ATLANTIS PRESS
Advances in Intelligent Systems Research (AISR), volume 157
Mathematics, Informatics, Science, and Education International Conference (MISEIC 2018)

Analysis of Factors Affecting The Acceptance of Surabaya E-Government Service Using Technology Acceptance Model (TAM) 3: A Case Study of E-Lampid

Rendris Dirgantara Putra
Technology Management Master Program, Sepuluh November Institute of Technology, Indonesia
rendris.dp@gmail.com

Febriliyan Samopa
Information Systems, Sepuluh November Institute of Technology, Indonesia
iyan@is.its.ac.id

***Abstract*— E-lampid is an application which focuses on population service in terms of e-Government. The service of E-lampid was created by the Surabaya government aiming to minimize the length of queue of the people coming to the Department of Population and Civil Registration. However, the application has not been optimally used. The framework of Technology Acceptance Model 3 (TAM 3) was implemented to explore the factors which affect the E-lampid service. The data were analysed using Structured Equation Modeling (SEM) method with the assistance of SPSS AMOS 24 program. The initial analysis revealed the 8 affecting factors. Furthermore, Analytical Hierarchy Process (AHP) was conducted to weigh each factor and it obtained some results as follows: computer self efficacy (36%), job relevance (15.8%), perceptions of external control (15.8%), computer anxiety (13%), object usability (12%), perceived enjoyment (9%), subjective norm (5.5%), and image (5.2%).**

Keywords*— E-Government, E-Lampid, Technology Acceptance Model 3 (TAM 3), SEM, AMOS.

I. INTRODUCTION

The Department of Communication and Information in Surabaya constitutes a Regional Work Unit (SKPD) is engaged in the sector of information technology. In accordance with the Regulation of the Surabaya Mayor No. 61 of 2016, the Department of Communication and Information Technology implements the government affairs within the field of communication and information technology, statistics, and coding. At this present time, numerous public services provided by the local government have made use of the information technology, one of which is E-lampid that focuses on population service.

E-government developed by the local government aims at providing convenience for the local community. Such IT service is an official government site of specific address that provides direct service without having to pay any visit to the relevant department and it is accessible whenever and wherever the user is. With the development of such service, the local community feels easier to carry out the government-related activities due to its availability and its various features, such as registration, uploading required files, monitoring files, information on service procedure, etc. The site can be accessed directly by the entire local community at ssw.surabaya.go.id/anjungan.

The objectives of E-government are considered to be met if the local community accepts the program. Th government of Surabaya has maximized the use of e-government through various means, such as advertising in the electronic media, organizing Pertura, and developing e-kios.

The large amount of funding does not lead to the maximum result from the local community in making use of e-government. It is considered to be essential for the local government, especially the Department of Communication and Information to identify the factors which trigger the local community to appreciate and make use of E-government in order to come up with a strategic plan to later improve its service quality.

Several models are developed by previous researchers to measure the acceptance of information system by users, one of which is the Technology Acceptance Model (TAM) 3 model designed specifically for computer innovation by the addition of exogenous variables to the endogenous variables of Perceived Ease of Use and Perceived Usefulness as shown Figure 1.

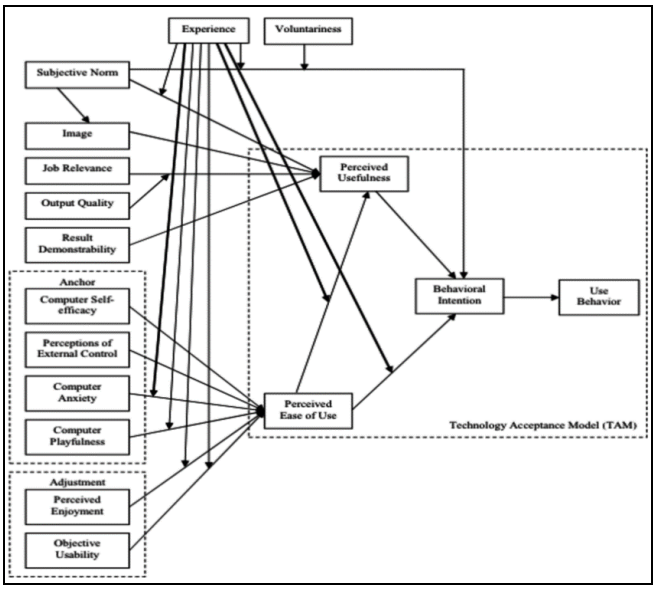

Figure 1: Technology Acceptance Model (TAM) 3

II. METHOD

This study was designed using quantitative approach. Questionnaire as a means of data collection was developed by the researcher to test and identify the hypotheses. Purposive sampling or judgmental sampling method is a sampling method which selects the subject based on specific criteria; in this study. The subjects were Surabaya residents who have used the e-lampid service. The statements listed on the questionnaire were made and modified based on the study of Vankatesh. The Likert scale contained in the questionnaire were (1) Strongly Disagree, (2) Disagree, (3) Neutral, (4) Agree, and (5) Strongly Agree.

