Analysis of Factors Influencing The Acceptance of Hospital Management Information System (SIMRS)

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ABSTRACT

More and more hospitals are using the Hospital Information Management System (SIMRS) to improve the quality and quality of their services. However, most RS still focus on SIMRS as a system, few pay attention to the successful reception of SIMRS by users. This study aims to determine the influence of Perception of Usability, Ease of Use, and Facility Conditions on the Use of SIMRS with Behavioral Intentions as a mediation variable. The research design used is cross sectional. The analysis technique used is Structural Equation Modeling (SEM). The population of this study was all employees of Cinta Kasih Hospital who used SIMRS in their daily work. The sampling technique used is total sampling. The data was retrieved by sharing questionnaires. There were 188 respondents who met the inclusion and exclusion criteria, which were subsequently included in the analysis. The results showed the influence of Perception of Usability and Ease of Use on the Use of SIMRS either directly or through mediation variables. However, no meaningful effect of Facility Conditions was found on the use of SIMRS directly, although significant influence was found through mediation variables. The implication of this study is to encourage hospital management to correct the factors that affect the acceptance of SIMRS by employees, thereby maximizing the use of SIMRS.

INTRODUCTION

Hospitals are currently in the process of transforming towards the digitalization era because of the various benefits that can be obtained through the use of technology, such as increasing efficiency, preventing human error, and facilitating storage and access to documents. However, the use of information systems in daily hospital activities, including the hospital management information system (SIMRS), is still minimal even though the facilities have been provided (Handayani et al., 2018).

One of the real manifestations of this statement is a phenomenon that can be observed at the Cinta Kasih Hospital (RS), Cengkareng. Since the SIMRS facility was established by the hospital in 2014, the use of the system has been minimal. In addition, SIMRS is only used for administrative purposes, and its use is also incorrect and incomplete. The re-implementation was carried out in 2019, where more units used SIMRS, such as for the purposes of making medical records, ordering drugs, and pharmaceuticals. This low *user acceptance* is because SIMRS is considered difficult to operate, thus slowing down work. In addition, this situation is exacerbated by the absence of orientation or specific guidance on how to use SIMRS given to RS employees. Based on the description above, this study aims to use an analysis of the acceptance of new technology (TAM) to evaluate the perception of usability, perception of ease of use, and facility conditions for the use of SIMRS at Cinta Kasih Hospital so that SIMRS can be one of the factors that can increase effectiveness and efficiency, improve service quality, minimize *human error,* and improving patient safety at Cinta Kasih Hospital.

Technology Acceptance Model (TAM), a theory introduced in 1989 by Davis (Davis, 1989), is a theory that embodies the model of acceptance and use of a system or technology. TAM has 4 main variables, namely perceived usefulness, perceived ease of use, behavioral intention, and actual system use. In addition, this study also uses the Unified Theory of Acceptance and Use of Technology (UTAUT) theory which considers the facilitating condition as one of the factors that influence the actual use of the system (Venkatesh et al., 2003).

