International Journal of Health and Medicine

E-ISSN: 3047-793X
P-ISSN: 3047-7948

(Research/Review) Article

Evaluating Outpatient EMR Adoption Using the Technology Acceptance Model: A Case Study at RSAU dr. Siswanto, Indonesia

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Abstract: Electronic Medical Records (EMRs) have become a fundamental component of healthcare digitization, offering improved accuracy, accessibility, and efficiency in patient data management. However, the adoption of EMR systems often encounters varied acceptance levels among healthcare workers, particularly in outpatient services where workflow integration is crucial. This study evaluates the implementation of an outpatient EMR system at RSAU dr. Siswanto, Indonesia, using the Technology Acceptance Model (TAM) framework. The research aims to explore users' perceived usefulness, ease of use, attitude toward usage, behavioral intention, and actual system usage in daily operations. Employing a qualitative descriptive approach, data were collected through in-depth interviews, observations, and document analysis involving doctors, nurses, and medical record staff. The findings reveal that although the EMR system is generally perceived as beneficial for improving documentation and efficiency, several challenges persist, including incomplete feature utilization, limited training, and inconsistent user adaptation across roles. Additionally, network instability and technical downtime were noted as barriers to system reliability. Overall, the study underscores that perceived ease of use and continuous institutional support significantly influence EMR acceptance. These insights highlight the need for targeted capacity building and iterative system development to ensure effective EMR integration in outpatient settings.

Keywords: Electronic Medical Records; Outpatient Services; Technology Acceptance Model; Health Information System; User Acceptance; Perceived Usefulness; Behavioral Intention

Received: 12 April, 2025
Revised: 16 May, 2025
Accepted: 07 June, 2025
Online Available: 19 June, 2025
Curr. Ver.: 19 June, 2025

1. Introduction

The integration of Electronic Medical Records (EMRs) into healthcare systems has revolutionized patient data management, offering enhanced accuracy, accessibility, and efficiency. In Indonesia, the government's push towards digital health transformation has led to widespread EMR implementation across various healthcare facilities. Studies have highlighted that EMR adoption contributes to reduced patient waiting times and overall service durations, thereby improving patient satisfaction and care quality [1].

Despite these advancements, the successful adoption of EMRs is not solely dependent on technological availability but also on user acceptance and adaptability. The Technology Acceptance Model (TAM), introduced by Davis, provides a framework to understand user acceptance by evaluating perceived usefulness and perceived ease of use [2]. TAM has been instrumental in assessing technology adoption across various sectors, including healthcare, where user interaction with EMRs is critical.

Previous research utilizing TAM in healthcare settings has identified factors influencing EMR adoption, such as system usability, training adequacy, and organizational support. However, challenges persist, including incomplete utilization of EMR features, limited training programs, and inconsistent user adaptation, which can hinder the effective use of EMRs [3].

This study aims to evaluate the adoption of outpatient EMR systems at RSAU dr. Siswanto, Indonesia, through the lens of TAM. By examining healthcare professionals' perceptions and experiences, the research seeks to identify barriers and facilitators to EMR adoption, providing insights into improving user acceptance and system integration.

The contributions of this study are threefold: (1) it offers empirical evidence on EMR adoption in a military hospital context; (2) it identifies key factors affecting user acceptance based on TAM; and (3) it provides recommendations to enhance EMR utilization among healthcare professionals.

The remainder of this paper is structured as follows: Section 2 reviews related work on EMR adoption and TAM applications in healthcare; Section 3 outlines the research methodology; Section 4 presents the findings and discussion; and Section 5 concludes with implications and suggestions for future research.

2. Related Work

2.1. Electronic Medical Records (EMR) Adoption in Indonesia

The Indonesian government's mandate, as stipulated in Minister of Health Regulation No. 24 of 2022, requires all healthcare facilities to implement Electronic Medical Records (EMRs) by December 31, 2023 [1]. This policy aims to enhance healthcare service quality, data accuracy, and patient safety. However, the implementation of EMRs faces several challenges, including infrastructural limitations, especially in remote areas, where approximately 30% of hospitals lack stable internet access [2]. High implementation costs, reaching up to IDR 1–2 billion for initial investments, pose significant barriers, particularly for small and private hospitals [2]. Additionally, a shortage of skilled IT personnel hampers the effective deployment and maintenance of EMR systems [2].

