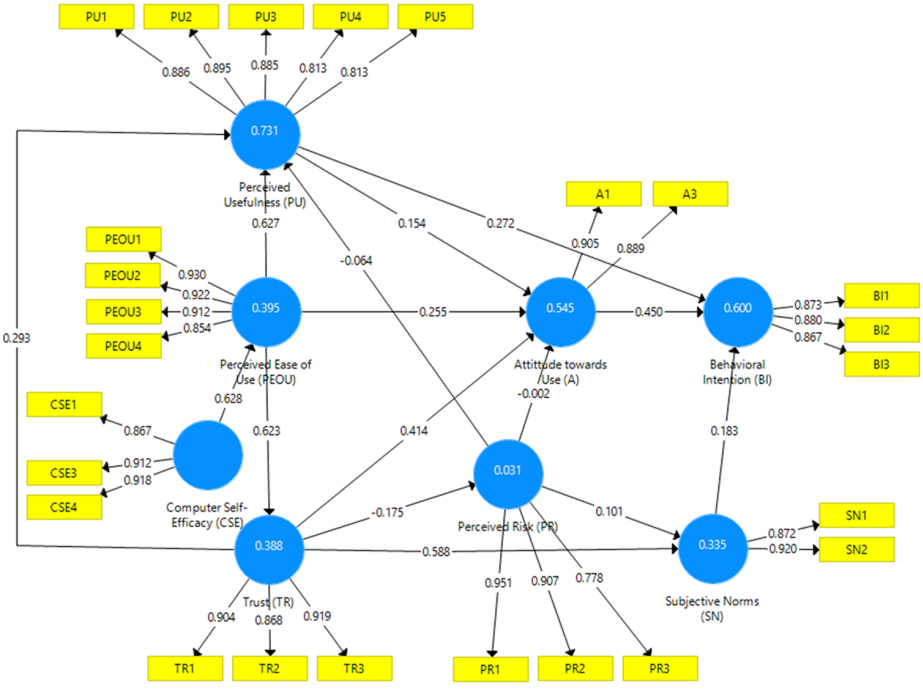
Following the assessment of R Square, the subsequent step involves evaluating the path coefficients and conducting significance tests to determine their statistical relevance. In the earlier stages of model development, hypotheses were formulated to represent relationships between latent variables, and these hypotheses will be tested in this step. Bootstrapping will be employed to assess the significance of path coefficients, with values typically ranging between -1 and +1. Positive values indicate a parallel relationship between variables, while negative values signify a perpendicular relationship. Significance testing is conducted through bootstrapping using the PLS Algorithm, with 5000 samples chosen as recommended by Hair et al. (2011) at a 0.05 significance level, corresponding to a critical value of 1.96. Values surpassing the critical value support the hypotheses. The summarised path coefficient and significance test results are presented in Table 7. Notably, three negative relationships are observed in the model, indicating perpendicular associations. For instance, higher Perceived Risk corresponds to lower Perceived Usefulness, reflecting a negative relationship. Conversely, 12 positive relationships are identified. Hypothesis testing using t-statistics reveals two values below the critical value, rejecting the current hypotheses and accepting the null hypothesis (H0). The hypotheses outlined in Chapter 3 directly state the alternative hypothesis (HA). When the t-statistic exceeds the critical value, as observed in 13 relationships, it indicates a significant relationship and supports the hypothesis.

The extended TAM model in this research is represented in Figure 4. The arrow pointing out from the latent variables to indicators are outer loading values. Since indicators CSE2, A2, and SN3 have outer loading values below the threshold, those indicators are exterminated. The arrow pointing between latent variables are path coefficient values. According to Sub-Chapter 5.2.3, all values indicate positive relationships, except for relationships between perceived risk (PR) and attitude towards use (A), perceived risk (PR) and perceived usefulness (PU), and trust (TR) and perceived risk (PR), which have negative relationships. The value inside the latent variables indicates the R^2 value.

