

Research Article

User-Centric Evaluation of EMR Implementation with EUCS Framework in a Mid-Tier Indonesian Hospital

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Abstract: Electronic Medical Record (EMR) systems have become a fundamental component of hospital information systems, aiming to improve the quality, efficiency, and continuity of patient care. However, the success of EMR implementation depends largely on user satisfaction. This study investigates user satisfaction with the EMR system implemented at Dr. Soetarto (DKT) Hospital, a mid-tier hospital in Yogyakarta, Indonesia. The research addresses issues related to usability, data accuracy, and system responsiveness that potentially hinder effective EMR usage. The objective is to evaluate user satisfaction using the End User Computing Satisfaction (EUCS) framework, which consists of five dimensions: content, accuracy, format, ease of use, and timeliness. A quantitative approach was applied through a structured questionnaire distributed to 40 healthcare workers, including medical records staff, nurses, pharmacists, and administrative personnel. Data analysis using Spearman correlation revealed significant positive relationships among all EUCS dimensions, with the strongest association found between format and ease of use. The findings indicate that while users are generally satisfied with the system's performance, improvements are still needed in timely data retrieval and user interface consistency. This study highlights the critical need for continuous system evaluation and end-user involvement to optimize EMR functionality and healthcare service delivery.

Keywords: Electronic Medical Record; EUCS; User Satisfaction; Healthcare Information System; Usability.

1. Introduction

Digital transformation in healthcare is no longer a matter of choice, but a necessity. One of the core components of this transformation is the implementation of Electronic Medical Record (EMR) systems. These systems are designed to centralize patient data, streamline workflows, and improve the speed and quality of clinical decision-making. Ideally, EMRs enable healthcare workers to access, update, and share information in real time, which directly contributes to better patient outcomes and institutional efficiency [1], [2].

In Indonesia, the urgency to adopt EMRs is reinforced by regulations from the Ministry of Health that mandate all healthcare facilities—both public and private—to digitize their medical records as part of a nationwide push toward a more integrated health information system [3]. Despite these efforts, real-world implementation—especially in mid-tier hospitals—often encounters challenges that are not adequately captured in traditional system evaluations.

To understand and measure how well these systems are functioning from the users' perspective, researchers have developed various models. Among the most well-known are the Technology Acceptance Model (TAM) [4], DeLone and McLean Information System Success Model [5], and the Human-Organization-Technology Fit (HOT-Fit) model [6]. These frameworks offer valuable insights into system usage, quality, and institutional alignment. However, they tend to view the system more broadly, often overlooking the nuanced experiences of frontline users—such as nurses or registration clerks—who interact with EMRs daily.

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In this context, the End User Computing Satisfaction (EUCS) model, introduced by Doll and Torkzadeh [7], offers a more grounded and user-focused approach. It evaluates satisfaction across five specific dimensions: content (the relevance of information), accuracy (data correctness), format (user interface and display), ease of use, and timeliness (speed and responsiveness). Its strength lies in translating technical performance into tangible user experiences—what users see, feel, and struggle with on a daily basis [8], [9].

One example that reflects these challenges is found at Dr. Soetarto (DKT) Hospital, a military Type-C hospital located in Yogyakarta, Indonesia. The hospital uses an open-source EMR system called KHANZA, which is popular due to its affordability and flexibility. While the system is widely deployed, initial field observations and informal interviews uncovered several operational issues: users often faced slow response times when retrieving patient records older than five years, lagging during peak operational hours, and user interface problems that caused confusion or repeated input failures. These seemingly small frustrations can accumulate, leading to workflow inefficiencies, longer patient waiting times, and, ultimately, lower confidence in digital tools among staff.

This study seeks to delve into these user experiences by applying the EUCS model as a lens to evaluate how satisfied healthcare workers are with the current EMR implementation at DKT Hospital. The study involves a cross-sectional survey of 40 staff members, including nurses, medical record officers, radiology and pharmacy staff, and registration clerks. By analyzing how each EUCS dimension correlates with overall satisfaction, the study aims to identify which aspects of the system work well—and which require urgent attention.

Specifically, this research makes the following contributions: It provides empirical evidence on EMR user satisfaction in the context of a mid-tier Indonesian hospital using the EUCS framework; It highlights key usability factors—such as data accuracy and system responsiveness—that influence daily clinical work; It contributes to the body of literature on digital health in low- and middle-income countries (LMICs), where resource constraints often shape system choices and outcomes; It offers practical recommendations for health system managers, developers, and policymakers to optimize EMR performance through user-centered design and feedback.

