



EVALUATION OF THE IMPLEMENTATION OF THE HOSPITAL MANAGEMENT INFORMATION SYSTEM USING THE HOT-FIT METHOD

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ABSTRACT

Implementing a hospital management information system (SIMRS) is very important to integrate all information generated in the service process. SIMRS can encourage increased efficiency and effectiveness of services in hospitals along with the smooth flow of information between service providers and patients. In the long term, the projected use of SIMRS can save costs and avoid repetitive administrative activities. The aim of this research is to determine the level of SIMRS utilization at RSU Hermina Tangerang and to determine the factors that influence SIMRS utilization. The type of research used in this research is quantitative with a cross-sectional research design using a survey approach. The research population is all employees who use SIMRS who have a username. Data collection was carried out using a questionnaire. Data analysis using SEM PLS. Based on the research results, it shows that SIMRS at RSU Hermina Tangerang is not running optimally, it is evident that there are still many obstacles occurring in the field.

Keywords: evaluation; hot fit; pls sem; simrs

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INTRODUCTION

The rapid advancement of technology in the field of information has given birth to changes in the order of life in society, nation and state. In this regard, the role and function of data and information services carried out by hospitals as one of the data and information management work units are required to be able to make various adjustments and changes. Information systems can be used for data and information service activities in a more productive, transparent, orderly, fast, easy, accurate, integrated, safe and efficient manner, especially helping to facilitate and facilitate policy formation in improving the health service system. The implementation of the hospital management information system (SIMRS) is very important to integrate all the information generated in the service process. SIMRS can encourage increased efficiency and effectiveness of services in hospitals along with the smooth flow of information between service providers and patients. Deep In the long term, the use of SIMRS is projected to save costs and avoid repetition of administrative activities. The importance of information systems in hospitals is strengthened by the enactment of Law Number 44 of 2009 in article 52 paragraph 1 stating that every hospital is obliged to record and reporting of all hospital administration activities in the form of a hospital management information system (SIMRS). Since 2011, this regulation has been followed by Government Regulations and Regulations of the Minister of Health which regulate the minimum requirements for the management of SIMRS and the requirement for SIMRS to be integrated

with Health Information Systems at the regional and central levels. Regulations related to the implementation of applicable information systems include Minister of Health Regulation No. 1171 of 2011 concerning Hospital Information Systems, Minister of Health Regulation No. 82 of 2013 concerning Hospital Management Information Systems, Minister of Health Regulation No. 92 of 2014 concerning the Implementation of Data Communication in Integrated Health Information Systems, and Government Regulation No. 46 of 2014 concerning Health Information Systems. All hospitals must adjust to these regulations no later than two years after they are promulgated, so it is necessary to manage the information system to be able to comply with the applicable regulations.

The SIMRS implementation process requires a process that involves technical and non-technical factors. Many hospitals have made considerable investments to implement information systems, but some have experienced difficulties or failures in the adoption of SIMRS. Failure to adopt information systems results in inefficient use of resources and decreased motivation to implement the system. It is important to understand that mistakes in managing, applying information technology and information systems can lead to the failure of information technology and business processes themselves². Errors in the application of technology can be seen from inhibiting factors, including human factors. A study conducted at a Saudi Arabia Hospital with 158 respondents found that the biggest inhibiting factor was human beings with an average of 3.73, the second was finance at 3.50, the next inhibiting factor was legal and regulatory factors, organizational factors, technical factors and professional factors, these factors had an average of between 3.32-3.00.

Evaluation of an information system is a real effort to find out the actual condition of an information system implementation. With this evaluation, the achievements of the implementation of an information system can be known and further actions can be planned to improve the performance of its implementation. The end user is one of the indicators to assess the extent to which the information system can provide convenience and provide benefits to the SIRMS user⁷. One of the theoretical frameworks used for the evaluation of information systems in the field of health services is the HOT-Fit Model, which looks at the entire system by placing important components in the information system, namely humans, organizations and technology) and the suitability of relationships as determining factors for the successful implementation of an information system. Where in evaluating the hospital management information system by measuring assessments based on the respondent's attitude towards a condition.