Table 7 Path coefficient and significance test result (see online version for colours)

Relationships	*Path coefficient*	*T-Statistics*	*Decision*
Perceived ease of use (PEOU) and perceived usefulness (PU)	0.627	11.456	Supported
Perceived usefulness (PU) and behavioural intention (BI)	0.272	3.356	Supported
Perceived usefulness (PU) and attitude towards use (A)	0.154	**1.654**	Not supported
Perceived ease of use (PEOU) and attitude towards use (A)	0.255	3.742	Supported
Computer self-efficacy (CSE) and perceived ease of use (PEOU)	0.628	14.547	Supported
Perceived ease of use (PEOU) and trust (TR)	0.623	14.482	Supported
Trust (TR) and attitude towards use (A)	0.414	5.168	Supported
Trust (TR) and perceived risk (PR)	**–0.175**	2.824	Supported
Trust (TR) and perceived usefulness (PU)	0.293	5.142	Supported
Trust (TR) and subjective norms (SN)	0.588	15.73	Supported
Perceived risk (PR) and subjective norms (SN)	0.101	1.992	Supported
Perceived risk (PR) and attitude towards use (A)	**–0.002**	**0.051**	Not supported
Perceived risk (PR) and perceived usefulness (PU)	**–0.064**	2.237	Supported
Subjective norms (SN) and behavioural intention (BI)	0.183	3.733	Supported
Attitude towards use (A) and behavioural intention (BI)	0.45	5.902	Supported

Figure 4 Final model result of extended (see online version for colours)



6 Hypothesis discussion

Hypothesis obtained from this study will be elaborated upon further below. The detailed explanation of each hypothesis is presented below:

1 H1(+): Perceived ease of use has positive effect on perceived usefulness.

a H0: Perceived ease of use has no positive effect on perceived usefulness.

b H1: Perceived ease of use has positive effect on perceived usefulness.

The result shows that all models support the hypotheses given. The path coefficient between the two variables also indicates a positive value which means the correlation is positive. If the perceived ease of use is increased, perceived usefulness will improve simultaneously. For t-statistics, the model provided a value above the critical value of 1.96, the H0 is rejected. This aligns with several previous studies about the TAM in e-government (Xie et al., 2017; Dahi and Ezziane, 2015; Shyu and Huang, 2011). Since the relationship is significant, it is important to pay attention to this relationship for further improvement proposals. The COPACR must convince citizen that the new KLAMPID system is useful to improve customer satisfaction and performance feedback. COPACR can first focus on how using KLAMPID can reduce the application burden and improve user experience by providing easier ways to access services. Ways to improve this can be deliberated and decisions related to making KLAMPID easier for users should be prioritised.

2 H2(+): Perceived usefulness has positive effect on behavioural intention.

a H0: Perceived usefulness has no positive effect on behavioural intention.

b H1: Perceived usefulness has positive effect on behavioural intention.

The result for the second hypothesis shows that all models support this hypothesis with a positive correlation. This indicates that the perceived usefulness will positively affect behavioural intention. The more an individual perceives a technology to be useful, the higher the behavioural intention or desire to use it. This result aligns and supports previous studies (Dahi and Ezziane, 2015; Xie et al., 2017). However, it contradicts the study by Lin et al. (2011) and ELKheshin and Saleeb (2020). Nevertheless, this hypothesis is from the original construct of TAM and is supported in this study. Knowing this, COPACR can focus on how to improve the perception of citizens that KLAMPID is useful, to encourage Surabaya residents to use the KLAMPID platform.

3 H3(+): Perceived usefulness has positive effect on attitude towards use.

a H0: Perceived usefulness has no positive effect on attitude towards use.

b H1: Perceived usefulness has positive effect on attitude towards use.

For the path coefficient, all models prove that this relationship has a positive correlation. However, mixed results are obtained from the t-statistic test. For the overall model this hypothesis was not supported (the value of t-statistic is < 1.96 hence accepting the H0). This demonstrates that the variable attitude towards use does not mediate the relationship between PU and BI (since the PU and BI relationship is positively significant). The result from the overall model conflicts with the study from (ELKheshin and Saleeb, 2020) and (Shyu and Huang, 2011). However, the original TAM construct developed by Davis

(1989) states the need to exclude attitude from the variables and directly use Behavioural Intention.

4 H4(+): Perceived ease of use has positive effect on attitude towards use.

a H0: Perceived ease of use has no positive effect on attitude towards use.

b H1: Perceived ease of use has positive effect on attitude towards use.

The path coefficient result for this relationship indicates a positive correlation for all models. This means that the easier the technology is perceived to be, the more likely an individual will want to use the technology. The overall model show support for this hypothesis. As aforementioned, the three major complaints experienced by users are KLAMPID mechanisms, document validation, and registration issues. These concerns are mainly built on PEOU variables. It is proven in this relationship that PEOU positively impacts attitude towards use in all models.