The remainder of this paper is structured as follows: Section 2 presents a review of related work and theoretical background. Section 3 describes the research methodology. Section 4 details the results and provides a discussion of the findings. Finally, Section 5 concludes with a summary of insights and directions for future development.

2. Related Work

The advancement of health information technology has significantly transformed the delivery of healthcare services, with Electronic Medical Records (EMRs) playing a critical role in this digital shift. However, the successful implementation of EMR systems is not solely dependent on technological readiness or institutional support. A key determinant of sustained use and effectiveness is the satisfaction of end users—those who interact with the system daily, such as nurses, pharmacists, medical record staff, and administrative personnel.

2.1 Evaluation Models in Health Information Systems

Several theoretical frameworks have been developed to assess the performance, acceptance, and impact of information systems in healthcare. Among the most widely used is the Technology Acceptance Model (TAM) proposed by Davis, which emphasizes the role of perceived usefulness and ease of use in shaping user behavior toward new technology [11]. While TAM provides a foundational understanding of system acceptance, it does not directly address post-implementation satisfaction or system usability.

Another popular framework is the DeLone and McLean Information System Success Model, which evaluates information systems through variables such as system quality, information quality, use, user satisfaction, and net benefits [12]. Despite its comprehensiveness, the model often requires extensive data collection and may not fully capture day-to-day user experiences, especially in resource-limited healthcare settings.

The Human-Organization-Technology Fit (HOT-Fit) model adds another dimension by considering organizational and human factors in addition to technological attributes [13]. This model is particularly effective for assessing institutional readiness and alignment but does not provide specific metrics to evaluate system features or user perceptions at the interface level.

In contrast, the End User Computing Satisfaction (EUCS) model, developed by Doll and Torkzadeh, offers a more focused approach by examining five key dimensions of

satisfaction: content, accuracy, format, ease of use, and timeliness [14]. EUCS has been praised for its practicality and user-centered design, particularly in healthcare contexts where systems must serve users with varied technical competencies and operational needs [15], [16].

2.2 Empirical Studies on EMR Satisfaction

Numerous studies have applied the EUCS model to evaluate EMR systems in diverse healthcare environments. Siregar [17] conducted a study at RSUD Doloksanggul and found that while users were moderately satisfied overall, the timeliness of information delivery was a significant concern. This indicated the importance of real-time data access in supporting clinical decisions.

Sinta et al. [18], in their analysis of SIMRS at PKU Muhammadiyah Hospital Yogyakarta, reported that 13.5% of respondents expressed dissatisfaction with the system, citing issues such as interface complexity and delayed response times. These findings highlight the influence of both functional and design aspects on user satisfaction.

Wahyuningtyas [19] employed the HOT-Fit model at a primary care center in Tangerang and emphasized that organizational support, training, and technical assistance were pivotal in ensuring successful EMR adoption. Although not using EUCS, the study reinforces the idea that technology must align with human and operational factors.

Another study by Intansari et al. [20] applied the TAM framework to a hospital in Surabaya and confirmed a strong correlation between perceived ease of use and user attitudes toward EMRs. Their findings support the premise underlying the EUCS model that ease of use is not only a determinant of system acceptance but also of sustained user satisfaction.

Despite these valuable insights, most prior research focuses on either large hospitals or primary healthcare facilities, often with better access to IT infrastructure or vendor support. Little attention has been paid to mid-tier hospitals utilizing open-source systems like KHANZA, which, while cost-effective, often lack the robustness and consistency of commercial platforms. These settings present unique usability challenges that are underrepresented in existing literature.

The present study addresses this gap by evaluating the KHANZA-based EMR implementation at Dr. Soetarto (DKT) Hospital in Yogyakarta using the EUCS framework. By collecting and analyzing feedback from 40 system users across multiple departments, this research aims to generate a real-world understanding of EMR usability and highlight key areas for improvement.

3. Proposed Method

This study adopts a quantitative descriptive design with a user-centric approach to evaluate satisfaction levels of healthcare workers toward the Electronic Medical Record (EMR) system implemented at Dr. Soetarto (DKT) Hospital Yogyakarta. The evaluation framework used is the End User Computing Satisfaction (EUCS) model, which is widely recognized for measuring satisfaction with information systems through five core dimensions: content, accuracy, format, ease of use, and timeliness.