Two data collection were conducted in this study. The first one constituted the initial sample for the validity and reliability test of 60 respondents and the second one of 565 respondents. In total, the number of the respondents was 625 respondents. The study procedure began with problem identification which was continued by problem formulation, objective determination, limitation formulation, literature review, data collection, validity test, reliability test, and SEM method analysis.

From the result of Technology Acceptance Model (TAM) alongside related previous studies, these following hypotheses were proposed:

H0 : Behavioural Intention (BI) does not affect Use Behaviour (UB) or Behavioral Intention (BI) has no influence on Use Behavior (UB)
H1 : Perceived Usefulness (PU) affects Behavioural Intention (BI)
H2 : Subjective Norm (SN) affects Behavioural Intention (BI), moderated by Experience (EXP) and Voluntariness (VOL)
H3 : Subjective Norm (SN) affects Perceived Usefulness (PU), moderated by Experience (EXP)
H4 : Perceived Ease of Use (PEOU) affects Perceived Usefulness (PU)
H5 : Subjective Norm (SN) affects Image (IMG)
H6 : Perceived Ease of Use (PEOU) affects Behavioural Intention (BI)
H7 : Image (IMG) affects Perceived Usefulness (PU)
H8 : Job Relevance (REL) affects Perceived Usefulness (PU), moderated by Output Quality (OUT)
H9 : Result Demonstrability (RES) affects Perceived Usefulness (PU)
H10 : Computer Self Efficacy (CSE) affects Perceived Ease of Use (PEOU)
H11 : Percetions of External Control (PEC) affects Perceived Ease of Use (PEOU)
H12 : Computer Anciety (CANX) affects Perceived Ease of Use (PEOU), moderated by Experience (EXP)
H13 : Computer Playfulness (CP) affects Perceived Ease of Use (PEOU), moderated by Experience (EXP)
H14 : Perceived Enjoyment (PE) affects Perceived Ease of Use (PEOU), moderated by Experience (EXP)
H15 : Objective Usability (OU) affects Perceived Ease of Use (PEOU), moderated by Experience (EXP)

Based on the proposed hypotheses, the next procedure was to create a model using SPSS AMOS 24 in order to easily understand and identify the correlation between the endogenous and exogenous variables alongside the indicator variables as in Figure 3.

III. RESULT

The collected data of the questionnaire were tested in terms of their validity and reliability. The tested data were further proceeded for SEM analysis by selecting the calculate estimate menu available in SPSS AMOS 24 with the previously created model. The result of calculate estimate is presented in Figure 3 showing the correlation among the variables.