Perceived usefulness is a person's belief that the use of a technology system will make work easier and improve work performance. Perceived ease of use (perceived ease of use) is defined as the level of one's confidence regarding the use of a particular system does not require effort. Behavioral intention is a user's tendency to apply and use a technology. Meanwhile, system use (actual system use) is an external psychomotor response as measured by real system use. Facilitating conditions referred to include the availability of technology/system infrastructure. These five variables influence each other as illustrated in Figure 1. The actual use of a technology is influenced by behavioral intentions, perceived usefulness, perceived ease of use and condition of facilities. Behavioral intention is influenced by perceived convenience, perceived usefulness, and facility conditions.
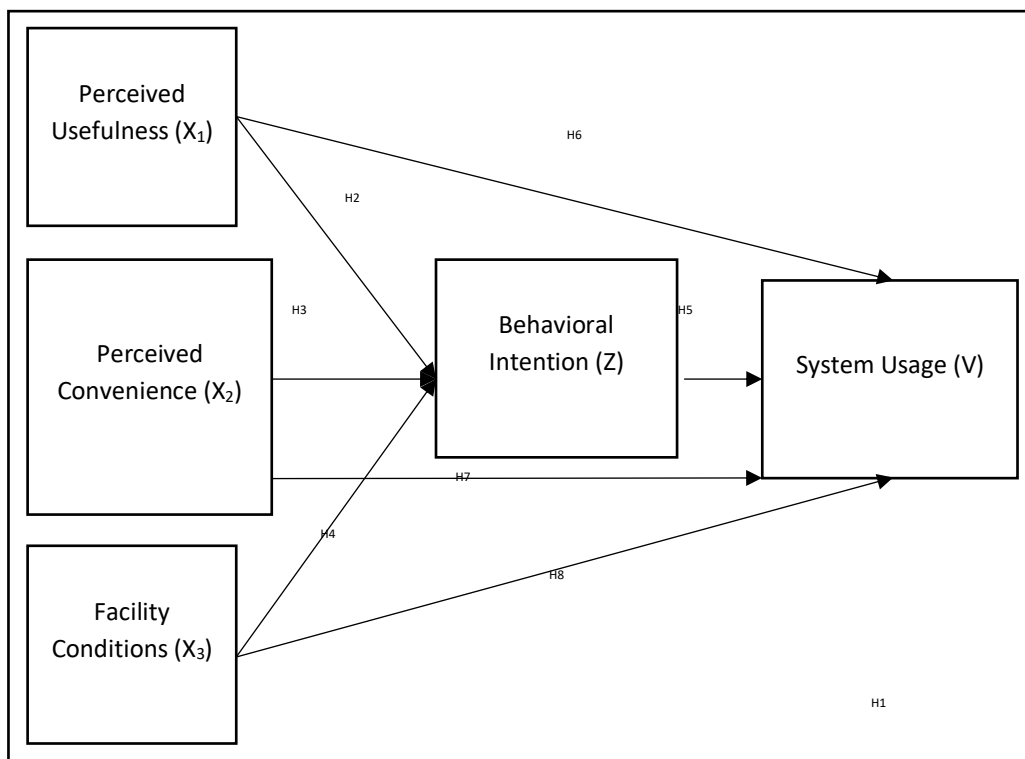

Figure 1. Conceptual Framework based on the Technology Acceptance Model (Davis, 1989)

Based on the problems identified and the existing theoretical basis, researchers have developed several hypotheses, namely:

H1= There is a simultaneous influence of perception usability, perceived ease of use, and condition of facilities towards the use of the SIMRS system with the intention to behave as intervening variables.

H2= There is an influence of perception usability towards behavioral intention to use SIMRS at Cinta Kasih Hospital.

H3=There is an influence on perceived ease of use towards behavioral intention to use SIMRS at Cinta Kasih Hospital.

H4= There is an influence on the condition of the facility behavioral intention to use SIMRS at Cinta Kasih Hospital.

H5= There is an influence of behavioral intention on the use of SIMRS system by employees of the Cinta Kasih Hospital.

H6= There is an influence of perception usability of the use of SIMRS system by employees of the Cinta Kasih Hospital.

H7= There is an influence on perceived ease of use of SIMRS system by employees of the Cinta Kasih Hospital.

H8= There is an influence on the condition of the facility use of SIMRS system by health workers at Cinta Kasih Hospital.

METHODS

This study used a cross sectional design. The sample in this study were all employees of the Cinta Kasih Hospital who used the Hospital Management Information System (SIMRS), which consisted of 188 employees. This study used the total sampling method, so that 188 employees were involved in this study.

The research instrument was a questionnaire containing 23 statements and was measured by a Likert scale. Each statement represents an indicator of each variable. Data collection was carried out by distributing questionnaires through an online form.

Validity analysis used the Pearson Product Moment test and reliability analysis used Cronbach's Alpha. To find out the distribution of data, a normality test based on skewness and curtosis was used. The multicollinearity test is carried out by calculating the covariance value. To test the hypothesis, Structural Equation Modeling (SEM) was used with the AMOS 5.0 tool.

