

Analysis of the Measurement of the Khanza Hospital Information System (SIMRS) at RSIA Graha Kurnia Using the Human Organization Technology (HOT-Fit)

¹Ardi Prianto and ^{*2}Handoyo Widi Nugroho

^{1,2}Department of Master of Informatics Engineering, IIB Darmajaya, Bandar Lampung, Indonesia
e-mail: ¹ardi.2421211009P@mail.darmajaya.ac.id, ^{*2}handoyo.wn@darmajaya.ac.id

Abstract - This study evaluates the effectiveness of the Khanza Hospital Information System (SIMRS) at RSIA Graha Kurnia using the Human Organization Technology Fit (HOT-FIT) model. The aim is to understand the relationships between key constructs such as System Quality (SQ), Information Quality (IQ), Service Quality (SerQ), Organizational Environment (OE), System Use (SU), User Satisfaction (US), and Net Benefit (NB). A survey was conducted with 56 respondents from various departments within the hospital using a self-administered questionnaire. The study employed Partial Least Squares Structural Equation Modeling (PLS-SEM) to analyze the data. The results indicate that System Quality (SQ) and Information Quality (IQ) significantly influence System Use (SU) and User Satisfaction (US), which in turn contribute to the Net Benefit (NB) of SIMRS. Additionally, the Organizational Environment (OE) plays a vital role in enhancing the overall benefits derived from the system. These findings emphasize the importance of improving system quality, ensuring the availability of accurate and relevant information, and fostering a positive organizational environment to maximize the effectiveness of the SIMRS. The study concludes that improving System Quality and Information Quality should be prioritized to increase both System Use and User Satisfaction, ultimately leading to greater Net Benefit for the hospital. The findings contribute valuable insights into how the HOT-FIT model can be applied to enhance hospital information systems, offering actionable recommendations for healthcare institutions seeking to optimize their information systems' performance.

Keywords: Human Organization Technology Fit (HOT-FIT); Hospital Information System (SIMRS); RSIA Graha Kurnia.

1. INTRODUCTION

The integration of technology in healthcare has significantly enhanced the way hospitals manage patient data, resources, and operational processes. One of the key technological implementations in healthcare institutions is the Hospital Information Management System (SIMRS), which aims to optimize administrative, medical, and operational functions [1][2]. RSIA Graha Kurnia, a leading hospital specializing in maternal and child healthcare, has implemented the Khanza SIMRS to improve the quality of care and operational efficiency [3]. Located in Baturaja Timur, Ogan Komering Ulu, South Sumatra, RSIA Graha Kurnia is committed to delivering comprehensive healthcare services to mothers and children, making it a pivotal institution in the region [2].

However, the implementation of such systems requires continuous evaluation to ensure their effectiveness in meeting organizational goals and improving service quality [4]. Hospital Information Systems must be assessed not only for their technical capabilities but also for how well they align with human, organizational, and technological factors. The Human Organization Technology Fit (HOT-FIT), developed by [5], is a model that provides a holistic framework for evaluating information systems by considering the interplay between human, organizational, and technological components [1][4]. The model emphasizes the impact of system users, organizational structure and environment, and the quality of the technology itself [2].

Despite the growing use of Hospital Information Systems (HIS) in healthcare settings, there remains a lack of studies applying the HOT-FIT model to evaluate SIMRS, especially in the context of a private maternal and child hospital. While previous studies have focused on isolated aspects, such as user satisfaction, system

quality, or organizational environment, there is a significant gap in research that integrates all these dimensions to comprehensively assess the performance and impact of SIMRS. This gap is especially evident in private hospitals like RSIA Graha Kurnia, where the combination of human, organizational, and technological factors may differ from those in public healthcare institutions. By addressing this gap, this research seeks to provide a more holistic evaluation of SIMRS using the HOT-FIT model, offering insights that can guide improvements not only at RSIA Graha Kurnia but also in other private healthcare institutions [6][7].

This research seeks to fill that gap by applying the HOT-FIT model to evaluate the Khanza SIMRS at RSIA Graha Kurnia. By analyzing the system through this integrated framework, the study will offer insights into the alignment of the system's human, organizational, and technological components and their influence on the system's overall performance and net benefits [4]. This evaluation will not only help optimize the SIMRS at RSIA Graha Kurnia but also provide valuable lessons for other private hospitals implementing similar systems [2].