5 H5(+): Computer self-efficacy will positively influence perceived ease of use.

a H0: Perceived usefulness has no positive effect on attitude towards use.

b H1: Perceived usefulness has positive effect on attitude towards use.

As the only pure exogenous variable, the result of path coefficient and t-statistics indicates that this relationship has a positive correlation and is supported by all models. It supports the studies from Xie in 2017 and Dahi in 2015. The more an individual can operate the technology, their perception of the ease of use of said technology will increase as well. This implies that people with a background understanding of technology and people with more self-confidence in using IT equipment will more likely perceive the e-government technology as easy to use.

6 H6(+): Perceived ease of use will positively influence user's trust.

a H0: Perceived ease of use has no positive effect on trust.

b H1: Perceived ease of use has positive effect on trust.

Based on the results, all models support this hypothesis with a positive correlation. The more an individual perceives an e-government technology to be easy to use, the more likely they trust it. This supports the study by Xie in 2017. For Surabaya residents to trust KLAMPID, COPACR should begin building that trust by developing a path for the KLAMPID to be more user-friendly and easier to use for citizens with different backgrounds.

7 H7(+): Trust has positive effect on attitude towards use.

a H0: Trust has no positive effect on attitude towards use.

b H1: Trust has positive effect on attitude towards use.

This hypothesis is supported by all models with a positive correlation. This indicates that the more an individual trusts e-government technology, the more likely they are to have a positive attitude towards using it. This concurs with the study by Dahi in 2015 about the correlation for the trust variable. This means developing citizen trust towards KLAMPID will increase their attitude on accepting it to access COPACR services.

8 H8(–): Trust will have a negative impact on perceived risk.

a H0: Trust has no negative effect on perceived risk.

b H1: Trust has negative effect on perceived risk.

For this hypothesis, all models show a negative result in the path coefficient, suggesting a negative correlation between these two variables. If the trust of an individual towards e-government technology decreases, their perceived risk will most likely increase. Xie et al. (2017) found this relationship to be significant in their study. Within the online respondent model, it was analysed that the perceived risk of an individual is not significantly influenced by how much trust in the system the individual has.

9 H9(+): Trust will have a positive impact on perceived usefulness.

a H0: Trust has no positive effect on perceived usefulness.

b H1: Trust has positive effect on perceived usefulness.

Based on the results in Chapters 5 and 6, all models come out with a positive relationship for these two variables. All the models also support this hypothesis which indicates a pronounced relationship between Trust and Perceived Usefulness. It supports the study by Xie et al. (2017). The more Surabaya residents develop trust in the KLAMPID platform and in extension COPACR, the more they will find it useful.

10 H10(+): Trust will have a positive impact on subjective norms.

a H0: Trust has no positive effect on subjective norms.

b H1: Trust has positive effect on subjective norms.

For this hypothesis, all models display a positive path coefficient result, and all models support the hypothesis, showing a significant relationship between these two variables. This means when an individual's trust in the KLAMPID platform and COPACR increases, the more likely an individual will be influenced to use KLAMPID.

11 H11(–): Perceived risk will negatively influence subjective norms.

a H0: Perceived usefulness has no positive effect on attitude towards use.

b H1: Perceived usefulness has positive effect on attitude towards use.

The path coefficient results negate the initial hypothesis relationship. Initially, the negative relationship was hypothesised to appear between the perceived risk and subjective norms variable. However, since the path coefficient result indicates a positive result, it means that the relationship between these two variables is positive, meaning that the initial relationship nature of this hypothesis needs to be revised. The result suggests that the more an individual perceives e-government technology to be risky, the more likely their environment will influence them to use the technology.

12 H12(–): Perceived risk will negatively influence attitude towards use.

a H0: Perceived usefulness has no positive effect on attitude towards use.

b H1: Perceived usefulness has positive effect on attitude towards use.

For this hypothesis, all models came out with similar results. Perceived risk negatively influences attitudes towards technology use and this relationship is substantial. This result expresses that the more an individual perceives e-government technology as risky, the less likely will they develop an attitude to adopt the technology. This result supports the study by Xie et al. (2017).

13 H13(–): Perceived risk will negatively influence perceived usefulness.

a H0: Perceived risk has no positive effect on perceived usefulness.

b H1: Perceived risk has a positive effect on perceived usefulness.

