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Implementing Khanza Hospital Information System in Outpatient Pharmacy: Insights from a HOT-Fit Evaluation

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ABSTRACT

Although Hospital Management Information System (SIMRS) implementation has been widely evaluated, evidence regarding its implementation in outpatient pharmacy services, particularly in regional hospitals, remains limited. This study aimed to qualitatively evaluate the implementation of the Khanza Hospital Management Information System (SIMRS) in the outpatient pharmacy department of Merauke Regional General Hospital, a Type B referral hospital in eastern Indonesia, using the Human, Organization, Technology, and Net Benefit (HOT-Fit) framework. A qualitative descriptive study with an exploratory design was conducted through in-depth interviews with eight purposively selected informants, complemented by observations and document review. Data were analyzed thematically using the HOT-Fit framework. The findings showed that Khanza SIMRS improved pharmaceutical service efficiency, as evidenced by a 66% reduction in waiting time for non-compounded medications and a 33% reduction for compounded medications after the system reached the stabilization phase. User acceptance and strong organizational support are key factors contributing to successfull implementation of the SIMRS. However, several challenges remained, including system instability, medication inventory discrepancies, and limited clinical information, which constrained the optimal use of SIMRS for clinical pharmacy services. These findings suggest that strong human and organizational support sustained SIMRS implementation despite technological limitations, while optimizing system quality and clinical information remains essential for clinical pharmacy services. The study provides practical evidence to support future optimization of SIMRS implementation in regional hospitals undergoing digital transformation.

Keywords: SIMRS, HOT-Fit, Ambulatory Pharmacy, Qualitative Evaluation

INTRODUCTION

Digital transformation has become a key pillar in healthcare, with SIMRS serving as an important tool to support administrative, clinical, and managerial processes. The literature indicates that SIMRS can reduce service fragmentation, improve operational efficiency, enhance cost control, and strengthen the quality of patient care (Fadilla & Setyonugroho, 2021). In Indonesia, healthcare digital transformation is regulated under Minister of Health Regulation No. 24 of 2022 on Electronic Medical Records, which mandates hospitals to adopt digital systems by improving technological infrastructure, organizational readiness, and human resources.

Despite being mandated by national policy, SIMRS implementation in Indonesia still faces challenges, particularly in regional and remote hospitals, including limited infrastructure, shortages of human resources, gaps in digital competencies, and geographical barriers. Based on baseline data collected before the implementation of the Hospital Management Information System (SIMRS), pharmacy services were still managed manually. The limitations of these manual procedures had a direct impact on several key pharmacy service performance indicators.

The outpatient pharmacy processed approximately 270–300 prescriptions per day. During the 2023–2024 period, the average waiting time for ready-to-dispense medications was 43.93 minutes per prescription, exceeding the established service standard of less than 30 minutes per prescription. Meanwhile, the average waiting time for compounded medications was 52.93 minutes per prescription. Although this duration remained within the established service standard of less than 60 minutes per prescription, it indicated that compounded prescriptions required a relatively longer preparation time.

Reliance on manual procedures and the potential for misinterpreting physicians' handwritten prescriptions contributed to three prescription preparation or dispensing errors during the reporting period. Pharmacy personnel also frequently encountered operational challenges, including inaccuracies in patient identification details and delays in accessing patients' medical histories during prescription screening and verification. Outpatient registration records indicated a high volume of patients, many of whom remained at the hospital while waiting for their prescriptions to be processed and their medications to be dispensed. This substantial patient volume, combined with the high pharmacy workload, highlighted the need for a prescription management process that

was rapid, accurate, and efficient. Furthermore, records of medication waiting times, incident reports, and interviews with pharmacy personnel indicated a clear need to digitalize pharmacy workflows and integrate relevant information systems.

The implementation of SIMRS was therefore expected to reduce medication waiting times, minimize human errors related to patient identification and prescription interpretation, and facilitate timely access to patients' medication histories. These improvements were anticipated to enhance the quality, safety, and efficiency of pharmaceutical care services. One framework that can be used for this evaluation is the HOT-Fit model. This model evaluates information system implementation by examining four key components of an information system: Human, Organization, Technology, and Net Benefits, as well as the fit among these components, which determines the success of system implementation (Yusof et al., 2008).

Evaluation of SIMRS implementation using the HOT-Fit model has been widely conducted in various hospitals across Indonesia. Previous studies have consistently reported positive implementation outcomes, including favorable performance across the HOT-Fit dimensions, improved operational efficiency, and the influence of human factors on system utilization (Kamal et al., 2024; Seto Wahyu Prasetyo, 2025; Sitompul et al., 2024; Wirajaya & Nugraha, 2022). However, existing evidence has predominantly focused on hospital-level evaluation, with less attention given to implementation within specific clinical service units. In particular, evidence regarding SIMRS implementation in outpatient pharmacy services remains limited despite the distinct operational and clinical characteristics of this service. Consequently, how SIMRS supports pharmacy practice and addresses operational and clinical challenges in outpatient pharmacy services, particularly in regional hospitals, remains insufficiently understood.

