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Analysis Of Application Of The UTAUT Model On Behavior Of Use Of Electronic Medical Records In RSUD Prof Dr Margono Soekarjo Purwokerto

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ABSTRACT

Medical records are an important tool for documenting patients' progress. The use ofelectronic medical records is an effort to effectively manage patient condition data,support diagnosis and therapy decisions and improve patient safety. Prof. Dr.Margono Soekarjo Purwokerto General Hospitalis a hospital that has implemented an electronic medical record system. One of the models that can assess the acceptance of an electronic system is*Unified Theory of Acceptance and Use of Technology* (UTAUT). UTAUT combines thesuccessful features of eight theories of technology acceptance. UTAUT consists of 4constructs, namelyperformance expectancy (PE) effort expectancy (EE) social influence (SE)and facilitating conditions(FC). This study aims to determine the behavior of doctors' use ofthe application of electronic medical records as a supporter of patient developmentdocumentation at Margono Soekarjo General Hospital, Purwokerto.

This research is aquantitativeresearchwith a cross sectional research design. Technique sampling used is randomsampling with the slovin formula obtained 49 respondents. Data collection by using aquestionnaire. Data analysis in this study used the SEM-PLS analysis technique. The resultsof this study prove that all UTAUT variables affect usage behavior with an R2 PE value of22.68%; EE 45.61%; SI 7.03%; and FC23.3%, with a total R2 value of 88.61%. The GoF value is 0.5777, so it can be concluded that theconstruct in the UTAUT model has an influence of 88.61% on the behavior of using electronicmedical records in Prof. Dr. Margono Soekarjo General Hospital, Purwokerto.

Keywords: Electronic Medical Record, UTAUT, Performance Expectancy (PE), Effort Expectancy(EE), Social Influence (SI) and Facilitating Condition (FC), Usage Behavior (UB)

1. Introduction

Information and communication technology is currently developing rapidly. This technological development also occurs in the health sector, including SIM-RS (Putra, 2017). This system is set up to handle the entire General Hospital management process starting from diagnostic services, actions

for patients, medical reportpharmacies, pharmacy warehouses, administration to management control (Afiana, 2019). One part of the SIM-RS is an electronic medical record. Electronic medical records (EMR) are useful for electronic documentation, drug prescribing, medical test requests, health care reminder management, and more. The use of electronic medical records can significantly reduce the workload of doctors and medical errors (Aldrich, 2010). EMR keep abreast of developments of needs and technology for the hospital, for it is an example of a well-adapted hospital. At Prof. Dr. Margono Soekarjo General Hospital, Purwokerto, all doctors have been required to use electronic medical records since 2015. The inpatient installation of Prof. Dr. Margono General Hospital has implemented EMR with an Integrated Patient Progress Record (IPPR) so that doctors do not need to manually write down the progress of inpatients every day.

RME has the potential to increase hospital efficiency and effectiveness and support integrated patient care (Scott 2007). There are several organizations that fail in implementing RME. Many systems development projects have failed to produce useful systems (Davis, 1989). If adopting applications and advanced technology is focused on features that are more difficult for users (Holden, 2010). As a result, low usage rates, resistance, abandonment of the use of RME and demand for alternative methods (Kim *et al*, 2016). Based on research by Hatton (2012), the adoption of electronic medical records currently only reaches an average of 50%, which means that RME is not optimally utilized for its functions and features to manage services and is used only for hospital administrative and financial needs.

The decision to use information systems is in the hands of management, but the successful use of an information system depends on its use and acceptance each individual user (Setiawan, 2018). User behavior has a role in determining the success of the implementation of information systems. However, it is still not getting more attention in the development and evaluation of information systems. To produce a maximum evaluation, a technology acceptance method is needed, namely the UTAUT method (Unified Theory of Acceptance and Use of Technology) (Williams, *et al*., 2005).

UTAUT is a model that combines several models of human behavior that aims to analyze user acceptance of the application of information technology (Kim, *et al*, 2016). UTAUT has 4 main constructs that affect the acceptance and behavior of technology users, namely: performance expectancy (PE), effort expectancy (EE), social influence (SE), and facilitating conditions (FC) (Venkatesh, *et al*. 2003). In this study, we analyze the factors that influence the intention of physician users to use an electronic medical record system that makes patient medical information easily accessible. Therefore, based on the explanation above, research on the effect of the application of the UTAUT model on the behavior of using electronic medical records in Prof. Dr. Margono General Hospital, Purwokerto is very much needed.