RESULTS

The data analysis technique used in this study is a quantitative test. There are several variables evaluated in this study: perceived usefulness and perceived ease of use which each have 6 indicators, behavioral intention which has 2 indicators, facility condition which has 4 indicators, and system use which has. 5 indicators. The data presented were statistically processed using structural equation modeling (SEM) to determine the relationship between perceived usefulness, perceived ease of use, behavioral intentions, and facility conditions on the use of SIMRS.

Table 1. Profile of respondents

Gender	Amount (n)	Percentage (%)
Gender		
a. Woman	134	71.28
b. Man	54	28.72
Age		
a. 21–25 years old	69	36.70
b. 26–30 years old	60	31.91
c. 31–35 years old	28	14.89
d. 36–40 years old	13	6.91
e. 41–45 years old	9	4.79
f. 46–50 years old	5	2.66
g. >50 years old	4	2.13
Length of work		
a. <1 year	17	9.04
b. 1–3 years	85	45.21
c. 4–5 years	47	20.74
d. >5 years	47	25.00
Education		
a. Highschool	9	4.79
b. D3	77	40.96
c. D4	2	1.06
d. S1	87	46.28
e. S2	13	6.91
Profession		
a. Doctor	28	14.89
b. Nurse	90	47.87
c. Midwife	18	9.57
d. Pharmacist/Pharmacist Assistant	18	9.57
e. Radiographer	7	3.72
f. Laboratory analyst	10	5.32

	Gender	Amount (n)	Percentage (%)
g.	Administration & Billing	11	5.85
h.	Etc	6	3.19

Validity and Reliability Test

Pearson Product Moment test results show that the value of r count is higher than r table for all statements. This shows that all statements are valid. Meanwhile, the value of Cronbach's Alpha is > 0.60 which indicates that all statements are reliable.

Normality test

The normality test was carried out to find out whether the data distribution was normal as indicated by the skewness value of each variable between -2.58 to 2.58. As can be observed in Table 2, the c.r. skewness ranges from -2.669 to -1.165. Because it is still between -3 to 3, the data is considered normally distributed. In addition, the c.r. kurtosis in the data of this study was between 0.398 to 1.952 for the univariate test and 8.164 for the multivariate test. The data is still considered normally distributed because the value is still between -10 to 10.

Table 2. Normality test results

Variable	min	max	skewness	c.r.	kurtosis	c.r.
PK	1.600	5.000	-.652	-2.662	.893	1.822
PKP	1.667	5.000	-.654	-2.669	.719	1.467
KF	1.857	5.000	-.285	-1.165	.195	.398
IB	2.000	5.000	-.575	-2.349	1.528	3.118
PS	2.000	5.000	-.610	-2.490	.956	1.952
Multivariate					13.661	8.164

PK: perceived usefulness, PKP: perceived ease of use, KF: condition of the facility,
IB: behavioral intention, PS: actual use

Multicollinearity Test

The multicollinearity test is a test to find out whether there is a correlation between the independent variables in the regression model (multicollinearity problem), where a good regression model is a model that does not have a multicollinearity problem. As can be seen in Table 3, the covariance matrix value is greater than 0.00 so there is no multicollinearity problem in this study.

Table 3. Collinearity test results

Condition number = 5,683
Eigenvalues
.917 .308 .218 .206 .161
Determinant of sample covariance matrix = .002

Hypothesis testing
Goodness of Fit test

The goodness of fit test predicts the closeness between the independent and dependent variables in this study. In accordance with Table 9, this test uses two indicators, namely the degree of freedom (DOF) which is positive, and the non-significant chi-square (p> 0.05). The acceptable conservative limit is p = 0.10.