Despite these obstacles, the adoption rate of EMRs has been increasing. By the end of 2023, approximately 70–80% of hospitals in Java and Bali had adopted EMRs, while the adoption rate in other regions remained at 40–50% [3]. The integration of EMRs with the SATUSEHAT platform further supports data interoperability and centralized health information management [4]. Studies have shown that EMR implementation can reduce patient waiting times by 15–20 minutes and overall service durations by 20–25 minutes, leading to improved patient satisfaction and operational efficiency [5].

2.2. Technology Acceptance Model (TAM) in Healthcare

The Technology Acceptance Model (TAM), introduced by Davis in 1989, posits that perceived usefulness and perceived ease of use are primary determinants of technology adoption [6]. In the healthcare context, TAM has been widely utilized to assess the acceptance of EMRs among medical professionals. Research indicates that both perceived usefulness and ease of use significantly influence healthcare workers' intentions to use EMR systems [7], [8].

In Indonesia, several studies have applied TAM to evaluate EMR adoption. For instance, a study conducted in public hospitals found that perceived ease of use had a substantial impact on the initial adoption of EMRs, while perceived usefulness played a crucial role in the sustained use of the systems [9]. Organizational support, including adequate training and infrastructure, also emerged as significant factors influencing EMR acceptance [10]. The integration of TAM with other models, such as the Unified Theory of Acceptance and Use of Technology (UTAUT), has provided deeper insights into the multifaceted nature of technology adoption in healthcare settings [11].

3. Proposed Method

This study employs a descriptive qualitative method to evaluate the adoption of Electronic Medical Records (EMR) in outpatient services using the Technology Acceptance Model (TAM) framework. The research was conducted at RSAU dr. Siswanto, a military-affiliated hospital in Central Java, Indonesia. The goal is to identify how perceived usefulness, perceived ease of use, user attitudes, behavioral intentions, and actual system usage affect the implementation of EMRs in this specific clinical context.

Data were collected through in-depth interviews, direct observations, and document analysis involving 36 healthcare workers, including doctors, nurses, and medical record staff. The informants were selected using purposive sampling, focusing on individuals directly involved with EMR operations for at least one year. Interviews were semi-structured, allowing exploration of user experiences across the TAM dimensions.

The following steps outline the research process:

1. Planning and Instrument Design:

   The researchers designed interview guides tailored to five TAM constructs: perceived usefulness (PU), perceived ease of use (PEOU), attitude toward use (ATU), behavioral intention to use (BI), and actual system use (AU). Observation sheets and consent forms were also prepared.

2. Data Collection:

   Fieldwork was conducted during February–March 2025. Interviews were recorded and transcribed verbatim. Observational notes were taken during outpatient service operations to validate verbal accounts.

3. Data Reduction and Categorization:

   All qualitative data were reduced, grouped, and coded according to the five TAM constructs. NVivo 12 software was used to assist thematic classification.

4. Triangulation and Validation:

   Data from interviews, observations, and documents (e.g., usage logs, SOPs) were compared to increase credibility. Validation was reinforced through member checking with selected respondents.

5. Interpretation and Synthesis:

   Thematic synthesis was used to interpret how each TAM construct manifested in real-world practices, including facilitating factors and obstacles encountered by users.

This methodological framework ensures that the study captures not only what users think about the system but also how their perceptions influence their behavior in using EMRs.

4. Results and Discussion

4.1. Thematic Findings Based on HOT-Fit Framework

To complement the interpretation of results using the Technology Acceptance Model (TAM), this study also applied the Human–Organization–Technology Fit (HOT-Fit) framework to thematically classify barriers and enablers in the adoption of Electronic Medical Records (EMR) at RSAU dr. Siswanto. This categorization offers a comprehensive view of the systemic, organizational, and individual factors that influence the effectiveness of EMR implementation.

The thematic coding process resulted in the classification of 36 respondents' narratives into four major categories: Human, Technology, Organizational, and Contextual (enablers and barriers). Each theme was assessed based on its frequency of occurrence and relevance during interviews and observations.