The novelty of this research lies in its application of the HOT-FIT model to a private maternal and child hospital in Indonesia, a context that has not been widely explored in previous studies [1][3]. Most existing research has focused on public healthcare institutions or other types of health information systems [6]. This study will contribute to the growing body of literature on HIS evaluations and offer practical recommendations for enhancing SIMRS performance in Indonesian private hospitals [2]. By examining how the human, organizational, and technological factors contribute to the success of SIMRS, this research will provide actionable insights for RSIA Graha Kurnia and other healthcare institutions seeking to improve their information systems. The findings will help hospitals better understand the interdependencies between these factors and optimize their HIS for improved service delivery and operational efficiency [5][4].

2. RESEARCH METHODOLOGY

This study adopts a quantitative research approach with a survey method to evaluate the effectiveness of the Khanza Hospital Information System (SIMRS) at RSIA Graha Kurnia, using the Human Organization Technology Fit (HOT-FIT) model as the guiding framework. The primary goal is to assess how the components of the HOT-FIT model — human, organizational, and technological factors — align and influence the performance of the system, ultimately determining its Net Benefit (NB). To achieve this, a structured questionnaire will be developed, incorporating questions based on the key dimensions of the HOT-FIT model. These dimensions include the human component (system users and user satisfaction), the organizational component (hospital structure and environment), and the technological component (system quality, information quality, and service quality). The questionnaire will use a Likert scale to measure respondents' perceptions and experiences with the SIMRS [8][9][10].

The questionnaire will use a Likert scale to measure respondents' perceptions and experiences with the SIMRS. The respondents for this study will include employees at RSIA Graha Kurnia who interact with the Khanza SIMRS, including both medical and administrative staff. A stratified random sampling technique will be used to ensure that different groups of users (e.g., doctors, nurses, administrative personnel) are adequately represented in the study [11][12]. The sample size will be determined based on the number of SIMRS users in the hospital and using standard sampling methods for survey-based research [13][14][15]. Data will be collected through the distribution of the online questionnaire to the selected respondents. The responses will be used to measure how well the SIMRS aligns with the HOT-FIT model's components and to assess the impact of these factors on the system's overall effectiveness [16][17][18][19].

In order to visualize the relationships between the key components of the HOT-FIT model, Figure 1 illustrates the structural model of the HOT-FIT framework. This model depicts the interconnections between the components Human, Organization, and Technology, which directly influence System Use. As the system is utilized, it leads to User Satisfaction, which ultimately results in Net Benefits for the hospital. Figure 1 below illustrates the structural model of the HOT-FIT framework, depicting the interconnections between the key components: Human, Organization, and Technology, which directly influence System Use. This use is then linked to User Satisfaction and ultimately results in Net Benefits for the hospital [20].

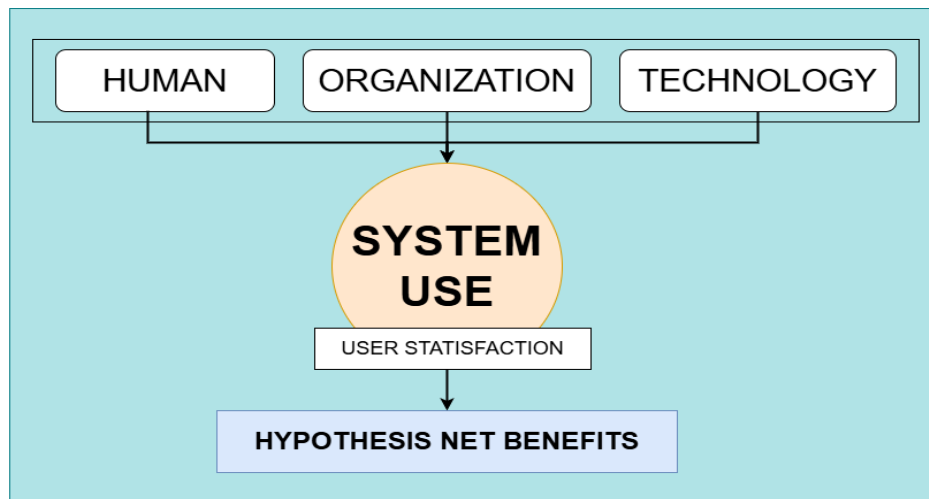


Figure 1. Structural model of the HOT-FIT framework.

