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Analysis of Successful Implementation of Hospital Information System in Bhayangkara Polda DIY Hospital with MMUST Method

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ABSTRACT
Since 2010, Bhayangkara Polda DIY Hospital has been using Hospital Information System (HIS), but the system still needs to be optimized. In the context of optimizing HIS implementation, it is necessary to analyze the success of HIS implementation. This study examines the factors that influence the successful implementation of Hospital Information System (HIS) in Bhayangkara Polda DIY Hospital based on the Model for Mandatory Use of Software Technologies (MMUST) method. This research is a descriptive study with a cross-sectional quantitative approach. The study sample used purposive sampling, which amounted to 98 respondents. Data analysis using the Structural Equation Modeling Partial Least Squares (SEM-PLS) technique using SmartPLS software version 4.1.0.3. The results stated that information satisfaction is influenced by information quality, performance expectations are influenced by information satisfaction and social influence, performance expectations and facility conditions influence attitudes, attitudes influence usage and overall satisfaction, and net benefits are influenced by usage and overall satisfaction. This study proves empirically that all hypotheses are accepted. HIS has proven to be a successful implementation because it can produce accurate, fast, and complete information, accelerate user performance, and provide benefits in its implementation.

INTRODUCTION

Information and communication technology development continues to grow globally and reach various sectors of life, including health services. The utilization of information technology in the healthcare field significantly impacts how healthcare services are delivered and how the entire healthcare system operates.[1] One example of the use of information technology in healthcare in many countries is the implementation of the Hospital Information System (HIS). HIS is a health data management system that includes recording, storing, maintaining, and distributing patient medical records, hospital organizational management, and decision-making systems supporting health policies.[2]

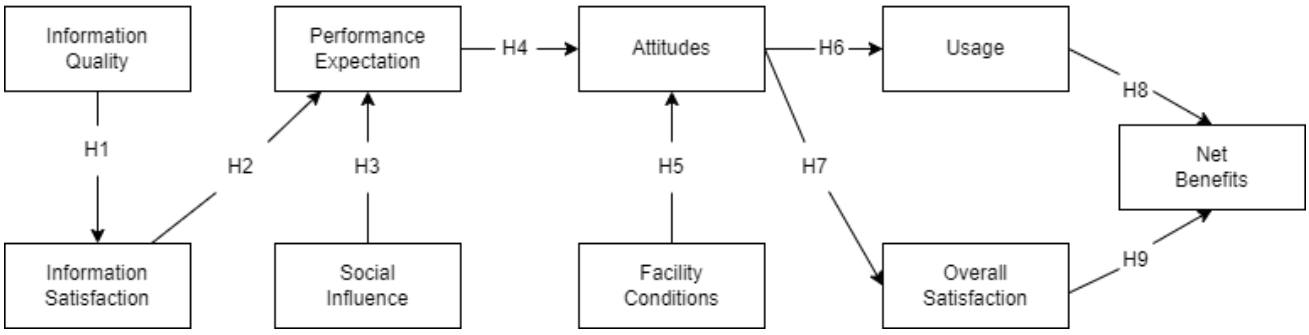
In Indonesia, efforts to develop infrastructure and implement HIS, also called *Sistem Informasi Manajemen Rumah Sakit (SIMRS)*, have become part of the government's policy. The Ministry of Health Regulation of 2013 mandates that every hospital implement HIS to promote its application in patient care and administration.[3] HIS plays a crucial role in enhancing efficiency, the quality of healthcare services, patient safety, and integrating health data in a computerized manner.[4]

In optimizing the implementation of HIS, one of the key elements that plays an essential role as a user is the HIS user.[5] The success or failure of HIS implementation is influenced by how willing users are to accept and utilize the HIS system.[6] Assessment of the success of HIS can be conducted both before and after implementation.[7] By understanding users' perceptions, appropriate recommendations can be identified to maximize and enhance the implementation of HIS in improving the quality of healthcare services. This is because users are considered to have the best knowledge to assess whether the system operates as expected, whether it provides ease of use, and how the technology can be utilized. Therefore, users' views and acceptance of HIS are appropriate indicators for evaluating the success of HIS its implementation.[8]