Table 4. Index Goodness of Fit

No	Goodness of Fit Index	Cut Off Value	Results
1	Degree of freedom		275
2	Probability of significance	≥ 0.05	0.850
Absolute Fit Measures			

No	Goodness of Fit Index	Cut Off Value	Results
3	Chi-Square	Expected small	250,790
4	RMSEA	≤ 0.08	0.000
5	GFI	≥ 0.90	0.907
Incremental Fit Measures			
6	TLI	≥ 0.95	1,311
7	CFI	≥ 0.95	1,000
Parsimonious Fit Measures			
8	AGFI	≥ 0.90	0.877
9	CMIN/DF	≤ 2.00	0.912

As shown in Table 4, there is no significant difference between the research results and the theory. Therefore, hypothesis 1 can be accepted with a probability value = 0.850 (p> 0.05). It can be concluded that there is a simultaneous influence of perceived usefulness, perceived ease of use, and facility conditions on the use of the SIMRS system with the intention to behave as an intervening variable.

Structural Equation Modelling (SEM)

The data in this study were analyzed using the Structural Equation Modeling (SEM) method with the AMOS 5.0 program to prove the 8 hypotheses proposed at the beginning of this study. The relationship between variables is illustrated by the path coefficient/ path analysis as shown in Figure 2.
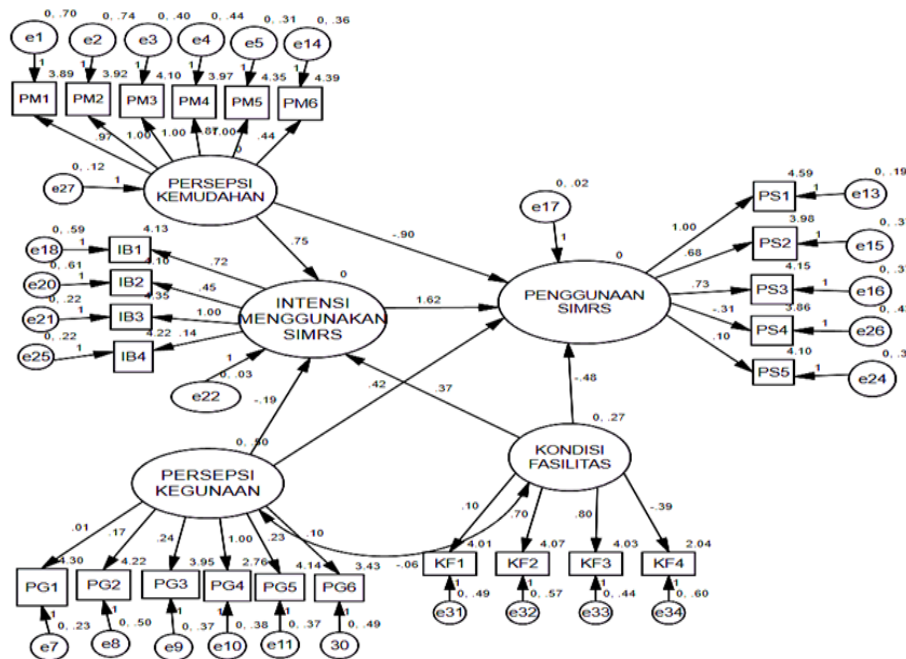

Figure 2. SEM Path Diagram

Coefficient of determination (R2)

The coefficient of determination shows the ability of all independent variables to determine the dependent variable. In this study, the coefficient of determination shows the ability of perceptions of usability, perceived ease of use, facility conditions, and internal behavior in describing the actual use of SIMRS. As illustrated in Table 5, the uncertainty of the effect of behavioral intention is 0.796 (79%) and the actual effect of using the system is 0.842 (84%). This means that only 16% of the use of the system is actually influenced by factors other than the variables in this study (age, gender, past work, social influence, and willingness to use the system).

Table 5. Squared Multiple Correlations

Variable	Estimates
behavioral intention	0.796
Actual use of the system	0.842

Partial Test

A partial test in the form of path analysis was carried out in this study to partially test the hypotheses, especially hypotheses 2-8 of this study and the results can be observed in Table 6 where hypotheses 2-7 are accepted, while hypothesis 8 is rejected.

