

Evaluation of Electronic Medical Record Implementation Based on the Hot-Fit Model at Universitas Sebelas Maret Hospital, Indonesia

Naim Khoirul Ummah¹⁾, Revi Gama Hatta Novika¹⁾,
Akbarudin Arif²⁾, Anik Lestari³⁾, Setyo Sri Rahardjo⁴⁾

¹⁾Master's Program in Public Health, Universitas Sebelas Maret, Indonesia

²⁾Department of Development Extension, Universitas Sebelas Maret, Indonesia

³⁾Department of Public Health and Preventive Medicine, Universitas Sebelas Maret, Indonesia

⁴⁾Department of Pharmacology, Universitas Sebelas Maret, Indonesia

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ABSTRACT

Background: Electronic Medical Record (EMR) has become an essential component of digital transformation in healthcare services. However, the successful implementation of EMR depends on the interaction between human, organizational, and technological factors. This study aimed to evaluate the effect of human, organization, and technology factors on the net benefit of EMR implementation based on the Human Organization Technology-Fit (HOT-Fit) model at Universitas Sebelas Maret Hospital.

Subjects and Method: This was an analytic observational study with a cross-sectional design conducted at Universitas Sebelas Maret Hospital, Surakarta, Indonesia, from December 2025 to July 2026. A total of 184 healthcare professionals were selected using proportionate stratified accidental sampling from a population of 515 EMR users. The dependent variable was the net benefit of EMR implementation. The independent variables were human, organization, and technology. Data were collected using a validated and reliable self-administered questionnaire adapted from previous studies. Data were analyzed using descriptive statistics, Pearson correlation, and multiple linear regression.

Results: Human had a positive and significant effect on the net benefit of EMR implementation ($b=0.16$; 95% CI= 0.06–0.26; $p = 0.002$). Organization also had a positive effect ($b=0.16$; 95% CI=0.05–0.28; $p = 0.006$), while technology showed the strongest effect ($b=0.295$; 95% CI=0.19–0.40; $p < 0.001$). Simultaneously, human, organization, and technology significantly influenced the net benefit of EMR implementation ($F=71.63$; $p<0.001$) and explained 54% of the variance (Adjusted $R^2=0.54$).

Conclusion: Human, organization, and technology factors significantly influence the net benefit of EMR implementation, with technology as the most influential factor. Strengthening system quality, user competency, and organizational support is essential to optimize the benefits of EMR implementation in hospitals.

Keywords: electronic medical record, healthcare services, healthcare quality

Correspondence:

Revi Gama Hatta. Master's Program in Public Health, Faculty of Medicine, Universitas Sebelas Maret. Jl. Ir. Sutami 36A, Surakarta, Central Java 57126, Indonesia. Email: revi.gama@staff.uns.ac.id.

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BACKGROUND

Digital transformation has become a key strategy for improving the quality of healthcare services through the utilization of information technology. One of its major implementations is the Electronic Medical Record (EMR), a system that records patients' health information in electronic format to support continuity of care, improve efficiency, reduce medical errors, and provide accurate information for clinical and managerial decision-making (Deharja et al., 2020; (Arismanda and Rizqi, 2025). In Indonesia, the implementation of EMRs has been reinforced through the Regulation of the Minister of Health of the Republic of Indonesia Number 24 of 2022, which mandates all healthcare facilities to implement electronic medical records as part of the national digital health transformation agenda (Ministry of Health of the Republic of Indonesia, 2022)

The implementation of EMRs in Indonesia has increased substantially. By 2025, approximately 96% of hospitals had implemented EMRs, and 92% had been integrated with the SATUSEHAT platform. Nevertheless, the high adoption rate does not necessarily reflect successful implementation, as challenges remain regarding system utilization, documentation completeness, data quality, and information integration across healthcare units ((Mutamakin, 2025)). These findings indicate that the success of EMR implementation depends not only on the availability of technology but also on user readiness and organizational support.