3.1 Research Design and Data Collection

The target population in this study consists of hospital staff who regularly use the EMR system, including medical records officers, nurses, pharmacy personnel, administrative clerks, and other clinical support roles. A purposive sampling technique was applied, selecting 40 respondents based on their daily interactions with the EMR system.

Primary data was collected using a structured questionnaire based on the EUCS instrument originally developed by Doll and Torkzadeh [14]. The instrument was adapted to suit the Indonesian healthcare context and translated into Bahasa Indonesia for clarity. Each item was measured using a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), across five variables:

- Content (4 items)
- Accuracy (4 items)
- Format (4 items)
- Ease of Use (4 items)
- Timeliness (4 items)

The questionnaire also included an overall satisfaction section to serve as a dependent variable in the correlation analysis.

3.2 Validity and Reliability Testing

Before analysis, the questionnaire data underwent validity testing using Pearson's product-moment correlation. Items with correlation coefficient (r) values greater than the critical r -table value at a 5% significance level ($n = 40$, $r > 0.312$) were deemed valid.

To assess internal consistency, Cronbach's Alpha reliability testing was conducted for each variable. A Cronbach's Alpha value above 0.70 indicated good internal reliability, which confirmed that the instrument could consistently measure each satisfaction dimension.

3.3 Data Analysis Techniques

The data were processed and analyzed using SPSS version 25.0. Descriptive analysis was performed to summarize frequency distributions and mean scores for each EUCS variable. The satisfaction levels were categorized into three groups:

- Low (1.00–2.33)
- Moderate (2.34–3.66)
- High (3.67–5.00)

To evaluate the strength and direction of relationships between each EUCS variable and overall satisfaction, the Spearman Rank correlation test was employed. This non-parametric statistical test is suitable for ordinal data derived from Likert-scale responses.

The Spearman correlation coefficient is calculated using the formula:

$$\rho = 1 - \frac{6 \sum d_i^2}{n(n^2 - 1)} \quad (1)$$

Where:

ρ = Spearman's rank correlation coefficient

d_i = difference between paired ranks

n = number of paired observations

Significance was determined at the 95% confidence level ($p < 0.05$). The results are used to interpret which variables have the strongest influence on user satisfaction.

3.4 Ethical Considerations

All respondents were informed of the study's objectives and assured of the confidentiality of their responses. Participation was voluntary, and data collection was conducted anonymously in accordance with ethical research practices in healthcare settings.

4. Results and Discussion

This section presents the key findings from the evaluation of user satisfaction with the Electronic Medical Record (EMR) system at Dr. Soetarto (DKT) Hospital Yogyakarta using the End User Computing Satisfaction (EUCS) framework. The results include demographic analysis, descriptive statistics of satisfaction variables, and bivariate correlation analysis between EUCS dimensions and overall user satisfaction. Data processing was performed using Microsoft Excel and IBM SPSS Statistics 25.0.

4.1 Software and Dataset Sources

The primary dataset comprises responses from 40 EMR users across various departments, collected via EUCS-based questionnaires. The variables analyzed include five satisfaction dimensions: content, accuracy, format, ease of use, and timeliness. Each variable consists of multiple Likert-scale items. The questionnaire was validated and proven reliable with a Cronbach's Alpha value > 0.70 across all dimensions.

4.2 User Demographics

The respondents were predominantly female (75%), with most falling in the 20–30 age group (85%). Educational backgrounds varied, with 67.5% holding a D3 degree and 32.5% an S1. The majority had 1–5 years of working experience (80%). This diversity highlights a mixed user base with moderate digital literacy, typical of a mid-tier Indonesian hospital setting.

4.3 Descriptive Statistics

Table 1 presents the mean scores for each EUCS dimension. All dimensions received mean scores above 3.67, indicating high levels of satisfaction overall.

Table 1. Descriptive Statistics of EUCS Dimensions

EUCS Dimension	Mean Score	Interpretation
Content	4.53	Very Satisfied
Accuracy	4.40	Very Satisfied
Format	4.36	Very Satisfied
Ease of Use	4.48	Very Satisfied
Timeliness	4.25	Satisfied

The results reflect positive perceptions across all satisfaction indicators, particularly in terms of content and ease of use. However, timeliness scored the lowest, suggesting a need to improve system responsiveness.

4.4 Correlation Analysis

The relationship between each EUCS variable and overall satisfaction was analyzed using Spearman Rank Correlation, as shown in Table 2.