METHOD

The type of research used in this study is quantitative with a cross sectional research design using a survey approach to determine the influence between independent variables (*system quality, information quality, service quality, top management support, project management, vendor support, it capabilities of staff, system use and user satisfaction*) on the dependent variables of net benefit. The sampling technique in this study uses the *purposive sampling method* with the hope that the quality or characteristics of the respondents can be represented. The instrument used is a structured list of interview questions for the management group and operators. The data sample collection point is *cross sectional* (one data collection per respondent)⁸. The type of question used in the questionnaire is a *closed ended question*, which is measured using five points on the likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The validity and reliability test of the questionnaire was carried out to ensure that the research instruments used were valid and reliable. Data processing using SEM PLS analysis with SmartPLS Software Version 3.0. Partial Least Squares is a powerful analysis

method and is often called soft modellin. Because it eliminates the assumption that the data must be normally distributed and there is no multicollinearity between exogenous variables (independent variables), as well as allowing testing with a small sample. PLS is used to explain the existence or absence of relationships between latent variables (predictions), and also to confirm theories.

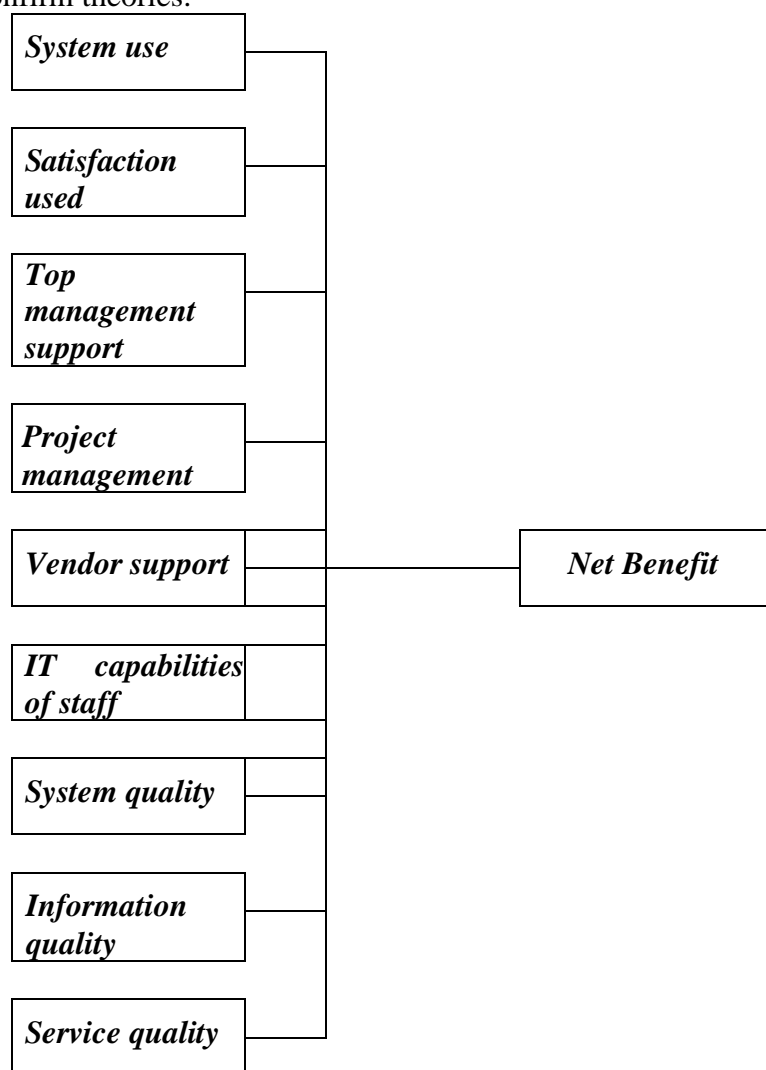


Figure 1. Research Concept Framework

Some of the research hypotheses developed in the research on factors that affect the use of SIMRS include:

