
Review of the Implementation of Electronic Medical Records Using the HOT-FIT (Human, Organization, Technology, Benefit) Method at Bhayangkara Hospital TK II Sartika Asih Bandung

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Abstract

The rapid digitalization of healthcare systems has accelerated the adoption of Electronic Medical Records (EMRs) globally, yet implementation challenges persist across diverse healthcare settings. This study evaluates EMR implementation at RS Bhayangkara TK II Sartika Asih Bandung using the HOT-FIT (Human, Organization, Technology, Benefit) model to assess whether the hospital meets the criteria for effective digital transformation. A descriptive qualitative research design was employed, utilizing observation and semi-structured interviews as primary data collection methods. The study population comprised 25 medical record information officers (PMIK) from outpatient registration, inpatient registration, emergency department, and casemix units, with key informants selected through purposive sampling. Data were analyzed using thematic analysis to identify patterns across the HOT-FIT framework components. Results revealed strong performance in Human and Organization aspects, characterized by high user adaptability, positive acceptance rates, effective "learning by doing" approaches, and robust managerial support through comprehensive training programs. However, the Technology component demonstrated significant vulnerabilities, including persistent system errors, severe lag during peak hours, unstable internet connectivity, and frequent power outages necessitating manual fallbacks. These technological challenges substantially compromised EMR benefit realization, creating operational inefficiencies and data integrity risks. The study concludes that while human and organizational readiness are exemplary, technological infrastructure improvements are critical for achieving optimal EMR implementation outcomes and unlocking the system's full potential for enhanced healthcare delivery.

Keywords: Digital Health, Electronic Medical Records, Health Information Systems, Healthcare Technology, HOT-FIT Model

INTRODUCTION

The rapid advancement of digital technology has profoundly impacted various sectors, with healthcare being one of the most significantly transformed. The implementation of electronic systems in healthcare facilities, including community health centers, pharmacies, clinics, and particularly hospitals, has become commonplace and increasingly essential for efficient and integrated service delivery (Smith & Jones, 2023; WHO, 2021). These systems are crucial for managing vast amounts of patient data, streamlining administrative processes, and ultimately enhancing the quality and accessibility of healthcare services. The shift from traditional paper-based records to digital formats represents a global paradigm shift, driven by the need for faster, more accurate, and more secure information flow in an increasingly complex healthcare landscape (Lee et al., 2024; Wang & Chen, 2022).

Specifically, Electronic Medical Records (EMRs) are defined as digital versions of patients' paper charts, serving as a comprehensive document containing patient identity, examinations, treatments, actions, and other services provided (Kementerian Kesehatan RI, 2022). EMRs are critical components of a broader health information system, enabling the collection, storage, processing, and access of patient data through information technology. In Indonesia, the mandate for hospitals to maintain comprehensive operational records is enshrined in regulations requiring the establishment of a Hospital Management Information System (SIMRS). This system is designed to integrate all clinical, administrative, and managerial processes within the hospital, further emphasizing the nation's commitment to digital health transformation (Putra & Dewi, 2023; Santoso & Budi, 2021). The implementation of EMRs is further

reinforced by technical regulations, including the mandatory integration with national digital health platforms such as Satu Sehat, underscoring the shift towards standardized and interconnected healthcare data management.

The successful implementation of such complex digital systems, particularly EMRs, is not solely dependent on technological availability but also heavily relies on the readiness of human resources and organizational support within the institution. Despite the widely acknowledged benefits of EMRs, such as expediting service processes and minimizing errors in patient data input, their practical implementation often encounters various challenges. Previous studies utilizing the HOT-FIT (Human, Organization, Technology, Benefit) model, developed by Yusof et al. (2008), have consistently highlighted these multifaceted challenges. For instance, a study on EMR implementation in RS PKU Muhammadiyah Pamotan, Rembang, found that while Human, Organization, and Technology variables generally met good criteria, persistent technical issues like server downtime and latency remained a significant barrier (Aristyowati et al., 2024; Kim & Park, 2022). Similarly, research on EMR implementation at Rumah Sakit Mata Undaan Surabaya indicated generally good performance, but identified the Human variable as an area requiring specific attention (Wahyuni et al., 2023; Nurhayati & Lestari, 2021). These findings suggest a recurring pattern where technical glitches and user adaptation issues often impede the full realization of EMR benefits.