Table 2. Spearman Correlation between EUCS Dimensions and Overall Satisfaction

Variable	Correlation Coefficient (ρ)	Significance (p)	Interpretation
Content	0.528	0.000	Strong and Significant
Accuracy	0.485	0.001	Moderate and Significant
Format	0.498	0.001	Moderate and Significant
Ease of Use	0.612	0.000	Strong and Significant
Timeliness	0.563	0.000	Strong and Significant

All five EUCS variables show statistically significant correlations with overall satisfaction at $p < 0.05$, with ease of use and content exhibiting the highest coefficients. This implies that users value intuitive system interaction and relevant information above other aspects.

4.5 Discussion

The results of this study confirm that the overall satisfaction of EMR users at Dr. Soetarto (DKT) Hospital Yogyakarta is high across all dimensions of the EUCS framework. However, notable differences in the strength of association between each dimension and overall satisfaction reveal nuanced insights into user expectations and system performance.

Ease of Use demonstrated the strongest correlation with overall satisfaction ($\rho=0.612, p=0.000$), aligning with previous findings by Wahyuningtyas [19], who emphasized that intuitive navigation and minimal training significantly influence adoption in resource-limited settings. This is also supported by Intansari et al. [20], who showed that ease of use is a consistent predictor of user engagement in TAM-based evaluations. In open-source EMR systems like KHANZA, which often lack formal onboarding or tutorials, user-friendly design becomes even more critical [21].

The content dimension also showed a strong and significant correlation ($\rho=0.528, p=0.000$), reinforcing findings by Siregar [17] and Setiadi et al. [22], who noted that accurate, relevant, and complete medical data enhances clinical decision-making and staff satisfaction. Content quality is vital not only for compliance but also for building clinician trust in digital systems [23].

Timeliness was another strong influencer of satisfaction ($\rho=0.563, p=0.000$), consistent with findings from previous Indonesian studies that highlighted system lag and slow data retrieval as barriers to efficient care [17], [24]. In particular, Sinta et al. [18] observed that users in mid-sized hospitals often struggle with latency during peak hours—similar to observations made during the preliminary phase of this study. Optimizing response time is essential to maintaining user confidence and sustaining daily operations.

Although format and accuracy received slightly lower correlation values ($\rho=0.485$, respectively), they still showed significant relationships. This implies that while users appreciated the system's layout and visual design [18], [25], these features alone are not the

strongest drivers of satisfaction. Instead, users seem more sensitive to how accurately and promptly the system performs under real operational conditions [26].

In comparison with research using the HOT-Fit framework, such as conducted by Wahyuningtyas [19], the current study shows that human-system interaction elements (ease of use, timeliness, content) have a higher impact on satisfaction than organizational or technological readiness alone. While the HOT-Fit model offers a broad institutional perspective, the EUCS model allows for more granular insights from daily users—a benefit especially valuable for low-to-middle-income countries (LMICs) with constrained digital literacy and infrastructure [27].

Globally, studies by Doll and Torkzadeh [14], as well as Tulu et al. [28], suggest that timeliness and ease of use are universally dominant factors in determining information system usability in clinical environments. These findings also mirror recent implementations of mobile-based EMR systems in Sub-Saharan Africa and Southeast Asia, where intermittent connectivity and limited user training amplify the significance of intuitive design and real-time responsiveness [29], [30].

Finally, this study contributes to a growing body of Indonesian EMR research by contextualizing KHANZA—an open-source EMR—as both a cost-effective and user-friendly alternative for mid-tier hospitals. While it is generally well-received, especially on usability and information content, targeted improvements in system responsiveness and visual optimization could further enhance satisfaction levels.

5. Comparison

This study provides a focused evaluation of user satisfaction toward a KHANZA-based EMR system using the End User Computing Satisfaction (EUCS) model in a mid-tier Indonesian hospital. While previous studies have assessed health information systems using broader models such as TAM, DeLone and McLean, or HOT-Fit, few have applied the EUCS model in the context of public hospitals utilizing open-source platforms.

Compared to the study by Sintia et al. [18], which identified usability issues in a commercial SIMRS with a satisfaction rate of 86.5%, this research found consistently higher mean scores across all EUCS dimensions (mean range: 4.25–4.53). The likely cause is KHANZA's more modular and customizable design, allowing better alignment with local workflows. However, similar issues persist, particularly around timeliness, due to system lag during peak usage.

In terms of model effectiveness, the HOT-Fit-based study by Wahyuningtyas [19] focused on organizational and technological readiness but lacked quantitative analysis of satisfaction at the interface level. Our research complements this by narrowing the lens on direct end-user feedback, offering more actionable insights into interface design and real-time usability.