- H1 : The Effect of *System Quality* on *Net Benefit*
- H2 : There is an effect of *information qualiti* on *net benefit*
- H3 : There is an effect of *service quality* on *net benefit*
- H4 : There is an influence of *Top Management Support* on *Net Benefit*
- H5 : There is an influence of *project management* on *net benefit*
- H6 : There is an influence of *vendor support* on *net benefit*
- H7 : There is an effect of *IT Capabilitie of Staff* on *Net Benefit*
- H8 : There is an effect of *system use* on *net benefit*
- H9 : There is an effect of *user satisfaction* on *net benefit*

RESULTS

Table 1.
Characteristics of Respondents

Characteristic	f	%
Gender		
Law	18	20,93
Woman	68	79,07
S2 Education		
D4/S1	3	3,35
D3	27	31,4
D3	46	53,5
High School/Equivalent	10	11,6
Registration Work Unit/RM		
Nurses/Midwives	15	17,5
From the toad	39	45,3
Payment	15	17,5
Support	10	11,6
Doctor	5	5,8
Doctor	2	2,3
Working Period		
<1 year	0	0,0
1-5 years	25	29,1
6-10 years	17	19,8
>10 years	44	51,1
Age		
<25 years	6	6,97
25-35 years old	38	44,19
36-45 years old	21	24,42
>45 years	19	22,09
Length of SIMRS		
<1 year	3	3,49
1-5 years	70	81,4
6-10 years	12	13,95
>10 years	1	1,16

Table 1. showed that 79.07% of SIMRS users were women with different levels of education with the highest percentage being D3 as much as 53.5%, high school as much as 11.6%, and S1 as much as 31.4%. Judging from the work unit, SIMRS has been installed in almost all service units in the hospital, the forefront is registration, then entering polyclinics such as general polyclinics, obstetric polyclinics, pediatric polyclinics, ophthalmic polyclinics, skin polyclinics, internal polyclinics, surgical polyclinics, etc. Laboratory, radiology, physiotherapy, nutrition, pharmacy and emergency room as well as hospitalization. The length of time respondents have used SIMRS as many as 81.4% of respondents have used SIMRS for 1-5 years, showing that with the long use of SIMRS, respondents already know and understand enough how to use SIMRS. The age of respondents who used SIMRS was 44.19% of respondents aged 26-35 years and as many as 24.42% were aged 36-45 years. This shows that the age of respondents who use SIMRS is classified as productive who are able to adapt to technology quickly and are used to using technology, especially in terms of communication. This certainly makes it easier to use the SIMRS application properly.

Evaluation of Measurement Model (*outer model*) Evaluation of measurement models is a type of

SEM that uses variance in the iteration process so that it does not require correlation between indicators or their latent constructs in a structural model. This measurement model aims to test the predictive relationship between constructs by looking at whether there is a

relationship or influence between the constructs. The thing that needs to be done to calculate the validity and reliability of the construct is to look at the validity of convergence, validity of discrimination, and reliability of the construct. Convergent *validity* refers to the correlation between the score of an item/indicator and its construction score. Individual indicators are considered reliable if the correlation value is above 0.60 in accordance with *the output* obtained from data processing using SmartPLS. To see if the value is >0.60 or not, it is necessary to carry out a *loading factor* test as shown in figure 2 below