Evaluating EMR implementation is essential to ensure that the system delivers meaningful benefits for both healthcare organizations and users. One of the most widely applied evaluation frameworks in health information systems is the Human, Organization, and Technology Fit (HOT-Fit) model.

Developed from the DeLone and McLean Information Systems Success Model, the HOT-Fit model integrates three key dimensions are human, organization, and technology and evaluates their impact on net benefit as an indicator of information system success (Tawar et al., 2022; Siswati et al., 2025). Compared with other evaluation frameworks, HOT-Fit provides a more comprehensive assessment because it considers not only technological quality but also user involvement and organizational support as critical determinants of successful system implementation.

Previous studies have demonstrated that the Human, Organization, and Technology Fit (HOT-Fit) model can be used to evaluate the implementation of health information systems in various healthcare settings. Adriani et al. (2025), Prameswari et al. (2025), and Fitriana & Widiyanto (2025) applied the HOT-Fit model to evaluate Electronic Medical Record implementation in different hospital settings, including inpatient and emergency care units. Other studies have also applied HOT-Fit to nursing information systems and hospital information management systems, demonstrating the importance of human, organizational, and technological aspects in the implementation of health information systems (Zhai et al., 2022; Munjirin et al., 2024; Wardhana et al., 2025).

However, previous HOT-Fit studies have primarily focused on evaluating the condition or fit of human, organizational, and technological factors within specific health information system contexts. The present study extends this approach by examining these three dimensions as predictors of the net benefit of EMR implementation, with particular attention to the statistical significance and magnitude of their effects. In addition, the present study examines the effects of the three dimensions both individually and simultaneously, enabling identification of the factor

with the greatest relative contribution to EMR-related benefits. Thus, rather than solely describing the condition of HOT-Fit dimensions, this study evaluates their contribution to the benefits obtained from EMR implementation.

This analytical approach has practical implications for EMR management and governance. Evidence regarding the magnitude of each factor's effect can assist hospital management in identifying priority areas for improvement and allocating resources according to the factors that contribute most to EMR benefits. Such evidence can support targeted interventions, including user competency development, organizational support, workflow improvement, and technological enhancement. It can also strengthen EMR governance by providing an empirical basis for prioritizing improvement strategies.

Previous studies have also been conducted in diverse organizational and healthcare service contexts, where differences in user characteristics, organizational structures, workflows, and technological conditions may influence health information system implementation and its outcomes. Therefore, findings from one healthcare setting may not be directly generalizable to other organizational contexts. This consideration is particularly relevant to teaching hospitals, which integrate healthcare delivery with educational and scientific activities and consequently involve diverse user groups and complex work processes. Successful EMR implementation depends not only on technological readiness but also on user adaptation and organizational process alignment (Fennelly et al., 2020; Lindsay & Lytle, 2022).

Universitas Sebelas Maret (UNS) Hospital is a teaching hospital that has implemented an EMR system since February 2024 as part of its digital healthcare transformation. However, no formal

evaluation of the system's implementation has been conducted to date. Preliminary findings identified several challenges, including incomplete integration of clinical documentation into the EMR system, occasional system disruptions, the absence of a specific Standard Operating Procedure (SOP) for EMR implementation, and medical record completion within 24 hours that has not yet met the minimum service standards. These conditions indicate the need to examine the human, organizational, and technological factors that may influence the benefits derived from EMR implementation at UNS Hospital.

Therefore, this study aimed to evaluate EMR implementation at UNS Hospital using the HOT-Fit framework by examining the significance and magnitude of the effects of human, organization, and technology factors on net benefit, both individually and simultaneously. The findings are expected to provide empirical evidence to support hospital management in prioritizing EMR improvement and strengthening EMR governance within a teaching hospital context.

SUBJECTS AND METHOD

1. Study Design

This quantitative study employed a cross-sectional design. The study was conducted at Universitas Sebelas Maret (UNS) Hospital, Surakarta, Indonesia, from December 2025 to July 2026.