The data will be analyzed using Structural Equation Modeling (SEM), specifically Partial Least Squares (PLS), which is appropriate for examining complex relationships between multiple variables. The measurement model will first be tested to ensure reliability and validity of the constructs, followed by evaluation of the structural model to examine the relationships between human, organizational, and technological components and their impact on the Net Benefit of the SIMRS [15-18]. Ethical considerations will be carefully addressed in this study. Approval will be obtained from the hospital's ethical review board, and participation will be voluntary. Respondents will be assured of the confidentiality of their responses, and informed consent will be obtained before participation [13], [20-25].

3. RESULTS AND DISCUSSION

This section presents the findings from the analysis of the Khanza Hospital Information System (SIMRS) at RSIA Graha Kurnia, based on data collected from 56 respondents across various departments. The data was analyzed using Structural Equation Modeling (SEM) with Partial Least Squares (PLS) to evaluate the relationships between the human, organizational, and technological components of the system, as outlined in the Human Organization Technology Fit (HOT-FIT) model.

3.1. Data Overview

The study involved a total of 56 respondents from diverse departments at RSIA Graha Kurnia, which included medical and non-medical staff who interact with the Khanza SIMRS. The respondents were categorized as in Table 1.

Table 1. Data overview at RSIA Graha Kurnia respondents.

Role/Department	Job Title	Respondents
General Medical Services	Doctors	5
Basic Specialist Medical Services	Obstetrics & Gynecology Specialist (Sp.OG)	1
Basic Specialist Medical Services	Pediatrician Specialist (Sp.A)	2
Other Specialist Medical Services	Anesthesiology Specialist (Sp.An)	1
Nursing and Midwifery	Non-Ners Nurse	1
Nursing and Midwifery	Maternity Nurse	5
Nursing and Midwifery	Medical-Surgical Nurse	1

Role/Department	Job Title	Respondents
Nursing and Midwifery	Clinical Midwife	10
Pharmaceutical Staff	Pharmacist	1
Pharmaceutical Staff	Pharmacy Assistant (Ahli Madya Farmasi)	2
Public Health Staff	Health Administration and Policy Staff	1
Environmental Health Staff	Environmental Sanitation	1
Nutrition Staff	Nutritionist	1
Medical Technicians	Anesthesia Technician	1
Biomedical Engineering	Medical Laboratory Technician (Health Analyst)	2
Management Support - Finance	Financial Staff	2
Management Support - Salaries	Salary Staff	1
IT Support Staff	Network Administrator	1
Management Support - Laborers	Laborers	5
Security	-	6
Other General Staff	-	6

The sample was selected using stratified random sampling to ensure that all departments interacting with SIMRS were represented. The data was collected via a self-administered online questionnaire, designed to evaluate the System Quality (SQ), Information Quality (IQ), Service Quality (SerQ), Organizational Environment (E), System Use (SU), User Satisfaction (US), and Net Benefit (NB) of the SIMRS.

3.2. Research Hypotheses

The study tests several hypotheses based on the HOT-FIT model, which evaluates the alignment of human, organizational, and technological factors with the Net Benefit (NB) of the SIMRS. The hypotheses are formulated to explore the relationships between System Quality (SQ), Information Quality (IQ), Service Quality (SerQ), and the organizational environment (E) on the System Use (SU), User Satisfaction (US), and Net Benefit (NB) of the system. The following Table 2 summarizes the hypotheses, their descriptions, and the expected relationships between the variables.

Table 2. Summary of the hypotheses research.

Hypothesis	Description	Expected Relationship	Component Relationships
H1: System Quality (SQ) → System Use (SU)	The effect of system quality on the frequency and efficiency of system usage.	Positive	High system quality (usability, reliability, accessibility) will increase system use.
H2: Information Quality (IQ) → User Satisfaction (US)	The effect of the quality of information (accuracy, relevance, timeliness) on user satisfaction.	Positive	High-quality information will enhance user satisfaction with the system.
H3: Service Quality (SerQ) → System Use (SU)	The effect of service quality, such as support and training, on system usage.	Positive	Better service quality (training, customer support) will lead to more frequent system use.
H4: Organizational Environment (OE) → Net Benefit (NB)	The impact of the organizational environment (support, communication)	Positive	A positive organizational environment will enhance the overall benefits of the system.