Many studies have been conducted to assess the success of an information system, but few consider whether the system's use is mandatory or voluntary. Mandatory and voluntary information systems have different characteristics: mandatory systems must be used according to applicable regulations or standard operating procedures, while voluntary systems are used based on personal preferences and perceived benefits. This requires a different analytical approach. One model specifically designed to measure the success of information systems in a mandatory management or organizational setting is the Model for Mandatory Use of Software Technologies (MMUST).[9] The use of the MMUST method is necessary for analyzing systems that are mandatory to implement, one of which is HIS. The MMUST method is necessary to analyze mandatory systems like HIS. A study has also utilized the MMUST method to measure the success of HIS implemented in a hospital in Lumajang, East Java.[10]

In 2010, Bhayangkara Hospital in Yogyakarta, Indonesia, implemented HIS to manage healthcare. Preliminary studies at Bhayangkara Polda DIY Hospital indicated that several issues still hinder the optimal use of HIS. Some challenges faced by users in the implementation of HIS include system errors that occur during updates, causing the system to be temporarily inaccessible, slow internet speeds that often disrupt the process of patient service, redundancy in patient data that interferes with health data analysis, and form formats that do not meet the hospital's needs. If these issues are not addressed and managed correctly, they could develop into more complex problems.

No studies have yet analyzed the success of HIS implementation at Bhayangkara Polda DIY Hospital. This analysis is vital to measure the effectiveness of the information system and provide guidance for improving HIS implementation to achieve successful outcomes. Based on the abovementioned issues, the researcher intends to analyze the factors contributing to the success of HIS implementation at Bhayangkara Polda DIY Hospital using the MMUST method. The choice of MMUST in this study is based on the nature of HIS as a mandatory information system that users must implement at the Bhayangkara Polda DIY Hospital.



Source: Deharja A, Waskito DY, Rachmawati E, Vestine V, 2023

Figure 1. MMUST Model with Hypotheses

MATERIAL AND METHOD

This research is descriptive quantitative research with a cross-sectional approach. This research was conducted at Bhayangkara Polda DIY Hospital, which was conducted from February to June 2024. The population in this study was all HIS users at Bhayangkara Polda DIY Hospital, totaling 122 people, consisting of doctors, nurses, midwives, pharmacists, medical recorders, laboratory assistants, nutritionists, and administration/cashiers. The study utilized purposive sampling to select a total of 90 files as the sample size. Purposive sampling is a sample selection method based on specific criteria.[11] The sample determination should be 5-10 times the number of variables in the study.[12] The number of variables in this study is 9 variables times 10 = 90 samples. So, the minimum sample in this study was 90 samples.

Data collection involved administering a questionnaire based on the MMUST and conducting observations.[10] The questionnaire utilized a five-point Likert scale ranging from 1 (disagree) to 5 (agree) and was distributed to HIS users at Bhayangkara Polda DIY Hospital via Google Forms sent through WhatsApp.

MMUST method combines the Wixom & Todd model, the UTAUT model, and the DeLone & McLean SI Success Model, which aims to measure the success of information systems that are mandatory to implement.[9] This is seen from how well users get information (information quality) to users getting realistic benefits from the system. The MMUST model looks at eight factors to measure information system success: information quality, information satisfaction, attitudes, performance expectations, social influence, usage, overall satisfaction, and net benefits.

This study refers to the research by Deharja et al (2023), which modified MMUST that has been tested for validity and reliability. Deharja et al modified MMUST by adding a new independent variable, namely the facilitating condition variable (Figure 1).[13] The nine hypotheses outlined are formulated as illustrated in Figure 1:

H1: Information quality has a positive effect on information satisfaction in the implementation of HIS.

H2: Information satisfaction has a positive effect on performance expectations in the implementation of HIS.

H3: Social influence has a positive effect on performance expectations in the implementation of HIS.

H4: Performance expectations have a positive effect on attitude in the implementation of HIS.

H5: Facility conditions have a positive effect on attitude in the implementation of HIS.

H6: Attitude has a positive effect on usage in the implementation of HIS.

H7: Attitude has a positive effect on overall satisfaction in the implementation of HIS.

H8: Usage has a positive effect on net benefits in the implementation of HIS.

H9: Overall satisfaction has a positive effect on net benefits in the implementation of HIS.

Data analysis employed the Structural Equation Modeling Partial Least Squares (SEM-PLS) technique using SmartPLS. Ethical approval for this study was obtained from the Research Ethics Commission at Bhayangkara Polda DIY Hospital under letter number: 05/III/2024/ KEPKRSBhy.