This study aims to qualitatively evaluate the implementation of Khanza SIMRS within the outpatient pharmacy department of Merauke Regional General Hospital, a Type B referral hospital in eastern Indonesia, using the HOT-Fit framework. The study examines the factors that support and constrain SIMRS implementation during the stabilization phase and explores its implications for outpatient pharmacy services. By focusing on outpatient pharmacy services in a regional referral hospital, this study extends the existing evidence beyond hospital-level evaluations and provides insights into SIMRS implementation provides insights into SIMRS implementation in regional healthcare

settings in eastern Indonesia. These findings are expected to contribute to existing evidence on hospital information system implementation and support the optimization of SIMRS in regional hospitals undergoing digital transformation.

METHOD

This study employed a qualitative descriptive approach with an exploratory design to examine the implementation of Khanza SIMRS and its implications within outpatient pharmacy services at Merauke Regional General Hospital, a type B referral hospital in eastern Indonesia. A qualitative approach was appropriate because the study sought to explore the implementation process and how Khanza SIMRS was used in routine pharmacy practice. This approach enabled the implementation to be examined from the perspective of healthcare personnel directly involved in system use and across the human, organizational, and technological dimensions of the HOT-Fit Framework. The study was conducted from March to May 2026 after obtaining ethical approval from the Health Research Ethics Committee of Dr. Moewardi Hospital (Protocol No. 322/III/HERC/2026).

Participants were purposively selected from pharmacists and pharmacy technicians directly involved in the implementation and daily use of Khanza SIMRS in the outpatient pharmacy department. They were selected as the primary users of the system within the pharmacy service workflow and were therefore considered relevant to exploring its implementation from the service unit perspective. Although the HOT-Fit framework encompasses human, organizational, and technological dimensions that may involve multiple stakeholder groups, this study was specifically designed to evaluate SIMRS implementation within outpatient pharmacy services rather than to provide a hospital-wide assessment. Accordingly, hospital management personnel, IT staff, SIMRS developers, and physicians were not included as participants because the study focused on the experiences of pharmacy personnel directly involved in routine system use. The organizational and technological dimensions were examined insofar as they affected SIMRS implementation within outpatient pharmacy services, rather than as a hospital-level assessment. These dimensions were explores through participant's perspective and complemented by direct observations and document reviews for methodological triangulation. Eligible participants had at least one year of experience using Khanza

SIMRS, while individuals with communication barriers or conditions that limited effective participation were excluded.

Data collection continued through successive interviews until data saturation was reached, defined as the point at which no new codes or themes emerged, in accordance with the guidelines provided by (Saunders et al., 2018). Saturation was prospectively assessed throughout the data collection process and was reached after the eighth interview. Data were collected through a semi-structured interview guide developed based on the HOT-Fit framework and reviewed by experts prior to data collection. Each interview lasted approximately 30–60 minutesminutes, was audio-recorded with participants' written consent, and transcribed verbatim. To achieve methodological triangulation, interview findings were complemented by direct observation of SIMRS implementation and document reviews, including hospital policies, meeting minutes, evaluation reports, and pharmacy service documents.

Data analysis followed the interactive model of Miles and Huberman, consisting of data collection, data reduction, data display, and conclusion drawing and verification (Miles et al., 2014). During the data reduction stage, interview transcripts were read repeatedly, manually highlighted to identify meaningful statements, and coded. Codes were organized and managed using Microsoft Word and Microsoft Excel before being grouped into categories and preliminary themes. Theme development and refinement followed Braun and Clarke's six-phase thematic analysis, including familiarization with the data, generation of initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the final report (Ahmed et al., 2025; Braun & Clarke, 2006). The resulting themes were subsequently mapped and interpreted according to the four HOT-Fit dimensions: Human, Organization, Technology, and Net-benefit. Examples of the coding process and thematic mapping are presented in Table 1.

Table 1. Coding and Thematic Framework of the HOT-Fit Analysis

HOT-Fit Domain	Initial Code	Coding Category	Main Theme
Human	Ease of use, willingness to adopt digital workflows, self-learning, peer assistance, limited use of clinical features	User acceptance and adoption; user competency	User acceptance and adaptive learning supported routine system use, while advanced clinical functionalities remained underutilized.
Organization	Management support; weekly monitoring;	Management support;	Organizational support sustained implementation

	responsive IT support; user feedback; absence of SIMRS-specific SOP	implementation governance	despite incomplete formal governance
Technology	System downtime; slow response; unstable system; stock discrepancies; incomplate diagnosis/laboratory/clinical data	System quality; information quality	Operational use was supported by the system, but technical instability and incomplete clinical information constrained broader utilization.
Net Benefit	Faster prescription processing; easier prescription verification; reduced waiting time; medication safety support; new risk from similat/duplicate medication entries	Operational efficiency; medication safety; clinical benefit	SIMRS provided operational benefits, while clinical benefits remained limited by information and utilization constraints.