All models show the same result in terms of path coefficient for this hypothesis. Perceived risk correlates negatively with perceived usefulness. When an individual perceives the technology to be risky, their view on the usefulness of said technology will decrease. In the overall model, this hypothesis was supported which means the perceived risk significantly affects perceived usefulness. It corresponds with the study by Xie, et al in 2017.

14 H14(+): Subjective norms has positive effect on behavioural intention.

a H0: Perceived usefulness has no positive effect on attitude towards use.

b H1: Perceived usefulness has positive effect on attitude towards use.

Based on the result, all models show that the relationship between subjective norms and behavioural intention correlates positively. This indicates the higher the subjective norms of an individual, the higher the behavioural intention as well. This hypothesis is proven significant in the overall model.

15 H15(+): Attitude has positive effect on behavioural intention.

a H0: Perceived usefulness has no positive effect on attitude towards use.

b H1: Perceived usefulness has positive effect on attitude towards use.

The final hypothesis is an attitude towards use will positively affect behavioural intention. Based on the results, all models show that attitude towards use positively impacts behavioural intention. An individual will be more inclined to use a technology when they have a more positive attitude towards its use case. All models display a significant relationship between the two variables.

7 Conclusions

User acceptance in this research is measured by developing an Extended TAM to evaluate e-government acceptance amongst the community. There are 8 variables involved in this study. Four original TAM variables namely behavioural intention (BI), attitude towards use (A), perceived usefulness (PU), PEOU, and four extended variables namely trust (TR), CSE, subjective norms (SN), and perceived risk (PR). These extension variables are accommodated based on e-government literature. As many as 15 hypotheses

were tested and two of them were rejected for the overall model. There were three negative path coefficients found in this study namely TR-PR, PR-A, and PR-PU while the rest had positive correlations.

According to the result of R Square, it can be derived that the variables that drive Surabaya residents to use the KLAMPID platform (behavioural intention) are reflected by 60% of variables observed in this study, which are PU, PEOU, TR, PR, SN, and CSE. Knowing this insight, it can be used as a reference model in other studies to evaluate user acceptance of e-government adoption. The COPACR of Surabaya can also evaluate their KLAMPID system by focusing on variables observed in this study, either by focusing on the KLAMPID's usefulness (PU), easiness (PEOU), building people trust on KLAMPID (TR), increasing security to reduce risk when using KLAMPID (PR), building public's interest (SN), or improving citizen proficiency in using today-age technology (CSE). These variables are also very much observed in other developing nations and their citizen's acceptance of the digitisation of government services. This experience positions Surabaya as a valuable example for other developing nations seeking to leverage e-government systems to enhance administrative processes and better serve their growing populations.

To conclude, even though his study is limited in terms of the scope of implementation, the research project and the analysed hypothesis can be carried out for other developing country municipalities with some adjustments to accommodate the context experienced by other agencies. Therefore, additional research should be conducted to extend this work to other regions and municipalities to identify e-governance acceptance and adoption in other municipalities as a precursor to developing an action plan for improving e-government performance and utilisation.

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Appendix: Survey

Segment 1: Introduction		
Segment 2: Demography questions		*Answer choices*
1	Age	Open ended questions
2	Gender	Male
		Female
3	Current occupation	Private employees
		Government employees
		Doctor
		Indonesia National Army (TNI)
		Entrepreneur
		Students
		Others
4	Education background	SD (Elementary school graduate)
		SMP (Middle school graduate)
		SMA (High school graduate)
		Diploma
		S1 (Bachelor's degree)
		S2 (Master's degree)
		S3 (Doctoral degree)
5	Sub-districts origin	31 Sub-Districts in Surabaya (Drop down selection)
6	Gadget ownership	*Checklist answer:*
		Smartphone
		Laptop
		Personal Computer (PC)
		Tablet
		Others (open ended questions)
7	Have you known KLAMPID?	Yes
		No
8	Have you ever used KLAMPID?	Yes
		No

