

Determinants Of EMR System Success: Integrating System Interoperability, Organizational Control Within The Hot-Fit Model

Sutiawan^{1*}, Hosizah Markam², Rina Mutiara³

¹⁻³ Master of Hospital Administration, Universitas Esa Unggul; Jakarta: sutiawan@student.esaunggul.ac.id^{1*}, hosisah@esaunggul.ac.id², rina.mutiara@esaunggul.ac.id³

* Corresponding Author: sutiawan@student.esaunggul.ac.id

Abstract: Background, the implementation of an Electronic Medical Record (EMR) has become a crucial component in efforts to improve the quality of healthcare services in hospitals. The success of its implementation is not solely determined by technological factors but is also influenced by organizational readiness, the system's ability to interoperate, and user support. Objective, this study aims to analyze the role of system interoperability and organizational control within the HOT-Fit Model framework to measure the level of success of EMR implementation at Mekar Sari Hospital. Methods, this study employed a quantitative research design with a cross sectional approach. Data analysis, the relationships among variables were examined using Structural Equation Modeling Partial Least Squares (SEM-PLS). Population and sample, the population consisted of all employees of Mekar Sari Hospital working across various service units, with a total sampling technique involving 120 respondents. Results, the findings indicate that technological factors, including system quality, information quality, and service quality, have a significant effect on system use and user satisfaction. Interoperability enhances information accuracy through more precise and consistent cross unit data integration. Organizational factors, particularly the organizational environment and organizational control, have a significant influence on structure, thereby supporting more optimal utilization of the EMR information system. Conclusion, this study recommends interoperability should be enhanced through data integration, standardization, and user training. In addition, organizations need to improve coordination, update standard operating procedures, strengthen audits, and optimize net benefits through measurable performance evaluations.

Keywords: EMR; HOT-Fit; Net Benefits; Organizational Control; System Interoperability.

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1. Introduction

The development of information technology has transformed almost every aspect of healthcare services, including the management of patient data and information in hospitals. One of the most significant forms of this transformation is the implementation of Electronic Medical Records (EMR), which enable patient health information to be stored digitally, integrated across systems, and accessed quickly and accurately by healthcare professionals. The existence of EMR is no longer merely an option but has become a necessity in supporting effective and efficient healthcare delivery. Through EMR, medical documentation processes can be conducted more systematically, thereby improving the quality of patient care. Furthermore,

EMR supports more accurate clinical decision-making because patient information is available in a complete and real-time format. Therefore, EMR implementation has become an essential component of efforts to modernize healthcare service systems in hospitals (Amatayakul, 2007; Shortliffe & Cimino, 2006).

The acceleration of digital transformation in the healthcare sector became even more pronounced following the COVID-19 pandemic. In Indonesia, the government issued Minister of Health Regulation Number 24 of 2022, requiring all healthcare facilities to implement Electronic Medical Records. This policy reflects the government's commitment to establishing a more integrated and technology-based healthcare system. The regulation also emphasizes that EMR should function as part of a healthcare facility information system interconnected with other subsystems. Consequently, hospitals are expected to ensure that the EMR systems they utilize are capable of adequately supporting operational and service needs. Ineffective implementation may hinder healthcare processes and reduce the quality of information generated by the system. Therefore, evaluating EMR implementation has become an important step in ensuring the effectiveness and sustainability of digital healthcare (Peraturan Menteri Kesehatan Nomor 24 Tahun 2022 Tentang Rekam Medis, 2022).

The success of information system implementation is determined not only by the sophistication of the technology employed but also by human and organizational factors involved in managing the system. In this context, the Human Organization Technology-Fit (HOT-Fit) model has been widely adopted as a framework for evaluating health information systems because it assesses the alignment among technological, human, and organizational dimensions. The HOT-Fit model was developed based on the DeLone and McLean Information System Success Model, which highlights the importance of system quality, information quality, service quality, system use, user satisfaction, and organizational benefits. Subsequently, the HOT-Fit model incorporated organizational dimensions as additional factors influencing information system success. Therefore, information system evaluation should be conducted comprehensively to provide an accurate representation of actual implementation conditions within healthcare organizations (DeLone & McLean, 2003; Yusof et al., 2008).

The HOT-Fit model categorizes information system success factors into three primary components: human factors, organizational factors, and technological factors. Human factors include system use and user satisfaction, while organizational factors encompass organizational structure and environment. Technological factors consist of system quality, information quality, and service quality. These three components interact dynamically in determining the success of information system implementation. Over time, numerous studies have modified the HOT-Fit model to better accommodate the specific needs and characteristics of different organizations. Such modifications are necessary because rapid advancements in information technology introduce new challenges that may not be fully addressed by the original framework. Consequently, the continued development and refinement of the HOT-Fit model remain highly relevant in contemporary healthcare settings (Yusof et al., 2008).

One aspect that has become increasingly important in healthcare information system management is system interoperability. Interoperability enables different healthcare applications and systems to exchange information using standardized protocols, allowing data to be utilized more effectively and efficiently. The presence of interoperability facilitates rapid access to

patient information, reduces duplication of work, and supports more accurate clinical decision-making processes. Moreover, interoperability enables data integration across healthcare departments and even between different healthcare organizations. In the era of digital healthcare services, the ability of systems to communicate and exchange information has become a critical determinant of EMR implementation success. Therefore, interoperability should be considered an essential component in the evaluation of healthcare information systems (Benson & Grieve, 2016; HIMSS, 2025; Lehne et al., 2019).

In addition to interoperability, organizational control plays a vital role in ensuring the successful implementation of information systems. Organizational control refers to internal control mechanisms designed to maintain operational effectiveness, regulatory compliance, and the security of organizational data and information. Within hospital settings, internal control may be manifested through information system training programs, policy dissemination, periodic evaluations, leadership commitment, and the implementation of clear reward and punishment mechanisms. Effective organizational control enables institutions to identify and mitigate risks that may disrupt hospital operations. Furthermore, it contributes to improving user compliance with established policies and procedures. Therefore, organizational control represents a relevant dimension to be incorporated into the HOT-Fit evaluation model to enhance its ability to assess information system success comprehensively (Bastian, 2016; COSO, 2019; Erimalata, 2016).