2. Population and Sample

The target population comprised healthcare workers using the Electronic Medical Record (EMR) system at Universitas Sebelas Maret (UNS) Hospital. The source population consisted of 515 registered EMR users. The population was divided into two strata based on professional characteristics, namely medical professionals and health professionals. The number of participants allocated to each stratum was determined proportionally, as presented in Table 1. Within each stratum,

participants were recruited using an accidental (convenience) sampling approach based on predetermined eligibility criteria. The inclusion criteria were healthcare professionals who routinely used the EMR system in providing healthcare services at UNS Hospital, were aged ≥ 18 years, had used the EMR system at UNS Hospital for at least one year, and provided informed consent to participate. The exclusion criteria were healthcare professionals who were on leave, undertaking study assignments, or otherwise inactive during the data collection period; respondents who did not complete the questionnaire; and respondents who withdrew or declined to continue their participation before completion of the data collection process.

The minimum sample size was determined using G*Power through an a priori power analysis for multiple linear regression with three predictors, a medium effect size ($f^2 = 0.15$), $\alpha = 0.05$, and power = 0.80, yielding a minimum sample size of 77 participants. A total of 184 eligible participants were included in the final analysis.

3. Research Variables

The dependent variable was the net benefit of EMR implementation. The independent variables comprised the three dimensions of the Human, Organization, and Technology Fit (HOT-Fit) model: human, organization, and technology.

4. Operational Definition

The human dimension assessed system use and user satisfaction with the EMR system.

The organization dimension evaluated organizational support, including organizational structure and organizational environment in facilitating EMR implementation.

The technology dimension measured system quality, information quality, and service quality.

The net benefit dimension reflected the benefits experienced by both users and the organization following EMR implementation, including improvements in work efficiency, service effectiveness, and information quality. All variables were measured using a four-point Likert scale

5. Study Instruments

Data were collected using a structured questionnaire adapted and modified from the instrument developed by Adriani et al. (2025) based on the HOT-Fit model constructs. The instrument had demonstrated acceptable validity using the Pearson Product-Moment correlation test ($r_{\text{calculated}} \geq r_{\text{table}}$) and satisfactory reliability based on Cronbach's alpha ($\alpha > 0.60$) (Adriani et al., 2025). The questionnaire included items on respondents' demographic characteristics as well as indicators of the human, organization, technology, and net benefit variables.

6. Data Analysis

Descriptive statistics were used to summarize respondents' characteristics and study variables. Pearson correlation analysis was performed to examine the relationships between variables. Multiple linear regression analysis was used to assess the effects of human, organization, and technology factors on the net benefit of EMR implementation.

Regression results were reported using unstandardized coefficients (b), standardized coefficients (β), p-values, and 95% confidence intervals (CI). Model fit was assessed using R^2 and adjusted R^2 , while the overall significance of the model was evaluated using the F-test. A p-value < 0.05 was considered statistically significant.

7. Research Ethics

All participants received information regarding the study objectives and provided written informed consent before participation. The study was conducted in accordance with ethical principles, including confidentiality,

anonymity, justice, and respect for participants' rights. All collected data were used solely for research purposes. Ethical approval was obtained from the Research Ethics Committee of the Faculty of Medicine, Universitas Sebelas Maret (Approval No. 79/UN27.06.11/KEP/EC/2026), issued on May 13, 2026.

RESULTS

1. Sample Characteristics

Univariate analysis was conducted to describe the frequency distribution of the respondents' characteristics and the study variables.