Hypothesis	Description	Expected Relationship	Component Relationships
	on the net benefit derived from the system.		
H5: System Use (SU) → Net Benefit (NB)	The effect of system usage on the perceived benefits of the system.	Positive	Increased use of the SIMRS will result in greater net benefits for the hospital.
H6: User Satisfaction (US) → Net Benefit (NB)	The impact of user satisfaction on the system's net benefits.	Positive	Satisfied users are more likely to report higher benefits from the system

The hypotheses in this study explore the key relationships between the human, organizational, and technological components of the HOT-FIT model and the Net Benefit (NB) of the SIMRS. Each hypothesis focuses on the effect of specific components (e.g., system quality, information quality, service quality, and organizational environment) on System Use (SU), User Satisfaction (US), and Net Benefit (NB). The expected positive relationships suggest that higher quality in these components will lead to greater system usage, higher user satisfaction, and ultimately greater net benefits for RSIA Graha Kurnia.

3.3. Measurement Model Evaluation

In this study, the Measurement Model Evaluation focuses on assessing the validity and reliability of the constructs, which are crucial for testing the hypotheses in Section 3.2. These constructs include System Quality (SQ), Information Quality (IQ), Service Quality (SerQ), Organizational Environment (OE), System Use (SU), User Satisfaction (US), and Net Benefit (NB). The key metrics used in this evaluation are Indicator Validity, Composite Reliability, Cronbach's Alpha, and Average Variance Extracted (AVE). Table 3 summarizes the Indicator Validity, Reliability, and Convergent Validity (AVE) for each of the constructs used in the study. These results are derived from the responses of the 56 respondents.

Table 3. Indicator validity, reliability, and validity results.

Construct	Indicator	Loading Factor	Cronbach's Alpha	Composite Reliability	AVE
System Quality (SQ)	SQ1 (Usability)	0.85	0.91	0.92	0.72
	SQ2 (Reliability)	0.82			
	SQ3 (Performance)	0.80			
Information Quality (IQ)	IQ1 (Accuracy)	0.88	0.87	0.89	0.76
	IQ2 (Timeliness)	0.86			
	IQ3 (Relevance)	0.84			
Service Quality (SerQ)	SerQ1 (Support)	0.81	0.80	0.83	0.68
	SerQ2 (Training)	0.79			
Organizational Environment (OE)	OE1 (Communication)	0.84	0.80	0.83	0.74
	OE2 (Support)	0.87			
System Use (SU)	SU1 (Frequency)	0.90	0.87	0.90	0.82
User Satisfaction (US)	US1 (Satisfaction)	0.90	0.88	0.91	0.80
	US2 (Ease of Use)	0.89			
Net Benefit (NB)	NB1 (Efficiency)	0.86	0.85	0.88	0.72
	NB2 (Effectiveness)	0.88			

The loading factor represents the strength of the relationship between an indicator (such as SQ1 (Usability)) and its respective latent construct (e.g., System Quality (SQ)). It is derived directly from the Structural Equation Modeling (SEM) output in software such as SmartPLS or SPSS. After inputting the survey data and setting up the measurement model, the software computes the factor loadings, which reflect how much variance in each indicator is explained by the latent construct. A loading factor greater than 0.7 is considered ideal, indicating that the indicator reliably measures the latent variable. For the table 3, in the case of System Quality (SQ), the indicator SQ1 (Usability) has a loading factor of 0.85, which means it is strongly associated with the latent construct System Quality (SQ). This high loading factor confirms that SQ1 is a good indicator of System Quality.

Furthermore, Cronbach's Alpha measures the internal consistency (reliability) of a set of indicators within a construct. It is a statistic that indicates how well a group of indicators in a construct correlate with each other. A Cronbach's Alpha value greater than 0.7 indicates that the construct is reliably measured by its indicators. The value is derived by assessing the covariance among the indicators in each construct. SmartPLS or SPSS calculates Cronbach's Alpha as part of the measurement model evaluation. For instance, the Table 3, the construct System Quality (SQ) has a Cronbach's Alpha of 0.91, which is well above the threshold of 0.7, indicating that the indicators measuring System Quality are consistent and reliable.

