

## Analysis of Information Management System Utilization at Pelengkap Medical Center Hospital, Jombang, East Java

Rendi Adiansa<sup>1,2)</sup>, Didik Gunawan Tamtomo<sup>3)</sup>, Bhisma Murti<sup>1)</sup>

<sup>1)</sup>Masters Program in Public Health, Universitas Sebelas Maret

<sup>2)</sup>Study Program of Health Sciences, Polytechnics of Jember, East Java

<sup>3)</sup>Faculty of Medicine, Universitas Sebelas Maret

### ABSTRACT

**Background:** Hospital Management Information System (SIMRS) is an information technology system that integrates the entire flow of hospital services in the form of a network of coordination, reporting, and administrative procedures to obtain precise and accurate information. The successful implementation of SIMRS depends on the use of the system by staff working in health care facilities. The model used in analyzing the use of SIMRS is the Technology Acceptance Model (TAM). The purpose of this study was to determine the effect of the TAM construct variable on the use of SIMRS.

**Subjects and Method:** This was an analytical observational study with a cross-sectional design. The study was conducted in Pelengkap Medical Center Hospital, Jombang, East Java, in April 2022. A sample of 73 staff was selected by random sampling. The sampled staff are active users of SIMRS for at least 1 year. The dependent variable was the use of SIMRS. The independent variables observed were profession and training education. The data were collected by questionnaire and analyzed by path analysis.

**Results:** MIS utilization was directly affected by positive attitude ( $b = 3.12$ ; 95% CI = 1.67 to 4.58;  $p < 0.001$ ) and perceived ease of use ( $b = 2.07$ ; 95% CI = 0.63 to 3.50;  $p = 0.005$ ). It was indirectly affected by education/training, profession, and perceived benefit.

**Conclusion:** MIS utilization is directly affected by positive attitude and perceived ease of use. It is indirectly affected by education/training, profession, and perceived benefit.

**Keywords:** SIMRS, Technology Acceptance Model

### Correspondence:

Rendi Adiansa. Masters Program in Public Health, Universitas Sebelas Maret. Jl. Ir. Sutami 36A, Surakarta 57126, Central Java. Email: [adiansarendi@gmail.com](mailto:adiansarendi@gmail.com). Mobile : 08816008735

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### BACKGROUND

Hospital Management Information System (SIMRS) is an information technology system that integrates the entire flow of hospital services in the form of a network of coordination, reporting, and administrative procedures to obtain precise and accurate information. The Jombang Medical Center Complementary Hospital is one of the hospitals that has implemented a hospital

management information system. This is done to create an integrated data management in accordance with existing regulations. Hospital management information system is expected to help the performance of hospital management to provide optimal service to the community.

Based on a preliminary study in August 2021, there are still problems in implementing the Khanza Hospital SIM,

namely; the level of discipline in filling or data entry and the use of information systems that are not carried out thoroughly. This can hinder system implementation because the attitude and acceptance of hospital information system users is an important factor in the success or failure of information system implementation (Ammenwerth, 2019).

Hospitals consist of many interconnected installations. The services provided by each installation must be recorded in writing, completely, and clearly using both conventional and electronic media. Hospitals are obliged to integrate their services in accordance with Article 52 of Law no. 44 of 2009 concerning Hospitals which requires the recording and reporting of all service delivery by hospitals using the Hospital Management Information System. The Hospital Management Information System or SIMRS is a device that functions as a data collection tool, data processing, information presentation, data analysis, and a tool for drawing conclusions of information needed by hospital management and health workers (Supriyati, 2017). hospital management, namely; support front office service activities such as patient registration and admission, as well as back office such as supporting structural administrative activities in hospital organizations (Daerina et al., 2018).

The Jombang Medical Center Complementary Hospital is one of the hospitals that has implemented a hospital management information system. This is done to create an integrated data management in accordance with existing regulations. Hospital management information system is expected to help the performance of hospital management to provide optimal service to the community.

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implementing the Khanza Hospital SIM, namely; the level of discipline in filling or data entry and the use of information systems that are not carried out thoroughly. This can hinder system implementation because the attitude and acceptance of hospital information system users is an important factor in the success or failure of information system implementation (Ammenwerth, 2019).

To find out the acceptance of officers to the hospital management information system, the technology acceptance model can be used. The TAM model is a model that explains how users perceive to be willing to accept and use a technology. This model states that there is a relationship between perceived benefits, perceived convenience, and user attitudes toward using a system (Nguyen et al., 2020). By knowing the description of user acceptance of the system, it is hoped that it can help management to improve the performance of hospital information systems.

Based on this description, the researchers felt it was necessary to evaluate and analyze the use of the Hospital Management Information System (SIMRS) in the hospital. Complementary Medical Center uses the Technology Acceptance Model (TAM). The results of the study are expected to provide input to hospital management to improve performance and develop hospital management information systems.