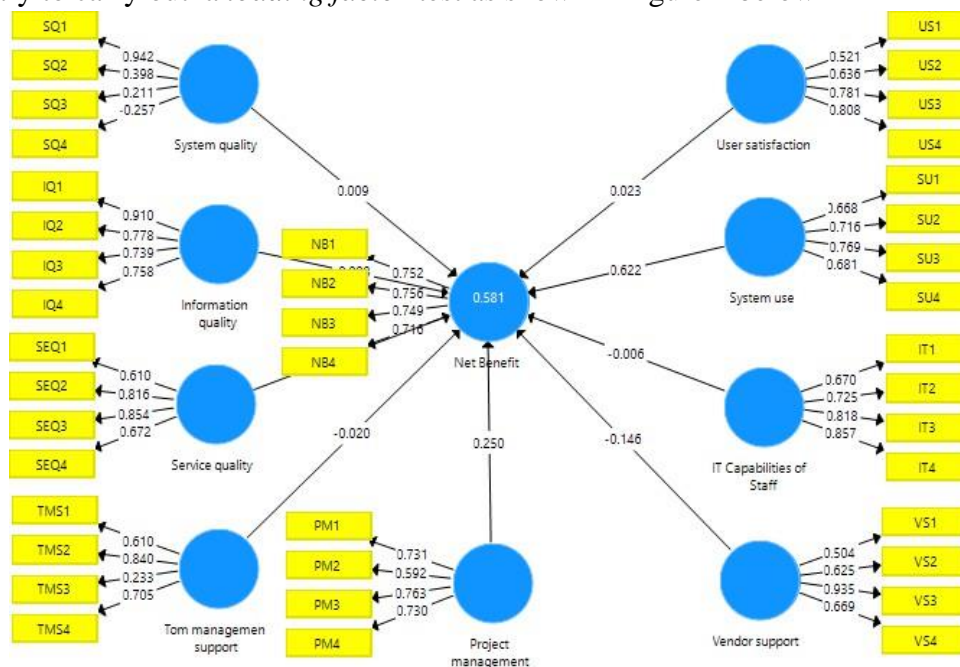


Figure 2. Loading Factor Results

Figure 2 shows that all *loading factor* values of each indicator for exogenous and endogenous constructs have a result of >0.60, except for the SQ2, SQ3, SQ4 indicators which are indicators for *system quality* constructs. Because the *loading factor* values are 0.398, 0.211, 0.257 (<0.60), the SQ2, SQ3, SQ4 indicators must be excluded from the model. Then on the TMS3 indicator which is a *top management support construction indicator with a loading factor value* of 0.233. Furthermore, on the PM2, VS1 and US1 indicators which are indicators of *project management, vendor support and user satisfaction* construction with PM2 loading factor values of 0.592, VS1 0.504 and US1 0.521, these indicators must be removed from the model. Then after the indicator is issued, a recalculation is carried out with the PLS algorithm. The results of the PLS calculation algorithm after issuing the QS2, QS3, QS4, TMS3, PM2, VS1 and SU1 indicators.