2. Literature Review

The literature review that will be discussed in this paper is regarding the electronic medical recordand the construct of the UTAUT model in the study.

2.1.Electronic Medical Records

Electronic medical record is a system of organizing medical records startingfrom recording as long as patients get medical services, organizing, storing andissuing medical record files from storage places (Handiwidjojo, 2015). Electronicmedical record is every record, statement or interpretation made by doctors andother health workers in the context of diagnosis and treatment of patients that

isentered and stored in electronic (digital) storage through a computerized system(Risdianty, 2019). Through RME, health services can improve service quality,increase patient satisfaction, and accelerate data access, especially in makingclinical decisions for patients (Bilimoria, 2007).

2.2.UTAUT

UTAUT (Unified Theory of Acceptance and Use of Technology) is a model thatcombines several models of human behavior that aims to analyze user acceptanceof the application of information technology (Prasetyo, 2018). UTAUT where thismodel explains behavioral intention by suggesting four predictive factors, namely*performance expectancy (PE), effort expectancy (EE), social influence(SI), andfacilitating condition (FC) (*Shiferaw, 2019).

2.2.1. Performance Expectancy (PE)

Performance Expectancy defined as "thedegree to which an individual believes that using the system will help him orher to achieve gains in job performance". PE is described as an important factorinfluencing behavioral intention to use technology (Gagnon*et al*., 2014; Kalavani*et al*, 2018). PE can be measured through indicators of 'system usability' and'relative advantage' (Davis, 1989; Moore and Benbasat, 1991).

2.2.2. Effort Expectancy (EE)

*Effort Expectancy*is defined as the level of user convenience that will be feltwhen using an information system. The three constructs of the EE model areperceived ease of use (TAM), complexity (MPCU) and ease of use (IDT)(Venkatesh *et al*., 2003). Several studies indicate that EE influences users'intention to use technology (Becker, 2016; Shiferaw, 2019).

2.2.3. Social Influence (SI)

Social Influence is the level of influence of others in the work environment in aneffort to ensure the use of information systems. Social influences as a directdeterminant of behavioral intention is constructed from subjective norm (TRA,TAM2, TPB/DTPB and C-TAMTPB), social factors (MPCU) and image (IDT) (Venkatesh,*et al*., 2003). Relevant studies show that social influence has a strong impact on the intentions and attitudes of users to accept technology (Chiu & Tsai, 2014; Guo *et al*, 2012; Rasmi *et al*, 2018).

2.2.4. Facilitating conditions (FC)

Facilitating conditions is the extent to which individuals believe that the organizationalandtechnical infrastructure exists to support the use of the system. This definition is deducedfrom three different constructs, namely:perceived behavioral control (TPB/DTPB, C-TAMTPB), facilitating conditions (MPCU) and compatibility (IDT) (Venkatesh *et al*,2003). Another relevant study conducted on technology acceptance shows thatfacilitating conditions are determinants of technology use behavior (Boontarig*et al*, 2012; Phichitchaisopa , 2013).

2.3. Usage Behaviour

*Usage Behavior*that is behavior of users who will use a system in the future (Venkatesh *et al*, 2003). Actual System Usage is a real condition of using the system. Conceptualized in the form of measuring the frequency and duration of technology use (Henry, 2011). Someone will be satisfied using the system if they believe that the system is easy to use and will increase their productivity, which is reflected in the real conditions of use (Auliya, 2018). using information systems. However, if the resulting perception is negative, the user will reject the information system (Joshi, 1991). Indicators of the acceptance of the information system can be seen through investigations of the constructs used in the study, in this study compiled using the construct from UTAUT (Jogiyanto, 2008):

Based on various explanations regarding previous research variables, it can be determined the research framework as shown in Figure 1.

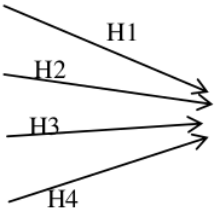

Figure 1. Framework of thought

3. Research Methodology

The research methodology that will be discussed in this paper consist of research design, and instrument analysis.

3.1 Research Design

This research is a quantitative research, with a cross sectional research design. The population used in this study were specialist doctors at RSUD Margono Soekarjo Purwokerto with a sample obtained from the slovin formula as many as 49 respondents. Samples were taken using the techniquerandom sampling. Collecting data used by using a questionnaire distributed to doctors who were respondents in this study. Measurements were carried out with a scale Likert (summated rating), which is a widely used scale by asking respondents to mark the degree of agreement according to or disagree with each of a series of questions about the stimulus object (Malhotra, 2009). Data analyzed by analysis Structural Equation Modeling Partial Least Square (SEM-PLS) using SmartPLS version 3.2.3. PLS is able to describe direct unmeasured variables (latent variables) and is measured using indicators. PLS is widely used for information systems research that aims to investigate technology adoption (Ghozali, 2015).