## SUBJECTS AND METHOD

### 1. Study Design

The was an analytic observational study with a cross-sectional design.

### 2. Population and Sample

The population of this study was the staff and employees of the Jombang Medical Center Complementary Hospital who used a hospital management information system during the research period from April 1,

2022 to April 14, 2022, with 200 employees. The sampling technique used was random sampling. The number of selected sample is 73 employees.

**3. Variable**

The variables observed in this study were education and training, profession, perceived convenience, perceived benefit, attitude, and use of SIMRS.

**4. Operational Definition**

**Education and training** is education and training related to the use of SIMRS that employees have received

**Profession** is a research sample job which is divided into health workers or administration/medical records.

**Perceived ease of use** is the user's level of confidence that using the system is not difficult and requires little effort to understand how the system works.

**Perceived usefulness** is the level of user confidence that the use of information systems can improve staff performance.

**Attitude** is the user's assessment of the

performance of the hospital management information system.

**SIMRS usage** is the actual usage rate of SIMRS.

**5. Instrument**

The research data was collected using a questionnaire given to the sample in the period April 1, 2022 to April 14, 2022.

**6. Data Analysis**

Data analysis was carried out using the path analysis method using the Stata 13 application.

**RESULTS**

**1. Sample Characteristics**

Of the 73 total samples, Table 1 shows the characteristics of the sample with age <45 years as much as 91.78%, >45 years as much as 8.22%. Male sex as much as 30.14%, female 69.86%. By profession as medical or paramedical personnel as much as 49.32%, and as administrative staff or medical records as much as 50.68%.

**Table 1. Sample Characteristics**

Characteristics	Criteria	N	%
Age (year)	<45	67	91.78
	>45	6	8.22
Gender	Male	22	30.14
	Female	51	69.86
Classification of profession	Health personnel or paramedic	36	49.32
	Administration staff	37	50.68

**Table 2. Univariate Analysis Results**

Variable	N	Mean	SD	Min.	Max.
Perceived benefit	73	39.89	8.40	21	50
Perceived ease of use	73	31.91	6.27	18	45
Education or training	73	25.16	5.82	15	35
User attitude	73	24.50	3.32	18	30
System usage	73	24.84	6.07	12	35
Profession	73	0.50	0.50	0	1

**Table 3. Results of Bivariate Analysis**

Independent Variable	System Usage				Total		OR	p
	Low		High		n	%		
	n	%	n	%				
<b>Perception of benefits</b>							13.28	<0.001
Little perception	24	85.71	4	14.29	28	100		
Much perception	14	31.11	31	68.89	45	100		
<b>Perception of convenience</b>							17.71	<0.001
Low perception	31	81.58	7	18.42	38	100		
High perception	7	20.00	28	80.00	35	100		
<b>Education and training</b>							108	<0.001
Not	36	87.80	5	12.00	41	100		
Yes	2	6.25	30	93.75	32	100		
<b>User attitude</b>							41.08	<0.001
Negative	34	85.00	6	15.00	40	100		
Positive	4	12.12	29	87.88	33	100		
<b>Profession</b>							26.57	<0.001
Medical personnel	31	86.11	5	13.89	36	100		
Medical administrator or recorder	7	18.92	30	81.08	37	100		

## 2. Univariate Analysis

Univariate analysis was conducted to describe the distribution of research data. The univariate results are listed in Table 2. The data in Table 2 is still in the form of continuous data and will be transformed into dichotomous data during bivariate analysis and path analysis.

## 3. Bivariate Analysis

Bivariate analysis in this study aims to determine the effect of independent variables (perception of convenience, perceived benefits, education, profession, attitude) on the dependent variable (use of SIMRS).

Based on Table 3, it is found that the results of perceived benefits have an odds ratio of 13.28, which means that users with high perceived benefits have a 13.28 probability of using the system. Perceived ease of use has an odds ratio of 17.71, which means that users with a high perception of convenience have 17.71 times the possibility of using the system. Education and training have an odds ratio of 108, which means that users who have received education and are 108 times more likely to use the system. The user's attitude has an odds ratio of 41.08, meaning that users with a positive attitude

have a 41.08 probability of using the system. Profession has an odds ratio value of 26.57, which means that users with administrative and medical record professions have a 26.57 probability of using the system.

## 4. Path Analysis

### Model Specification

The model specification describes the relationship between the variables to be studied. In this study, there are 6 measurable variables, namely perceived convenience, perceived benefits, education and training, professional classification, attitudes, and system use. Data analysis using Stata 13 GSEM Builder software.

### Model Identification

Model identification is the step to determine whether a unique value can be obtained for each independent parameter to be estimated from the data observed in the study to be carried out. A research model is identified if it is theoretically possible to find a unique solution about the estimated parameters. The model must meet the "over-identified" or "just-identified" requirements.