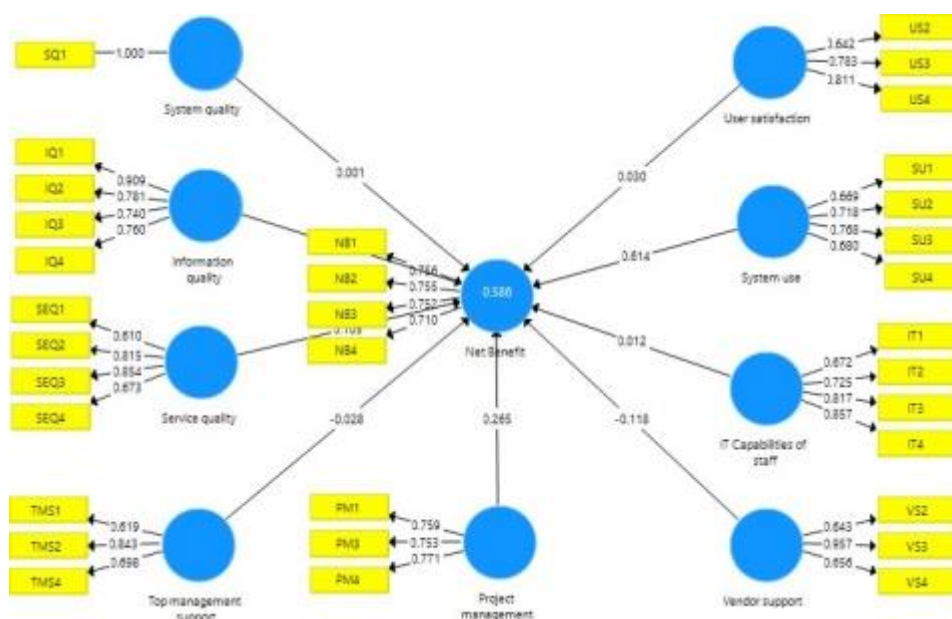


Figure 3. Loading Factor Results after Elimination

Figure 3 explains that after the seven indicators are issued, the results show that there are no more indicators that have a *loading factor value* of <0.60 . So that the indicator is declared significant and has met the requirements for convergence validity.

Tabel 3.

Variable	Nilai <i>Composite Reliability</i> , <i>Composite Reliability</i> dan AVE		
	Value <i>Composite Reliability</i>	<i>Cronbach alpha</i>	AVE Scores
SQ	1,000	1,000	1,000
IQ	0,876	0,848	0,640
SEQ	0,830	0,731	0,555
TMS	0,767	0,649	0,527
PM	0,805	0,640	0,579
VS	0,804	0,668	0,587
IT	0,854	0,784	0,595
HIS	0,802	0,679	0,503
US	0,792	0,615	0,561
<u>N B</u>	<u>0,832</u>	<u>0,733</u>	<u>0,533</u>

Table 3 explains that the *composite reliability* and *cronbach alpha* values of each variable are >0.60 , thus explaining that the high reliability of the measuring tool means that all constructs have good reliability. The AVE value is greater than 0.5, indicating that all of the above indicators have met the convergence validity requirements.

Table 4.