RS Mekar Sari has implemented an Electronic Medical Record system since 2014; however, a comprehensive evaluation of its implementation success has not yet been conducted. Preliminary survey findings revealed several issues, including limited system interoperability, difficulties experienced by users when accessing multiple applications simultaneously, system maintenance activities that frequently disrupt healthcare services, and suboptimal organizational support and information technology services. In addition, weaknesses were identified in data security, authorization policies, and the evaluation of procedures related to EMR management. These findings indicate that the success of EMR implementation is influenced not only by technological factors but also by organizational and user-related factors. Based on these challenges, this study aims to analyze the success of EMR implementation using the HOT-Fit model while incorporating System Interoperability and Organizational Control as novel dimensions, thereby contributing to the advancement of healthcare information system evaluation frameworks (Benson & Grieve, 2016; COSO, 2019; Yusof et al., 2008).

2. Preliminaries or Related Work or Literature Review

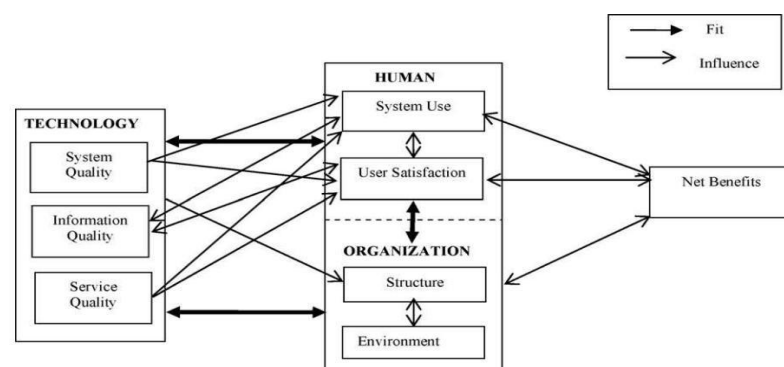


Figure 1. Framework Human Organization and Technology-Fit

The Human Organization and Technology-Fit (HOT-Fit) model, developed by Mohamad M. Yusof and colleagues in 2006, is an information system evaluation framework derived from the Information Systems Success Model proposed by William H. DeLone & McLean (2003). The model provides a comprehensive approach to assessing information system success through three key dimensions: Human, Organization, and Technology. According to Yusof et al. (2008), the HOT-Fit model explains that the success of an information system is influenced not only by technological quality but also by human involvement and organizational support. Furthermore, the model emphasizes the importance of alignment or “fit” among these three dimensions, highlighting that technological factors can significantly influence human and organizational factors, while the interaction and compatibility among all components ultimately determine the effectiveness, acceptance, and overall success of information system implementation.

Net Benefit refers to the impact generated by the implementation of an information system on both individuals and organizations. According to DeLone & McLean (2003), these benefits may include improvements in job performance, productivity, effectiveness, ease of work, decision-making quality, and reductions in operational costs. Similarly, the Technology Acceptance Model (TAM) proposed by Venkatesh & Bala (2008) explains that users’ perceptions of technology usefulness (perceived usefulness) are key factors influencing their intention and actual behavior in using technology. The greater the benefits perceived by users, the more likely the technology will be accepted and continuously utilized. Within the HOT-Fit model, Yusof et al. (2008) measure Net Benefit through elements such as efficiency, effectiveness, decision-making quality, and error reduction resulting from the use of the information system.

System Use is a component used to measure the extent to which an information system is utilized by its users. DeLone & McLean (2003) suggest that system use can be assessed through the amount of use, frequency of use, and intention to use. Furthermore, Yusof et al. (2008) explain that system use is associated with factors such as frequency of use, user knowledge, training, and users’ acceptance or resistance toward the system. System use also has a reciprocal relationship with user satisfaction, whereby higher levels of system use can enhance user satisfaction and vice versa. Therefore, within the HOT-Fit model, system use serves as an important indicator for evaluating the success of information system implementation, particularly through the dimensions of frequency of use and user knowledge regarding the system.

System Use is one of the key components used to evaluate the success of information system implementation. According to DeLone & McLean (2003), system use reflects the extent to which users utilize an information system, either voluntarily or as part of organizational requirements. The level of system use can be assessed through factors such as frequency of use, amount of use, and users’ intention to continue using the system to support their tasks and responsibilities. The more frequently a system is used and the greater the benefits perceived by users, the more successful the implementation of the information system is considered to be.

Furthermore, Yusof et al. (2008) explain that system use is influenced not only by technological factors but also by user-related factors such as knowledge, training, and acceptance of the system. System use has a close relationship with user satisfaction, as satisfied users are more likely to use the system regularly in their daily work activities. Therefore, system use

serves as an important indicator in the HOT-Fit model for assessing the effectiveness of information system implementation. In this study, the System Use component is measured through two main elements: frequency of use and users' knowledge of the system.

User Satisfaction is a component used to assess the extent to which users are satisfied with the information system they utilize. According to DeLone & McLean (2003), user satisfaction is influenced by system quality, information quality, and service quality. Within the HOT-Fit framework, user satisfaction reflects the overall evaluation of users' experiences when interacting with a system and the benefits they perceive from its use. A higher perception of system usefulness and more positive user behavior toward the system contribute to a greater level of satisfaction (Yusof et al., 2008).

Structure represents one of the organizational factors in the HOT-Fit model that plays an important role in determining the success of information system implementation. According to Yusof & Yusuff (2013), organizational structure encompasses internal collaboration, organizational strategy, leadership, top management support, and staff support. Robbins & Judge (2017) explain that organizational structure is shaped by complexity, formalization, and centralization, which regulate task distribution, authority, and work coordination. An effective organizational structure clarifies roles, improves coordination, and supports the successful implementation of information systems.