The primary researcher conducted all interviews, performed the initial coding, and thematic analysis. Regular reflexive discussions with the supervisory team were undertaken to critically examine coding decisions, refine emerging themes, and minimize potential researcher bias throughout the study. Credibility was established through member checking and methodological triangulation by comparing interview findings with observations and document reviews. Dependability and confirmability were supported through an audit trail documenting the analytical process, while transferability was supported by providing detailed descriptions of the study setting, participants, and research procedures. Findings from the interviews, observations, and document reviews were synthesized using a triangulation matrix to ensure analytical consistency and comprehensive interpretation of SIMRS implementation.

RESULTS

This study involved eight purposively selected participants who were directly involved in the implementation and daily use of Khanza SIMRS in the outpatient pharmacy department. Their sociodemographic characteristics are presented in Table 2.

Tabel 2. Socio-Demographic Characteristics of Respondents

Socio-Demographic Characteristics	Quantity (n)	Percentage
Gender		
Male	1	12,5 %
Female	7	87,5 %
Age		

Socio-Demographic Characteristics	Quantity (n)	Percentage
18-59 years old	8	100 %
≥ 60 years old	0	0 %
Education		
D3 - S1 Pharmacy	4	50 %
Pharmacist Profession	4	50 %
Work Experience (Years)		
<2 years	1	12,5 %
≥ 2 years	7	87,5%
Duration of System Use (Years)		
< 2 years	1	12,5 %
≥ 2 years	7	87,5 %

As shown in Table 2, most participants were female (n = 7; 87.5%), all participants were between 18 and 59 years old, and the participants were equally distributed between pharmacists and pharmacy technicians (50% each). The majority had at least two years of work experience (87.5%) and had used Khanza SIMRS for two years or longer (87.5%), indicating that most participants had sufficient experience with the system and outpatient pharmacy workflows.

For the human dimension, Khanza SIMRS was well accepted by the participants. Participants consistently reported that the system was easy to learn and use and facilitated routine outpatient pharmacy services, particularly through its electronic prescribing (e-prescribing) feature. Participants described e-prescribing as simplifying prescription processing by reducing manual procedures and facilitating prescription verification, label preparation, and dispensing.

> *"It is easy to learn and use because the features are available in Indonesian, making the system easy to understand. The most helpful aspect is prescription services, as we no longer need to perform tasks manually, such as reading physicians' prescriptions, preparing medication labels, and other related activities. Previously, these tasks took a considerable amount of time, but they can now be completed more quickly."(Participant 6)*

Consistent with these findings, field observations showed that pharmacy personnel were able to operate Khanza SIMRS during routine pharmacy services and had adapted well to a more digital workflow, in which prescriptions could be accessed directly through the system without waiting for paper prescriptions. Nevertheless, several pharmacy reports and administrative activities were still completed manually.

Participants also expressed their readiness to adopt digital workflows despite

limited structured training opportunities. Competency in using Khanza SIMRS was primarily developed through self-learning and assistance from senior colleagues. Although participants were able to perform routine operational tasks using Khanza SIMRS, several advanced clinical pharmacy features, including drug information services and patient counseling, had not yet been routinely utilized. Document review supported these findings by showing the absence of structured user manuals, formal training records, training certificates, and routine evaluations of SIMRS utilization. Overall, participants had adapted to routine operational use of Khanza SIMRS, whereas advanced clinical pharmacy functionalities remained underutilized.

Regarding the organizational dimension, participants consistently described strong management support for the implementation of Khanza SIMRS. This support was reflected in the provision of operational facilities, regular monitoring and evaluation meetings, openness to user feedback, and the availability of a responsive internal IT team. As one participant explained :

> *"The hospital provides good support, as we are directly equipped with computers, printers, and other necessary equipment. Hospital management ensures ongoing support by conducting weekly evaluations of the Hospital Management Information System (SIMRS) across all units, including the pharmacy department." (Participant 1)*

These accounts were consistent with field observations, which showed that computers, printers, and internet connectivity adequately supported routine pharmacy services. Weekly monitoring and evaluation meetings were conducted regularly, and institutional records documented the ongoing evaluation of Khanza SIMRS implementation through meeting minutes and evaluation reports.

Participants also highlighted the important role of the internal IT team in supporting the continuity of SIMRS implementation. As one participant stated:

> *"Whenever we encounter technical issues, we usually report them directly to the IT department and request assistance. The IT team responds promptly and takes immediate action upon receiving our reports." (Participant 5)*

Consistent with these accounts, field observations showed that technical issues were managed collaboratively by pharmacy personnel and the internal IT team, allowing pharmacy services to continue with minimal disruption. Document review further showed

that although routine monitoring and evaluation had been implemented, several governance documents supporting Khanza SIMRS had not yet been formally established. These included a Standard Operating Procedure (SOP) specifically governing Khanza SIMRS utilization, a director's decree regulating its implementation, and documented collaboration agreements with the system developer. Participants explained that, pharmacy services continued to operate using existing manual SOPs while utilizing Khanza SIMRS in routine practice. As reflected in the following quotation:

> *"Based on my observation, there is no SOP (Standard Operating Procedure) in place yet. Although the Hospital Management Information System (SIMRS) is being implemented, its implementation is not supported by a formal SOP."(Participant 2)*

For the technological dimension, participants identified system stability and information quality as the main technological challenges affecting Khanza SIMRS implementation. Participants frequently reported slow system performance, intermittent system downtime, discrepancies in medication inventory data, and incomplete clinical information during routine pharmacy services. As one participant explained:

> *"Sometimes, the system goes down, resulting in slow loading times, and the system is occasionally unstable." (Participant 4)*

Another participant also described the impact of system errors on medication inventory data:

> *"The most challenging issue seems to be system errors. When an error occurs, the stock quantities sometimes change unexpectedly." (Participant 7)*

Consistent with the interview findings, field observations showed that four of the ten prescription service processes observed were affected by slow system response and internet connectivity issues. Document review further identified records of system downtime and technical errors. Observations also revealed discrepancies between medication inventory data in the system and actual physical stock, while essential clinical information, including patient diagnoses, laboratory results, and body weight, was not consistently available in the system.

Regarding the Net Benefits dimension, participants consistently perceived Khanza SIMRS as contributing to improved operational efficiency in outpatient pharmacy

services, particularly by supporting prescription validation, administrative verification, and access to patients' medication histories. As one participant explained:

> *"The Khanza Hospital Management Information System (SIMRS) has provided substantial support for our work. The features that have been particularly beneficial are those related to prescription services, especially medication validation and dispensing."(Participant 4)*

Participants also perceived that Khanza SIMRS contributed to medication safety by facilitating patient data verification and reducing errors associated with manually reading prescriptions. However, several participants reported that system-related factors, including medications with similar names and overlapping medication entries, could still contribute to the risk of medication errors. As one participant stated:

> *"The Khanza Hospital Management Information System (SIMRS) is beneficial because it facilitates and accelerates service delivery. Its use also significantly reduces medication errors, as the system allows healthcare personnel to verify prescriptions directly against patient records."(Participant 7).*

Consistent with participants' accounts, field observations showed that prescription services had become more structured and digitally integrated. Pharmacy staff were able to access prescriptions directly through the e-prescribing system without having to wait for paper prescriptions, allowing for earlier preparation and dispensing of medications. Further observation of 30 prescription services showed an average waiting time of 10 minutes for non-compounded prescriptions and 27 minutes for compounded prescriptions, both of which met the hospital's minimum service standards. Historical prescription waiting time records were also reviewed to examine changes across the implementation period (Table 3). As one participant explained:

> *"Consequently, service delivery becomes faster than with manual prescribing. Patient waiting times are reduced, allowing prescriptions to be processed more quickly than before" (Participant 1)*

As shown in Table 3, before the implementation of SIMRS in 2023, the average prescription waiting time was 40.51 minutes for non-compounded prescriptions and 51.66 minutes for compounded prescriptions. During the transition and early implementation phase in 2024, waiting times increased before declining substantially after the system reached the stabilization phase in 2025. Compared with the pre-implementation period, the average waiting time decreased by 66% for non-compounded

prescriptions and 33% for compounded prescriptions. The observed reduction in waiting time was consistent with participant's perceptions that Khanza SIMRS contributed to more efficient prescription processing.

Tabel 3. Prescription Waiting Times

Years	Prescription Service Waiting Time	
	Non-Compounded Medications (Minutes)	Compounded Medications (Minutes)
2023	40,51	51,66
2024	47,36	54,24
2025	13,65	34,65

Despite these operational benefits, field observations showed that pharmaceutical screening, drug information services, and patient counseling were still conducted manually. Participants and observations indicated that the limited availability of clinical information in the system was a relevant constraint, including incomplete information on patient diagnoses, laboratory result and body weight. Document review further confirmed that although Khanza SIMRS contained features for drug information services and patient counseling, no documentation was identified of pharmaceutical screening, pharmaceutical interventions, drug information services, patient counseling, or medication safety activities performed through the system.

The findings were sythesized across the four HOT-Fit dimensions to identify the main implementation streghts, persistent challengens, and implication for out patient pharmacy services. Table 4 presents this synthesis, integrating evidence from interviews, observation, and document reviewes.

Table 4. Summary of Findings Based on the HOT-FIT Framework

HOT-Fit Component	Major Theme	Supporting Evidence	Challenges	Implications
Human	User acceptance and adaptive learning supported routine system use	Ease of use, willingness to adopt digital workflows, self-learning, peer assistance, and routine system use were supported by interviews, observations, and document review.	Advanced clinical functionalities remained underutilized and structured competency development was limited.	Continuous structured learning is needed to extend competencies beyond routine system use.
Organization	Organizational support sustained SIMRS	Management support, routine monitoring, collaborative work	SIMRS-specific governance, particularly	Existing organizational support should

HOT-Fit Component	Major Theme	Supporting Evidence	Challenges	Implications
	implementation despite incomplete formal governance	practices, responsive IT support, and supporting infrastructure were identified across data sources.	specific SOPs and formal implementation documentation, remained incomplete.	be complemented by formal SIMRS governance mechanisms.
Technology	Operational use was supported by the system, but technical and information-quality limitations constrained broader utilization	Interviews, observations, and documents identified slow response, downtime, stock discrepancies, and incomplete clinical information.	Technical instability and incomplete clinical information limited broader and clinical use.	System performance and integration of essential clinical information need to be strengthened.
Net Benefit	SIMRS provided operational benefits, while clinical benefits remained limited	Participants reported improved prescription processing; observations showed digital prescription access; waiting-time records showed improvement after stabilization.	Clinical pharmacy functions remained underutilized and new medication-selection risks were identified.	Optimization should extend from operational efficiency toward clinical pharmacy integration and medication safety.