RESULTS

Demographic Characteristics of The Respondents

This section provided an overview of the characteristics of the 98 respondents involved in the study. The demographic information of HIS users indicated that most participants were female (86%), and approximately half of them were aged between 21 and 30 years (52%). A significant portion of the participants had a diploma degree (68.4%). Furthermore, over half of the participants (51%) had more than five years of hospital work experience. Regarding system usage, a notable finding was that users with over three years of experience constituted the largest proportion (41%) (Table 1).

Multivariate Analysis

Multivariate analysis using the Structural Equation Model-Partial Least Squares (SEM-PLS) analysis with the help of SmartPLS 4.1.0.3 software is used to see the influence between variables with hypothesis testing. The analysis consisted of two stages: outer model analysis and inner model analysis. Outer model analysis is used to test and check the validity and reliability of construct indicators. While inner model analysis is used to observe the correlation between constructs or research variables.

Analysis of the Outer Model

The outer model stage is carried out to test and check the validity (convergent validity test and discriminant validity test) and reliability (composite reliability and Cronbach's alpha) of the construct indicators.

Convergent Validity Test

Convergent validity is carried out to determine whether the indicators or research questions used are valid and can measure the construct of the concept being measured. Indicators are declared valid if the loading factor value is >0.7 and the Average Variance Extracted (AVE) value is >0.5. The data processing results in Table 2 show that the value of each indicator is more significant than 0.7. Thus, it can be stated that the instrument has been declared valid and meets convergent validity. Based on Table 2, all AVE values have met the validity test because they have a value of more than 0.5. Therefore, all indicators in the model have satisfied the criteria for convergent validity.

Table 1. Demographic Characteristics of the Respondents

Characteristics	n = 98	%
Gender		
Female	84	86
Male	14	14
Age (Years)		
< 20	1	1
21-30	51	52
31-40	27	28
41-50	17	17
> 50	2	2
Education degree		
High School Graduation	9	9.2
Diploma	67	68.4
Bachelor	21	21.4
Master	1	1
Job Level		
Pharmacists	16	16
Radiographer	3	3
Nurse	39	40
Medical Recorders	2	2
Administration/Cashier	9	9
Midwives	13	13
Health Analyst	4	4
Anaesthetist	2	2
Nutritionists	7	7
Environmental Health Staff	1	1
BPJS Staff	2	2
Work Experience (Years)		
< 1	5	5
1-5	43	44
> 5	50	51
Experience of Using the System (Years)		
< 1	22	22
1-3	36	37
> 3	40	41

Source: Primary Data, 2024

Discriminant Validity Test

Discriminant validity testing is done by looking at the cross-loading factor value of each construct, which must be greater than the relationship between the construct and other constructs in the model, as shown in Table 3. Consequently, it can be inferred that all indicators have met the criteria for the discriminant validity test.

Reliability Test

The reliability test was carried out to show that each questionnaire used was reliable. Indicators are considered trustworthy if the composite reliability value is >0.7 and Cronbach's alpha is >0.7. Table 2 demonstrates that the composite reliability value and Cronbach's alpha exceed 0.7. Hence, it can be concluded that all indicators of constructs have fulfilled the reliability test criteria.

Analysis of the Inner Model

The structural model testing aims to observe the correlation between constructs or research variables. This examination involves observing the R-Square (R^2) values, which indicate how much the independent variables influence the dependent variables in the model, as shown in Table 4. According to Chin (1998), R^2 values are categorized into three levels: strong (0.67), moderate (0.33), and weak (0.19).[14]

Table 2. Variable, Items, Outer Loading, Composite Reliability, Cronbach Alpha, AVE

Variable	Items	Outer Loading	AVE	Cronbach Alpha	Composite Reliability
Information Quality (KI)	KI1	0.922	0.857	0.944	0.960
	KI2	0.935			
	KI3	0.937			
	KI4	0.908			
Facility Conditions (KF)	KF1	0.784	0.628	0.802	0.870
	KF2	0.754			
	KF3	0.872			
	KF4	0.753			
Social Influence (PS)	PS1	0.897	0.799	0.873	0.923
	PS2	0.943			
	PS3	0.839			
Information Satisfaction (KP)	KP1	0.945	0.900	0.889	0.947
	KP2	0.952			
Performance Expectations (HK)	HK1	0.910	0.815	0.922	0.946
	HK2	0.962			
	HK3	0.952			
	HK4	0.776			
Attitude (SP)	SP1	0.926	0.881	0.955	0.967
	SP2	0.942			
	SP3	0.956			
	SP4	0.931			
Usage (PG)	PG1	0.976	0.949	0.946	0.974
	PG2	0.973			
Overall Satisfaction (KK)	KK1	0.942	0.909	0.966	0.975
	KK2	0.956			
	KK3	0.959			
	KK4	0.955			
Net Benefits (MB)	MB1	0.835	0.848	0.955	0.965
	MB2	0.964			
	MB3	0.953			
	MB4	0.940			
	MB5	0.907			

