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Investigating Acceptance of Electronics Medical Record: Applying TAM Model

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Abstract. Electronic medical records are used to increase interoperability, efficiency and flexibility in medical record services. There are many obstacles in implementing electronic medical records at Clinic 'X' Sukoharjo, but this does not prevent health workers from using them. Investigation of users of electronic medical records needs to be carried out to determine the perceptions of health workers. TAM is a model that we use to determine user acceptance of technology. The TAM variables used are Perceived ease of use (PEU), Perceived Usefulness (PU), Attitude towards Using (IU), and Actual Usage (AU). The sample we used was 30 health workers. Our data was collected and calculated using PLS-SEM with the SmartPLS 4 application. The results of this research show that health workers feel helped by the existence of electronic medical records. The ease of using technology helps health workers in their work. So electronic medical records are considered useful for health workers. This usefulness encourages health workers' behavioral interest in using electronic medical records to improve their performance.
Keywords: Electronic Medical Record, TAM, PLS-SEM, SMARTPLS4

I. BACKGROUND

Science and technology are developing rapidly. The world of health cannot be separated from developments in science and technology [1, 2]. One of them is applied to the patient service data documentation system (electronic medical records) [2]. Electronic medical records are used to increase interoperability, efficiency and flexibility in medical record services [3]. The implementation of electronic medical records in Indonesia is regulated by law [4]. Many other countries have already implemented electronic medical records [3]. By December 31, 2023, Indonesia is required to switch from manual medical records to electronic medical records [3, 4].

Clinic 'X' in Sukoharjo has been using electronic medical records since 2021. The clinic conducted a trial for two months (January – February 2021) and implemented electronic medical records for real in March 2021. Clinic 'X' opened 3 polyclinics, but only 1 polyclinic that uses electronic medical records. The use of electronic medical records at Clinic 'X' has several obstacles. Obstacles arise when officers input new and old patient medical records. When officers want to delete patient data registered at the polyclinic, the patient gets a new medical record number. Apart from that, drug officers often make mistakes in inputting drug data and have to coordinate with the IT unit. The obstacles do not make health workers switch back to conventional medical records[5]. Therefore, evaluation needs to be carried out to determine user acceptance of technology.

Many studies have examined user perceptions of technology using TAM [6-9]. TAM is a model used to determine user acceptance of technology [6, 10]. TAM can show an evaluation of use in terms of ease (Perceived ease of use), usefulness (perceived usefulness), behavior in use (Attitude toward Using), and the user's actual use of the electronic medical record system (Actual Usage) [10, 11, 12].

II.METHOD

The system development method uses a waterfall model. These data were collected from infectious disease prevention and control officers at the Sleman District Health Service and tuberculosis reporting programmer officers at community health centers. Data on rainfall, humidity, altitude, temperature, area, population and population density were obtained from the Central Statistics Agency of Sleman Regency.

a. Sample

The sample we used was 30 respondents. Respondents are health workers at Clinic X Sukoharjo.

b. Data gathering tool

Data collection uses the TAM questionnaire. We created a questionnaire with 25 statements. The reliability of the questionnaire obtained a value of 0.981. We will use the scores from the questionnaire items that have been distributed to respondents to calculate PLS-SEM. PLS-SEM calculations using the Smart-PLS4 application.

c. Variables

In this research, there are 4 latent variables. These latent variables are: perceived ease of use (PEU), perceived usefulness (PU), Attitude toward Using (IU), and Actual Usage (AU). PEU variable has 6 manifest variables. PU has 9 manifest variables. IU and AU have 5 manifest variables.

d. Study hypotheses

Fig. 1 shows the TAM variables relationships [12,13]. Based on Fig. 1 several hypotheses can be outlined. H1: there is a positive and significant relationship between perceived ease of use and perceived usefulness [12]. H2: there is a positive and significant relationship between perceived usefulness and usage behavior [13]. H3: there is a positive and significant relationship between perceived ease of use and usage behavior [12]. H4: there is a positive and significant relationship between user behavior and Actual Usage [12-13].

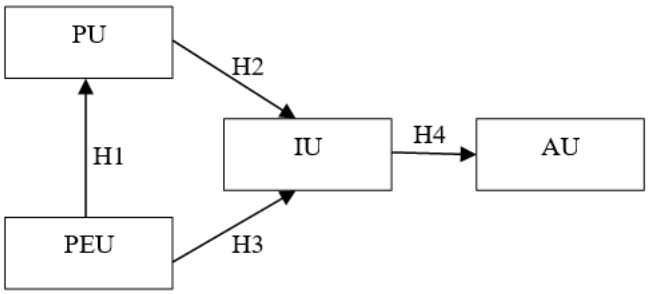

Figure 1. TAM Research Concept

e. Data analysis

We used a 5-Likert scale for the items in the questionnaire. Then start calculating values to find the resulting Outer Model and Inner Model. Loading Factor, Reliability, and AVE values can represent the Outer Model values. After that we can look at the FIT Model (SRMR), P Value, and Path Coefficient, for the Inner Model value. The final result of this research is hypothesis testing.

III. RESULTS AND DISCUSSION

A. OUTER LOADING

a. Reliability

The reliability values obtained can be seen in table 1. Reliability uses Cronbach's Alpha analysis. A reliability value of more than 0.70 has good and consistent reliability. Table 1 shows that the variables PEU, PU, IU, and AU have good reliability.