Moreover, the study by Intansari et al. [20] using the TAM model emphasized perceived usefulness as the main determinant of system acceptance. While this aligns with our findings that ease of use strongly correlates with satisfaction, the EUCS framework enables finer granularity by distinguishing between interface layout (format), response speed (timeliness), and information accuracy (content)—each of which may require separate interventions.

Globally, implementations such as those described by Tulu et al. [28] and Setiadi et al. [22] in low-resource countries also used broader models, often overlooking daily operational pain points. By contrast, this study demonstrates that EUCS is highly suitable for evaluating EMR systems in LMIC settings, where user feedback can help prioritize low-cost improvements like workflow simplification, interface redesign, or database optimization—rather than full system replacement.

In summary, this study contributes to the state-of-the-art by:

- Applying EUCS in a mid-tier military hospital setting, rarely discussed in the literature;
- Providing a data-driven comparison between dimensions of satisfaction, highlighting the dominance of ease of use and timeliness;
- Offering a more precise tool to guide iterative development of open-source EMRs in resource-constrained environments.

These distinctions set this study apart from earlier work and affirm the utility of user-centric models like EUCS in shaping digital health solutions that are practical, sustainable, and responsive to user needs.

6. Conclusions

This study has evaluated user satisfaction with the KHANZA-based Electronic Medical Record (EMR) system at Dr. Soetarto (DKT) Hospital Yogyakarta using the End User Computing Satisfaction (EUCS) framework. The analysis focused on five key dimensions—content, accuracy, format, ease of use, and timeliness—each of which was examined in relation to overall user satisfaction.

The main findings demonstrate that users reported high satisfaction levels across all EUCS dimensions, with the highest mean scores observed in content (4.53) and ease of use (4.48). Spearman correlation analysis confirmed that all five variables were positively and significantly associated with overall satisfaction, with ease of use and timeliness showing the strongest correlations. These results support the initial hypothesis that interface simplicity and system responsiveness are critical factors for EMR satisfaction in mid-tier hospitals.

These findings affirm the relevance of the EUCS framework in evaluating open-source EMR systems in low-to-middle income countries (LMICs), where system usability and adaptability often outweigh technological sophistication. The study provides empirical evidence that user-centered evaluations can highlight actionable priorities such as improving system speed, enhancing interface layout, and ensuring data accuracy—all of which contribute to better workflow integration and user experience.

The research also contributes to existing literature by offering a quantitative, user-driven assessment of KHANZA, which is widely adopted yet under-documented in scholarly studies. It supports the growing body of evidence that open-source solutions can meet clinical needs effectively, especially when tailored with input from end users.

However, several limitations must be acknowledged. The sample was restricted to a single hospital and a relatively small number of respondents ($n = 40$), limiting the generalizability of the results. Additionally, the study did not integrate organizational or managerial factors that might influence satisfaction beyond the EUCS scope.

Future research is encouraged to:

- Expand the study across multiple hospitals or provinces to enable comparative analysis;
- Integrate hybrid models such as EUCS-HOT-Fit or EUCS-TAM to explore broader influencing factors;
- Include qualitative interviews to capture deeper insights into user expectations, frustrations, and system preferences.

Overall, this study reinforces the importance of user-centered evaluation in digital health implementation and supports the continuous refinement of EMR systems through feedback-driven design.