Source: Primary Data, 2024

Table 3. Cross-Loading of Measures

	HK	KF	KI	KK	KP	MB	PG	PS	SP
HK1	**0.910**	0.461	0.708	0.602	0.620	0.694	0.639	0.626	0.661
HK2	**0.962**	0.493	0.748	0.643	0.665	0.753	0.719	0.683	0.732
HK3	**0.952**	0.464	0.747	0.612	0.621	0.728	0.639	0.700	0.765
HK4	**0.776**	0.353	0.619	0.550	0.544	0.645	0.576	0.603	0.608
KF1	0.405	**0.784**	0.497	0.427	0.480	0.440	0.448	0.462	0.474
KF2	0.313	**0.754**	0.301	0.361	0.305	0.358	0.332	0.428	0.361
KF3	0.380	**0.872**	0.407	0.463	0.431	0.527	0.479	0.476	0.473
KF4	0.447	**0.753**	0.452	0.465	0.560	0.494	0.440	0.518	0.483
KI1	0.731	0.527	**0.922**	0.587	0.629	0.679	0.632	0.635	0.685
KI2	0.693	0.507	**0.935**	0.559	0.590	0.641	0.588	0.608	0.677
KI3	0.718	0.471	**0.937**	0.576	0.622	0.717	0.601	0.604	0.667
KI4	0.758	0.464	**0.908**	0.585	0.641	0.705	0.679	0.596	0.702
KK1	0.654	0.508	0.603	**0.942**	0.663	0.842	0.814	0.651	0.801
KK2	0.656	0.544	0.618	**0.956**	0.708	0.821	0.801	0.684	0.837
KK3	0.588	0.504	0.534	**0.959**	0.695	0.822	0.871	0.618	0.769
KK4	0.644	0.528	0.620	**0.955**	0.651	0.797	0.745	0.675	0.817
KP1	0.618	0.527	0.620	0.691	**0.945**	0.783	0.759	0.571	0.647
KP2	0.670	0.557	0.652	0.662	**0.952**	0.739	0.642	0.603	0.678
MB1	0.596	0.513	0.518	0.726	0.656	**0.835**	0.706	0.602	0.633
MB2	0.751	0.582	0.699	0.807	0.737	**0.964**	0.835	0.690	0.807
MB3	0.750	0.533	0.703	0.781	0.758	**0.953**	0.832	0.644	0.752
MB4	0.757	0.484	0.706	0.805	0.782	**0.940**	0.830	0.676	0.789
MB5	0.735	0.564	0.769	0.839	0.749	**0.907**	0.859	0.657	0.834
PG1	0.711	0.539	0.671	0.844	0.754	0.881	**0.976**	0.678	0.780
PG2	0.678	0.518	0.646	0.805	0.678	0.841	**0.973**	0.592	0.721
PS1	0.631	0.537	0.587	0.623	0.589	0.646	0.583	**0.897**	0.613
PS2	0.699	0.512	0.589	0.584	0.564	0.627	0.584	**0.943**	0.633
PS3	0.610	0.560	0.595	0.650	0.508	0.637	0.587	**0.839**	0.724
SP1	0.678	0.554	0.666	0.721	0.602	0.707	0.638	0.705	**0.926**
SP2	0.683	0.497	0.658	0.760	0.632	0.719	0.668	0.631	**0.942**
SP3	0.758	0.565	0.721	0.854	0.699	0.829	0.795	0.723	**0.956**
SP4	0.759	0.529	0.720	0.829	0.682	0.852	0.778	0.686	**0.931**

Source: Primary Data, 2024

The R^2 value for the information satisfaction variable, which is 0.450, indicates that the information quality variable explains 45% of the variation in information satisfaction. In comparison, the remaining 55% is attributed to other variables not included in this study. Based on this R^2 value, it can be concluded that this model falls within the moderate category.

Similarly, the R^2 value for the performance expectation variable, at 0.612, suggests that the information satisfaction and social influence variables together explain 61.2% of the variation in performance expectation, with the remaining 38.8% explained by other variables not covered in this study. Thus, this model also falls within the moderate category.