Environment refers to external factors that influence the success of information system implementation. Robbins & Judge (2009) categorizes the organizational environment into the general environment, which includes economic, social, political, legal, and technological aspects, and the specific environment, which consists of customers, government agencies, suppliers, and other stakeholders. In healthcare organizations, environmental factors include government policies, healthcare financing, interorganizational relationships, the population served, and communication processes. According to Yusof & Yusuff (2013), financing and communication are among the key elements used to assess the organizational environment.

Organizational Control refers to the mechanisms established to ensure that information systems are utilized in accordance with organizational goals and objectives. Yusof et al. (2008) describe organizational control as being reflected through policies, procedures, authority distribution, and managerial supervision. From the perspective of information technology governance, effective control mechanisms enhance accountability, compliance, and the security of information system management. Based on the COSO Framework, internal control consists of the control environment, risk assessment, control activities, information and communication, and monitoring activities that collectively support organizational effectiveness.

System Quality describes the technical capability of an information system in meeting user needs. DeLone & McLean (2003) state that system quality includes ease of use, reliability, flexibility, response time, and security. A high-quality system enables users to access information efficiently, securely, and promptly. According to Yusof et al. (2008), the primary dimensions of system quality include ease of learning, ease of use, response time, security, availability, and flexibility, all of which contribute to the successful implementation of information systems.

Information Quality refers to the quality of information generated by an information system. DeLone & McLean (2003) argue that high-quality information should be accurate, complete, relevant, and timely in order to

support decision-making processes. Romney & Steinbart (2015) further emphasize that useful information should be understandable, verifiable, and free from bias. Within the HOT-Fit framework, information quality is measured through dimensions such as accuracy, completeness, availability, timeliness, relevancy, and consistency, reflecting the system's ability to produce valuable information for users (Yusof et al., 2008).

Service Quality is concerned with the support provided by information system service providers, whether from internal organizational units or external vendors. DeLone & McLean (2003) suggest that service quality can be evaluated through responsiveness, empathy, and the competence of service providers. Yusof et al. (2008) further indicate that service quality encompasses technical support, service assurance, and follow-up services for resolving user issues. High-quality services improve user comfort and encourage the continued use of information systems.

System Interoperability is the ability of different information systems to communicate, exchange data, and integrate information effectively. According to the Healthcare Information and Management Systems Society (HIMSS, 2025), interoperability facilitates the secure and timely exchange of healthcare data across organizations. Four levels of interoperability are recognized: foundational, structural, semantic, and organizational interoperability. Effective interoperability enhances healthcare coordination, reduces data duplication, and improves the quality of clinical decision-making (Lehne et al., 2019).

Electronic Medical Records (EMR) are digital health records that are created, managed, and utilized by healthcare professionals during the delivery of healthcare services. According to Amatayakul (2007), EMRs enable patient information to be accessed and used in an integrated manner by healthcare professionals within a healthcare facility. Huffman (1994) describes medical records as both clinical tools and legal documents that must fulfill the principles of completeness, accuracy, timeliness, readability, and confidentiality. Therefore, the quality of documentation is a critical factor in supporting patient safety and healthcare service quality.

The implementation of EMRs in Indonesia is regulated under the Indonesian Ministry of Health Regulation Number 24 of 2022, which mandates all healthcare facilities to implement Electronic Medical Records. This regulation governs patient data management, system interoperability, information security, data storage, and integration with the national health information platform. Furthermore, EMR systems are required to possess interoperability capabilities and be connected to the national health data integration platform, SATUSEHAT. These policies aim to enhance healthcare service quality, improve data management efficiency, and support the ongoing digital transformation of the Indonesian healthcare system.

3. Proposed Method

This study was conducted at Mekar Sari Hospital, Bekasi, using a descriptive quantitative approach with a cross-sectional design to analyze the success of Electronic Medical Record (EMR) system implementation based on the HOT-Fit model, modified by the addition of System Interoperability and Organizational Control variables. The study population consisted of 120 EMR system users, all of whom were included as research respondents through a total sampling technique. Data were collected through an online survey using a structured questionnaire based on a Likert scale. The questionnaire items were developed from the indicators of the ten research variables to measure respondents' perceptions and experiences regarding the

EMR system. The collected data were then analyzed using descriptive statistical methods and Structural Equation Modeling–Partial Least Squares (SEM-PLS) to examine the relationships among variables and evaluate the factors influencing the success of EMR implementation at the hospital.

4. Results and Discussion

Respondent Characteristics

This study involved 120 respondents, the majority of whom were at the staff level (86.7%), indicating that the assessments primarily reflect the experiences of operational users. Respondents were distributed across various service units, predominantly inpatient care (45%), outpatient care (19.2%), and pharmacy services (14.2%), thereby providing a broad range of perspectives. Most respondents were female (94.2%) and were aged 20–

<30 years (50%) and 30–<40 years (27.5%). The educational background was dominated by diploma (D3) graduates (59.2%) and bachelor's degree (S1) holders (38.3%). Most respondents had a length of employment of 1–<5 years (48.3%) and a similar duration of system usage (60.8%), indicating sufficient experience to provide informed assessments. Overall, the respondent characteristics represent experienced operational users who are highly relevant to the context of evaluating system quality, information quality, and user satisfaction.

Validity Test

The validity test was conducted on 120 respondents using the Pearson Product-Moment correlation method with a significance level of 5%, resulting in an r-table value of 0.178. An item was considered valid if its calculated correlation coefficient (r-count) exceeded the r-table value. The results showed that all indicators across the ten research variables, namely Net Benefit, System Use, User Satisfaction, Structure, Environment, Organizational Control, System Quality, Information Quality, Service Quality, and System Interoperability, obtained r-count values ranging from 0.768 to 0.911, all of which were greater than 0.178. Therefore, every questionnaire item was declared valid and appropriate for measuring its respective construct, indicating that the instrument had a strong ability to accurately capture the variables examined in this study.