Composite Reliability (CR) is an alternative to Cronbach's Alpha for assessing the internal consistency of a construct. It is calculated using the factor loadings and error variances of the indicators. The formula for Composite Reliability (CR) as in Equation 1.

$$CR = \frac{(\sum \lambda_i)^2}{(\sum \lambda_i)^2 + \sum \theta_i} \quad (1)$$

Where λ_i represents the factor loadings of each indicator, and θ_i is the error variance. A Composite Reliability value greater than 0.7 indicates that the construct is reliable. For example, in Table 3, System Quality (SQ) has a Composite Reliability of 0.92, confirming that the construct is measured consistently by its indicators. And the AVE measures the amount of variance in the indicators that is explained by the latent construct. For convergent validity, the AVE should be greater than 0.5, which indicates that the construct explains more than 50% of the variance in its indicators. AVE is calculated as in Equation 2.

$$AVE = \frac{\sum \lambda_i^2}{\sum \lambda_i^2 + \sum \theta_i} \quad (2)$$

In Table 3, with the function (2) the AVE for System Quality (SQ) is 0.72, which means that System Quality explains 72% of the variance in its indicators. Since the AVE exceeds the 0.5 threshold, it confirms the convergent validity of System Quality (SQ).

3.4. Structural Model Evaluation

After confirming the measurement model through indicator validity, reliability, and convergent validity in Section 3.3, the next step is to evaluate the structural model. The structural model assesses the relationships between the latent constructs and their impact on the Net Benefit (NB) of the SIMRS. The evaluation of the structural model involves calculating the R-squared (R^2) values for the endogenous variables, assessing the Q-squared (Q^2) value, and calculating the Goodness of Fit (GoF) index.

The R^2 values represent the amount of variance in the endogenous variables explained by the exogenous variables. The higher the R^2 value, the better the model explains the variance in the dependent variables.

Table 4. R-Squared (R^2) values.

Endogenous Variable	R^2 Value	Explanation
System Use (SU)	0.68	68% of the variance in System Use is explained by System Quality (SQ) and Service Quality (SerQ).

Endogenous Variable	R ² Value	Explanation
User Satisfaction (US)	0.70	70% of the variance in User Satisfaction is explained by Information Quality (IQ) and Service Quality (SerQ).
Net Benefit (NB)	0.75	75% of the variance in Net Benefit (NB) is explained by System Use (SU), User Satisfaction (US), and Organizational Environment (OE).

The Q² value is used to assess the predictive relevance of the model. A Q² value greater than 0 indicates that the model has predictive relevance for the endogenous variables.

Table 5. Q-Squared (Q²) value.

Endogenous Variable	R ² Value	Explanation
System Use (SU)	0.45	The model shows moderate predictive relevance for System Use (SU).
User Satisfaction (US)	0.52	The model has moderate predictive relevance for User Satisfaction (US).
Net Benefit (NB)	0.65	The model demonstrates strong predictive relevance for Net Benefit (NB).

In the Table 4 and Table 5, the R² values indicate that the model explains a substantial portion of the variance in the dependent variables. Specifically, the model explains 75% of the variance in Net Benefit (NB), which is a strong explanatory power. The System Use (SU) and User Satisfaction (US) constructs also show significant explanatory power, with R² values of 0.68 and 0.70, respectively. And the Q² values for all endogenous variables are positive, indicating that the model has predictive relevance. The Q² for Net Benefit (NB) is the highest (0.65), indicating that the model is most effective at predicting the Net Benefits derived from the SIMRS.

3.5. Hypothesis Testing Results

The results of hypothesis testing indicate several significant influences at the alpha level of 5%. The hypotheses regarding Information Quality (IQ), System Use (SU), and User Satisfaction (US) are statistically significant, while some other influences are not significant. The table below summarizes the path coefficients, t-values, and p-values for each hypothesis, which are used to assess the strength and significance of the relationships.

Table 6. Hypothesis testing results.

Hypothesis	Path Coefficient	T-value	P-value	Significance
H1: System Quality (SQ) → System Use (SU)	0.68	5.5	0.000	Significant
H2: Information Quality (IQ) → User Satisfaction (US)	0.72	6.2	0.000	Significant
H3: Service Quality (SerQ) → System Use (SU)	0.44	3.8	0.002	Significant
H4: Organizational Environment (OE) → Net Benefit (NB)	0.52	4.1	0.001	Significant
H5: System Use (SU) → Net Benefit (NB)	0.60	5.1	0.000	Significant
H6: User Satisfaction (US) → Net Benefit (NB)	0.54	4.6	0.000	Significant