Table 1. Summary of HOT-Fit Component Issues

Component	Frequency
Human	14
Technology	10
Enablers and Barriers	9
Organization	3

The Human component emerged most frequently. Many informants, including DS-06, DS-08, and RM-03, emphasized the need for additional training, particularly in mastering advanced features of SIMRS. Several staff, such as RM-04 and RM-07, stated they initially struggled with EMR documentation but gradually adapted to the system.

The Technology component reflected recurring issues related to system performance, including login delays and underutilization of features. Respondents like DS-02 and RM-05 reported system downtime during peak hours, while DS-05, RM-02, and RM-08 observed that several SIMRS functions were not optimally used.

In the Enablers and Barriers category, multiple informants acknowledged the availability of supporting infrastructure (e.g., *"tiap unit punya akses komputer"* – DS-01, PR-02). However, others reported operational constraints such as network interruptions during power outages (PR-07, RM-01), and adjustment difficulties among newly assigned staff (PR-01, RM-10).

The Organization theme was less frequently mentioned but remains critical. DS-04 and PR-05 noted the importance of inter-unit coordination, and RM-09 highlighted the need for equitable training distribution.

These findings are visualized in Fig. 1.

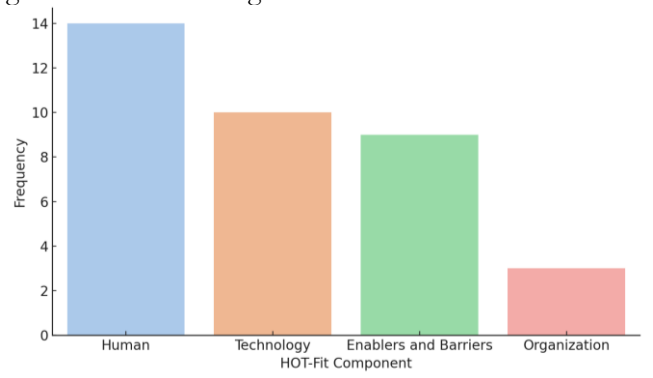

Figure 1. Distribution of Issues and Themes Based on HOT-Fit Components

4.2. Discussion of Key Findings Based on TAM

The findings from interviews and observations were also analyzed using five core constructs of the Technology Acceptance Model (TAM):

1. Perceived Usefulness (PU): Most participants agreed that the EMR system facilitated better documentation and streamlined service delivery. However, several respondents (e.g., DS-05, RM-02) pointed out that some features, such as pharmacy integration, remained underutilized due to weak inter-unit coordination.
2. Perceived Ease of Use (PEOU): Respondents with longer exposure to EMRs (e.g., DS-07, RM-04) found the system increasingly manageable. In contrast, new users (e.g., RM-10, PR-01) relied on manual processes before digital entry. Unstable network conditions further limited seamless usage.
3. Attitude Toward Use (ATU): The overall perception toward the EMR was positive. Administrative staff found it efficient, though clinical staff raised concerns over extended documentation time at workstations.
4. Behavioral Intention (BI): Users showed a willingness to continue using the EMR, conditional on system improvements. Suggestions included enhanced access via mobile devices and standby procedures during outages.
5. Actual Use (AU): EMR usage was consistent during service hours but declined outside of them, indicating potential gaps in policy or technical access.

5. Comparison

To contextualize this study within existing literature, a comparison was made with previous research applying the Technology Acceptance Model (TAM) and HOT-Fit framework in healthcare settings, especially in Indonesia.

Agiwahyuanto et al. [12] reported that perceived ease of use and digital literacy significantly affected EMR adoption in Semarang, which aligns with this study's findings that users with longer exposure showed better adaptability. Similarly, a study by Wahyuningrum and Santoso [13] in a private hospital found organizational support and routine system audits positively influenced perceived usefulness and behavioral intention to use EMRs.

However, unlike Wahyuningrum's findings, the current study revealed that individual-level readiness (human factors) was more dominant than organizational facilitation, as shown by the high frequency of human-related themes in the HOT-Fit analysis. This might be attributed to RSAU dr. Siswanto's institutional characteristics, where operational discipline and autonomy among users are prioritized.