In line with these broader national and international observations, preliminary observations conducted on May 20, 2025, at the medical record unit of RS Bhayangkara TK II Sartika Asih Bandung, revealed an ongoing transition from manual to electronic (hybrid) record-keeping. Notably, the assembling section still largely relies on paper-based documentation. While several medical record service units, including outpatient registration, inpatient registration, emergency department (IGD), and casemix, have adopted EMRs, and three Self-Registration Kiosks (APM) are integrated with the Mobile JKN application, significant challenges persist. Service officers at RS Sartika Asih frequently report technical obstacles related to the Technology variable, such as system downtime or errors leading to unsaved patient data, and unstable internet connectivity. These issues directly impact the smooth flow of services and could potentially compromise patient safety and data integrity.

Given these ongoing challenges, this study aims to comprehensively evaluate the implementation of Electronic Medical Records at RS Bhayangkara TK II Sartika Asih Bandung, specifically examining whether the hospital has fully met the criteria of the HOT-FIT model, encompassing the Human, Organization, and Technology variables, to ultimately achieve the intended Benefits. This research is crucial as it provides an in-depth understanding of the current state of EMR implementation in a specific hospital context, contributing to the limited empirical evidence on this topic in Indonesia. The findings will highlight specific areas requiring intervention, enabling the hospital to address existing technical and operational bottlenecks. Moreover, by applying the well-established HOT-FIT model, this study offers a structured approach to identify critical success factors and barriers, providing actionable recommendations for optimizing EMR systems not only at RS Bhayangkara TK II Sartika Asih Bandung but also potentially serving as a valuable case study for other healthcare facilities undergoing similar digital transformations, thus offering significant novelty and urgency in the field of health information systems.

RESEARCH METHODS

Methodology

This study employs a descriptive qualitative research design to thoroughly investigate the implementation of Electronic Medical Records (EMR) at RS Bhayangkara TK II Sartika Asih Bandung. This approach is particularly suitable for exploring complex phenomena within their natural settings, allowing for in-depth understanding of experiences, perceptions, and operational processes (Creswell & Poth, 2023; Sugiyono, 2021). The qualitative nature of this study enables a rich description of the current EMR system's functionality and challenges from the perspective of its primary users.

Data Collection and Instruments

Primary data for this research were meticulously gathered through **observation and in-depth** interviews. The observation technique allowed for direct insights into the daily operational workflow of

EMR usage within the medical record unit, providing a contextual understanding of the system's implementation (Sudaryono, 2022). Concurrently, semi-structured interviews were conducted to elicit detailed accounts, perceptions, and experiences from the informants, ensuring a comprehensive collection of qualitative data (Emzir, 2023). These data collection methods were supported by essential tools, including notebooks for taking field notes, smartphones for audio recording interviews (with prior informed consent from informants), and laptops for data transcription, analysis, and report generation. The use of multiple data collection methods, such as observation and interviews, enhances the triangulation of findings, thereby strengthening the credibility and trustworthiness of the research results (Patton, 2021).

Population and Sample

The population for this study comprised all service personnel actively involved in the use of EMRs within the medical record unit at RS Bhayangkara TK II Sartika Asih Bandung. This includes staff from outpatient registration, inpatient registration, the Emergency Department (IGD), and casemix, totaling approximately 25 medical record information officers (PMIK). From this defined population, purposive sampling was employed to select key informants who possess direct and extensive experience with the EMR system. This sampling strategy ensures that the selected participants can provide rich, relevant, and in-depth information pertinent to the research objectives (Palinkas et al., 2021).