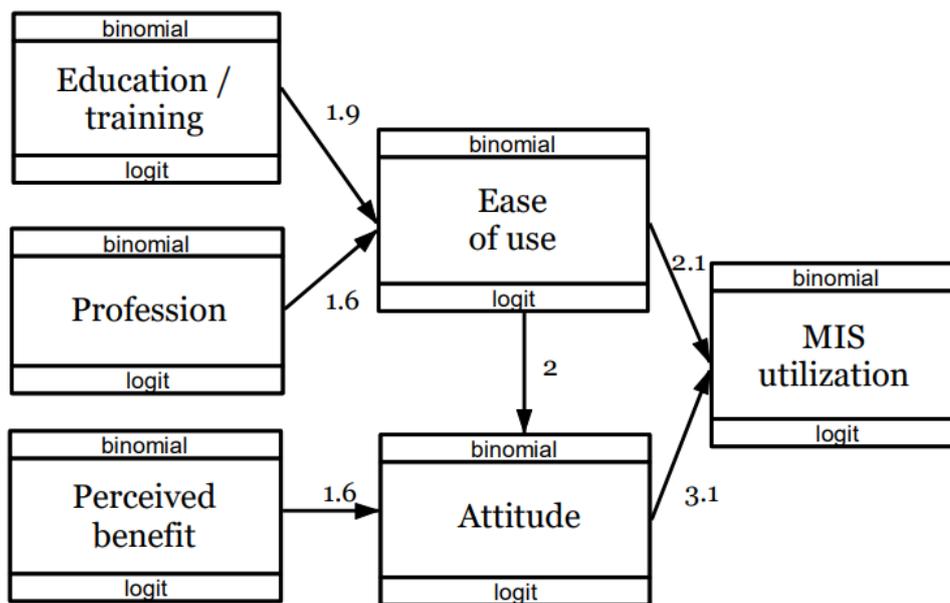


Figure 1. Structural Model of Path Analysis Before Estimation

Table 4. Path Analysis Results

Dependent Variable	Independent Variable	b	95% CI		p
			Lower Limit	Upper Limit	
<b>Direct effect</b>					
MIS utilizaion	← Perceived ease of use	2.07	0.63	3.50	0.005
	← Attitude	3.12	1.67	4.58	<0.001
<b>Indirect effect</b>					
Attitude	← Perception of benefit	1.57	0.21	2.93	0.001
	← Perceived ease of use	1.96	0.75	3.17	0.024
Perceived ease of use	← Education/training	1.89	0.56	3.22	0.005
	← Profession	1.57	0.26	2.63	0.019

**Path Analysis Results**

There is an effect of perceived ease of use on the hospital management information system. Users who have a high perceived convenience have a logodd (probability) to use SIMRS 2.07 units higher than a low perceived convenience, and are statistically significant (b= 2.07; 95% CI= 0.64 to 3.51; p= 0.005). There is an effect of attitude on the use of hospital management information systems. Users who have a positive attitude have a logodd (probability) to use SIMRS 3.12 units higher than a negative attitude, and are statistically significant (b= 3.12; 95% CI= 1.67 to 4.58; p= 0.005).

There is an effect of perceived conve-

nience on the attitudes of users of hospital management information systems. Users who have high perceived convenience have logodds (probability) to be positive 1.96 units higher than perceived ease of low, and are statistically significant, and statistically significant (b= 1.96; 95% CI= 0.75 to 3.17; p= 0.001) . There is an effect of perceived benefits on the attitudes of users of hospital management information systems. Users who had a high perceived benefit had a logodd (probability) to be positive 1.57 units higher than the perceived benefit slightly, and were statistically significant (b= 1.57; 95% CI= 0.21 to 2.93; p= 0.024).

There is an effect of education and

training on the perception of convenience. Users who received education and training had logodds (probability) for easy use of SIMRS 1.89 units higher than those who did not receive education and training, and statistically significant ( $b=1.89$ ; 95% CI= 0.56 to 3.22;  $p=0.005$ ).

There is a professional influence on the perception of ease. Users who work as administrative staff or medical records have logodds (possibility) to easily use SIMRS 1.57 units higher than those who work as medical personnel, and statistically significant ( $b=1.57$ ; 95% CI= 0.26 to 2.89;  $p=0.019$ ).

## DISCUSSION

### 1. The effect of perceived ease of use on information systems

The results of the path analysis of this study indicate that there is a positive relationship between perceived ease of use and the use of information systems. Users with high perceived ease of use are better at using information systems than users with low perceived ease of use.