Cross Loading Value All Indicators

	SQ	IQ	SEQ	TMS	PM	VS	IT	HIS	US	NB
SQ1	0,942	0,837	0,762	0,560	0,756	0,558	0,628	0,620	0,724	0,762
IQ1	0,926	0,910	0,850	0,691	0,782	0,791	0,665	0,732	0,882	0,850
IQ2	0,943	0,778	0,901	0,765	0,778	0,834	0,682	0,765	0,868	0,901
IQ3	0,734	0,739	0,683	0,522	0,741	0,640	0,671	0,737	0,697	0,683
IQ4	0,774	0,758	0,544	0,619	0,749	0,626	0,692	0,602	0,725	0,544
SEQ1	0,685	0,852	0,610	0,662	0,606	0,556	0,652	0,697	0,649	0,610
SEQ2	0,760	0,813	0,816	0,529	0,577	0,569	0,660	0,669	0,741	0,816
SEQ3	0,835	0,815	0,854	0,614	0,648	0,758	0,619	0,593	0,733	0,854
SEQ4	0,836	0,767	0,672	0,636	0,623	0,779	0,612	0,671	0,751	0,672
TMS1	0,827	0,758	0,941	0,610	0,574	0,713	0,565	0,614	0,710	0,941
TMS2	0,866	0,737	0,960	0,840	0,625	0,739	0,714	0,749	0,878	0,960
TMS4	0,818	0,771	0,908	0,705	0,528	0,585	0,715	0,830	0,815	0,908
PM1	0,664	0,615	0,726	0,801	0,731	0,657	0,636	0,656	0,681	0,726
PM3	0,768	0,665	0,701	0,970	0,763	0,670	0,716	0,682	0,783	0,701
PM4	0,548	0,527	0,477	0,851	0,730	0,501	0,684	0,702	0,579	0,477
VS1	0,749	0,660	0,614	0,928	0,750	0,504	0,684	0,715	0,756	0,614
VS2	0,745	0,616	0,535	0,651	0,784	0,625	0,495	0,620	0,735	0,535
VS3	0,585	0,514	0,428	0,428	0,821	0,935	0,591	0,451	0,565	0,428
VS4	0,711	0,784	0,479	0,482	0,882	0,669	0,670	0,522	0,603	0,479
IT1	0,680	0,786	0,539	0,591	0,914	0,651	0,670	0,560	0,675	0,539
IT2	0,731	0,761	0,674	0,619	0,878	0,741	0,720	0,646	0,721	0,674
IT3	0,683	0,584	0,683	0,667	0,630	0,915	0,818	0,676	0,733	0,683
IT4	0,835	0,717	0,835	0,724	0,778	0,933	0,857	0,679	0,821	0,835
SU1	0,635	0,545	0,635	0,591	0,537	0,919	0,565	0,668	0,651	0,635
SU2	0,683	0,568	0,683	0,567	0,512	0,759	0,492	0,716	0,501	0,683
SU3	0,761	0,703	0,761	0,634	0,696	0,934	0,660	0,769	0,748	0,761
SU4	0,451	0,526	0,326	0,461	0,532	0,449	0,754	0,681	0,583	0,784
US1	0,691	0,628	0,699	0,540	0,591	0,551	0,717	0,441	0,521	0,786
US2	0,518	0,552	0,465	0,537	0,436	0,270	0,764	0,700	0,636	0,761
US3	0,622	0,705	0,596	0,765	0,625	0,602	0,869	0,795	0,781	0,584
US4	0,617	0,669	0,623	0,541	0,698	0,700	0,850	0,548	0,808	0,717
NB1	0,713	0,690	0,638	0,650	0,707	0,674	0,656	0,765	0,720	0,752
NB2	0,596	0,563	0,613	0,701	0,472	0,574	0,640	0,886	0,743	0,756
NB3	0,734	0,796	0,758	0,586	0,654	0,731	0,731	0,839	0,756	0,749
NB4	0,370	0,422	0,474	0,508	0,267	0,416	0,639	0,769	0,593	0,710

Table 4 shows that the *cross loading* value of each indicator in the variable is >0.60. Thus, as a result of convergent validity and discriminant validity, all variables and indicators in the study have good validity

Structural Model Evaluation (*inner model*)

Table 5.
Path Coefficient Value for Each Hypothetical Path

Variable	Original sample	Sample Mean	Standard Deflected	T-statistic	P-Values
SQ→NB	0,001	0,012	0,084	0,016	0,988
IQ→NB	-0,019	-0,016	0,124	0,155	0,877
SEQ→NB	0,105	0,107	0,081	1,294	0,196
TMS→NB	-0,028	-0,040	0,089	0,317	0,751
PM→NB	0,265	0,263	0,102	2,603	0,010
VS→NB	-0,118	-0,085	0,079	1,487	0,138
IT→NB	0,012	0,015	0,089	0,129	0,897
SU→NB	0,614	0,604	0,087	7,002	0,000
US→NB	0,030	0,029	0,121	0,244	0,807

Hypothesis Testing

Table 6.
Hypothesis Test Results

Variable	Hipotesis	T-statistic	T-table	Result
SQ→NB	H1	0,016	1,96	Rejected
IQ→NB	H2	0,155	1,96	Rejected
SEQ→NB	H3	1,294	1,96	Rejected
TMS→NB	H4	0,317	1,96	Rejected
PM→NB	H5	2,603	1,96	Accepted
VS→NB	H6	1,487	1,96	Rejected
IT→NB	H7	0,129	1,96	Rejected
SU→NB	H8	7,002	1,96	Accepted
US→NB	H9	0,244	1,96	Rejected

Table 6 shows that there are three indicators accepted after hypothesis testing, Among them are *project management* and *system use*

