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Research Article

Literature Review: Evaluation of the Performance of the Pharmacy Management Information System (SIM-Farmasi) Using the HOT-Fit Model

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Abstrack: Introduction: The use of information technology has become a necessity and an increasing demand for public service providers, including hospital pharmacy departments. The pharmacy department plays a vital role in supporting patient recovery through the provision of pharmaceutical services oriented toward patient and community needs. To enhance service quality, an effective management information system is required. SIM Farmasi (Pharmacy Management Information System) is designed to improve drug distribution management, ensure medicine availability according to patient needs, and support accurate inventory control. This study applied the HOT-Fit model to evaluate the performance of SIM Farmasi in hospital pharmaceutical services. Methods: This study employed a literature review method by collecting and analyzing previous research articles selected based on predetermined inclusion and exclusion criteria. The selected studies were evaluated and synthesized to strengthen the theoretical foundation, identify knowledge gaps, and support the development of a conceptual framework. Results and Discussion: The effectiveness of SIM Farmasi implementation is strongly influenced by human factors (staff competence and training), organizational factors (management support and standard operating procedures), and technological factors (system quality and data accuracy). Major challenges include limited human resource skills, inadequate system features, and weak organizational policies. Continuous training, system enhancement, and strengthened management commitment are therefore essential to optimize system performance. **Conclusion:** Overall, the HOT-Fit evaluation indicates that the implementation of SIM Farmasi has not yet been optimal. The main obstacles include insufficient staff training, weak management support, and data accuracy issues within the system.

Kata kunci: HOT-Fit; Information; Management; Pharmacy; System.

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1. Introduction

A hospital is an organization operated by professional health personnel and supported by complete and permanent medical facilities and infrastructure, providing medical services, continuous nursing care, and conducting diagnosis and treatment of diseases experienced by patients (Sondakh et al., 2022). Service quality and patient satisfaction are considered interrelated, as the level of patient satisfaction can influence the quality of services provided by healthcare providers (Cahyani et al., 2023). Pharmaceutical services are a form of healthcare service provided directly and with full professional responsibility to patients in relation to pharmaceutical preparations, aiming to achieve optimal therapeutic outcomes and improve patients' Quality of Life (QoL) (Yulianingsih et al., 2023). Pharmaceutical care focuses on the safe, effective, and rational use of medicines through the application of pharmacists' competencies in patient care, with the goal of minimizing the risk of medication errors and enhancing the quality of pharmaceutical services (Putri, 2017). In the provision of pharmaceutical services, quality serves as a fundamental standard of care. The quality of hospital pharmacy services refers to the highest level of service capable of achieving patient satisfaction in accordance with public expectations, implemented in compliance with professional service standards and the pharmacy code of ethics (Yulianingsih et al., 2023).

Furthermore, pharmaceutical services in Indonesia are regulated by the Regulation of the Minister of Health of the Republic of Indonesia Number 72 of 2016 (Permenkes RI, 2016). This regulation was established to improve the quality of pharmacy services, ensure legal protection for pharmacy personnel, reduce inappropriate medication use among patients and the community, and ultimately promote patient safety.

The pharmacy department is a unit within the hospital responsible for various pharmaceutical activities that actively contribute to patient recovery and are oriented toward the interests of patients and the community (Murnita et al., 2016). Pharmacy services function not only as a supporting service but also as one of the hospital's main revenue centers (Ninaprilia et al., 2024). This is because more than 90% of hospital healthcare services rely on pharmaceutical products, including medicines, chemicals, radiological materials, medical consumables, medical devices, and medical gases, and approximately 50% of total hospital revenue is generated from pharmaceutical inventory management (Murnita et al., 2016). Therefore, hospital management is required to enhance the effective and efficient management of pharmaceutical inventories, medical devices, and consumable materials to ensure high-quality hospital operations while simultaneously achieving optimal revenue generation.

One of the important factors in the planning and implementation of healthcare services is the availability of health information supported by the utilization of information technology (Zulfa, 2018). The use of information technology has now become a necessity and a demand for all public service providers. As institutions delivering healthcare services to the community, hospitals require well-managed information systems to ensure that services can be provided optimally (Muhammad & Arief, 2020). To support pharmaceutical services, a management information system is needed as a means to achieve high-quality healthcare delivery, namely SIM Farmasi (Pharmacy Management Information System) (Murnita et al., 2016). Through the implementation of a pharmacy management information system, drug distribution can be managed more effectively, thereby facilitating the provision of medications to patients in accordance with physicians' prescriptions (Sholistiyawati et al., 2020).