For the attitude variable, the R^2 value of 0.640 indicates that the performance expectation and facility condition variables account for 64% of the variation in attitude, while other variables explain 36%. Therefore, this model is categorized as moderate based on the R^2 value.

Regarding the usage variable, the R^2 value of 0.595 implies that the attitude variable explains 59.5% of the variation in usage, while 40.5% is explained by other variables not included in the study. Consequently, this model falls within the moderate category.

The R^2 value for overall satisfaction is 0.716, indicating that the attitude variable explains 71.6% of the variation in overall satisfaction, while 28.4% is explained by other variables not included in this study. Therefore, this model falls within the strong category based on the R^2 value.

Lastly, the R^2 value for the net benefit variable is 0.826, suggesting that the usage and overall

satisfaction variables explain 82.6% of the variation in net benefit, with the remaining 17.4% attributed to other variables not included in this study. Accordingly, this model falls within the strong category based on the R^2 value.

Hypothesis Testing

Hypothesis testing was done using t-statistics through the bootstrapping method in SmartPLS 4.1.0.3 software with a one-tailed significance value. The data were analyzed at a significant level of 5% (α = 0.05). The hypothesis can be accepted if the t-statistic is > 1.96 and the p-value is < 0.05. The following hypothesis testing results can be seen in Figure 2.

Based on Table 5, the results show that there is a significant influence between information quality on information satisfaction (t-statistic = 10.252, p-value < 0.05), information satisfaction on performance expectations (t-statistic = 3.371, p-value < 0.05), social influence on performance expectations (t-statistic = 5.401, p-value < 0.05), performance expectations on attitude (t-statistic = 8.827, p-value < 0. 05), facility condition to attitude (t-statistic = 3.819, p-value < 0.05), attitude to usage (t-statistic = 10.838, p-value < 0.05), attitude to overall satisfaction (t-statistic = 23.369, p-value < 0.05), usage to net benefits (t-statistic = 3.011, p-value < 0.05), and overall satisfaction to net benefits (t-statistic = 2.191, p-value < 0.05). Thus, all hypotheses were accepted.

Table 4. Result of The Coefficient of Determination

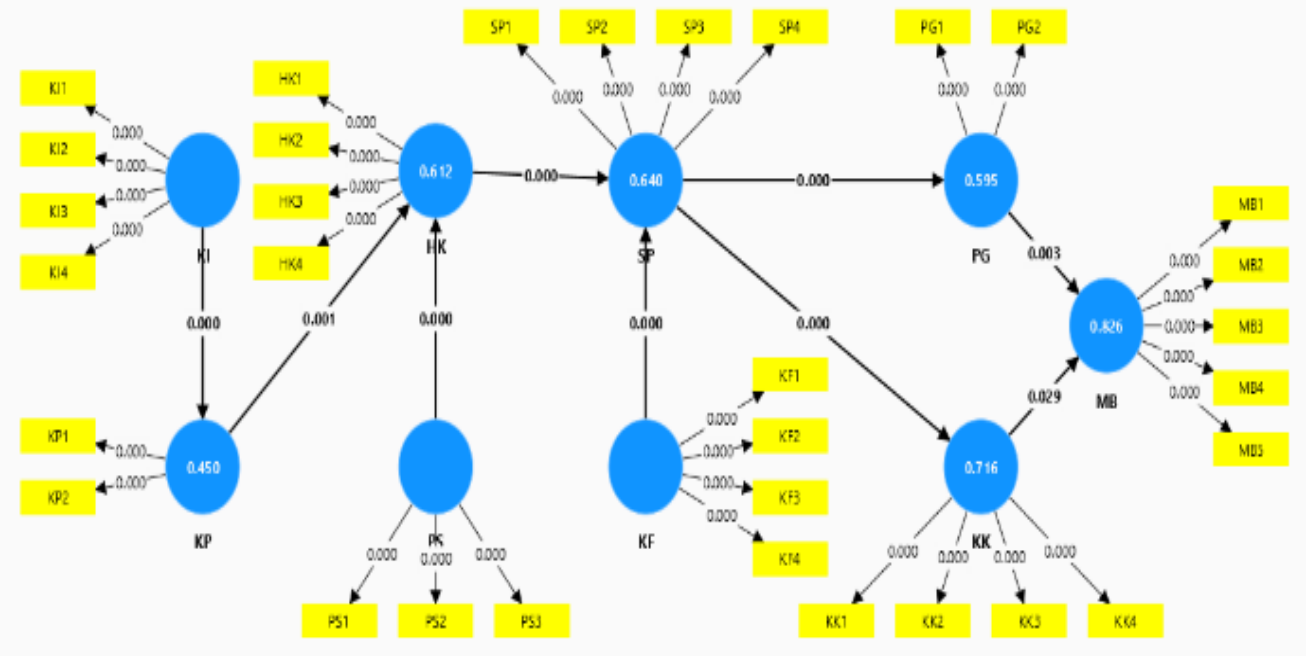
Variable	R^2	Category
Information Satisfaction	0.450	Moderate
Performance Expectations	0.612	Moderate
Attitude	0.640	Moderate
Usage	0.595	Moderate
Overall Satisfaction	0.716	Strong
Net Benefits	0.826	Strong