The technology aspect also remains a key barrier. Rachmawati et al. [14] found that network instability and limited IT support constrained the effectiveness of EMRs in district hospitals, which mirrors reports from respondents in this study who faced login delays and system downtime. In this regard, the recommendation from Susanti et al. [15] to implement scheduled technical audits and emergency backup systems is highly relevant.

In terms of actual system use, data from a study at RSUD Tenriawaru by Anriani et al. [16] identified usage decline during non-service hours due to limited system access, similar to the usage pattern observed in RSAU dr. Siswanto. Sari and Ramadhani [17] also noted that while adoption rates improved, sustained engagement remained a challenge without workflow realignment and consistent policy enforcement.

This study contributes methodologically by combining TAM with HOT-Fit—an integration still rarely applied in Indonesian EMR evaluations. Setiadi and Nugroho [18] highlighted the importance of such hybrid models for assessing both user acceptance and systemic readiness, while Yusof et al. [19] emphasized the value of HOT-Fit in bridging human and organizational components.

In conclusion, while this research confirms existing findings related to perceived usefulness and ease of use, it extends the literature by offering empirical evidence on the dominance of human factors and providing a nuanced classification of barriers using HOT-Fit. The findings support prior work while offering new insights on the contextual challenges of EMR implementation in public military healthcare settings.

6. Conclusions

This study evaluated the adoption of Electronic Medical Records (EMR) at RSAU dr. Siswanto using the Technology Acceptance Model (TAM) complemented by the HOT-Fit framework. Through in-depth interviews, observations, and supporting documents, several key findings emerged.

First, the analysis revealed that human-related factors—including user confidence, system understanding, and motivation—played the most dominant role in influencing EMR adoption. This was followed by technological challenges such as login delays, incomplete feature utilization, and unstable internet connectivity. Organizational support, although present, was less frequently mentioned but essential in promoting sustained usage. These findings are supported by the thematic frequency mapped using the HOT-Fit framework.

Second, based on the TAM constructs, perceived usefulness and ease of use were confirmed as strong predictors of behavioral intention to use the EMR system. A positive user attitude was observed, particularly among administrative staff, while some clinical personnel raised concerns about increased documentation time. Despite these issues, there was a strong behavioral intention among staff to continue using the EMR system, provided that technical reliability improves and mobile accessibility is enabled.

Third, the integration of HOT-Fit with TAM in this research provides a comprehensive analytical approach, allowing the study to not only capture user perception but also contextual and system-level readiness. This contributes methodologically to EMR evaluation studies in Indonesia, particularly in the underrepresented setting of military or government-operated healthcare units.

However, the study has several limitations. It was conducted in a single institution with a qualitative design, which may limit generalizability. The analysis did not include log-based or quantitative system usage metrics beyond observational validation.

Future research may adopt a mixed-method approach by incorporating real-time system analytics and expanding the scope to include multi-site comparison. Enhancing the digital literacy of staff, conducting regular system audits, and integrating EMRs across departments are recommended to ensure sustained adoption and maximize the system's potential for improving healthcare delivery.

In conclusion, the success of EMR implementation at RSAU dr. Siswanto hinges not only on the system itself but largely on user readiness, cross-departmental coordination, and institutional commitment to continuous digital transformation.

Author Contributions: Conceptualization: D.L.P. and W.W.W.; Methodology: D.L.P.; Software: D.L.P.; Validation: D.L.P. and W.W.W.; Formal analysis: D.L.P.; Investigation: D.L.P.; Resources: D.L.P.; Data curation: D.L.P.; Writing—original draft preparation: D.L.P.; Writing—review and editing: W.W.W.; Visualization: D.L.P.; Supervision: W.W.W.; Project administration: D.L.P.; Funding acquisition: W.W.W.

Funding: This research received no external funding.

Data Availability Statement: The data supporting the findings of this study are not publicly available due to institutional privacy policies and ethical considerations. However, data may be available from the corresponding author upon reasonable request and with appropriate institutional approvals.

Acknowledgments: The authors would like to thank the management and staff of RSAU dr. Siswanto for their cooperation and support during data collection. We also appreciate the administrative assistance provided by the Study Program of Health Information Management, Politeknik Indonusa Surakarta.

Conflicts of Interest: The authors declare no conflict of interest.

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