Table 1. Characteristics of the Respondents

Category	Frequency (n)	Percentage (%)
Sex		
Male	27	14.7
Female	157	85.3
Age		
≤ 32 years old	120	65.2
>32 years old	64	34.8
Educational Level		
SHS/VHS	3	1.6
Undergraduate	168	91.4
Postgraduate	13	7
Occupation		
Medical professionals	32	17.4
Health professionals	152	82.6
Length of Employment		
1–5 years	62	33.7
6–10 years	118	64.1
> 10 years	4	2.2
Duration of EMR Use		
1–2 years	133	72.3
3–5 years	48	26.1
> 5 years	3	1.6

A total of 184 healthcare professionals participated in this study. The majority of respondents were female (85.3%) and aged ≤32 years (65.2%). Most respondents had an undergraduate degree as their highest educational qualification (91.4%). Health professionals constituted the largest

professional category (82.6%), while medical professionals accounted for 17.4%. Most respondents had 6–10 years of work experience (64.1%) and had been using the Electronic Medical Record (EMR) system for 1–2 years (72.3%)

Table 2. Descriptive Statistics of The Study Variables

Variable	Mean	SD	Min.	Max.
Human	3.12	0.09	2.97	3.25
Organization	3.10	0.07	3.00	3.20
Technology	2.91	0.23	2.45	3.11
Net Benefit	3.14	0.07	3.05	3.22

Table 2 presents the descriptive statistics of the study variables. Overall, all

variables demonstrated mean scores indicating that the implementation of the

EMR system at UNS Hospital was rated as good to very good. The net benefit variable had the highest mean score (mean = 3.14; SD= 0.07), followed by human (mean = 3.12; SD= 0.09) and organization (mean = 3.10; SD= 0.07), suggesting that respondents perceived the benefits of EMR implementation, user competence, and organizational

support to be at a very good level. The technology dimension had the lowest mean score (mean = 2.91; SD = 0.23), although it remained within the good category.

2. Bivariate Analysis

Bivariate analysis was conducted to examine the relationships between the independent variables and the dependent variable.

Table 3. Pearson Correlation Analysis between the Independent Variables and the Dependent Variable

Independent Variable	r	p
Human	0.64	<0.001
Organization	0.64	<0.001
Technology	0.66	<0.001

The relationships between the human, organization, and technology factors and net benefit were examined using Pearson correlation analysis. As shown in Table 3, all independent variables were positively and significantly correlated with net benefit. The human factor showed a strong positive correlation with net benefit ($r = 0.64$; $p < 0.001$), indicating that better system use and higher user satisfaction were associated with greater benefits from EMR implementation. Similarly, the organization factor demonstrated a strong positive correlation with net benefit ($r = 0.64$; $p < 0.001$), suggesting that stronger organizational support for EMR implementation was associated with greater perceived benefits.

The technology factor exhibited the strongest positive correlation with net benefit among all independent variables ($r = 0.66$; $p < 0.001$). This finding indicates that system quality, information quality, and service quality were the dimensions most strongly associated with the benefits of EMR implementation.

3. Multivariate analysis

Multivariable analysis was performed using multiple linear regression to evaluate the simultaneous effects of the human, organization, and technology factors on the net benefit of Electronic Medical Record (EMR) implementation.

Table 4. Direct and Indirect of Transformational Leadership on Healthcare Worker Performance Through Subjective Well-Being and Work Motivation

Variable	b	95% CI		p
		Lower Limit	Upper Limit	
Human	0.16	0.06	0.26	0.002
Organization	0.16	0.05	0.28	0.006
Technology	0.30	0.19	0.40	<0.001
n observation = 184				
Adj R-Squared = 0.54				
p <0.001				

Multiple linear regression analysis demonstrated that the human, organization, and technology factors were all positively and significantly associated with the net benefit of EMR implementation at UNS Hospital. The human factor was positively associated with net benefit ($b = 0.16$; 95% CI = 0.06–0.26; $p = 0.002$), indicating that each one-unit increase in the human factor was associated with a 0.16-point increase in the net benefit score after controlling for the organization and technology variables.

The organization factor also had a significant positive effect on net benefit ($b = 0.16$; 95% CI = 0.05–0.28; $p = 0.006$), indicating that stronger organizational support contributed to greater benefits of EMR implementation. The technology factor showed the largest positive effect on net benefit ($b = 0.30$; 95% CI = 0.19–0.40; $p < 0.001$), suggesting that technology quality was the most influential determinant of the perceived benefits of EMR implementation compared with the human and organization factors.