DISCUSSION

The Effect of System Quality Factors on Net Benefit

From the results of the research that has been carried out, it shows that hypothesis 1 (H1) is rejected so that it can be proven that the system quality factor has no effect on net benefit. This can also be seen from the results of the analysis conducted descriptively which shows that the majority of respondents do not agree that SIMRS operates properly without both technical and non-technical obstacles during working hours. Respondents felt that the internet network was not so good, when the system was operating, it often took a long time to load, affecting data entry not in real time. The ease of technology is something that affects the frequency of system use. Ease of use is also influenced by ease of learning and usefulness is influenced by ease of use. Meanwhile, convenience and usefulness will affect the acceptance of the system by its users. The system received will provide satisfaction for its users. From this research case, the quality of the system has not satisfied its users due to the system that often errors during busy service hours and slow internet networks. Therefore, it is necessary to improve and improve the quality of the system in order to provide optimal benefits for users by further increasing the use of SIMRS in hospitals14.

The Influence of Information System Factors on Net Benefits

From the results of the research that has been carried out, it shows that hypothesis 2 (H2) is rejected so that it can be proven that the information quality factor has no effect on net

benefit. This can also be seen from the results of the analysis conducted descriptively which shows that the majority of respondents stated that they did not agree with SIMRS producing information that could be accounted for in its truth, respondents did not agree that SIMRS produced was timely and accurate and very complete and relevant to the information needed. A system that often fails is one of the obstacles to providing timely information, officers who do not enter data and systems that sometimes do not match the input and output. The low benefits felt by information system users show that information system users are not satisfied, the quality of the information produced is not accurate and accountable. The information generated from SIMRS technology has not been used for reporting or decision-making. Based on the results of the data analysis that has been carried out by the researcher, there is no influence between the quality of information on the benefits and satisfaction of use.

The Effect of Service Quality Factor on Net Benefit

From the results of the research that has been carried out, it shows that hypothesis 3 (H3) is rejected so that it can be proven that the service quality factor has no effect on net benefit. The results of the descriptive analysis on service quality showed that only 55.81% of respondents stated that they did not agree that it was quickly repaired in the event of a system malfunction, 53.49% of respondents did not agree that SIMRS had user documentation, 50% of respondents did not agree that SIMRS had helddesk support and 51.16% did not agree that SIMRS had a helpdesk number that could be contacted in case of complaints or disturbances in the system. This hypothesis shows that user dissatisfaction is caused by vendor services that are not quick to respond when needed, the unavailability of a helpdesk, vendors have not provided quality assurance and service for the use of SIMRS and have not been able to solve problems that may arise in the use of SIMRS. To support the needs of a hospital, good communication with the management is needed before the system is translated into a programming language so that it will make it easier for users to meet their needs in using an information system. Good communication will produce the information needed for the analysis of hospital management needs so that the implementation of SIMRS can be beneficial for all parties.

The influence of Top Management Support factors on Net Benefit

From the results of the research that has been carried out, it shows that hypothesis 4 (H4) is rejected so that it can be proven that the top management support factor has no effect on net benefit. Leadership support in the form of leadership commitment in SIMRS is still not optimal. The leadership has not yet established policies and guidelines for the use of SIMRS. SIMRS has not been a priority from the leadership and the follow-up of the evaluation that has not been carried out. The top management support factor has a very significant effect on the success of ERP implementation. Top management support has a significant effect on the success of IT adoption, research was conducted on three subjects and significant results were found three times. According to him, from this top management, it can be studied the profile and vision and mission, employees and middle management of an agency, so that strengthening in top management will affect the success of IT10 adoption.

The Effect of Project Management Factors on Net Benefit

From the results of the research that has been carried out, it shows that hypothesis 5 (H5) is accepted so that it can be proven that the project management factor has an effect on the net benefit. The results of the descriptive analysis on project management showed that 83.72% of respondents agreed that the management supported the implementation of SIMRS, 73.26% of employees accepted the process of changing the work culture from paper recording to the SIMRS system, 56.98% of respondents agreed that the management provided infrastructure

support to support the implementation of SIMRS, 52.33% of respondents agreed that the implementation of SIMRS received financial support from management. Medical staff who actively use SIMRS is one of the factors driving the adoption of information systems. Staff cohesion, support between colleagues, regular use of SIMRS are the driving factors for the use of SIMRS⁷.