3.2 Instrument Analysis

The statistical method used to test the conceptual hypothesis is SEM-PLS. In SEM there are two types of models that are formed, namely the measurement model and the measurement model(outer model) and structural models (inner model). Performance Expectancy (PE) has three indicators,

Effort Expectancy (EE) has 5 indicators, Social Influence (SI) has 4 indicators, Facilitating Conditions (FC) has 4 indicators and Usage Behavior (UB) has 6 indicators.

3.2.1 Measurement Model Testing (Outer Model)
Evaluation of outer model used to see the relationship between latent variablesand their indicators or its variables manifest(meansurement models). Toevaluate outer model used testing of convergent validity, discriminant validityand reliability

3.2.1.1 Convergent Validity
Convergent Validity related to the principle that indicators of a construct should be highlycorrelated. Convergent validity is tested with software PLS can be seen from the value of outerloading for each construct indicator, as for assessing convergent validity score outer loadingmust be more than 0.5-0.6 is considered sufficient, whereas if it is more than 0.7 then it issaid to be high, and the value of average variance extracted (AVE) and valuecommunality must be greater than 0.5 (Siswoyo, 2017).

3.2.1.2 Discriminant Validity
Discriminant validity of the reflective model was evaluated through cross loading, thencompared the AVE value with the square of the correlation value between constructs (orcomparing the square root of the AVE with the correlation between constructs). The measureof cross loading is to compare the correlation of the indicator with its construct andconstructs from other blocks. If the correlation between the indicator and its construct ishigher than the correlation with other block constructs, this indicates that the constructpredicts the size of their block better than other blocks (Siswoyo, 2017).

3.2. 1.3 Reliability Test
Reliability test is used to measure a questionnaire which is an indicator of a variable.Reliability testing was carried out using Cronbach Alpha. The Cronbach Alpha coefficient more than 0.6, it indicates the questionnaire that's used is reliable (Priyatno, 2011).

3.2.2. Fit Test of Combination Model Evaluation (All Model)
Fit test of the entire combined model(fit test of combination model) is a fit test tovalidate the model as a whole, using the value of Goodness of Fit(GoF). GoF is a single measure used to validate the combined performance of themeasurement model and the structural model obtained from the root of the mean valuecommunality multiplied by the root of the mean value of R-square. GoF values range from 0-1 with an interpretation of 0.1 (small GoF); 0.25(moderate GoF); and 0.36 (substantial GoF) (Siswoyo, 2017).

3.2.3. Structural Model Testing (Inner Model)
The structural model is used to see the relationship between the constructs in the study andtheir significance values. The structural model can be tested by using the coefficient valuepath and t-value. The structural path coefficient can show how much influence theindependent variable has on the dependent variable. The significance value between pathscan be seen in the t statistics column in the table. The value is considered related if it has avalue above 1.96. (Siswoyo, 2017).

4. Results

The results of the calculation of the entire model using SmartPLS softwareare as follows:

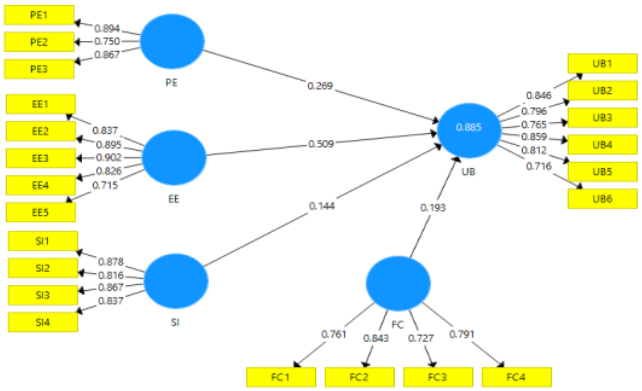

Figure 2. Path Diagram of the Complete Standardized Coefficient Model

4.1 Convergent validity

Based on the test results using SmartPLS software, explained that the value of outerloading for each indicator regarding EE, FC, PE, SI, and UB has a value of > 0.7 whichmeans that all indicators are declared to have good validity in explaining the latentvariables. While the AVE value and valuecommunality above for each variable latent exceeds the specified limit of 0.5 (Ghozali, 2015) which means all variables latent has good validity.