Overall, the regression model was statistically significant ($F = 71.63$; $p < 0.001$). The coefficient of determination ($R^2 = 0.54$) indicated that the human, organization, and technology factors collectively explained 54% of the variance in the net benefit of EMR implementation. After adjustment for the number of predictors, the adjusted R^2 was 0.54, demonstrating that the model retained good explanatory power. The remaining 46% of the variance was attributable to factors not included in the present study.

DISCUSSION

1. Human Factor and Net Benefit of Electronic Medical Record Implementation

This study demonstrated that the human factor had a positive and statistically significant effect on the net benefit of Electronic Medical

Record (EMR) implementation at Universitas Sebelas Maret (UNS) Hospital. This finding indicates that better performance of the human dimension is associated with greater benefits from EMR implementation. The descriptive analysis further showed that the human dimension was rated as very good, suggesting that most users possessed adequate knowledge, skills, and experience in utilizing the EMR system to support healthcare delivery. Such competencies enable more effective clinical documentation, faster access to patient information, and improved service efficiency.

These findings support the Human, Organization, and Technology Fit (HOT-Fit) model proposed by Yusof et al. (2008), which conceptualizes the human dimension through system use and user satisfaction. Within this framework, the extent to which users are able and willing to use an information system and their satisfaction with the system are important aspects of health information system implementation and are related to the benefits obtained from the system. The significant effect identified in this study therefore provides empirical support for the relevance of the human dimension within the HOT-Fit framework in the context of EMR implementation. The finding also aligns with the Technology Acceptance Model (TAM), particularly the role of perceived usefulness and perceived ease of use in shaping technology acceptance and use (Davis, 1989). However, TAM primarily explains technology acceptance, whereas HOT-Fit provides a broader framework for interpreting the relationship between human factors and the outcomes of health information system implementation. Thus, the present finding provides empirical support for the relevance of the human dimension within the HOT-Fit framework in the context of EMR implementation at a teaching hospital.

The findings are consistent with previous studies by Prameswari et al. (2025),

Fitriana & Widiyanto (2025), and Rokim et al. (2024), which demonstrated the importance of user-related factors in achieving successful EMR implementation. Similarly, Ahmadi et al. (2017) identified human factors as an important determinant of health information system implementation. The consistency of these findings suggests that the benefits of EMR implementation depend not only on the availability of the system but also on how effectively users interact with and utilize the system.

From a practical perspective, the significant effect of the human factor indicates that maintaining and improving user-related conditions should remain part of EMR management at UNS Hospital. Training and technical support should therefore be directed toward maintaining users' ability to utilize the system effectively, particularly when new features or system changes are introduced. Periodic evaluation of user experiences can also help identify areas requiring further improvement. These recommendations are directly aligned with the finding that the human dimension significantly contributes to the net benefit of EMR implementation.

2. Organization Factor and Net Benefit of Electronic Medical Record Implementation

This study found that the organization factor had a positive and statistically significant effect on the net benefit of Electronic Medical Record (EMR) implementation at Universitas Sebelas Maret (UNS) Hospital. These findings indicate that stronger organizational support is associated with greater benefits from EMR implementation. Descriptive analysis also showed that the organization dimension was rated as very good, indicating favorable organizational conditions in supporting EMR implementation and use. Such organizational conditions may facilitate consistent system use and contribute to the achievement of the expected benefits of EMR implementation.

These findings are consistent with the Human, Organization, and Technology Fit (HOT-Fit) model, which proposes that the success of information system implementation depends not only on technology quality and user capability but also on organizational readiness to provide a supportive structure and environment for system utilization (Yusof et al., 2008). Within the HOT-Fit framework, the organization dimension encompasses organizational structure and organizational environment, including management support, organizational policies, communication, coordination, organizational culture, and the availability of resources. Organizations that establish clear policies, provide continuous training, and implement regular evaluation mechanisms are more likely to promote effective system utilization, thereby maximizing the benefits of EMR implementation for both individuals and the organization.