Table 6. Test path analysis

Variable Influence	Estimates	SE	CR	P	Information
IB ← PG	-.186	.078	-2,368	.018	H2 Accepted
IB ← PK	.745	.152	4,893	***	H3 Accepted
IB ← KF	.368	.142	2,590	010	H4 Accepted
PS ← IB	1620	.399	4,058	***	H5 Accepted
PS ← PK	.416	.153	2,724	006	H6 Accepted
PS ← PG	-. 896	.383	-2,341	.019	H7 Accepted
PS ← KF	-.483	.268	-1,802	072	H8 Rejected

PK: perceived usefulness, PKP: perceived ease of use, KF: condition of the facility, IB: behavioral intention, PS: actual use

Intervening Testing

The intervening variable in this study is behavioral intention. Intervening test results can be seen in Tables 7 and 8 where the indirect effect (through the intervening variable) on perceived ease of use and facility conditions (1.174 and -0.0869) on system use is greater than the direct effect (-0.871 and -0.704). This shows that perceived ease of use increases the effect indirectly and the condition of the facility reduces the effect on system use.

Table 7. Standardized Direct Effects (Group number 1 − Default model)

Variable	Perceived Usefulness	Perceived Ease of Use	Facility conditions	Behavioral Intention
Behavioral Intention	-0.326	0.642	0.475	0.000
Real Use	0.826	-0.871	-0.704	1,829

Table 8. Standardized Indirect Effects (Group number 1 − Default model)

Variable	Perceived Usefulness	Perceived Ease of Use	Facility conditions	Behavioral Intention
Behavioral Intention	0.000	0.000	0.000	0.000
Real Use	0.596	1.174	0.0869	0.000

DISCUSSION

The simultaneous influence of perceived usefulness, perceived ease of use, and facility conditions on the use of the SIMRS system with behavioral intentions as an intervening variable

Based on the results of the suitability of the model that has been done, there is no significant difference between the results of the research and the existing theory, so that hypothesis 1 states that there is a simultaneous effect of perceived usefulness, perceived ease of use, and facility conditions on the use of the SIMRS system in Cinta Kasih Hospital with the intention behaving as an intervening variable is acceptable with a probability value of 0.850 (p>0.05).

This finding is in line with the theory of the Technology Acceptance Model (TAM) by Davis (1989) which states that perceived usefulness, perceived ease of use, and intentional user behavior influence the use of a technology system. In addition, user acceptance of the technology system also influences the user's willingness

to use the technology. As stated by (Pikkarainen et al., 2004), the greater the user's willingness to implement a new information technology system to replace the old one in their daily work.

The same pattern is also supported by another study by (Gomer et al., 2020). In his research on 100 employees at the MMC Hospital, Jakarta, it was found that perceived usefulness and perceived ease of use influenced the actual use of the SIMRS system, with the intervening variable being behavioral intentions. Research by Aji (2017) the staff at RSIA Bhakti Persada Magetan got the simultaneous influence of perceived usefulness and perceived ease of use on the use of SIMRS by 75.3%. In addition, based on the theory of UTAUT (Anonym, et al., 2003), the condition of the facility also affects the use of the SIMRS system. This is also supported by various studies, for example by Wahyuni's research (2015) and Puspitasari et al (2013). In addition, Handayani (2018) also stated that the condition of the facility is one of the important factors that support the implementation of SIMRS in hospitals.

Meanwhile, in terms of the demographic profile of the respondents, age, gender, and type of work did not significantly influence the use of SIMRS which was marked by an overall average score that tended to be similar in these parameters where acceptance and use of SIMRS were quite good to good. However, length of work has been shown to affect acceptance of SIMRS where the longer a staff member has worked, the lower acceptance of SIMRS is obtained.

This finding is supported by several previous studies by Maryati (2021), Safitri (2012), Gagno (2014), and Shahbahrami et al. (2016), that age and gender do not significantly influence acceptance of electronic medical records. In addition, research by Pakarbudi (2018) found that staff length of service had an effect on the use of SIMRS where the longer the staff worked, the more difficult it would be to accept the use of SIMRS to replace the old system. Nevertheless, research by Maryati (2021) found that the type of work had an effect on the use of SIMRS where doctors were the profession with the lowest use of SIMRS. However, the study also said that this might be because many nurses helped fill in the doctor's electronic medical record at the hospital and the study was only conducted at one hospital.