Table 1. AVE

	AVE	Communality
EE	0.702	0.702
FC	0.611	0.611
PE	0.705	0.705
SI	0.722	0.722
UB	0.64	0.64

4.2 Discriminant validity

Cross loading factor score of each latent construct for the corresponding indicator is higher than the other constructs, so it can be concluded that the indicators used to measure the latent variable have met the requirements. The AVE root value must be higher than the correlation between constructs and other constructs or the AVE value must be higher than the square of the correlation between constructs (Siswoyo, 2017). The comparison of the AVE root value with the correlation of each latent variable is presented as follows:

Table 2. Root AVE comparison with Latent Variable Correlation

Variable	AVE Root	Correlation Between Laten Var.				
		EE	FC	*PE*	SI	UB
EE	0.838	1				
FC	0.782	0.562	1			
PE	0.840	0.788	0.688	1		
SI	0.850	0.462	0.178	0.278	1	
UB	0.800	0.896	0.689	0.843	0.488	1

Table 2 shows that the AVE root value of each variable is higher than the correlation valuebetween latent variables. Based on the description above, the size of cross loading factoras well as thecomparison of the AVE roots with the correlation between the latent variables have met therequirements, so it can be concluded that the requirements discriminant validity on the variable hasbeen met.

4.3 Reliability Test

Reliability test using Composite Reliability (CR). In table 3, the value of Cronbach's alphaandcomposite reliability for each latent variable exceeds 0.7 (Siswoyo, 2017)sothat the model is declared to have high reliability.

Table3. *Composite Reliability*

	Alpha Cronbach	**Composite Reability**
EE	0.892	0.921
FC	0.789	0.862
PE	0.796	0.877
SI	0.872	0.912
UB	0.887	0.914

4.4.Evaluation of Fit Test of Combination Model (All Model)

Based on table 4, it is known that the value of Goodness of Fit (GoF) which is obtained fromthe product of the value of communality and R-square of 0.5664. The GoF value of 0.5664according to Siswoyo (2017) is quite substantial, so it can be concluded that the results ofthe model fit testgoodness of fit already substantial.

Table 4. Results of UB's GoF

	Communality	**R Square**
UB Variable	0.64	0.885
Multiplication	0.5664	
GoF value	0.5664	

Source: Data processed using softwareSmart Pls

4.5.Structural Model Testing (Inner Model)

The hypothesis is tested with the coefficient value path and t-value which is presented asfollows:

Table 5. Structural Path Coefficient Values and Hypothesis Significance Test

Influence	**Original Sample (O)**	**T Statistics (|O/STERR|)**	**p-Value**
PE -> UB (H1)	0.269	2.526	0.012
EE -> UB (H2)	0.509	5.510	0.000

SI -> UB (H3)	0.144	2.662	0.008
FC -> UB (H4)	0.193	2.660	0.008

Source: Data processed using softwareSmart Pls

Based on table 5, the path coefficient values of PE, EE, SI and FC are obtained for UB. Thus, the structural equation model is obtained as follows:

UB= 0.269PE + 0.509EE + 0.144SI + 0.193FC + - (1)

From the equation, it can be seen that the structural path coefficient of the EE variableis greater than the PE, SI and FC variables, which indicates that EE tends to have a greater influence than PE, SI and FC on UB. The results of the test in the t-statistics column in Table 2show that the relationship between PE to UB, EE to UB, SI to UB and FC to UB is said to berelated because the value is above 1.96 (Siswoyo, 2017).

To see the percentage effect of each exogenous latent variable on endogenousvariables, the following partial and simultaneous determination coefficients (R2) which isthe product of the structural path coefficient with the correlation with the endogenouslatent variable. Table 6 shows the value of R-square obtained by 88.61%. These resultsindicate that PE, EE, SI, and FC together have an effect of 88.61% on UB, while as much as(1-R-squares) The remaining 11.39% is a large contribution of influence given by otherfactors not examined (-).