Reliability Test

Reliability testing is used to assess the extent to which each indicator in the questionnaire produces consistent answers. An instrument is considered reliable if the responses remain stable when repeated measurements are taken. The basis for this assessment is Cronbach's alpha > 0.60, which is the instrument's reliability limit (Ghozali, 2018). The results of the reliability test were obtained through data processing using SPSS 25, as follows.

Tabel 1. Realibility Test

Variable	Cronbacch's Alpha	Description
Tangible Benefits	0,959	Reliabel
<i>System Usage</i>	0,827	Reliabel
<i>User Satisfaction</i>	0,815	Reliabel
<i>Structure</i>	0,823	Reliabel
<i>Organizational Environment</i>	0,849	Reliabel
<i>Organizationa Control</i>	0,827	Reliabel
<i>System Quality</i>	0,936	Reliabel
<i>Information Quality</i>	0,962	Reliabel
<i>Service Quality</i>	0,931	Reliabel
<i>System Interoperability</i>	0,913	Reliabel

The table above shows that all variables in this study meet reliability criteria, as their Cronbach's Alpha values are above the minimum threshold of 0.60. This finding confirms that the instrument used is reliable and capable of producing consistent assessments.

Hypotesis Test

Hypothesis Testing Results – The research data were processed using SmartPLS.

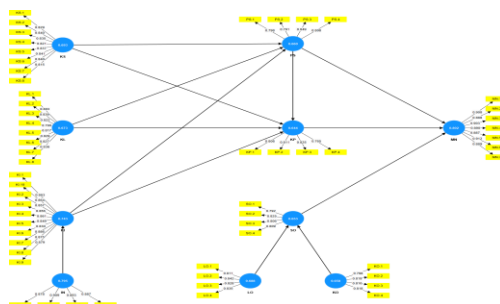


Figure 2. Bootstrapping Analysis Results

Simultaneous Tes

Hypothesis testing was conducted at a 5% significance level, where a hypothesis is accepted when the test statistic exceeds the critical value. For the simultaneous effect test of Hypothesis 1 (H1), the influence of System Quality, Information Quality, and Service Quality on Structure was evaluated using the F-test derived from the R^2 value obtained in the SmartPLS analysis. Based on an R^2 value of 0.870, three independent variables ($k = 3$), and a sample size of 120 respondents ($n = 120$), the calculated F-value was 258.77, which was substantially higher than the critical F-value of 2.68. These results indicate that System Quality, Information Quality, and Service Quality jointly have a significant effect on Structure and explain 87% of its variance. Therefore, Hypothesis 1 (H1) was accepted, confirming the strong collective contribution of these variables to the organizational structure dimension.

Determinant Coefficient

The overall R-square test results indicate that the endogenous variables namely Information Quality (IQ), User Satisfaction (US), Net Benefits (NB), System Use (SU), and Organizational Structure (OS) have R-square values ranging from 0.741 to 0.870. These results demonstrate that the endogenous variables are strongly explained by the exogenous variables included in the model. This finding indicates that the research model possesses very strong explanatory power and is highly relevant in describing the relationships among the variables under investigation.

Consistent with these findings, the Q-square test results show that the tested PLS model has adequate predictive relevance, as most endogenous variables exhibit positive Q^2 values ranging from 0.490 to 0.597. The model is able to explain a substantial proportion of data variance, particularly for the Information Quality (IQ) variable, which demonstrates the highest predictive relevance. Therefore, it can be concluded that the research model is not only structurally valid but also possesses sufficient predictive capability, which is an important indicator in assessing model quality within PLS analysis.

Furthermore, the results of the F-square (f^2) test indicate that the research model exhibits several very strong effects, particularly along the paths from System Interoperability to Information Quality, from Organizational

Environment to Organizational Structure, and from System Use to User Satisfaction, all of which demonstrate strong effects that signify substantial and meaningful relationships within the structural model. Most of the remaining relationships show small effects, which still contribute to the model but are not dominant in influencing changes in the endogenous variables. The absence of negative f^2 values further indicates that all relationships have positive directional effects, although the magnitude of these effects varies

Tabel 2. Path Coefficients

Direct Effect Path	Coefficient	T Statistik	P Value	Coclusion
System Quality→ System Use	0,316	4,012	0,000	H2 Accepted
System Quality→ User Satisfaction	0,172	2,579	0,009	H3 Accepted
System Interoperability → InformationQuality	0,901	49,550	0,000	H4 Accepted
Information Quality → System Use	0,290	3,405	0,001	H5 Accepted
Information Quality → User Satisfaction	0,161	2,319	0,020	H6 Accepted
Service Quality→ System Use	0,305	3,001	0,003	H2 Accepted
Service Quality→ User Satisfaction	0,027	0,325	0,745	H3 Rejected
System Use → User Satisfaction	0,600	8,463	0,000	H4 Accepted
Environment →Structure	0,686	6,543	0,000	H5 Accepted
Control →Structure	0,257	2,424	0,015	H6 Accepted
System Use → Net Benefits	0,213	2,670	0,008	H4 Accepted
User Satisfaction → Net Benefits	0,277	3,200	0,001	H5 Accepted
Structure →Net Benefits	0,405	4,768	0,000	H6 Accepted

The results of the path coefficient analysis indicate that most of the proposed hypotheses were supported, demonstrating significant positive relationships among the variables in the modified HOT-Fit model. System Quality significantly influenced both System Use ($p = 0.000$; $t = 4.012$) and User Satisfaction ($p = 0.009$; $t = 2.579$), while System Interoperability showed a very strong positive effect on Information Quality ($p = 0.000$; $t = 49.550$). Furthermore, Information Quality significantly affected both System Use ($p = 0.001$; $t = 3.405$) and User Satisfaction ($p = 0.020$; $t = 2.319$), indicating that accurate, complete, and accessible information enhances user engagement and satisfaction with the EMR system.