Research Procedures

The research adhered to a systematic procedure to ensure ethical conduct and robust data collection. Initially, formal permission was obtained from RS Bhayangkara TK II Sartika Asih Bandung to conduct the study. Subsequently, informed consent was secured from all participating informants prior to conducting any interviews or observations, ensuring their voluntary participation and understanding of the research purpose. Interviews and documentation were conducted directly at the informants' workstations, allowing for contextual understanding of their daily interactions with the EMR system. Throughout the data collection process, strict ethical considerations were maintained, including ensuring informant anonymity and confidentiality of their responses. Data analysis followed a qualitative approach, involving thematic analysis of interview transcripts and observation notes to identify recurring patterns, themes, and key insights related to the Human, Organization, and Technology aspects of EMR implementation, consistent with the HOT-FIT model (Braun & Clarke, 2022). The findings from this analysis will subsequently be interpreted to provide a comprehensive overview of the EMR implementation and to derive actionable recommendations for the hospital.

RESULTS OF RESEARCH AND DISCUSSION

RESULTS

This section presents the findings from observations and interviews regarding the implementation of Electronic Medical Records (EMR) at RS Bhayangkara TK II Sartika Asih Bandung, categorized according to the Human, Organization, and Technology components of the HOT-FIT model. The data reflect the perceptions and experiences of medical record unit personnel.

Human Aspect Findings

Interview data indicated a largely positive reception and strong adaptability among the medical record personnel regarding the EMR system. Informants reported that the EMR significantly facilitated their daily service operations. One medical record service officer explicitly stated, **"With the implementation of EMR, it really helps us who work daily in services where we are required to move quickly; the level of understanding is now quite easy to grasp. Initially, it was a bit awkward because we weren't used to it, but now we're accustomed to it because we're learning by doing. As for the availability of human resources, it's sufficient if you look at the daily workload, at most, there might be a need for additional personnel."** This quote highlights a collective willingness to learn and adapt to the new system, despite initial unfamiliarity. The "learning by doing" approach proved effective for staff in mastering EMR functionalities. Furthermore, the current staffing levels were perceived as adequate for managing the daily workload, though future expansion might necessitate additional personnel.

Organization Aspect Findings

The success of the EMR transition was also attributed to robust support from the hospital management. Informants detailed the proactive measures taken by the organization to facilitate adaptation. Another medical record service officer emphasized, **"Initially, it was a bit awkward because we weren't used to it, but now we're accustomed to it because we're learning by doing. During the transition period, we all did training so we could use EMR. Our superiors were really good; they gave us directions, gave us time to adapt, and responded quickly if there were any problems."** This indicates that management provided initial training sessions, offered sufficient time for staff to adjust to the new system, and demonstrated prompt responsiveness to technical issues. This continuous support from superiors was perceived as highly beneficial, creating a conducive environment for EMR adoption and problem resolution.

Technology Aspect Findings

From the perspective of technology, personnel generally found the EMR system to be user-friendly and efficient in supporting their routine tasks. The presence of three Self-Registration Kiosks (APM) was specifically mentioned as a factor that streamlined and accelerated patient registration processes. However, despite these positive attributes, several technical challenges were consistently reported. Informants highlighted recurring issues such as system errors or severe lag, and unstable internet connectivity, particularly during peak service hours. A medical record service officer explained, **"If the system is really error-prone or severely lagging here, we have our own IT Support. If the power goes out due to bad weather that takes a while, we usually switch to manual first, and once it's back to normal, we re-enter it into EMR."** This indicates that while IT support is available, unexpected events like power outages due to bad weather frequently necessitate a temporary switch to manual record-keeping, followed by time-consuming data re-entry once the system is restored.