DISCUSSION

The successful adoption of Khanza SIMRS observed in this study appears to have resulted from the interaction among users' readiness, organizational support, and system characteristics. Positive experiences with the system in daily pharmacy practice, particularly its perceived usefulness and ease of use, appeared to strengthen users' willingness to adapt to digital workflows. The immediate benefits experienced during routine pharmacy services also appeared to facilitate users' adaptation to the system, suggesting that informal workplace learning may support the implementation process. This finding aligns with the Technology Acceptance Model (TAM), which proposes that perceived usefulness and perceived ease of use are primary determinants of users' acceptance of an information system (He et al., 2018; Moefida & Sutrisna, 2026). Similar findings have been reported in previous studies, demonstrating that users are more likely to adopt hospital information systems when they perceive them as easy to use and capable of improving their work performance (Shania & Paramarta, 2024). The present

findings extend this evidence by suggesting that, in the context of a regional hospital undergoing digital transformation, positive user experiences during routine practice may have contributed to the initiation and sustained acceptance of the system, even before formal training and standard operating procedures had been fully established.

Although users successfully adapted to Khanza SIMRS, the implementation process remained largely dependent on informal, practice-based learning rather than structured organizational learning. Users developed operational competencies through hands-on daily practice and guidance from experienced colleagues. This learning approach enabled pharmacy personnel to solve practical problems collaboratively and facilitated rapid adaptation to routine operational tasks, allowing operational activities to continue despite limited formal training (Wiggen et al., 2026). While this approach effectively supported users during the early stages of routine system use, it primarily developed competencies required for routine operational activities rather than broader system functionalities, such as clinical pharmacy functions available within the system. These findings suggest that user acceptance alone was insufficient to ensure standardized system utilization across outpatient pharmacy services. Similar observations have been reported by Wiggen et al. (2026), who described "shoulder-to-shoulder learning" as an effective strategy for supporting system implementation in settings with limited formal training, although such learning may also contribute to uneven knowledge transfer among healthcare professionals (Wiggen et al., 2026).

The absence of SIMRS-specific standard operating procedures suggests that the implementation of Khanza SIMRS had not yet been fully formalized within the organizational governance framework. Although routine pharmacy services continued without major disruption, the lack of formal governance mechanisms may reduce consistency in workflow implementation and hinder the standardized utilization of system functionalities across pharmacy services. Previous studies have also emphasized that adequate organizational support, encompassing both infrastructure and structured governance mechanisms such as standardized procedures, continuous monitoring, and regular evaluation, is crucial for sustaining hospital information systems by promoting consistent implementation and reducing variations in practice (Christasani et al., 2021; Laia & Boris, 2025).

Despite the successful adoption of Khanza SIMRS, recurring technical problems

remained an important barrier to its optimal implementation. Slow system response and intermittent downtime continued to disrupt routine pharmacy workflows, indicating that system quality had not yet fully supported the operational demands of outpatient pharmacy services. Nevertheless, these technical limitations did not lead to system abandonment. Pharmacy staff continued to rely on Khanza SIMRS because its operational benefits, particularly those associated with e-prescribing and prescription processing, outweighed the inconvenience caused by temporary system disruptions. This finding illustrates the interaction between the Technology and Organization dimensions of the HOT-Fit Framework; although system quality remained suboptimal, management commitment, regular monitoring and evaluation, and responsive internal IT support appeared to help maintain routine system use. User's willingness to adapt and their reliance on peer assistance further supported the continuity of pharmacy workflows despite technical disruptions. In this regional hospital context, these findings suggest that organizational support and user adaptation can help sustain system utilization when technical performance is imperfect, although they cannot substitute for improvements in system quality and clinical information completeness. Similar findings have been reported in previous studies, which showed that although technical instability remains a common challenge during SIMRS implementation, responsive technical support and continuous organizational commitment are critical for maintaining system utilization and implementation sustainability (Dimas Luthfi Pambudi & Wahyu Wijaya Widiyanto, 2025).