The present findings are consistent with those of Ahmadi et al. (2019), who identified management support, organizational readiness, and resource availability as key determinants of successful Hospital Information System implementation. Similar results were reported by Fitriana & Widiyanto (2025) and Prameswari et al. (2025), who found that leadership commitment, interdepartmental coordination, user training, and organizational policies significantly contribute to successful EMR implementation. Furthermore, the rapid umbrella review conducted by Fennelly et al. (2020) highlighted governance, leadership, organizational culture, user engagement, training, and workflow integration as critical organizational factors influencing the successful implementation of Electronic Health Records. The consistency of these findings suggests that the benefits of EMR implementation depend not only on system characteristics and user capabilities but also on the organizational environment in which the system is implemented.

From a practical perspective, the significant effect of the organization factor indicates that organizational support should remain a priority in EMR management at UNS Hospital. Management can strengthen EMR governance by maintaining organizational support, improving coordination across relevant units, and regularly evaluating policies and Standard Operating Procedures (SOPs) related to EMR implementation. These efforts are directly aligned with the finding that the organization dimension significantly contributes to the net benefit of EMR implementation.

1. Technology Factor and Net Benefit of Electronic Medical Record Implementation

This study demonstrated that the technology factor had a positive and statistically significant effect on the net benefit of Electronic Medical Record (EMR) implementation at Universitas Sebelas Maret (UNS) Hospital. Moreover, the multiple linear regression analysis identified technology as the factor with the largest relative effect on net benefit compared with the human and organization factors, based on its standardized regression coefficient. This finding indicates that the technological aspects of the EMR system play an important role in determining the benefits obtained from its implementation.

The stronger relative effect of the technology factor may be explained by its direct role in supporting users' daily interaction with the EMR system. System performance, information accessibility, response time, reliability, and the availability of appropriate features may influence how effectively users can utilize the system in their daily work. Consequently, even when users have adequate capabilities and organizational support, limitations in system performance may reduce the benefits obtained from EMR implementation.

Descriptive analysis showed that the technology dimension was rated as good,

whereas the human and organization dimensions were rated as very good. This difference is noteworthy because technology had the largest relative effect on net benefit despite receiving a lower descriptive rating than the human and organization dimensions. This finding suggests that technological factors may represent an important area for improvement in maximizing the benefits of EMR implementation. Preliminary findings also identified several technical challenges, including occasional system errors, inconsistent system response times, and the need for additional features to better meet users' needs. These conditions further indicate the importance of maintaining and improving technology quality to support the continued effectiveness of EMR implementation.

These findings are consistent with the Human, Organization, and Technology Fit (HOT-Fit) model, which conceptualizes the technology dimension as comprising system quality, information quality, and service quality (Yusof et al., 2008). These components reflect the extent to which the system performs reliably, provides useful and appropriate information, and is supported by adequate technical services. The present findings are also consistent with the DeLone and McLean Information Systems Success Model (2003), which proposes that system quality, information quality, and service quality influence system use and user satisfaction and ultimately contribute to net benefits. Thus, the significant effect of the technology factor in this study provides empirical support for the relevance of technological quality in achieving the expected benefits of EMR implementation.

The findings are consistent with previous studies. In a rapid umbrella review, Fennelly et al. (2020) reported that successful Electronic Health Record implementation is strongly influenced by technological characteristics, including usability, interoperability,

adaptability, infrastructure, and supporting standards and policies. Similar findings were reported by Waris & Hilmy (2024), who demonstrated that system quality, ease of use, and information quality positively influence the benefits of EMR implementation in hospitals. Furthermore, Urbanantika et al. (2024) identified system performance, network stability, usability, and technical support as key factors contributing to successful EMR implementation. Therefore, based on the significant effect and relatively largest contribution of the technology factor observed in this study, UNS Hospital should prioritize continuous technological improvement, particularly by enhancing system stability, optimizing response time, refining system features according to users' needs, and strengthening technical support services.