Service Quality was found to have a significant positive effect on System Use ($p = 0.003$; $t = 3.001$), suggesting that reliable support services encourage users to utilize the system more frequently. However, Service Quality did not significantly influence User Satisfaction ($p = 0.745$; $t = 0.325$), making Hypothesis H8 the only unsupported hypothesis in the model. In contrast, System Use had a strong positive effect on User Satisfaction ($p = 0.000$; $t = 8.463$), confirming that greater utilization of the system contributes to higher levels of user satisfaction.

Within the organizational dimension, Environment significantly influenced Structure ($p = 0.000$; $t = 6.543$), while Organizational Control also had a significant positive effect on Structure ($p = 0.015$; $t = 2.424$). These findings suggest that organizational conditions, support, and control mechanisms play an important role in strengthening the structural aspects required for successful EMR implementation. The results emphasize the importance of both environmental and managerial factors in supporting system adoption and organizational readiness.

Regarding the outcome variables, System Use ($p = 0.008$; $t = 2.670$), User Satisfaction ($p = 0.001$; $t = 3.200$), and Structure ($p = 0.000$; $t = 4.768$) were all found to have significant positive effects on Net Benefits. Overall, the majority of the relationships in the structural model were positive and statistically significant, with t-statistics exceeding 1.96 and p-values below 0.05. These findings provide strong support for the proposed theoretical framework and indicate that the success of EMR implementation is influenced by technological, human, and organizational factors, while only the relationship between Service Quality and User Satisfaction was not supported.

Discussion

The Simultaneous Effect of System Quality, Information Quality, and Service Quality on Organizational Structure

The results of testing the first hypothesis (H1) in this study confirm that System Quality, Information Quality, and Service Quality simultaneously have a positive and significant effect on Organizational Structure. This finding emphasizes that the three technology-related variables collectively provide a significant direct contribution to strengthening hospital organizational structures, thereby enhancing the benefits derived from the use of the EMR information system.

Based on the results of the Three Box Method analysis, the technology factor is classified in the high category in terms of system quality, information quality, and service quality. This indicates that the EMR information system has been able to optimally support hospital operational and service needs, although certain aspects still require improvement.

These findings are consistent with the study by Yusof et al. (2008), which emphasizes the importance of adequate technological support for healthcare organizations to optimize the utilization of Health Information Systems (HIS). Several other studies also provide empirical evidence that System Quality, Information Quality, and Service Quality have a significant influence on organizational aspects. The technological dimension plays a crucial role in strengthening organizational structure. Improvements in system quality, information quality, and service quality contribute to the development of more effective organizational processes, clearer roles and responsibilities, and better coordination within the organization. The findings indicate that the three technological dimensions play a crucial role in strengthening organizational structure. Technological factors were also found to have a significant influence on organizational aspects, suggesting that the

successful implementation of technology contributes to improved organizational performance and effectiveness.

Furthermore, improvements in technological quality are directly associated with the strengthening of organizational structure. Technological quality variables have also been shown to significantly influence organizational structure, although system quality may not always directly affect user satisfaction. These findings suggest that technological factors play an important role in enhancing organizational effectiveness and supporting the successful implementation of information systems.

Overall, these studies reinforce the evidence that the three technological dimensions within the HOT-Fit model make an important simultaneous contribution to enhancing organizational structure, which is consistent with the findings of this study.

The Effect of System Quality on System Use

The results of testing the second hypothesis (H2) in this study confirm that System Quality has a positive and significant effect on System Use. This finding indicates that the better the quality of the EMR information system as perceived by users, the higher the level of system utilization.

Based on the results of the Three Box Method analysis, the System Quality variable index falls within the high category. This suggests that the EMR information system demonstrates very good performance, although several technical disruptions are still present. This consistency is reflected in the System Use variable index, which is also categorized as high, indicating that the system is widely used, considered important, and supported by effective training.

These findings are consistent with the theoretical framework proposed by Yusof et al. (2008) and the DeLone & McLean (2003), which emphasize that system quality is a primary determinant in promoting the use of information systems. Empirical evidence from various studies further reinforces this result. System quality has been found to have a significant positive effect on system use. A well-designed system that is reliable, user-friendly, and efficient encourages users to utilize the system more frequently and effectively in carrying out their tasks. Improved system quality can therefore increase user acceptance and promote the successful implementation of information systems within organizations. Studies by Muhimmah (2013), also demonstrate a comparable relationship.

Overall, both theoretical and empirical evidence confirm that good system quality characterized by ease of use, reliability, and optimal performance directly enhances system utilization by users.

The Effect of System Quality on User Satisfaction

The results of testing the third hypothesis (H3) in this study confirm that System Quality has a positive and significant effect on User Satisfaction. This finding indicates that the better the quality of the EMR information system as perceived by users, the higher the level of user satisfaction with the system.

Based on the results of the Three Box Method analysis, the System Quality variable index is classified in the high category. This indicates that the EMR information system is perceived as easy to use, intuitive, responsive, and secure, although minor technical issues are still present. The high system quality index is consistent with the User Satisfaction index, which is also categorized as high, reflecting that users perceive the system as highly supportive, effective, and capable of improving the quality of their work.

These findings are consistent with the theoretical foundations proposed by Yusof et al. (2008) and the Information Systems Success Model DeLone & McLean (2003), which state that system quality is a primary determinant of user satisfaction. Empirical support from various studies, Muthimmah (2013), also demonstrates that system quality has a significant positive effect on user satisfaction.

Furthermore, system quality, information quality, and service quality have been shown to directly influence user satisfaction, which subsequently affects users' intentions to utilize the system. When users perceive the system as reliable, the information as accurate, and the support services as responsive, they are more likely to feel satisfied and demonstrate a stronger willingness to continue using the system.