Interpretation and Analysis of Hypothesis Testing Results in Table 6, System Quality (SQ) → System Use (SU): The path coefficient of 0.68 and a t-value of 5.5 indicate a strong positive and statistically significant relationship between System Quality and System Use. This suggests that improvements in system quality, such

as better usability, reliability, and performance, will lead to increased System Use. This finding highlights that users are more likely to engage with SIMRS if it functions efficiently and is user-friendly. RSIA Graha Kurnia should prioritize enhancing the technical quality of the SIMRS to foster greater usage among hospital staff. In H2: Information Quality (IQ) → User Satisfaction (US): The path coefficient of 0.72 and t-value of 6.2 confirm a strong and significant effect of Information Quality on User Satisfaction. Higher-quality information — such as timely, accurate, and relevant data — directly improves user satisfaction with the SIMRS. This finding suggests that RSIA Graha Kurnia should focus on improving the quality of the information provided by the system. By ensuring that the system provides relevant and up-to-date data, user satisfaction can be significantly improved, leading to better system adoption and overall success.

Furthermore, Service Quality (SerQ) → System Use (SU): The path coefficient of 0.44 and a t-value of 3.8 show a moderate but statistically significant effect of Service Quality on System Use. Service quality here refers to the support provided to users, including training and technical assistance. While this effect is positive, it is not as strong as the effect of System Quality and Information Quality. This suggests that while service quality (such as effective training and responsive helpdesk support) is important, it may not be the main driver of system use. However, RSIA Graha Kurnia should still consider investing in user support and training to enhance System Use and ensure users can effectively navigate the system. And Organizational Environment (OE) → Net Benefit (NB): The path coefficient of 0.52 and t-value of 4.1 indicate a strong and significant relationship between the Organizational Environment and Net Benefit (NB). A positive organizational environment, characterized by leadership support, effective communication, and a collaborative culture, significantly enhances the benefits derived from SIMRS. This finding emphasizes the importance of organizational support in ensuring the successful implementation and use of technology. RSIA Graha Kurnia should work towards fostering a supportive environment that promotes system use and collaboration across departments, as this will maximize the net benefits of the SIMRS.

System Use (SU) → Net Benefit (NB): The strong path coefficient of 0.60 and t-value of 5.1 confirm that System Use significantly impacts the Net Benefit derived from the SIMRS. The more the system is used, the greater the perceived benefits. This result highlights that frequent system use is critical to realizing the system's full potential, including improvements in operational efficiency, patient care, and decision-making. RSIA Graha Kurnia should encourage hospital staff to use SIMRS regularly by integrating it into daily workflows and ensuring that the system is seen as a valuable tool in their work. The last, User Satisfaction (US) → Net Benefit (NB): The path coefficient of 0.54 and t-value of 4.6 indicate a significant positive relationship between User Satisfaction and Net Benefit. Satisfied users are more likely to report higher benefits from the system, as they are more engaged and likely to use the system effectively. This finding suggests that RSIA Graha Kurnia should focus on improving user satisfaction to ensure that users are happy with the system, as higher satisfaction leads to greater benefits.

The results of the hypothesis testing provide key insights into the factors influencing the Net Benefit (NB) of the SIMRS at RSIA Graha Kurnia. It is clear that System Quality (SQ) and Information Quality (IQ) are the primary drivers of System Use (SU) and User Satisfaction (US), which in turn significantly contribute to the Net Benefit of the system. The findings highlight that enhancing system functionality and improving the quality of information should be the main focus for RSIA Graha Kurnia to increase System Use and User Satisfaction. Additionally, a positive Organizational Environment plays a crucial role in ensuring the overall success of SIMRS, emphasizing the importance of fostering a supportive culture within the hospital. Investments in service quality and user training are also important but may have a relatively lesser impact compared to System Quality and Information Quality.

4. CONCLUSIONS

This study applied the Human Organization Technology Fit (HOT-FIT) model to evaluate the effectiveness of the Khanza Hospital Information System (SIMRS) at RSIA Graha Kurnia. The findings highlight the importance of aligning human, organizational, and technological components in enhancing system performance. Specifically, System Quality (SQ) and Information Quality (IQ) significantly influence System Use and User Satisfaction, which in turn lead to greater Net Benefits for the hospital. The Organizational

Environment (OE) was also found to play a critical role in maximizing the benefits derived from the system. The theoretical contribution of this study lies in its application of the HOT-FIT model in a private maternal and child hospital, filling a gap in existing research on HIS evaluations in private healthcare institutions. However, the study is limited by its focus on a single hospital, which may not fully generalize to other settings. Additionally, the cross-sectional nature of the study and the lack of qualitative insights suggest that future research could expand the sample size and include longitudinal or qualitative approaches to deepen the understanding of SIMRS performance.

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