In this study, the HOT-Fit model was applied to evaluate the performance of SIM Farmasi. The HOT-Fit model is a theoretical framework widely used to assess information systems in the healthcare sector (Yusof et al., 2008). This model encompasses four main dimensions: human, organization, technology, and net benefits, as well as the alignment among these components. The HOT-Fit model is considered one of the most comprehensive and relevant approaches for addressing the issues examined in this study. This research focuses on analyzing the relationships among the human dimension, which includes system use and user satisfaction; the organizational dimension, which comprises organizational structure and environment; and the technological dimension, which consists of system quality, information quality, and service quality, in relation to the net benefits generated by SIM Farmasi (Tawar et al., 2022).

Performance is defined as a measure of the achievement of desired objectives (Safitri, 2022). It reflects the work outcomes of individuals or groups within an organization according to their respective authorities and responsibilities, as well as the level of success attained within a specific period, as measured against predetermined and mutually agreed standards, targets, goals, or performance criteria (Safitri, 2022). Every organizational activity requires evaluation. Evaluation is an effort undertaken to determine the actual condition of an information system's implementation. Through evaluation, the extent to which information system activities have been achieved can be understood, thereby enabling the formulation of improvement strategies to enhance system performance (Murnita et al., 2016). This process is particularly crucial, as information systems that are not evaluated periodically may fail to meet user needs, making system revision and improvement essential to ensure continued relevance to operational requirements. The primary objective of evaluation is to improve or refine programs for future implementation. Without evaluation, the actual condition of a program—whether in terms of design, implementation, or outcomes—cannot be clearly identified (Maharani et al., 2022). In the pharmaceutical context, the evaluation of management information system performance aims to ensure that the technology effectively supports well-organized pharmaceutical services, ranging from data input processes to the provision of accurate information for users. A comprehensive evaluation approach, such as the HOT-Fit method, enables organizations to identify whether performance barriers originate from human factors, organizational support, or technical constraints, thereby

facilitating optimal effectiveness in managing pharmaceutical assets and medications without compromising the institution's primary objectives.

Management information systems function as organizational resources that support decision-making at all levels of management. When properly designed, these systems are capable of transforming data into relevant and effective information to serve as decision-support tools for managers (Advistasari et al., 2015). SIM Farmasi is able to manage drug distribution more effectively, facilitate the provision of medications in accordance with physicians' prescriptions, and ensure the availability of drug stock based on patient needs (Murnita et al., 2016). Furthermore, SIM Farmasi supports managerial decision-making processes, particularly in pharmaceutical inventory procurement, through the utilization of computer-based systems (Murnita et al., 2016).

The first dimension is the human aspect, which consists of two components: system use and user satisfaction. The system use component includes the level and frequency of use, system operation procedures, user experience or expertise, resistance to system adoption, and training. Meanwhile, user satisfaction is employed to evaluate application usage activities, based on perceptions of usefulness and the overall level of user satisfaction (Pranata, 2019). The importance of this aspect is demonstrated in the study by Zulfa (2018), which found that system effectiveness is highly dependent on human resource competencies in operating computers and on inter-unit collaboration to prevent service delays. In addition, user satisfaction is often considered a primary indicator of system success, although in practice the available features may not always fully align with the daily operational needs of frontline staff.

The second dimension is the organizational aspect, which comprises two main components: structure and environment. The structural component is related to planning, strategy, governance, autonomy, communication, leadership, and overall management processes (Franki & Sari, 2022). Meanwhile, the environmental component is viewed in a broader context, encompassing factors that exert both direct and indirect influence, such as financing, government regulations, political conditions, location, level of competition, and interactions among users involved in system utilization. Management support, including the development of a system implementation master plan and direct oversight through supervision, plays a critical role in determining whether the system is consistently adopted by staff or instead neglected. Without strong organizational commitment in enforcing operational procedures, the data generated by the system are often underutilized in strategic decision-making processes.