Segment 3: KLAMPID Portal Website		*Answer Choices*
1	KLAMPID Socialization	–
2	I do not use KLAMPID because I do not need it.	1 (Strongly disagree) – 5 (Strongly agree)
3	I do not use KLAMPID because I am afraid my personal data will be lost and misused.	1 (Strongly disagree) – 5 (Strongly agree)
4	I do not use KLAMPID because It is difficult to use	1 (Strongly disagree) – 5 (Strongly agree)
5	I do not use KLAMPID because I do not have proper gadget	1 (Strongly disagree) – 5 (Strongly agree)
6	I do not use KLAMIPD because the procedure is complex	1 (Strongly disagree) – 5 (Strongly agree)
7	According to socialization above, how much do you understand about KLAMPID?	1 (Strongly not understand) – 5 (Strongly agree)
8	Are you interested in using KLAMPID in the future?	Yes No
Segment 4: Perceived usefulness and perceived ease of use		*Answer choices*
1	How many times have you used KLAMPID previously?	1 time 2–3 times 3–5 times >5 times
2	What kind of services did you access in KLAMPID previously?	*Checklist answer:* ID card re-printing Family card data update Birth certificate Death certificate Marriage certificate Electronic legalisation Transfer letter Others (open ended questions)
3	Learning to use KLAMPID is easy for me	1 (Strongly disagree) – 5 (Strongly agree)
4	Easy for me to become accustomed to using KLAMPID application	1 (Strongly disagree) – 5 (Strongly agree)
5	KLAMPID application is easily understandable and unambiguous	1 (Strongly disagree) – 5 (Strongly agree)
6	Flow and procedures for filing in the KLAMPID application easily understood.	1 (Strongly disagree) – 5 (Strongly agree)
7	Using KLAMPID applications increase my productivity and effectiveness	1 (Strongly disagree) – 5 (Strongly agree)

8	KLAMPID application ease me in accessing the services of COPACR	1 (Strongly disagree) – 5 (Strongly agree)
9	KLAMPID application allows me to get the services of COPACR quickly	1 (Strongly disagree) – 5 (Strongly agree)
10	I get enough information for a service that I want to access in KLAMPID application	1 (Strongly disagree) – 5 (Strongly agree)
11	Application process data KLAMPID applicant filed with accurate (minimal errors, typos, etc.)	1 (Strongly disagree) – 5 (Strongly agree)
Segment 5: Computer self-efficacy and attitude towards use		*Answer choices*
1	I am confident in my ability to operate a computer / gadget.	1 (Strongly disagree) – 5 (Strongly agree)
2	I usually find it easy to learn how to use a new information technology	1 (Strongly disagree) – 5 (Strongly agree)
3	I am confident in using KLAMPID even though there is nobody to guide me	1 (Strongly disagree) – 5 (Strongly agree)
4	I feel confident using the new application that I had never tried before	1 (Strongly disagree) – 5 (Strongly agree)
5	I support COPACR digitizing service through online media (via KLAMPID application	1 (Strongly disagree) – 5 (Strongly agree)
6	Using the KLAMPID application (digitizing service) is a bad idea	1 (Strongly disagree) – 5 (Strongly agree)
7	Using KLAMPID application will be a pleasant experience for me	1 (Strongly disagree) – 5 (Strongly agree)
Segment 6: Trust, perceived risk, subjective norms, and behavioural intention		*Answer choices*
1	KLAMPID application from COPACR is trustworthy	1 (Strongly disagree) – 5 (Strongly agree)
2	I believe the documents and the data I entered on KLAMPID Applications will not be misused.	1 (Strongly disagree) – 5 (Strongly agree)
3	I believe that COPACR with its reliable KLAMPID Applications	1 (Strongly disagree) – 5 (Strongly agree)
4	Using the KLAMPID application a risky choice	1 (Strongly disagree) – 5 (Strongly agree)
5	Providing personal information to the KLAMPID application a risky action	1 (Strongly disagree) – 5 (Strongly agree)
6	In general, access to public services through online platform is risky actions	1 (Strongly disagree) – 5 (Strongly agree)
7	People who are close to me would think that I would use KLAMPID	1 (Strongly disagree) – 5 (Strongly agree)
8	People who are important to me would advise me to use KLAMPID	1 (Strongly disagree) – 5 (Strongly agree)
9	I would use KLAMPID if my friends and colleagues used them	1 (Strongly disagree) – 5 (Strongly agree)

10	I would use KLAMPID application in the near future	1 (Strongly disagree) – 5 (Strongly agree)
11	I would prefer to access the KLAMPID application Surabaya COPACR services than the other way	1 (Strongly disagree) – 5 (Strongly agree)
12	It is likely that I will reuse KLAMPID	1 (Strongly disagree) – 5 (Strongly agree)
Segment 7: Critics and suggestions for KLAMPID COPACR		*Answer choices*
Any critiques and suggestion for KLAMPID or for COPACR?		Open-ended question