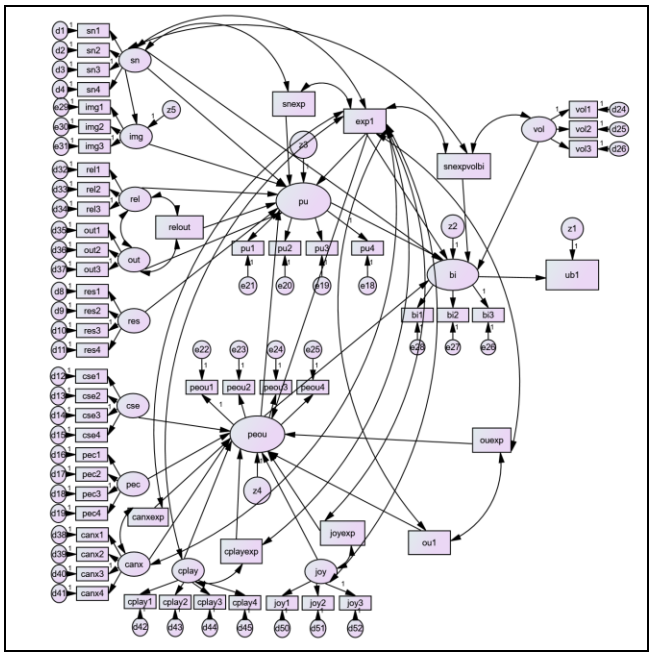

Figure 2: Full Model of SEM Analysis

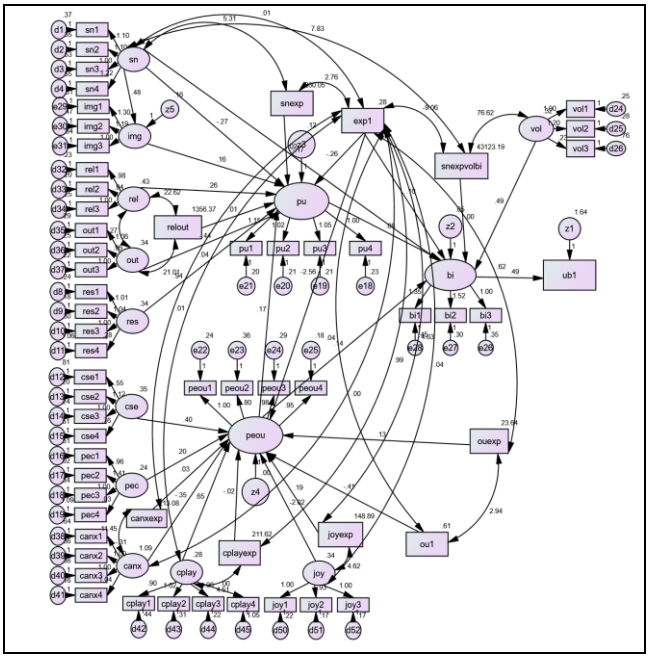

Figure 3: SEM Analysis Result

A. Factor Analysis

Further analysis to identify the factors affecting the acceptance of electronic-based population service E-lampid was conducted by analyzing the relationship of each variable in Table 1. This factor analysis was performed by referring to the predetermined hypotheses of 16 hypotheses.

TABLE I. HYPOTHESIS TESTING

Hypothesis		Estimate	C.R	P	Result
H0	BI does not affect UB	0.490	3.192	.001	Rejected
H1	PU ➔ BI	0.075	2.017	0.044	Accepted
H2	SN ➔ BI x EXP x VOL	0.000	-0.129	0.897	Rejected
H3	SN ➔PU x EXP	0.019	3.043	0.002	Accepted
H4	PEOU ➔ PU	0.170	2.582	0.010	Accepted
H5	SN ➔ IMG	0.484	7.161	0.000	Accepted
H6	PEOU ➔ BI	0.145	2.926	0.003	Accepted
H7	IMG ➔ PU	0.161	2.444	0.015	Accepted
H8	REL ➔ PU x OUT	0.010	4.613	0.000	Accepted
H9	RES ➔ PU	0.043	0.794	0.427	Rejected
H10	CSE ➔ PEOU	0.400	7.614	0.000	Accepted
H11	PEC ➔ PEOU	0.198	4.094	0.000	Accepted
H12	CANX ➔ PEOU x EXP	0.035	3.258	0.001	Accepted
H13	CPLAY ➔PEOU x EXP	-0.016	-1.812	.070	Rejected
H14	JOY ➔PEOU x EXP	0.187	4.201	0.000	Accepted
H15	OU ➔ PEOU x EXP	0.130	2.816	0.005	Accepted

Upon the completion of factor analysis, it can be seen that out of the 16 proposed hypotheses, 12 hypotheses were accepted and 4 hypotheses were rejected. The accepted hypothesis was a variable which affects other variables; otherwise, the rejected hypothesis was a variable which does not affect other variables, except for H0. In other words, there were 13 variables which affect other variables, while the other 3 variables do not affect other variables.

B. Factor of Priority

Factor priority aims at determining which factor should undertake an improvement immediately. This procedure was needed to obtain the weight of each criterion by employing Analytical Hierarchy Process (AHP). The weighting process was conducted by providing the level of importance on each criterion. There are 8 criteria of the exogenous variables which directly affect perceived usefulness and perceived ease of use. The weighting procedure was performed by the Head of Information Technology in the Department of Communication and Information in Surabaya who is in charge of the e-government service.

The weighting result of each criterion based on its importance level is shown in Table 2 below. Moreover, the

results of CI (Consistency Index) and CR (Consistency Ratio) testing are presented in Table 3.