Table 1. Reliability and AVE

Variables	Cronbach's Alpha	AVE
PEU	0.955	0.819
PU	0.951	0.722
IU	0.937	0.801
AU	0.903	0.718

b. AVE

The AVE value can be seen in table 1. Table 1 shows that all variables are valid because they have an AVE value of more than 0.50.

c. Loading Factor

The requirement for a loading factor value is a value above 0.7. Table 2 shows the loading factor value for each manifest variable for each latent variable. The values obtained by the manifest variables all get a value of more than 0.70, so the

conditions are met.

Table 2. Loading Factor

Latent Variable	Manifest Variable	Value
PEU	PEU1	0.939
	PEU2	0.932
	PEU3	0.941
	PEU4	0.867
	PEU5	0.766
	PEU6	0.970
PU	PU1	0.928
	PU2	0.786
	PU3	0.805
	PU4	0.845
	PU5	0.891
	PU6	0.914
	PU7	0.831
	PU8	0.875
	PU9	0.759
IU	IU1	0.878
	IU2	0.822
	IU3	0.931
	IU4	0.908
	IU5	0.931
AI	A1	0.806
	A2	0.809
	A3	0.917
	A4	0.840
	A5	0.858

B. INNER LOADING

a. Model Fit

The fit model requires an SRMR value of less than 0.10. The SRMR value obtained in PLS-SEM is 0.99 so it has a model that fits the data.

b. P-Value

The p-value obtained can be seen in Table 3. From Table 3 it can be concluded that the PEU to PU value is significant. The PU to IU variable also gets a significant value. Significant values also occur in the IU to AU variable. However, the PEU to IU variable did not get a significant value. The condition for a significant p-value is less than 0.05.

Table 3. p-Value and Path Coefficients

Variable	p-Value	Path Coeff	Direction	Result
PEU -> PU	0.000	0.640	Positive	Significant
PU -> IU	0.000	0.869	Positive	Significant
PEU -> IU	0.862	-0.020	Negative	-
IU -> AU	0.003	0.600	Positive	Significant

c. Path Coefficient

Table 3 shows the path coefficient values and their directions. The path coefficient value is closer to 1, the better and has a positive value. From Table 3 it can be concluded that the relationship between latent variables has a positive value and only the PEU to IU variable is negative.

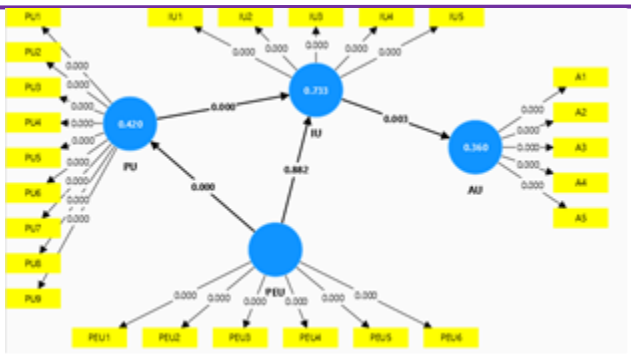

Figure 2. TAM Boostraping

C. THE RELATIONSHIP OF PERCEIVED EASE OF USE WITH PERCEIVED USEFULNESS

Fig. 2 shows the relationship between the PEU variable and the PU variable. Based on the values obtained in Table 4, the value is close to 1 and the direction is positive. This shows that there is a relationship between perceived ease of use and perceived usefulness. Perception of ease in using technology influences perception of technology usefulness [14]. Health workers feel that using electronic medical record technology can make their work easier. It is felt that electronic medical records can help health workers in carrying out their work. So that electronic medical record technology has benefits for its users [12]. Hypothesis H1 can be accepted. Perceived ease of use shows the belief that technology can be used easily without expending high effort [14,15].

D. THE RELATIONSHIP OF PERCEIVED USEFULNESS WITH ATTITUDE TOWARD USING

Perceived usefulness shows the belief that the technology used can be useful and improve the performance of health workers. Perceived usefulness with an attitude toward using gets a significant value [17]. H2 is acceptable. Users' perceptions that electronic medical records are useful influence the behavioral intentions of health workers. So that health workers are interested and interested in using electronic medical records.

E. THE RELATIONSHIP OF PERCEIVED EASE OF USE WITH ATTITUDE TOWARD USING

The relationship between the PEU and IU variables can be seen in Fig. 2. The p-value obtained for the relationship between the two variables exceeds 0.05 in Table 4 and means that H3 is rejected. Perceived ease of use does not have a significant relationship with attitude toward using. So it can be understood that the perception of ease does not influence user behavior in using technology. The ease of using electronic medical record technology does not motivate health workers' interest in using this technology.

F. THE RELATIONSHIP OF ATTITUDE TOWARD USING WITH ACTUAL USAGE

Fig. 2 shows that there is a positive and significant relationship between Attitude toward using and actual usage [16, 17]. This shows that user behavioral interests influence users in using technology. Hypothesis H4 can be accepted. Behavioral interests of health workers that encourage the use of electronic medical records.

IV.CONCLUSIONS AND SUGGESTIONS

User perceptions of new technology can be determined using the TAM model. This research found that health workers' perception of new technology is that it is easy to use. The ease of using new electronic medical record technology makes the work of health workers more efficient. Health workers feel helped by the existence of electronic medical records. So electronic medical record technology is useful for health workers. This usefulness is what drives interest in the behavior of health workers. The emerging behavioral interest makes health workers use electronic medical records to improve their performance.

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