Overall, both theoretical and empirical evidence indicate that a high-quality system characterized by ease of use, reliability, strong performance, and security leads to higher levels of user satisfaction, thereby supporting the hypothesis proposed in this study.

The Effect of System Interoperability on Information Quality

The results of testing the fourth hypothesis (H4) in this study confirm that System Interoperability has a positive and significant effect on Information Quality. This finding indicates that the better the interoperability of the EMR information system in use, the higher the quality of information generated by the system.

Based on the results of the Three Box Method analysis, the System Interoperability index of the EMR information system falls within the moderate category. This suggests that while basic interoperability has been implemented effectively, the system's capability to exchange data with other platforms or organizations still requires further enhancement. This condition is consistent with the Information Quality index, which is categorized as high but continues to face challenges related to data completeness, accuracy, and duplication.

Previous studies provide strong support for this relationship. Integrated systems facilitate more efficient data flows, resulting in information that is more accurate, timely, and easily accessible to users. Improved system integration enhances information availability and supports better decision-making processes within healthcare organizations. Erl (1900) further asserted that system integration creates seamless data flows, which ultimately enhance information consistency.

In the healthcare context, interoperability is a critical factor in providing timely and relevant information (Benson & Grieve, 2016), while also reducing documentation duplication and administrative burden (Lehne et al., 2019).

Interoperability refers to the ability of different information systems to exchange, share, and effectively use data across various platforms and organizations. Effective interoperability enables seamless data coordination among healthcare facilities, improves information accessibility, enhances continuity of care, and supports integrated healthcare services at regional and national levels.

Overall, these findings collectively affirm that effective interoperability enhances the accuracy, completeness, and timeliness of information, thereby supporting the hypothesis proposed in this study.

The Effect of Information Quality on System Use

The results of testing the fifth hypothesis (H5) in this study confirm that Information Quality has a positive and significant effect on System Use.

This finding indicates that the better the quality of EMR information as perceived by users, the higher the level of system utilization.

Based on the results of the Three Box Method analysis, the Information Quality index of the EMR system is categorized as high, indicating that the information generated by the system is generally available in a timely manner and easy to understand, although several shortcomings remain, particularly in terms of data accuracy and completeness. This condition is consistent with the high System Use index, which reflects that the system is widely used and considered important by users.

Theoretical support from Yusof et al. (2008) and the model DeLone & McLean (2003) emphasizes that information quality encompassing accuracy, relevance, completeness, and timeliness plays a direct role in encouraging system use. This perspective is consistent with Iivari (2005) as well as McGill & Klobas (2009), who argue that high-quality information increases the intensity of system utilization.

Previous empirical findings indicate that information quality has a positive and significant effect on system use. Information that is accurate, complete, relevant, and timely encourages users to utilize the system more effectively in their daily activities. High-quality information enhances user confidence, supports decision-making processes, and increases the likelihood of continued system utilization. The study by Muhimmah (2013) also reported a similar direction of relationship, although it was not statistically significant. Technological factors, including information quality, play an important role in influencing user behavior. High-quality information supports users in performing their tasks more effectively, increases confidence in the system, and encourages greater acceptance and utilization of information technology within organizations.

Overall, both theoretical and empirical evidence confirm that good information quality promotes increased system use, thereby supporting the hypothesis proposed in this study.

The Effect of Information Quality on User Satisfaction

The results of testing the sixth hypothesis (H6) in this study confirm that Information Quality has a positive and significant effect on User Satisfaction. This finding indicates that the better the quality of EMR information as perceived by users, the higher the level of user satisfaction with the system.

Based on the results of the Three Box Method analysis, the Information Quality index of the EMR system is classified in the high category, indicating that the information generated by the system is generally available in a timely manner and easy to understand, although several shortcomings remain, particularly in terms of data accuracy and completeness. This condition is consistent with the high User Satisfaction index, which reflects that users perceive the system as effective and capable of improving the quality of their work.

The theoretical foundations proposed by Yusof et al. (2008) and the model DeLone & McLean (2003) explain that user satisfaction is strongly influenced by information quality, particularly with respect to timeliness, relevance, clarity, and data completeness. High quality information enables users to perform tasks more effectively and enhances their overall system experience.

Previous empirical studies support these findings. Muhimmah (2013), concluded that information quality has a positive and significant effect on user satisfaction. Dwi and Erma Suryani (2019) also identified a significant effect, with a path coefficient 0.653 and a p-value of 0.000. Furthermore,

information quality, together with system quality and service quality, has been shown to influence user satisfaction, which subsequently affects users' intention to use the system. When users perceive the information as accurate and relevant, the system as reliable, and the support services as responsive, they are more likely to be satisfied and demonstrate a stronger intention to continue utilizing the system.

Overall, both theoretical and empirical findings demonstrate that good information quality enhances user satisfaction, thereby supporting the hypothesis proposed in this study.

The Effect of Service Quality on System Use

The results of testing the seventh hypothesis (H7) in this study confirm that Service Quality has a positive and significant effect on System Use. This finding indicates that the better the quality of services provided and perceived by users, the higher the level of system utilization.

Based on the results of the Three Box Method analysis, the Service Quality variable index is categorized as high, indicating that the support team is perceived as responsive, competent, and capable of delivering friendly and consistent services. This strong service support fosters user comfort and trust in operating the system on a continuous basis.

From a theoretical perspective, Yusof et al. (2008) and Petter et al. (2008) emphasize that responsive and supportive services enhance user convenience, thereby encouraging greater intensity of system use. Empirical findings indicate that service quality has a positive and significant effect on system use. High-quality support services, including responsiveness, technical assistance, and user guidance, encourage users to utilize the system more effectively. When users receive adequate support and timely problem resolution, they are more likely to develop confidence in the system and maintain consistent usage over time. Studies by Muhimmah (2013) report a similar direction of relationship, although not always statistically significant.

Furthermore, service aspects as part of the technological dimension play an important role in influencing user responses and behaviors, thereby strengthening the relationship between service quality and system use.