Source: Primary Data, 2024

Table 5. Hypothesis Testing

	Variable	T-Statistic	P-Value	Results
H1	KI→KP	10.252	0.000	Accepted
H2	KP→HK	3.371	0.001	Accepted
H3	PS→HK	5.401	0.000	Accepted
H4	HK→SP	8.827	0.000	Accepted
H5	KF→SP	3.819	0.000	Accepted
H6	SP→PG	10.838	0.000	Accepted
H7	SP→KK	23.369	0.000	Accepted
H8	PG→MB	3.011	0.003	Accepted
H9	KK→MB	2.191	0.029	Accepted

Source: Primary Data, 2024



Source: Primary Data, 2024

Figure 2. Structural Equations Model

DISCUSSION

Characteristics of The Respondents

The characteristics of HIS users at Bhayangkara Polda DIY Hospital are dominated by female users, accounting for 86%. Research at Neioumazloum Hospital in Lebanon also shows that the majority of HIS users involved in that study were female, at 76.1%.[2] Most HIS users at Bhayangkara Polda DIY Hospital are aged between 21 and 30 years, making up 52%. A study has proven that younger adults (18-30 years) demonstrate higher proficiency in interacting with technology.[15] Users in the age range of 21-30 can quickly adapt to and utilize technological and communication advancements to support their work.

Most of HIS users at Bhayangkara Polda DIY Hospital hold a diploma level of education, accounting for 68.4%. An individual's level of education tends to aid in forming knowledge, attitudes, and behaviors towards various subjects. The higher an individual's level of education, the greater their ability to assess and critique information.[16] In this study, the majority of HIS users are nurses, comprising 40%. Another study found that the professions represented at the research site were predominantly nursing, totaling 46.4%.[17] Nursing is the most in-demand role in every hospital, surpassing other professions.

The tenure of HIS users at Bhayangkara Polda DIY Hospital is over five years, reaching 51%. Most HIS users at this hospital have utilized the system for over three years, totaling 41%. Other research also involved HIS users with over three years of experience, making up 59.4%.[18] This indicates that the respondents have a good understanding and mastery of using the system.[19] The longer users engage with the system, the deeper their understanding of its operation becomes.

Hypothesis Testing

This study analyzes the success of information systems in a mandatory environment using the MMUST model. In this study, all hypotheses were accepted and the significantly influenced variables. The research results show that Hypothesis 1 (H1) is accepted with a t-statistic value of 10.252 > 1.96 and a p-value of 0.001 <0.05, so information quality has a significant effect on information satisfaction. These findings consistently indicate a significant relationship between information quality and satisfaction.[13,20,21]

A system that produces quality information will further increase user satisfaction.[9] Based on observation, the HIS used by Bhayangkara Polda DIY Hospital provides information quickly, accurately, and ultimately, allowing users to respond more effectively to patient needs and daily work demands. With HIS, information can be appropriately recorded and accessed easily so that administrative staff and hospital medical teams can easily search for information and improve the efficiency of health services. The ease of accessing quality information increases the productivity of medical and administrative staff and strengthens their satisfaction with the information generated by the system.

However, an analysis of the research shows that respondents still feel that the information generated, such as oxygen monitoring forms and RL reports, has not been presented appropriately. The format of the RL report contained in HIS does not meet the requirements of the format specified in the online SIRS, so the officer must recapitulate the report manually. In addition, the HIS used sometimes still experiences errors and long loading times in obtaining information in the HIS, disrupting the service process.