2. Simultaneous Effect of Human, Organization, and Technology on Net Benefit

The present study demonstrated that the human, organization, and technology factors collectively had a positive and statistically significant effect on the net benefit of Electronic Medical Record (EMR) implementation at Universitas Sebelas Maret (UNS) Hospital. These findings indicate that the benefits of EMR implementation are associated with the combined contribution of user-related, organizational, and technological factors rather than a single dimension alone. Descriptive analysis further showed that the human and organization dimensions were rated as very good, whereas the technology dimension was rated as good. Overall, these findings indicate favorable conditions across the three dimensions, although technological aspects remain an area for further improvement. The significant simultaneous effect suggests that consideration of human, organization, and technology factors together is important in understanding the benefits of EMR implementation at UNS Hospital.

These findings support the Human, Organization, and Technology Fit (HOT-Fit) model proposed by Yusof et al. (2008), which emphasizes the interaction and alignment among human, organization, and technology dimensions in determining the outcomes of health information system implementation. Within this framework, the benefits of an information system are influenced not only by individual system users, organizational conditions, or technological characteristics considered separately, but by their interrelationship within the implementation context. The present findings are also consistent with the DeLone and McLean Information Systems Success Model (2003), which identifies net benefit as the ultimate outcome of the interaction among system quality, information quality, service quality, system use, and user satisfaction. Therefore, the significant simultaneous effect observed in this study provides empirical support for considering the three HOT-Fit dimensions together when evaluating the benefits of EMR implementation.

The findings are consistent with those reported by Indah et al. (2026), who found that the human, organization, and technology dimensions collectively influence the success of EMR implementation. Similar results were reported by Munjirin et al. (2024), who concluded that the success of Hospital Information System implementation cannot be explained by a single HOT-Fit dimension but rather by the alignment of all components within the model. Furthermore, Zhai et al. (2022) demonstrated that successful health information system implementation depends on user readiness, organizational support, and technology that effectively meets healthcare service requirements. These findings are further supported by Wardhana et al. (2025) and the literature review conducted by (Ilmada, 2023), which concluded that evaluations of hospital information systems should

comprehensively consider all HOT-Fit dimensions to achieve optimal implementation outcomes.

From a practical perspective, the significant simultaneous effect indicates that EMR improvement at UNS Hospital should not focus exclusively on one dimension. This study highlights that the successful implementation of EMRs at UNS Hospital is the result of the synergy among the human, organization, and technology dimensions. Although the human and organization dimensions have achieved very good performance, the technology dimension still requires further improvement to maximize the benefits of EMR implementation. Therefore, the hospital should conduct regular evaluations of EMR implementation while prioritizing improvements in system quality, refinement of system features based on users' needs, enhancement of system stability, and strengthening of governance through the development and periodic evaluation of Standard Operating Procedures (SOPs) for EMR use. These efforts are expected to sustainably enhance the net benefits of EMR implementation for both healthcare professionals and the organization.

This study demonstrated that human, organization, and technology factors had positive and statistically significant effects on the net benefit of EMR implementation at UNS Hospital, both individually and simultaneously. Technology showed the largest relative effect based on the standardized regression coefficient, indicating that technological improvement should remain an important priority in maximizing EMR benefits.

This study has several limitations. The cross-sectional design limits causal interpretation, while the use of self-reported questionnaire data may introduce response bias. In addition, the study was conducted at a single teaching hospital, which may limit the generalizability of the findings to other healthcare

settings. Future studies should consider longitudinal designs and multiple healthcare institutions to strengthen the evidence on EMR implementation.

AUTHOR CONTRIBUTION

The first author contributed to the study design, data collection, data analysis, interpretation of the results, and preparation of the manuscript. The co-authors contributed to supervision, critical review, interpretation of the results, and revision of the manuscript. All authors reviewed and approved the final version of the manuscript.

CONFLICT OF INTEREST

There are no conflicts of interest.

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