Effect of perceived usefulness on behavioral intention to use SIMRS

This study found that CR = -2.368 and p<0.001 (p<0.05) so that H2 was accepted. Therefore, perceived usefulness influences behavioral intentions with an estimate of 18.6%, where the better the perceived usefulness of the system, the better the intention to use the system, in this case SIMRS. This is in accordance with the TAM theory (Davis, 1989) which states that perceived usefulness is related to the intention to use the system. In addition, this is also in line with the results of several other studies, namely research by Adhiputra (2015) in his research on the intention to use internet banking, Rahmawati (2018) in his research on the use of PT. Transjakarta, and Tubaishat (2018) in his research on nurses in 15 hospitals in Jordan. The same results were also found in several studies in Indonesia, such as research by Saputra (2013) and Gomer (2020) where after hospital employees experience the benefits of SIMRS in increasing work effectiveness, they are motivated to continue using SIMRS and also recommend it to their colleagues.

Effect of perceived ease of use on behavioral intention to use SIMRS

It was found that the value of CR = 4.893 and p = 0.018 (p <0.05) so that H3 was accepted. This shows that perceived ease of use has an effect on behavioral intention with an estimate of 74.5%. This is in line with the TAM theory (Davis, 1989). Systems that are easier to use and understand will be used more often than systems that are more complex and complicated, even though more complex systems provide more benefits. Findings from several studies in Indonesia also support this, such as research by Setiawati (2019) on the behavior of using the accounting system in a hospital and research by Helia(Helia et al., 2018)on the behavior of using SIMRS at Panti Rapih Hospital, and Salinding Gomer (2020) in his research on the use of SIMRS in MMC Hospital.

Effect of facility conditions on behavioral intention to use SIMRS

It was found that the value of CR = 2.290 and p = 0.010 (p <0.05) so that H4 was accepted. This shows that the condition of the facility has an effect on behavioral intention with an estimate of 36.8%. This is in accordance with the theory of UTAUT Venkatesh (2003)(2003) that the condition of the facility, the availability of technology/system infrastructure, is one of the important factors that support the real use of the

system. The condition of the facility in question is the provision of resources, knowledge, assistance, and SIMRS Slade system compatibility Slade (2015) and Venkatesh (2003). Based on findings from research by Handayani regarding behavioral intentions of using SIMRS in a hospital in Jakarta, if the conditions of the facility are not supportive, the implementation of SIMRS in a hospital may fail.

The effect of behavioral intention on the use of the SIMRS system by employees

It was found that the value of CR = 4.058 and $p < 0.001$ ($p < 0.05$) so that H5 was accepted. This shows that behavioral intention has an effect on actual use with an estimate of 36.8%. This is in line with the TAM theory (Davis, 1989) which states that the higher the intention to use a system, the higher the actual use of the system. This is also in line with the theory of planned behavior (Fishbein & Ajzen, 2005) that behavioral intentions are closely correlated with actual behavior and can be used to predict a person's behavior. Findings from several studies are also in line with this, including research by Rahmawati (2018) regarding the use of electronic ticketing systems, Setiawati (2019) regarding the use of accounting systems in hospitals, and Adhiputra (2015) regarding the use of internet banking services. There are also many studies in Indonesia with similar findings in the context of using SIMRS in hospitals, namely research by Supriyanti (2017), Saputra (2013), Ghafar (2018), and Helia (2018).

Effect of perceived usefulness on the use of the SIMRS system by employees

It was found that the value of CR = 2.724 and $p < 0.006$ ($p < 0.05$) so that H6 was accepted. This shows that perceived usefulness influences actual use with an estimate of 41.6%. The influence of perceived usefulness on the use of the SIMRS system can be in the form of direct and indirect influences (through behavioral intentions). This is supported by research by Ologeanu (2015) in Teaching Hospitals in France and Tubaishat (2018) regarding the use of SIMRS in hospitals. In Indonesia, research by Saputra (2013) regarding the use of SIMRS in hospitals also get the same results.