Based on the research findings, Hypothesis 2 (H2) is accepted with a t-statistic value of 3.371 > 1.96 and a p-value of 0.001 < 0.05, so information satisfaction significantly affects performance expectations. These findings correspond with research highlighting a significant relationship between information satisfaction and performance expectations.[13,20,21]

Information satisfaction obtained by users can directly affect high-performance expectations.[9] Based on observations, HIS users at Bhayangkara Polda DIY Hospital are satisfied with the system as it allows them to access information quickly and accurately, improving performance and speeding up the execution of daily tasks. This directly contributes to increasing users' performance expectations at Bhayangkara Polda DIY Hospital toward HIS, as users perceive the system as supportive in providing the information required in service delivery.

However, the research analysis shows that HIS users at Bhayangkara Polda DIY Hospital still need to improve in providing information on the HIS used. One piece of information users at Bhayangkara Polda DIY Hospital require is for the system to display when data is entered and updated, such as the time of patient registration. Such time information allows HIS users to track when the patient was registered and when the data was last updated. In addition, accurate time information allows HIS users to make better decisions based on the latest data.

Based on the research findings, Hypothesis 3 (H3) is accepted with a t-statistic value of 5.401 > 1.96 and a p-value of 0.000 < 0.05, so social influence significantly affects performance expectations. These findings align with research that similarly emphasized the substantial impact of social influence on performance expectations.[13,20] This study presents findings that differ from previous research, indicating that social influence does not significantly enhance performance expectations.[22]

Social influence from parties in the work environment can increase user performance expectations when implementing a system.[9] Based on the research analysis, assistance from coworkers and support from the hospital can improve user performance. At Bhayangkara Polda DIY Hospital, implementing HIS requires cooperation and colleague assistance. Training related to the system is only organized for one officer in each unit, responsible for teaching other colleagues who did not attend the training. Colleagues in the hospital also help each other with the implementation and use of HIS if they face difficulties operating the system.

One form of support that the Bhayangkara Polda DIY Hospital can provide in implementing HIS is by providing Standard Operating Procedures (SOP) for using HIS as a basis for HIS implementation. Based on observations, the hospital does not currently have a specific SOP for using HIS. This SOP is important because it regulates the steps users must follow when using HIS, making it easier for users to access and utilize this system. Nonetheless, every unit in the Bhayangkara Polda DIY Hospital is already required to use HIS to improve user performance.

According to the research findings, Hypothesis 4 (H4) is accepted with a t-statistic value of 8.827 > 1.96 and a p-value of 0.000 < 0.05, so performance expectations significantly affect attitude. These findings align with research that has similarly shown a significant relationship between performance expectations and attitudes [13,20,23]

The higher the performance expectations, the more significant the impact on user attitudes.[9] Based on the research analysis, HIS users at Bhayangkara Polda DIY Hospital feel that HIS can improve their performance and provide convenience in completing tasks. This leads to the formation of positive attitudes and perceptions towards HIS, thus encouraging users to use HIS in their daily activities at the hospital. HIS users at Bhayangkara Polda DIY Hospital have high expectations that HIS will improve their performance so that users become motivated to learn and use the system.

Based on the research findings, Hypothesis 5 (H5) is accepted with a t-statistic value of 3.819 > 1.96 and a p-value of 0.000 < 0.05. Hence, the condition of the facility has a significant effect on attitude. Earlier studies have indicated a significant relationship between facility conditions and attitudes.[13,21,22] However, this contrasts with research that found no significant relationship between facility conditions and attitudes [10]

Another study shows that the condition of existing facilities will affect user attitudes or behaviors.[24] Based on observation, Bhayangkara Polda DIY Hospital has adequate software and hardware facilities to assist users in implementing HIS. HIS users at Bhayangkara Polda DIY Hospital feel increasingly helped by HIS because it changes the previously manual system into a computerized one, making it easier to manage data. HIS users at Bhayangkara Polda DIY Hospital are enthusiastic about using HIS because it is the latest system, is updated regularly, has an attractive appearance, and is easy to use.

However, the analysis shows that HIS users at Bhayangkara Polda DIY Hospital feel that there is a need to improve the condition of available facilities, such as the lack of the required number

and specifications of computers, limited servers for storing and backing up data, and unstable or slow internet network problems that interfere with the smooth running of services. Users also complained that the system's alert notification feature malfunctioned, causing patient data redundancy. Data redundancy can complicate the analysis of health information, influencing decision-making and decreasing staff efficiency as they must spend time identifying and removing duplicate data. Users also expressed the need for better support from the IT team when problems occur, such as errors and long loading times on HIS.