Overall, both theoretical and empirical evidence consistently indicate that high-quality services help users feel supported and assisted in operating the system, which in turn increases the intensity of system use and reinforces the hypothesis proposed in this study.

The Effect of Service Quality on User Satisfaction

The results of testing the eighth hypothesis (H8) in this study indicate that it is not supported and is therefore rejected, as Service Quality does not have a significant effect on User Satisfaction. This finding suggests that service quality is not empirically proven to influence user satisfaction in this study.

Based on the results of the Three Box Method analysis, the Service Quality variable index is categorized as high and is perceived as responsive, competent, and capable of providing a positive user experience. Within the Service Quality variable, the empathy dimension achieved the highest index, reflecting that users perceive strong attention and support from the system management team, particularly the IT team. This high level of service empathy enhances user comfort, trust, and positive perceptions of the information system. Meanwhile, the assurance of service continuity dimension recorded the lowest index, although it remains within the high category. This indicates that service reliability and certainty have been well implemented but still require continuous strengthening to maintain consistency in service quality.

On the other hand, the User Satisfaction variable index is also classified as high. Within this variable, both the perceived usefulness and user behavior dimensions achieved high index values. The similarity of these values indicates that the benefits of the EMR information system perceived by users are aligned with consistent usage behavior.

Although the Three Box Method analysis indicates that both Service Quality and User Satisfaction are categorized as high, these findings are not consistent with the path analysis results, which show that improvements in service quality do not have a direct and significant impact on user satisfaction.

These findings differ from several previous studies, such as those by Muhimmah (2013), which reported a significant effect of service quality on user satisfaction. However, some studies report results similar to those of the present study. However, service quality was found to have no significant effect on user satisfaction in several system evaluation studies, indicating that improvements in support services do not always lead directly to higher levels of user satisfaction.

The findings indicate that service quality has a positive but non-significant relationship with user satisfaction, suggesting that although better service support may contribute to higher satisfaction levels, its influence is relatively weak and not sufficient to produce a statistically significant effect. Overall, these findings emphasize that although services are delivered at a high level, they do not automatically translate into increased user satisfaction, thereby supporting the rejection of the hypothesis in this study.

The Effect of System Use on User Satisfaction

The results of testing the ninth hypothesis (H9) in this study indicate that it is supported and accepted, demonstrating that System Use has a positive and significant effect on User Satisfaction. This finding suggests that the higher the level of use of the EMR information system by users, the higher their level of satisfaction with the system.

Based on the results of the Three Box Method analysis, the System Use variable index is classified as high, indicating that the EMR information system is widely used, considered important in daily work activities, and supported by adequate understanding and effective training. This high level of system use is consistent with the high index of the User Satisfaction variable, which indicates that the system is perceived as useful, effective, and capable of improving users' work quality.

These findings are consistent with previous studies. Yusof et al. (2008) explain that system use and user satisfaction have a reciprocal relationship: greater system utilization can enhance user satisfaction, while higher satisfaction, in turn, encourages increased intensity of system use. The Information Systems Success Model DeLone & McLean (2003) also emphasizes that system use and user satisfaction mutually influence each other in determining information system success. Iivari (2005) further reinforces this perspective by stating that positive usage experiences such as comfort, ease of use, and perceived practical benefits lead to higher user satisfaction and ultimately promote continued system use.

Overall, the results of this study provide strong evidence that the more intensively a system is used and the greater the benefits perceived by users, the higher the level of user satisfaction. These findings are therefore consistent with the hypothesis concerning the effect of System Use on User Satisfaction.

The Effect of Environment on Structure

The results of testing the tenth hypothesis (H10) in this study indicate that it is supported and accepted, demonstrating that the Environment variable has a positive and significant effect on Structure. This finding suggests that the more favorable and conducive an organization's environment is, the stronger the support for structural stability and effectiveness.

Based on the Three Box Method analysis, the Environment variable index is classified as high, reflecting that financial conditions and internal communication strongly support the development of the EMR information system. This result is consistent with the high index of the Structure variable, which indicates strong managerial and organizational support for the implementation of the EMR information system.

Several previous studies are consistent with the hypothesis that Environment influences Structure. From a theoretical perspective, Yusof et al. (2008) explain that environmental factors such as government policies, regulations, and other external dynamics can affect the form and performance of organizational structures. A conducive environment provides stronger support for structural stability and effectiveness, whereas environmental changes may drive the need for structural adjustments.

Empirical evidence indicates that the organizational environment has a positive and significant effect on organizational structure. A more conducive and supportive environment contributes to the development of a stronger and more effective structure, thereby enhancing structural performance in the implementation of hospital information system.

Accordingly, the body of evidence is consistent with the hypothesis that Environment affects Structure, confirming that external conditions play an important role in shaping structural effectiveness.

The Effect of Organizational Control on Structure The results of testing the eleventh hypothesis (H11) in this study indicate that it is supported and accepted, demonstrating that Organizational Control has a positive and significant effect on Structure. This finding suggests that strengthening organizational control can directly enhance coordination and effectiveness across different units within an organization.

Based on the Three Box Method analysis, the Organizational Control variable index is classified as high, reflecting strong compliance with both internal and external regulations, as well as the presence of routine evaluations that indicate the organization's commitment to continuous improvement. This condition is reinforced by the high index of the Structure variable, which signifies solid managerial and structural support in the implementation of the EMR information system.

The literature also supports these findings. Kaplan & Norton (1996) 4Cs concept positions control as a critical element in organizational interaction, as effective control enhances coordination and work effectiveness. Marshall B. Romney & Steinbart (2015), as well as Boockholdt (1999), emphasize that internal control serves to safeguard assets, ensure information reliability, improve operational efficiency, and maintain policy compliance all of which constitute the foundation of a strong organizational structure.