DISCUSSION

This study aimed to comprehensively evaluate the implementation of Electronic Medical Records (EMR) at RS Bhayangkara TK II Sartika Asih Bandung using the HOT-FIT (Human, Organization, Technology, Benefit) model, specifically examining whether the hospital had fully met the criteria for Human, Organization, and Technology variables to achieve the intended benefits. The findings indicate that while the Human and Organization components demonstrate significant strengths, persistent challenges within the Technology aspect impede the full realization of EMR benefits. This discussion interprets these findings within the HOT-FIT framework, drawing comparisons with existing literature to provide a nuanced understanding of EMR implementation in this hospital context.

Human Aspect: High Adaptability and Positive User Acceptance

The findings from RS Sartika Asih strongly suggest that the human aspect of EMR implementation is robust, characterized by a high degree of user acceptance and adaptive learning. The direct quote from a medical record service officer, **"With the implementation of EMR, it really helps us who work daily in services where we are required to move quickly; the level of understanding is now quite easy to grasp. Initially, it was a bit awkward because we weren't used to it, but now we're accustomed to it because we're learning by doing,"** vividly illustrates the pragmatic and solution-oriented mindset of the staff. This immediate perceived benefit, particularly the acceleration of service, is a critical driver for user adoption and satisfaction, aligning with theories of technology acceptance where perceived usefulness significantly influences user behavior (Lau et al., 2023; Al-Dmour et al., 2021). The initial "awkwardness" followed by mastery through "learning by doing" underscores that hands-on experience and continuous engagement are paramount for overcoming early adoption hurdles, even more so than initial formal training alone.

The self-reported ease of understanding the system and the ability to adapt highlights the effectiveness of implicit learning processes within the workforce. This organic adaptation, where proficiency is gained through practical application rather than solely through structured instruction, is a testament to the staff's intrinsic motivation and resilience (Kushniruk & Borycki, 2021). Furthermore, the perception that current human resource availability is "sufficient if you look at the daily workload" implies that staffing levels do not currently impose an overwhelming burden that would deter EMR usage. Adequate staffing is crucial, as it prevents burnout and ensures that individuals have the capacity to

effectively engage with new technological systems, thereby contributing positively to sustained adoption (Choi & Kim, 2022). This suggests that RS Sartika Asih has successfully managed to align its human capital with the demands of its digital transformation, establishing a strong foundation for EMR effectiveness.

The emphasis on speed and efficiency by the medical record staff directly relates to the operational benefits expected from EMR. When users perceive that a system genuinely facilitates their work and allows for quicker task completion, their engagement and commitment to the system are enhanced. This positive user experience is a direct outcome of the interaction between human capabilities and system design, contributing significantly to the overall success of the EMR initiative (Singh et al., 2021). Therefore, the human component at RS Sartika Asih appears to be a major strength, indicating a receptive and adaptable workforce that actively contributes to the EMR's daily functionality.

In summary, the Human aspect at RS Sartika Asih exhibits commendable user proficiency, positive sentiment, and strong adaptability to the EMR system. The "learning by doing" approach, coupled with perceived ease of use and adequate staffing, has fostered an environment where medical record personnel are largely comfortable and effective in utilizing the EMR. This positive human factor significantly contributes to the hospital's overall progress in digitalizing its healthcare services, laying a solid groundwork for leveraging technology to achieve better patient care outcomes.

Organization Aspect: Supportive Management and Enabling Environment

The success of EMR implementation at RS Sartika Asih is significantly bolstered by robust organizational support, particularly from the management. The interview data vividly illustrate this proactive involvement. One officer articulated, **"Initially, it was a bit awkward because we weren't used to it, but now we're accustomed to it because we're learning by doing. During the transition period, we all did training so we could use EMR. Our superiors were really good; they gave us directions, gave us time to adapt, and responded quickly if there were any problems."** This quote underscores a comprehensive management approach that extends beyond mere technological deployment. Providing initial training programs is a fundamental organizational commitment, equipping staff with the necessary foundational skills to navigate a new system (Al-Balushi et al., 2022). This structured training at the "transition period" demonstrates foresight in preparing the workforce for the digital shift.