Based on the research findings, hypothesis 6 (H6) is accepted with a t-statistic value of 10.838 > 1.96 and a p-value of 0.000 < 0.05, so that attitude significantly affects usage. Other research also stated that there is a substantial influence on attitudes towards usage.[20] This contrasts with research indicating that attitude does not significantly influence usage.[13,25]

Conversely, other studies suggest positive user attitudes enhance system acceptance and utilization.[9] Based on the analysis results, HIS users at Bhayangkara Polda DIY Hospital gave positive responses, increased enthusiasm, and acceptance of using the system. This positive attitude arises from HIS users because they feel the system can meet their needs and significantly benefit their daily work or life. The positive attitude of HIS users at Bhayangkara Polda DIY Hospital directly impacts the increase in acceptance and use of HIS.

According to the research findings, Hypothesis 7 (H7) is accepted with a t-statistic value of 23.369 > 1.96 and a p-value of 0.000 <0.05, so that attitude significantly affects overall satisfaction. Previous research also stated that there is a significant influence of attitude and overall satisfaction.[13,20,22]

The research also stated that users' positive attitudes ultimately result in high satisfaction levels with the system, as satisfaction often emerges as a response following system use.[9] Based on the analysis results, HIS users at Bhayangkara Polda DIY Hospital stated that implementing HIS successfully led to positive attitudes because users felt comfortable and satisfied using HIS in completing their daily work. Users also believe that HIS at Bhayangkara Polda DIY Hospital can increase productivity and reduce administrative workload, making them more satisfied with the system.

Based on the research findings, Hypothesis 8 (H8) is accepted with a t-statistic value of 3.011 > 1.96 and a p-value of 0.003 or < 0.05, so usage significantly affects net benefits. Previous studies have also indicated a significant relationship between usage and benefits.[26,27,28] However, this contrasts with other research findings, where usage does not significantly impact net benefits.[9,13,20]

Increasing system usage will bring more benefits to system users.[29] Based on observation, implementing HIS in Bhayangkara Polda DIY Hospital is mandatory because it provides benefits to support services in the hospital. Most units in the hospital have implemented HIS so that the services offered are computerized and optimized for data management. In the research analysis, HIS users at Bhayangkara Polda DIY Hospital routinely use HIS to ensure the accuracy of the data entered into the system. This accurate data is used in making the right decisions regarding patient care and hospital resource management. The use of HIS in Bhayangkara Polda DIY Hospital consistently provides benefits in assisting the delivery of services to patients.

According to the research findings, hypothesis 9 (H9) is accepted with a t-statistic value of 2.191 > 1.96 and a p-value of 0.029 < 0.05, so overall satisfaction significantly affects net benefits. This finding aligns with previous research indicating a significant relationship between overall satisfaction and net benefits.[13,20,30] However, it contradicts other studies that found no impact of user satisfaction on perceived benefits.[31]

According to prior studies, satisfaction across all aspects has a notable impact on the perceived benefits experienced by users during system implementation.[9] Based on the analysis results, HIS users at Bhayangkara Polda DIY Hospital are satisfied with the HIS because it provides benefits in helping to improve the effectiveness and efficiency of their work, as well as facilitating the presentation of information. This satisfaction arises because HIS provides tangible

benefits in improving operational efficiency, such as faster and more accurate data management, provision of easily accessible information, and acceleration of the service process.

CONCLUSION AND RECOMMENDATION

This study analyzes the factors that influence the successful implementation of the Hospital Information System (HIS) in Bhayangkara Polda DIY Hospital. It empirically proves that all hypotheses are accepted. HIS has proven to be a successful implementation because it can produce accurate, fast, and complete information, accelerate user performance, and provide benefits.

This study suggests several things, such as that hospital management is advised to provide Standard Operating Procedures (SOPs) as a basis for using HIS, and hospital management also needs to provide supporting facilities for system use, such as computers, servers, and strong internet connections to facilitate the use of HIS. In addition, hospital management and the IT team should conduct training on the use of the system and develop the features and formats in the system to meet users' needs. Future research should modify MMUST by adding control variables for confounding factors such as working hours.

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AUTHOR CONTRIBUTIONS

AH organized and planned the research concept, designed the methodology, conducted the research, analyzed the data, and drafted the manuscript. SCB assisted in the conduct of the research and provided feedback on the manuscript. All authors read and approved the final manuscript. AH = Afriliya Hayati; SCB = Savitri Citra Budi.

CONFLICTS OF INTEREST

The authors have no conflicts of interest regarding this investigation.

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