In the context of information systems, BPKP RI (2017) states that organizational control can be implemented through training, socialization, regulatory compliance, leadership commitment, special control programs, and reward-and-punishment mechanisms. The COSO (2019) further emphasizes that internal control assists organizations in identifying risks and maintaining the reliability of business processes.

The Effect of System Use on Net Benefits

The results of testing the twelfth hypothesis (H12) in this study indicate that it is supported and accepted, demonstrating that System Use has a positive and significant effect on Net Benefits. This finding suggests that the higher the level of use of the EMR information system, the greater the benefits obtained by users in supporting the completion of their tasks and work activities.

Based on the Three Box Method analysis, the index of the System Use variable is classified as high, indicating that the EMR information system is used intensively and effectively. It is therefore reasonable that such intensive use contributes to an increase in the benefits perceived by both users and the organization. Meanwhile, the index of the Net Benefits variable is in the moderate category, reflecting that the EMR information system has generated positive impacts, including improved efficiency, reduced documentation errors, and enhanced service quality. Although these benefits have not yet reached an optimal level, they nonetheless demonstrate a positive relationship with the high level of EMR system utilization.

From a theoretical perspective, (Halawi and Aronson, 2007; (Yusof et al., 2008) explain that more intensive system use leads to greater benefits for both users and organizations. The more frequently a system is utilized, the higher the perceived value and usefulness derived from it.

Empirical evidence consistently indicates that system use has a positive and significant effect on net benefits. Greater utilization of information systems tends to enhance organizational performance, improve work efficiency, and increase the overall benefits obtained from system implementation. Although some findings suggest that the relationship may not always reach statistical significance, the overall pattern of evidence continues to support a positive association between system use and net benefit.

The Effect of User Satisfaction on Net Benefits

The results of testing the thirteenth hypothesis (H13) in this study indicate that it is supported and accepted, demonstrating that User Satisfaction has a positive and significant effect on Net Benefits. This finding suggests that the higher the level of user satisfaction with the EMR information system, the greater the benefits obtained by users in supporting the completion of their tasks and work activities.

Based on the Three Box Method analysis, the index of the User Satisfaction variable is classified as high, indicating that users perceive the EMR information system as highly supportive, effective, and reliable in their work. This condition is aligned with the achievement of Net Benefits, which falls into the moderate category, reflecting that the system has made substantial contributions to improving efficiency, reducing documentation errors, and enhancing service quality.

From a theoretical perspective, Yusof et al. (2008) explain that satisfied users tend to utilize information systems more optimally, thereby increasing the benefits gained from system use. This view is reinforced by Iivari (2005) as well as McGill & Klobas (2009), who emphasize that user satisfaction enhances users' perceptions of a system's usefulness in accomplishing their tasks.

Previous empirical studies also support this relationship. Putra et al. (2025), Puspita et al. (2020), Muhimmah (2013), and Fajri et al. (2025) provide evidence that user satisfaction has a positive and significant effect on net benefits. Other studies, such as Rasipin et al. (2024), Suryana et al. (2021), Dhanaris et al. (2020), dan Rocky Rumambi et al. (2017), report similar patterns, either through the satisfaction variable or through the human dimension within the HOT-Fit framework.

The Effect of Structure on Net Benefits

The results of testing the fourteenth hypothesis (H14) in this study indicate that it is supported and accepted, demonstrating that Structure has a positive and significant effect on Net Benefits. This finding suggests that the higher the level of structural support for the implementation of the EMR information system, the greater the net benefits obtained by users in supporting the completion of their work.

Based on the Three Box Method analysis, the index of the Structure variable falls within the high category, reflecting strong management support and effective internal coordination in facilitating the implementation of the EMR information system. Such support is evident across organizational levels, from top management to operational staff. Meanwhile, Net Benefits are categorized as moderate, indicating that the EMR system has delivered tangible contributions, including improved work efficiency, reduced documentation errors, and enhanced service quality. However, these benefits have not yet reached an optimal level and still require further strengthening in several aspects.

From a theoretical perspective, Yusof et al. (2008) explain that the HOT-Fit framework positions structure encompassing management support, internal coordination, and role clarity as a critical factor in the successful implementation of information systems. An effective structure enables users to work more easily and efficiently, thereby increasing the benefits derived from system use.

Previous empirical findings also support this relationship. Muhimmah (2013), report that structure has a positive and significant effect on net benefits. Furthermore, structural support, including clear policies, effective coordination, and strong management commitment, plays an important role in enhancing the success and overall impact of information system implementation within organization.

Overall, the results consistently demonstrate that a strong organizational structure contributes significantly to increased net benefits, thereby supporting the hypothesis that Structure influences Net Benefits.

5. Conclusions

The findings of this study demonstrate that the success of Electronic Medical Record (EMR) implementation at Mekar Sari Hospital is influenced by technological, human, and organizational factors within the modified HOT-Fit framework. Technological factors, including System Quality, Information Quality, and Service Quality, collectively contributed to strengthening organizational Structure. Individually, System Quality significantly influenced both System Use and User Satisfaction, while Information Quality significantly affected System Use and User Satisfaction. In addition, System Interoperability was found to improve Information Quality, indicating that effective system integration supports the delivery of accurate, relevant, and timely information. Service Quality also positively influenced System Use, although it did not have a significant direct effect on User Satisfaction, suggesting that user satisfaction is more strongly determined by the quality of the system and the information provided.

Furthermore, the study revealed that System Use significantly enhanced User Satisfaction and directly contributed to Net Benefits. Organizational factors, namely Environment and Organizational Control, were also found to strengthen organizational Structure, highlighting the importance of managerial support, effective communication, adequate resources, and com-

pliance mechanisms in EMR implementation. Finally, System Use, User Satisfaction, and Structure were all shown to have significant positive effects on Net Benefits, indicating that intensive system utilization, satisfied users, and strong organizational support are essential for maximizing the benefits of EMR implementation. Overall, these findings confirm that the successful implementation of EMR at Mekar Sari Hospital depends on the integration of technological quality, user engagement, and organizational readiness.

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