Table 6. Analysis of the Coefficient of Determination (R^2)

	Structural Path Coefficient	Correlation with UB	Influence (%)
PE -> UB	0.269	0.843	22.68
EE -> UB	0.509	0.896	45.61
SI -> UB	0.144	0.488	7.03
FC -> UB	0.193	0.689	13.30
TOTAL INFLUENCE (R^2)			88.61

Source: Data processed using softwareSmart Pls

5. Discussion

Hypothesis 1 state that Performance Expectancy (PE) has an effect onUsage Behavior (UB) electronic medical records by doctors at RSUD Prof. Dr. MargonoSoekarjo Purwokerto. Based on the results of the study, it was stated that PE had asignificant effect on UB because t value (2,526) > t table (2,011). The coefficient of thePE path is positive, which means that the higher the PE, the higher the UB, indicatingthat users feel confident that the RME system helps daily activities such as accuracy indata input, saving costs when using the medical record information system and thetime required to access the system Gagnon*et al,* 2014; Kalavani*et al*, 2018). PE variablehas an influence on UB by 22.68%. These results support the research conducted byBashir (2020) which states that PE has a significant effect on UB and on Nyembezi &Bayaga (2014) that PE has a significant effect on behavioral interest .

Hypothesis 2 state that Effort Expectancy (EE) effect on Usage Behavior (UB)electronic medical records by doctors at RSUD Prof. Dr. Margono SoekarjoPurwokerto. Based on the results of the

study, it was stated that EE had a significanteffect on UB because t value (5,510) > t table (2,011). The coefficient of the EE path ispositive, which means the higher the EE, the higher the UB, indicating that the useralready understands using the medical record information system, the userunderstands the simulation in the medical record information system, the user finds iteasy to use the system and the user is ready to use the system. medical records (Koh,2010). The EE variable has an influence on UB by 45.61%. This result is not in line withthe research conducted by Bashir (2020) which states that EE has no significant effecton UB. Respondents believe that using RME will improve performance. This will form apositive attitude of users towards RME. According to Erawantini (2013) RME is veryeasy to use, especially the ease of finding data and patient history so that it saves timeand is more effective.

Hypothesis 3 state that Social Influence (SI) affects Usage Behavior (UB)electronic medical records by doctors at RSUD Prof. Dr. Margono SoekarjoPurwokerto. Based on the results of the study, it was stated that SI had a significanteffect on UB because t value (2.662) > t table (2.011). The SI path coefficient is positive,which means that the higher the SI, the higher the UB. SI has an influence on UB by7.03%. This shows that SI is one of the factors that influence user behavior in utilizingthe medical record system. Users feel confident using the medical record systembecause of the hospital's policy in using the medical record information system and user requirements in the use of the medical record system. Venkatesh, *et al* (2003) stated that social influence has a positive impact on users, especially support from peers, leaders and organizations. Things that need to be considered are the establishment of written policies or regulations regarding the application of RME that which provides law protection such as procedures for using the RME system, the rights and obligations of RME system users, protection of patient data confidentiality so that patient data is more secure (Risdianty, 2019).

Hypothesis 4 state that Facilitating Conditions (FC) has an effect on Usage Behavior (UB) electronic medical records by doctors at RSUD Prof. Dr. Margono Soekarjo Purwokerto. Based on the results of the study FC has a significant effect on UB because t value (2,660) > t table (2,011). The coefficient of the FC path is positive, which means that the higher the FC, the higher the UB. FC variable has an effect on UB by 13.30%. The FC variable is proven to have an effect on the behavior of using the RME system. This shows that facilitating conditions affect user behavior such as the provision of facilities for users of the medical record information system and assistance if they have difficulty using the medical record information system. These results are in accordance with research by Bashir (2020) which states that FC has a significant effect on UB. Supporting facilities are a key factor in the successful implementation of health information systems (Khalifa, 2013). The tendency of users to use a system will increase if the existing facilities are more complete (Handayani, 2015). Supporting facilities at Margono Soekarjo Hospital in the form of facilities and infrastructure such as hardware, software, and networks in every ward, clinic, and supporting installations are adequate. Andriani's research (2017) shows that adequate facility conditions affect the positive attitude of technology system users.

6. Conclusion

Based on the results of the research described above, it can be concluded that thecomponents of UTAUT are: Performance Expectancy, Effort Expectancy, Social Influence, andFacilitating Conditions has significant effect on behavior of using electronic medical records inProf. Dr. Margono Soekarjo General Hospital, Purwokerto. Path coefficient of PE, EE, SI, FC, when positive, it will cause an increase in usage behavior. The advice that can be given from the author isthat it is

necessary to do an analysis other than from the user side, for example from thedeveloper side regarding the suitability of needs with technological developments. Overallsatisfaction has a positive effect on overall benefits. For further development of the RME, theoutput of the report produced by the RME needs to be adjusted to the format from theMinistry of Health.

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