TABLE II. CRITERIA WEIGHTING

Criteria	SN	IMG	REL	CSE	PEC	CANX	JOY	OU
SN	1.00	2.00	0.33	0.20	0.33	0.50	0.33	0.33
IMG	0.50	1.00	0.33	0.20	0.33	0.33	1.00	0.50
REL	3.00	3.00	1.00	0.20	2.00	2.00	1.00	2.00
CSE	5.00	5.00	5.00	1.00	5.00	2.00	3.00	3.00
PEC	3.00	3.00	0.50	0.20	1.00	3.00	2.00	1.00
CANX	2.00	3.00	0.50	0.50	0.33	1.00	2.00	2.00
JOY	3.00	1.00	1.00	0.33	0.50	0.50	1.00	0.50
OU	3.00	2.00	0.50	0.33	1.00	0.50	2.00	1.00
Total	**17.50**	**18.00**	**8.67**	**2.63**	**9.50**	**9.33**	**10.33**	**9.33**

TABLE III. CONSISTENCY TESTING

Lambda Max	CI	CR	Consistency	Percentage
8.92167	0.13167	0.0933807	Consistent	9.3%

Based on the weighting process using the AHP method, the priority of each factor was obtained. It is presented in the table below.

TABLE IV. PRIORITY FACTORS

Factor	Weight
Computer Self Efficacy	36%
Job Relevance	15.8%
Perceptions of External Control	15.0%
Computer Anxiety	13%
Object Usability	12%
Perceived Enjoyment	9%
Subjective Norm	5.5%
Image	5.2%

IV. CONCLUSION AND SUGGESTION

A. Conclusion

Based on the aforementioned analysis result, the following conclusions were drawn:

1. The Surabaya residents sufficiently accept the electronic-based population service e-lampid, with the estimated value of 0.490.
2. The factors which affect the acceptance of e-lampid based on the proposed model were: subjective norm, image, job relevance, computer self-efficacy, perceptions of external control, computer anxiety, perceived enjoyment, and object usability.
3. Based on the calculation using the Analytical Hierarchy Process (AHP) method, the following priority of each factor was obtained: computer self efficacy (36%), job relevance (15.8%), perceptions of external control (15.8%), computer anxiety (13%), object usability (12%), perceived enjoyment (9%), subjective norm (5.5%), image (5.2%).

B. Suggestion

Based on the above conclusions, the proposed suggestions regarding this study are given as follows.

1. Based on the identified factors regarding e-lampid, it is expected that the Surabaya government, especially the Department of Communication and Information continuously improves the use of e-lampid based on the priority. Thus, e-lampid can be accessed easily by the local people of Surabaya which will further increase its usage.
2. More variables which previously not included in the TAM 3 model, such as training or educational background can be considered to be added in further study.

ACKNOWLEDGEMENT

The researcher would like to express her gratitude towards Dr.Eng. Febriliyan Samopa, S. Kom, M. Kom as the advisor, and college friends who always give support as well as the Institute of Technology Sepuluh Nopember for the chance to study in this post-graduate program.

REFERENCES

[1] D. J. Andrew, David Andrew Jeffrey, Testing The Technology Acceptance Model 3 (TAM 3) With The Inclusion Of Change Fatigue And Overload, In The Context Of Faculty From Seventh-Day Adventist Universities : A Revised Model, 2015.

[2] A. Bachtiar and D. O. Siahaan, Analisis Faktor-Faktor Yang Mempengaruhi Tingkat Penerimaan Aplikasi E-Learning Di Universitas Xyz Menggunakan Tecnology Acceptance Model (Tam), Prosiding Seminar Nasional Manajemen Teknologi XXII, 2015.

[3] M. Chuttur, Overview Of The Technology Acceptance Model: Origins, Developments And Future Directions, USA: Indiana University, USA, 2009.

[4] D. A. Jeffrey, Testing The Technology Acceptance Model 3 (TAM 3) With The Inclusion Of Change Fatigue And Overload, In The Context Of Faculty From Seventh-Day Adventist Universities: A Revised Model. Andrews University, 2015.

[5] J. Sarwono, Pengertian Dasar Structural Equation Modeling (SEM), Jakarta: CV. Mekar Jaya, 2015.

[6] V. Venkatesh and H. Bala, "Technology Acceptance Model 3 And A Research Agenda On Interventions", A Journals of The Decision Sciences Institute, 2008.

[7] M. Waluyo, Mudah Cepat Tepat Penggunaan Tools Amos Dalam Aplikasi (SEM), Surabaya: UPN Veteran Jatim, 2006.

[8] W. Widhiarso, Contoh Analisis Melalui AMOS – Ketika Mediator & Moderator Dalam Satu Model, 2011.