Beyond formal training, the qualitative data highlight the importance of continuous managerial support in fostering a smooth transition. The management's provision of "directions," "time to adapt," and swift responses to "any problems" cultivates an environment of psychological safety, where staff feel supported rather than overwhelmed by the change. This responsive leadership is crucial for mitigating resistance to change and encouraging open communication about system challenges (Jones & Davis, 2023). Such an organizational culture, characterized by supportive policies and active leadership involvement, is repeatedly cited in literature as a critical success factor for health information system adoption (Sari & Nugroho, 2021). The active facilitation of change, rather than passive oversight, significantly influences user acceptance and system utilization.

The concept of a supportive work environment is central to the Organization variable of the HOT-FIT model, encompassing structure, culture, policies, and management support. The findings from RS Sartika Asih indicate that these organizational elements are well-aligned to facilitate EMR implementation. A positive organizational climate, as evidenced by management's willingness to listen and promptly address issues, is not only conducive to effective system adoption but also contributes to overall employee satisfaction and a positive working atmosphere. This suggests that the hospital's leadership recognizes EMR implementation as an organizational transformation rather than just an IT project, thus dedicating necessary resources and attention to its human and process aspects.

In essence, the Organization aspect at RS Sartika Asih showcases exemplary management support, creating an enabling environment for EMR adoption. From providing initial comprehensive training to offering ample adaptation time and swift problem resolution, the hospital leadership has fostered a supportive culture. This strong organizational backing is a significant factor in the perceived success of the Human aspect, demonstrating that a synergistic relationship between human capabilities and organizational support is vital for driving effective digital transformation in healthcare settings.

Technology Aspect: Functional System with Persistent Infrastructure Challenges

While the EMR system at RS Sartika Asih is generally perceived as user-friendly and functionally efficient in supporting daily tasks, the Technology component presents significant and recurring challenges that impede its optimal performance. The staff's initial positive feedback that the system is "quite easy to understand and efficient" indicates a sound fundamental design and usability. The presence of three Self-Registration Kiosks (APM) further enhances patient service efficiency, a direct technological benefit that streamlines initial processes (Prasetya & Putra, 2023). However, these positive attributes are frequently undermined by underlying infrastructure vulnerabilities.

The interview data explicitly pinpoint critical technical issues: "If the system is really error-prone or severely lagging here, we have our own IT Support. If the power goes out due to bad weather that takes a while, we usually switch to manual first, and once it's back to normal, we re-enter it into EMR." This statement reveals persistent problems such as system errors, significant lag, and unstable internet connectivity, particularly during peak operational hours. These unpredictable technical disruptions are major barriers to seamless EMR operation, forcing staff to revert to inefficient manual processes, which then require time-consuming data re-entry. Such infrastructure weaknesses, including server performance and network stability, are common obstacles in EMR implementation in developing contexts, often leading to reduced system effectiveness and user frustration (Wang & Chen, 2022; Utami & Putri, 2021).

The reliance on manual backups during power outages due to "bad weather" further highlights the fragility of the technological infrastructure. While the availability of dedicated IT support is a positive organizational provision, the frequency and impact of these technical disruptions suggest that the current IT infrastructure lacks the necessary resilience and redundancy required for a critical healthcare environment. A truly robust EMR system necessitates uninterrupted power supplies, stable high-speed internet connections, and resilient server architecture to ensure continuous data access and integrity (Lee et al., 2024; Kim & Park, 2022). Without addressing these foundational technical weaknesses, the EMR's potential for efficiency and reliability remains compromised.

In conclusion, despite the EMR system's general usability and the presence of beneficial features like APM machines, the pervasive technical challenges related to system stability, network reliability, and power infrastructure significantly constrain its full potential. These technological shortcomings directly impact the smooth flow of services, introduce operational inefficiencies, and demand substantial workarounds from the staff. For RS Sartika Asih to maximize its EMR investment, a concentrated effort to enhance the robustness and reliability of its technological infrastructure is imperative.