Effect of perceived ease of use on the use of the SIMRS system

It was found that the value of CR = -2.341 and $p = 0.019$ ($p < 0.05$) so that H7 was accepted. This shows that perceived ease of use has an effect on actual use with an estimate of 89.6%. This finding is in accordance with the TAM theory (Davis, 1989) and findings by Schnall (2017) and Ologeanu (2015) which states that users will prefer to use a system that is easy to use and understand to help with their daily work. In Indonesia, this finding is also supported by several studies, such as research by Palupi (2015) and Gomer (2020) regarding the use of SIMRS in hospitals.

Effect of facility conditions on the use of the SIMRS system by health workers

It was found that the value of CR = -1.802 and $p = 0.072$ ($p > 0.05$) so that H8 was rejected. This shows that perceived usefulness has no effect on actual use. In the data we got, there are 2 indicators that get moderate scores, namely compatibility and special assistance. The low compatibility in our study may be due to the fact that the data in the system has not been retrieved easily, such as queue number machines, radiology equipment, and lab equipment that produce results in the form of data, which cannot be directly entered into SIMRS. Interoperability between systems is also important in a health system, both internal information exchange in hospitals and externally between hospitals. Meanwhile, regarding the availability of assistance, Cinta Kasih Hospital does not yet have a special team to aid users who have difficulty using SIMRS. Cinta Kasih Hospital only has an IT team to help users who have difficulty, but the numbers are not comparable and cannot accommodate all SIMRS users. This may have caused the Cinta Kasih Hospital employees' perception of the condition of the facility to be unrelated to actual use.

This finding is different from previous studies, such as research by Wahyuni (2015) and Muchlis (2019), where the condition of the facility positively affects the use of the SIMRS system in hospitals. In addition, according to research by Zhou (2019), adequate facilities and training are needed to achieve the use of SIMRS. This is because the condition of the facility significantly influences behavioral intention which is an intervening factor in the use of the SIMRS system. This is in accordance with the conditions in the Cinta Kasih Hospital

where facilities and training are still considered lacking so that this causes no significant relationship to be found between the condition of the facilities and the actual use of the system.

CONCLUSION

This study found that there was a simultaneous influence of perceived usefulness, perceived ease of use, and facility conditions on the use of the SIMRS system with the intention to behave as an intervening variable. This is appropriateTechnology acceptance model as stated by Davis (1989) and Unified Theory of Acceptance and Use of Technology (UTAUT) by Venkatesh (2003). In addition, behavioral intention was found as an intervening variable, so that behavioral intention serves to increase the influence between perceptions of ease of use and perceptions of facility conditions on the actual use of SIMRS. The conclusion that can be drawn from this is that the behavior to use SIMRS starts from the intention to use SIMRS.

There is a simultaneous effect of perceived usefulness, perceived ease of use, and facility conditions on the use of the SIMRS system with the intention to behave as an intervening variable. These results indicate that there is no difference between the theory of technology acceptance and the conditions in the field of Cinta Kasih Hospital.

There is an influence of perceived usefulness on the behavioral intention to use SIMRS at Cinta Kasih Hospital. The better the benefits of using SIMRS, the better the intention to use the system.

There is an influence of perceived ease of use on behavioral intentions to use SIMRS at Cinta Kasih Hospital. The better the perceived ease of use of the system, the better the intention to use SIMRS.

There is an influence of the condition of the facility on the behavioral intention to use SIMRS at Cinta Kasih Hospital. The better the perception of the condition of the facility, the better the intention to use SIMRS.

There is an influence of behavioral intention on the use of the SIMRS system by Cinta Kasih Hospital employees. The higher the intention to use SIMRS, the better the actual use of SIMRS will be.

There is an influence of perceived usefulness on the use of the SIMRS system by Cinta Kasih Hospital employees. The better the perceived usefulness of SIMRS, the better the actual use of SIMRS will be.

There is an influence of perceived ease of use on the use of the SIMRS system by Cinta Kasih Hospital employees. The better the perceived ease of use of SIMRS, the better the actual use of SIMRS will be.

There is no direct effect of the condition of the facility on the use of the SIMRS system by the Cinta Kasih Hospital health workers.

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