An important operational benefit identified in this study was the progressive improvement in outpatient pharmacy efficiency throughout the implementation of Khanza SIMRS. As shown in Table 4, prescription waiting times increased slightly during the first year of implementation (2024) compared with the pre-implementation period (2023), then declined markedly in 2025 after the system had been routinely integrated into pharmacy services. This transitional pattern suggests that the operational benefits of digitalization are realized progressively rather than immediately, reflecting the time required for user adaptation, workflow integration, and organizational learning before efficiency gains can be fully achieved. Similar transitional patterns have been reported in previous studies, in which hospital information systems initially increased workload during implementation before generating sustained improvements in service efficiency as organizational routines became established (Al Ani et al., 2022; Tsai et al., 2020).

The substantially greater reduction in waiting time observed for non-compounded prescriptions compared with compounded prescriptions further indicates that Khanza SIMRS generated its greatest efficiency gains by optimizing information flow and administrative processes throughout prescription management, including electronic prescribing, prescription verification, and dispensing workflow coordination. In contrast, compounded prescription services continued to depend largely on pharmacists' manual professional activities, such as pharmaceutical calculations, compounding, and final verification, which could not be substantially accelerated through digitalization alone.

A more important finding of this study is that improvements in operational performance were not accompanied by equivalent improvements in clinical pharmacy services. This discrepancy appears to be primarily attributable to the limited quality and completeness of clinical information available in the system, including patient diagnoses, laboratory results, and body weight. Without these data, pharmacists remained dependent on manual review of medical records and other information sources when conducting pharmaceutical screening and clinical assessment. Consequently, although dispensing activities became more efficient, the system had not yet fully supported clinical decision-making in pharmaceutical care. These findings suggest that the clinical value of hospital information systems depends not only on system availability but also on the completeness and integration of clinically relevant information required for pharmaceutical care. Previous studies have similarly emphasized that comprehensive clinical information is fundamental to integrating hospital information systems into clinical pharmacy services (Chen et al., 2022; Sychev, 2021). This limited integration of clinical information provides a plausible explanation for the underutilization of clinical pharmacy features identified in this study. Although Khanza SIMRS provides functions supporting drug information services and patient counseling, these features were not routinely integrated into pharmacy practice because the information required to support comprehensive pharmaceutical care remained incomplete. From the HOT-Fit perspective, this finding demonstrates that technological availability alone is insufficient to generate clinical benefits unless it is supported by adequate information quality, organizational governance, and users' clinical competencies.

The findings also suggest that Khanza SIMRS has influenced medication safety. Rather than eliminating medication errors, the implementation of Khanza SIMRS appears

to have shifted their underlying mechanisms. Errors traditionally associated with handwritten prescriptions and manual transcription were reduced through e-prescribing and digital verification, whereas new medication safety challenges emerged from interactions between users and the digital system itself, including incorrect drug selection due to similar drug names or duplicate drug entries with the same indications. This finding suggests that improvements in patient safety depend not only on digitalization itself but also on continuous system refinement and careful pharmacist verification during routine practice. Similar observations have been reported in previous studies showing that electronic prescribing systems can reduce conventional medication errors while introducing new risks associated with computerized prescribing processes (Afrash et al., 2022). Overall, the findings demonstrate that successful operational implementation alone is insufficient to maximize the clinical value of a hospital information system. This finding is consistent with the HOT-Fit framework, which emphasized the importance of alignment among human, organizational, and technological dimensions for sustained system implementation.

This study has several limitations. First, it was conducted at a single regional referral hospital and focused specifically on outpatient pharmacy services; therefore, the findings may not represent SIMRS implementation across other hospital departments or institutions with different organizational and technological contexts. Second, the study involved eight purposively selected pharmacy personnel, providing in-depth perspectives from direct system users but not capturing the perspective of hospital management, IT personnel, SIMRS developers, or physicians. Third, qualitative interpretation may be influenced by researcher judgment; this potential influence. Third, qualitative interpretation may be influenced by researcher judgment; this potential influence was addressed through reflexive discussion with the supervisory team, member checking, and methodological triangulation. Accordingly, the findings primarily reflect the service unit perspective rather than hospital-level implementation, and their transferability to other hospitals or healthcare settings should be considered with caution.

CONCLUSION

This study demonstrated that Khanza SIMRS has been successfully integrated into routine outpatient pharmacy services. Routine system utilization was primarily sustained

by strong user acceptance and organizational commitment, enabling pharmacy services to continue despite persistent limitations in system performance. However, although the system substantially improved operational efficiency, particularly through reduced prescription waiting times, its contribution to clinical pharmacy services remained limited by incomplete clinical information and suboptimal utilization of advanced clinical functionalities. These findings indicate that maximizing the clinical value of SIMRS requires not only successful system implementation but also stronger organizational governance. Potential priorities include developing and implementing specific Standard Operating Procedures (SOPs) for the use of SIMRS in pharmaceutical services, supported by structured and periodic user training and mentoring programs. The integration of clinical data, particularly prescription data, medication history, and patient service information, should be prioritized to improve the continuity, completeness, and accuracy of information. In addition, the hospital is expected to establish system monitoring indicators covering SIMRS compliance, the completeness and accuracy of data entry, system response time, and system-related problems or disruptions, which should be monitored regularly. Furthermore, a Director's Decree should be issued to clearly define the person or unit responsible for SIMRS management, the mechanism for reporting problems encountered during SIMRS use, follow-up procedures for identified issues, and periodic system evaluations. These measures are essential to ensure the sustainability and effectiveness of SIMRS Khanza implementation in supporting pharmaceutical services. Future studies are recommended to be conducted across multiple hospitals or different healthcare settings to provide comparative insights into SIMRS implementation across healthcare facilities. Longitudinal evaluations are also recommended to examine changes and developments in SIMRS implementation after the system has been routinely and stably operated. In addition, a mixed-methods approach may be employed to obtain a more comprehensive understanding by integrating quantitative and qualitative data. Future studies are also recommended to involve a broader range of stakeholders, including physicians, hospital management, and hospital IT teams, to provide a more comprehensive understanding of the factors influencing the successful implementation of SIMRS.