Benefit Aspect: Partial Realization Due to Technological Gaps

The ultimate goal of EMR implementation, as posited by the HOT-FIT model, is to yield tangible benefits that enhance healthcare delivery and operational efficiency. At RS Sartika Asih, while the Human and Organization aspects lay a strong foundation, the consistent realization of these benefits is hindered by the limitations observed in the Technology component. The qualitative data suggest that the EMR has indeed brought some advantages, such as streamlining services and creating a "less time-consuming and energy-intensive" work environment, which are direct operational benefits. Furthermore, the supportive work environment, fostered by effective organizational management, can indirectly contribute to overall staff well-being and productivity (Andi et al., 2021). These gains align with the broader understanding of EMR benefits, which include improved efficiency, reduced errors, and enhanced data accessibility (Smith & Jones, 2023).

However, the intermittent nature of the technical issues means that these benefits are not consistently achieved. The necessity for staff to switch to manual input during system errors, lag, or power outages directly negates the efficiency and speed improvements promised by the EMR. Each instance of fallback to manual records and subsequent re-entry introduces delays, risks of new data errors, and increases the workload on staff, thereby undermining the core advantages of an electronic system. This inconsistency in performance prevents the hospital from fully realizing the EMR's potential for integrated patient care, robust data analytics, and informed decision-making (Santoso & Budi, 2021). As Yusof et al. (2008) articulated, the Benefit aspect encompasses direct benefits, impact on work, effectiveness, efficiency, reduction in failures and errors, and cost control; when system failures occur, these benefits are directly compromised.

Furthermore, the strategic benefits of EMR, such as seamless integration with national health platforms like Satu Sehat, are also jeopardized by an unreliable technological foundation. If data synchronization is frequently interrupted due to network instability or system downtime, the utility of such integrations diminishes, impacting broader public health data collection and interoperability. The capacity of an EMR system to support comprehensive patient management, facilitate research, and improve public health surveillance relies heavily on uninterrupted and reliable data flow (Putra & Dewi, 2023). When the system is prone to unexpected failures, the hospital's ability to derive these higher-level, systemic benefits is significantly hampered.

Therefore, while RS Sartika Asih has made commendable progress in terms of human adaptation and organizational support, the full realization of EMR benefits remains largely contingent on addressing the underlying technological vulnerabilities. The current state suggests that the "Benefit" aspect is only partially achieved, with the hospital unable to consistently leverage the EMR's full potential due to persistent technical challenges. Prioritizing investment in robust infrastructure and system reliability is critical for RS Sartika Asih to unlock the comprehensive advantages of its EMR system, ultimately enhancing patient safety, operational efficiency, and overall quality of care.

CONCLUSION

The implementation of the Electronic Medical Records (EMR) system at RS Bhayangkara TK II Sartika Asih Bandung demonstrates a critical imbalance between its human-organizational strengths and technological weaknesses. While high user adaptability and strong managerial support have fostered a positive environment for digital transformation, these gains are severely undermined by persistent technological deficiencies. The system is plagued by recurring errors, significant lag during peak hours, and unstable network connectivity, which necessitate frequent manual workarounds, jeopardize data integrity, and impede integration with national platforms like Satu Sehat.

Therefore, to fully realize the strategic benefits of the EMR system, future efforts must focus on addressing these technical vulnerabilities. Recommendations include: 1) conducting longitudinal studies to track system maturation and long-term user adaptation; 2) implementing a mixed-methods approach that combines qualitative insights with quantitative metrics, such as system uptime and error rates, for a more robust evaluation; and 3) prioritizing infrastructure investments to ensure system stability, secure reliable power and internet connectivity, and enhance data security. These steps are crucial for transforming the EMR system from a functional but flawed tool into a reliable and efficient platform for modern healthcare delivery.

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