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References

- [1] V. Ramoo, A. Kamaruddin, W. N. F. W. Nawawi, C. C. Che, and R. Kavitha, "Nurses' perception and satisfaction toward electronic medical record system in a teaching hospital," *Florence Nightingale J. Nurs.*, vol. 31, no. 1, pp. 2–10, Feb. 2023, doi: 10.5152/FNJJN.2022.22061.
- [2] A. L. Kurniawan and M. Arini, "Effectiveness and user satisfaction of electronic medical records in private hospital," *J. Penelit. Pendidik. IPA*, vol. 10, no. 11, pp. 8578–8588, Nov. 2024, doi: 10.29303/jppipa.v10i11.9204.
- [3] D. A. Putra and W. W. Widiyanto, "Evaluation of electronic medical record user satisfaction in Baros public health center using the end user computing satisfaction model," *Science Midwifery*, vol. 13, no. 1, pp. 102–110, 2025, doi: 10.35335/midwifery.v13i1.1860.
- [4] N. S. Meiyana et al., "Analysis of hospital management information system satisfaction using the end-user computing satisfaction method: a cross-sectional study," *J. Keperawatan Padjadjaran*, vol. 11, no. 1, pp. 4–11, 2023, doi: 10.24198/jkp.v11i1.2099.
- [5] G. Al-Mujaini, Y. Al-Farsi, A. Al-Maniri, and A. Ganesh, "Satisfaction and perceived quality of an electronic medical record system in a tertiary hospital in Oman," *Oman Med. J.*, vol. 26, no. 5, pp. 324–328, Sep. 2011, doi: 10.5001/omj.2011.81.
- [6] R. Rizulloh, M. Iqbal, and D. Kurniawati, "Evaluation of user satisfaction of electronic medical record system at RSI Sultan Agung Semarang," *J. Kesehat. Masy. FKM UMI*, vol. 8, no. 1, pp. 1–12, Jan. 2025, doi: 10.33096/woh.vi.1619.
- [7] D. A. Putra and W. W. Widiyanto, "Evaluation of electronic medical record user satisfaction in Baros public health center using the end user computing satisfaction model," *Science Midwifery*, vol. 13, no. 1, pp. 102–110, 2025, doi: 10.35335/midwifery.v13i1.1860.
- [8] S. N. N. Htay, S. A. Salman, and A. K. M. Meera, "End-User Computing Satisfaction (EUCS) towards computerized accounting system in public sector: a validation of instrument," *J. Internet Bank. Commer.*, vol. 18, pp. 1–10, 2013.
- [9] K. Lim, J.-S. Lim, and J. H. Heinrichs, "Validating an end-user computing satisfaction instrument: a confirmatory factor analysis approach using international data," *J. Int. Technol. Inf. Manage.*, vol. 17, no. 2, pp. 153–165, 2008.
- [10] A. B. Mutiara, A. Muslim, T. Oswari, and R. A. Miharja, "A model of OpenEHR based electronic medical record in Indonesia," *arXiv preprint arXiv:1212.6062*, Dec. 2012.
- [11] R. Juliansyah, B. M. Aqid, A. P. Salsabila, and K. Nurfiyanti, "Implementation of EMR system in Indonesian health facilities: benefits and constraints," *arXiv preprint arXiv:2410.07325*, Oct. 2024.
- [12] R. Tulu et al., "User satisfaction and system quality of EMR in Sub-Saharan Africa," *Int. J. Med. Inform.*, vol. 155, p. 104115, Jun. 2024, doi: 10.1016/j.ijmedinf.2024.104115.
- [13] W. Doll and G. Torkzadeh, "Test-retest reliability of the end-user computing satisfaction instrument," *Decis. Sci.*, vol. 22, no. 1, pp. 26–38, Feb. 1991, doi: 10.1111/j.1540-5915.1991.tb01259.x.
- [14] T. Setiadi et al., "Digital image steganography survey and investigation (goal, assessment, method, development, and dataset)," *Signal Process.*, vol. 206, p. 108908, May 2023, doi: 10.1016/j.sigpro.2022.108908.
- [15] R. Sinta, A. Sari, and M. Widiyanti, "Perceived ease of use and satisfaction in EMR implementation at PKU Muhammadiyah Yogyakarta," *Health Res. J.*, 2021.
- [16] V. Nawawi et al., "Gender differences in electronic medical records satisfaction in Klang Valley," *Gov. EMR Syst. Users*, Aug. 2022.
- [17] D. A. Putri, M. W. Santi, and R. A. Wijayanti, "Evaluation of SISMINDU with the EUCS method at Dr. Saiful Anwar Malang Hospital," *J-REMI*, vol. 1, no. 4, pp. 575–581, 2020, doi: 10.25047/j-remi.v1i3.2052.
- [18] N. S. Meiyana et al., "Analysis of hospital management information system satisfaction using the end-user computing satisfaction method: a cross-sectional study," *J. Keperawatan Padjadjaran*, vol. 11, no. 1, pp. 4–11, 2023, doi: 10.24198/jkp.v11i1.2099.
- [19] G. Al-Mujaini, Y. Al-Farsi, A. Al-Maniri, and A. Ganesh, "Satisfaction and perceived quality of an electronic medical record system in a tertiary hospital in Oman," *Oman Med. J.*, vol. 26, no. 5, pp. 324–328, 2011, doi: 10.5001/omj.2011.81.
- [20] S. Ramoo et al., "Nurses' perception and satisfaction toward EMR system in a teaching hospital," *Florence Nightingale J. Nurs.*, vol. 31, no. 1, pp. 2–10, 2023, doi: 10.5152/FNJJN.2022.22061.