The Effect of Vendor Support Factors on Net Benefit

From the results of the research that has been carried out, it shows that hypothesis 6 (H6) is rejected so that it can be proven that the vendor support factor has an effect on net benefit. The existence of a rejected hypothesis indicates that there is a problem with the quality of the vendor. Based on the results of the study, many respondents complained about the existence of SIMRS which often errors during busy working hours, then also the length of response from the vendor to overcome the problem. In addition, the quality of information is also considered inaccurate. Technical problems, unintegrated systems, equipment disruptions and poor service quality are things that can cause reluctance to use SIMRS. ⁷ Service quality is the user's perception of the services that have been provided by the service provider. Initially, a measure of service quality was used to measure customer satisfaction which was defined as a comparison between customer expectations and perceptions of the quality of customer service provided.

The Effect of IT Capabilities of Staff Factor on Net Benefit

From the results of the research that has been carried out, it shows that hypothesis 7 (H7) is rejected so that it can be proven that the IT capabilities of staff factor has no effect on net benefit. The existing SIMRS has not been supported by expert staff in accordance with PMK No. 82 of 2013 that the Hospital must have an information and technology unit/installation and have staff with qualifications such as system analyst staff, programmer staff, hardware staff and network maintenance staff. At present, the staff serving in SIMRS are 3 computer graduates and 4 non-computer graduates. For this reason, it is necessary to accept contract personnel who are in accordance with these qualifications as well as experience in the field of information systems or utilize existing human resources either with education or training to improve the quality of SIMRS human resources in hospitals. Based on the results of their research, they are of the opinion that the existence of an IT team that has good competence and performance to handle SIMRS technical problems, is available 24 hours/7 days a year and has the ability to communicate well with users will affect the successful implementation of SIMRS¹⁴.

Effect of System Use Factor on Net Benefit

From the results of the research that has been carried out, it shows that hypothesis 8 (H8) is accepted so that it can be proven that the System use factor affects the net benefit. From observations in the field, they feel that the use of SIMRS makes the process of searching for information easier, SIMRS is very helpful for their daily work. Therefore, it is necessary to increase the use of a quality system to achieve the net benefits desired by hospitals.

Effect of User Satisfaction Factor on Net Benefit

From the results of the research that has been carried out, it shows that hypothesis 9 (H9) is rejected so that it can be proven that the user satisfaction factor has no effect on net benefit. The results of the descriptive analysis on user satisfaction showed that 30.23% of respondents did not agree that the facilities and features in SIMRS were in accordance with their needs, 30.93% overall SIMRS was in line with expectations in helping my daily tasks, 20.93% of

users were satisfied with the appearance of the application and easy to use 45.35% of the information generated by the system, accurate and could help in the decision-making process. User satisfaction is the response and feedback that users generate after using the information system. User attitude towards information systems is a subjective criterion regarding how much users like the system used⁶. The level of satisfaction has a direct effect on the use of the system. If SIMRS is satisfactory, the level of use will be more frequent. User satisfaction is a factor that encourages the use of the system and affects the user's perception of the benefits obtained

CONCLUSION

SIMRS at Hermina Tangerang Hospital has not run optimally, it is evident that there are still many obstacles that occur in the field, including: systems that often error during service hours, information that is not complete and accurate, slow response in case of system damage, leadership commitment that has not been maximized and policies and guidelines related to SIMRS, vendors in the development of SIMRS are still lacking and the competence of IT staff is not optimal and not in accordance with educational background or experience. The variables that have an influence on net benefit are: project management and system use. The variables that do not have an influence on net benefit are: system quality, information quality, service quality, top management support, vendor support, IT capabilities support and user satisfaction

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