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REFERENCES

Afrash, M. R., Rabiei, R., Hosseini, A., Salari, S., & Sepehri, M. (2022). Impact of Computerized Provider Order Entry on Chemotherapy Medication Errors: A Systematic Review. *International Journal of Cancer Management*, *15*(3). https://doi.org/10.5812/ijcm-120300

Ahmed, S. K., Mohammed, R. A., Nashwan, A. J., Ibrahim, R. H., Abdalla, A. Q., M. Ameen, B. M., & Khdhir, R. M. (2025). Using thematic analysis in qualitative research. *Journal of Medicine, Surgery, and Public Health*, *6*(3), 100198. https://doi.org/10.1016/j.glmedi.2025.100198

Al Ani, M., Garas, G., Hollingshead, J., Cheetham, D., Athanasiou, T., & Patel, V. (2022). Which Electronic Health Record System Should We Use? A Systematic Review. *Medical Principles and Practice*, *31*(4), 342–351. https://doi.org/10.1159/000525135

Aulia Dini Ayuningtias. (2025). Literature Review Sistem Informasi Manajemen Rumah Sakit dalam Pengambilan Keputusan. *Jurnal Riset Rumpun Ilmu Kedokteran*, *4*(2), 321–329. https://doi.org/10.55606/jurrike.v4i2.6292

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2). https://doi.org/10.1191/1478088706qp063oa

Chen, Q., Wang, L., Lin, M., Chen, W., Wu, W., & Chen, Y. (2022). Development and implementation of medication-related clinical rules for obstetrics, gynaecology, and paediatric outpatients. *European Journal of Hospital Pharmacy*, *31*(2), 101–106. https://doi.org/10.1136/ejhpharm-2021-003170

Christasani, P. D., Wijoyo, Y., Hartayu, T. S., & Aris Widayati. (2021). Implementation of Hospital Information System in Indonesia: A Review. *Systematic Reviews in Pharmacy*, *12*(7), 499–503. https://www.sysrevpharm.org/abstract/implementation-of-hospital-information-system-in-indonesia-a-review-82877.html

Dimas Luthfi Pambudi, & Wahyu Wijaya Widiyanto. (2025). Evaluating Outpatient EMR Adoption Using the Technology Acceptance Model: A Case Study at RSAU dr. Siswanto, Indonesia. *International Journal of Health and Medicine*, *2*(3), 76–82. https://doi.org/10.62951/ijhm.v2i3.456

Fadilla, N. M., & Setyonugroho, W. (2021). Sistem Informasi Manajemen Rumah Sakit dalam Meningkatkan Efisiensi: Mini Literature Review. *Jurnal Teknik Informatika Dan Sistem Informasi*, *8*(1), 357–374.

He, Y., Chen, Q., & Kitkuakul, S. (2018). Regulatory focus and technology acceptance: Perceived ease of use and usefulness as efficacy. *Cogent Business and Management*, *5*(1). https://doi.org/10.1080/23311975.2018.1459006

Kamal, S., Mardi, Y., & Regina, R. (2024). Evaluasi Penerapan Sistem Informasi Khanza

Menggunakan Metode HOT-FIT Di Rumah Sakit Tentara Reksodiwiryo Kota Padang. *Jurnal Ilmiah Perekam Dan Informasi Kesehatan Imelda (JIPIKI)*, *9*(1), 1–11. https://doi.org/10.52943/jipiki.v9i1.1447

Laia, G. P., & Boris, J. (2025). Overview Of a Hospital Management Information System Using The Hot-Fit Method in Medan Hospitals in 2025. *Journal of Indonesian Health Policy and Administration*, *10*(3). https://doi.org/10.7454/ihpa.v10i3.1156

Miles, M. B. ., Huberman, A. M. ., & Saldaña, J. (2014). *Qualitative data analysis : a methods sourcebook*. SAGE Publications, Inc.