The results of this study are supported by Tubaishat (2018) which states that there is a significant relationship between perceived ease of use and use of information systems. Nurses with a low perception of ease have a high level of use of information systems (Holden et al., 2016). Other models such as the Unified Theory of Acceptance and Use of Technology also state that perceived ease of use influences the intention to use and use SIMRS (Kim et al., 2015). Perceived convenience is an important factor in the acceptance of information systems in developing countries. The factor that influences the perception of convenience is the accessibility of the software so that it is easy to operate (Puhan et al., 2017). Perceived ease of using technology can motivate users to use services (Kamal et al., 2020). Several studies mention that the indicator of system

quality is perceived ease. A quality system should produce a good perception of convenience (Ojo, 2017).

### 2. The influence of attitudes on the use of information systems

The results of the path analysis of this study indicate that there is a positive relationship between user attitudes and the use of information systems. Users with positive attitude is better at using information systems than system users with negative attitudes.

The results of this study are supported by Sombat (2018) which states that attitude has a significant effect on the use of information systems. The attitude of SIMRS users has a positive effect on the use of SIMRS and has a negative effect on implementation barriers (Hsieh, 2015). Factors that support the attitude of users of information systems are organizational contextual factors (Abdekhoda et al., 2015). The use of information systems is a response to user satisfaction with the system. Users who have a positive attitude tend to be satisfied with system performance and will use SIMRS (Maillet et al., 2015). Contextual factors are management support for information system implementation and system usage training for employees. Users with good attitudes have self-efficacy to use hospital information systems.

### 3. The effect of perceived benefits on user attitude

The results of the path analysis of this study indicate that there is a positive relationship between perceived benefits and user attitudes. Users with high perceived benefits are better at using information systems than users with low perceived benefits.

The results of this study are supported by Nadri et al. (2018) which states that there is a relationship between perceived benefits and user attitudes. Another study in the African continent stated that perceived benefits as measured by costs, sys-

tem automation, increased staff workflow had an effect on SIMRS implementation (Cline & Luiz, 2013). Perception of benefits is an important component of cost benefit analysis. Information systems researchers use the perceived benefit variable as an independent variable that has an impact on the adoption of information systems (Dinev et al., 2016). Perceived benefit is defined as the relative advantage associated with the use of electronic health records. Management support can increase employee motivation to continue using information systems so that SIMRS implementation can be achieved (Handayani et al., 2017). Perceived benefits are also related to other factors in the dimensions of health information technology (Ahmadi et al., 2015). Users have hopes that the implementation of SIMRS can improve access to information, increase productivity, increase efficiency, code accuracy and clinical management and health services in general (Khalifa, 2013). Users who feel that the hospital management information system has many benefits will have the attitude to continue to use.

#### **4. The effect of perceived convenience on user attitudes**

The results of the path analysis of this study indicate that there is a relationship between perceived convenience and user attitudes. Users with high perceived ease of use are better at using information systems than users with low perceived ease of use.

The results of this study are supported by Zhao et al. (2018) which states that the perception of convenience has a significant effect on user attitudes. Based on the technology acceptance model, perceived ease of use directly affects user perceptions and attitudes (Rho et al., 2014). Perception of convenience together with perception of convenience, and perceptions of effectiveness and cost simultaneously have a direct effect on user attitudes (Ahlanan, 2014).

Several important factors that influence the perception of convenience include compatibility and cost. Research by Alhashmi et al. (2020) also states that the perception of convenience affects user attitude. Perceived ease of use is a factor that has a positive impact on the implementation of information systems.

#### **5. The effect of education and training on perceived convenience**

The results of the path analysis of this study indicate that there is a relationship between education and training with perceived convenience. Users who received appropriate education and training had a higher perceived convenience than users who did not receive education and training.

These results are supported by research which states that training has a significant effect on perceived convenience (Abdekhoda et al., 2015). Education and training programs can increase knowledge in using information systems. Knowledge can increase self-efficacy in using computers which can help make it easier for users.

#### **6. The influence of the profession on the perception of convenience**

The results of the path analysis of this study indicate that there is a relationship between professions and perceptions of convenience. Administrative officers and medical records have a higher perception of convenience than users who are medical personnel. These results are caused by the education and training of medical record administrative staff is more appropriate than medical personnel.

Administrative personnel and medical records generally receive education and training related to the use of hospital management information systems. According to research conducted by Furi et al. (2021) individual factors and institutional factors can shape perceptions and attitudes in

using SIMRS. Individual factors underlie the perception of the system user's responsibility to complete work using SIMRS. Institutional factor is a policy made to improve SIMRS is one of the individual and institutional factors that affect the perception of convenience.

#### **AUTHOR CONTRIBUTION**

Rendi Adiansa as the main researcher, formulates problems, collects research data. Bhisma Murti and Didik Gunawan Tamtomo as mentors and data analyzers.

#### **CONFLICT OF INTEREST**

There is no conflict of interest in this study

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