Moefida, N., & Sutrisna, E. M. (2026). *Pengaruh Kinerja Rumah Sakit Terhadap Penerimaan Sistem Informasi Manajemen Rumah Sakit (SIMRS) dengan Metode Technology Acceptance Model (TAM) Systematic Literature Review (SLR)*. *11*(01), 446–455. https://doi.org/10.36418/syntax-literate.v11i1.63636

Mohammadpour, A., Ghaemi, M. M., Darrudi, R., & Sadagheyani, H. E. (2021). Use of Hospital Information System to Improve the Quality of Health Care from Clinical Staff Perspective. *Galen Medical Journal*, *10*. https://doi.org/10.31661/gmj.v10i0.1830

Prianto, A., & Widi Nugroho, H. (2025). Analysis of the Measurement of the Khanza Hospital Information System (SIMRS) at RSIA Graha Kurnia Using the Human Organization Technology (HOT-Fit). *Jurnal Pepadun*, *6*(3), 220–229. https://doi.org/10.23960/pepadun.v6i3.300

Putra, T. R., Adikara, F., & Saptaningsih, A. B. (2025). Hospital Information System (SIRS) Using Human Model Organization Technology-Fit (Hot-Fit) in Pharmaceutical Installation. *International Journal of Nursing and Health Services (IJNHS)*, *8*(1), 48–57. https://doi.org/10.35654/ijnhs.v8i1.767

Rahmalia, A. (2023). Evaluasi Penerapan Sistem Informasi Manajemen pada Rumah Sakit Menggunakan Metode HOT-Fit: Tinjauan Pustaka Sistematis. *Jurnal Ilmiah IT CIDA*, *9*(2), 85. https://doi.org/10.55635/jic.v9i2.193

Rajah, R., Hanif, A. A., Tan, S. S. A., Lim, P. P., Karim, S. A., Othman, E., & Teoh, T. F. (2019). Contributing factors to outpatient pharmacy near miss errors: a Malaysian prospective multi-center study. *International Journal of Clinical Pharmacy*, *41*(1). https://doi.org/10.1007/s11096-018-0762-1

Saunders, B., Sim, J., Kingstone, T., Baker, S., Waterfield, J., Bartlam, B., Burroughs, H., & Jinks, C. (2018). Saturation in qualitative research: exploring its conceptualization and operationalization. *Quality and Quantity*, *52*(4). https://doi.org/10.1007/s11135-017-0574-8

Seto Wahyu Prasetyo. (2025). Analysis Of The Implementation Of The Hospital Management Information System (SIMRS) On Operational Efficiency At Xyz Hospital Pamekasan. *Multidisciplinary Indonesian Center Journal (MICJO)*, *2*(3). https://doi.org/10.62567/micjo.v2i3.1152

Shania, F., & Paramarta, V. (2024). Analysis of Technology Acceptance Model (TAM) on The Use of Electronic Medical Records in Hospitals. *Jurnal Indonesia Sosial Sains*, *5*(12). https://doi.org/10.59141/jiss.v5i12.1520

Siddik, F., Noor, N. B., & Pasinringi, S. A. (2024). *Analysis The Effect Of Human , Organization And Technology On Simrs Implementation At Konawe Selatan Regional Hospital*. *21*(07), 2161–2175. https://doi.org/10.5281/zenodo.13120402

Sitompul, R. L., Yuniar, N., & Prasetya, F. (2024). Evaluasi Sistem Informasi Manajemen Rumah Sakit (SIMRS) Khanza : Metode HOT FIT di Instalasi Rawat Jalan RSUD Bahteramas Tahun 2024. *NeoRespublica : Jurnal Ilmu Pemerintahan*, *5*(2), 826–842.

https://doi.org/10.52423/neores.v5i2.285

Sychev, D. A. (2021). Information technologies' role in optimizing the application of drugs in clinical practice: a view of a clinical pharmacologist. *South Russian Journal of Therapeutic Practice*, *2*(4). https://doi.org/10.21886/2712-8156-2021-2-4-30-32

Tsai, C. H., Eghdam, A., Davoody, N., Wright, G., Flowerday, S., & Koch, S. (2020). Effects of electronic health record implementation and barriers to adoption and use: A scoping review and qualitative analysis of the content. *Life*, *10*(12), 1–27. https://doi.org/10.3390/life10120327

Wiggen, C. U., Anthun, K. S., Håland, E., & Lillefjell, M. (2026). Shoulder-to-shoulder: healthcare professionals' experiences of learning during electronic health record implementation in municipal primary care. *Scandinavian Journal of Primary Health Care*, *44*(1). https://doi.org/10.1080/02813432.2026.2673131

Wirajaya, K. M., & Nugraha, I. N. A. (2022). Evaluasi Sistem Informasi Manajemen Rumah Sakit (SIMRS) dengan Metode HOT-Fit di Rumah Sakit Daerah Mangusada. *Jurnal Manajemen Kesehatan Yayasan RS.Dr. Soetomo*, *8*(1), 124. https://doi.org/10.29241/jmk.v8i1.934

Yusof, M. M., Kuljis, J., Papazafeiropoulou, A., & Stergioulas, L. K. (2008). An evaluation framework for Health Information Systems: human, organization and technology-fit factors (HOT-fit). *International Journal of Medical Informatics*, *77*(6). https://doi.org/10.1016/j.ijmedinf.2007.08.011

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