The third dimension is the technological aspect, which consists of three main components: system quality, information quality, and service quality (Franki & Sari, 2022). System quality refers to the characteristics of the information system, particularly its functional capabilities and visual interface, including ease of use, response time, usability, availability, reliability, flexibility, and security. Information quality relates to the outputs generated from data processing within the system. The evaluated elements include completeness, accuracy, readability, timeliness, availability, relevance, consistency, reliability, data entry, and methodological quality. Meanwhile, service quality is associated with comprehensive support provided by system vendors or technology administrators, which is assessed through response speed, service assurance, empathy, and follow-up actions (Tawar et al., 2022). The quality of technology is critical, as technical issues such as software errors or delayed responses from development teams may hinder the continuity of pharmaceutical services. Inaccurate discrepancies between system data and actual warehouse conditions often arise from poor real-time data updating, thereby reducing user trust in the reliability of the technology.

The fourth dimension is the net benefit aspect. In this context, net benefits refer to the balance between the positive outcomes and perceived value gained from the use of an information system. The components of net benefits include advantages, task accomplishment, efficiency, error reduction, reciprocal interaction, clinical outcomes, and financial impact (Franki & Sari, 2022). The greater the perceived benefits achieved, the more optimal the utilization of the information produced by the system. These benefits are ultimately measured by the extent to which the system improves operational efficiency and assists management in accurately forecasting pharmaceutical procurement costs. A high level of net benefits indicates that the system not only functions effectively from a technical perspective but also delivers tangible impacts in enhancing patient care quality and minimizing the risk of medication errors.

This review article was conducted to evaluate the effectiveness and efficiency of pharmaceutical service management in hospitals through the implementation of the

Pharmacy Management Information System (SIM Farmasi), with the aim of improving healthcare service quality, ensuring the availability and distribution of medicines according to patient needs, and supporting managerial decision-making in pharmaceutical procurement and inventory management. In addition, this study seeks to identify factors influencing the successful implementation of SIM Farmasi, including human resources, organizational, and technological aspects. The findings of this review are expected to provide evidence-based recommendations for hospitals to optimize the utilization of pharmacy information systems in order to enhance service quality and operational efficiency.

2. Materials and Method

This literature review employed a descriptive qualitative research design, in which descriptive qualitative research is an approach aimed at describing and explaining phenomena or research objects as they naturally occur, in accordance with the conditions at the time of the study (Sugiyono, 2017). This study applied a document study approach, which involves a series of activities including data collection from library sources, reading, recording, and processing materials relevant to the research topic (Zed, 2003).

The study utilized a literature review analysis technique by collecting findings from previous studies based on predetermined criteria, followed by evaluation and synthesis to strengthen the theoretical foundation, identify knowledge gaps in prior research, and support the development of a conceptual framework or research hypotheses.

The sample in this study consisted of articles that met the established inclusion and exclusion criteria. The inclusion criteria comprised original articles published in English or Indonesian that contained information related to pharmaceutical inventory management in pharmacies. Meanwhile, articles whose full texts were not available and those published more than the last ten years (2016–2026) were excluded from the review.

3. Results and Discussion

The Pharmacy Management Information System (SIM Farmasi) is an information system application designed to provide users with the information required for pharmaceutical services, with a focus on community-oriented services, the provision of high-quality medicines, and accessible clinical pharmacy services. The implementation of SIM Farmasi represents an important strategy for improving the quality of pharmaceutical care in healthcare facilities. Based on the analysis of five selected journals, the main factors influencing the successful performance of SIM Farmasi implementation include human resources, organizational support, and technological aspects. In the study conducted by Rivai et al. (2024), it was concluded that the human, organizational, and technological dimensions did not significantly affect the perceived benefits of SIM Farmasi implementation in one hospital in Manado City. The human aspect showed no significant influence on system benefits, as system implementation by employees had not been optimal, resulting in limited perceived functionality among users. Based on interview findings, respondents reported frequent discrepancies between system data and actual c onditions in the field. For example, the quantity of drug stock recorded in the system often did not match actual inventory levels because warehouse staff did not consistently update data whenever medicines were received. Consequently, discrepancies between system records and real conditions frequently occurred, potentially leading to drug shortages. In addition, inconsistencies were also identified in patient care status information, where some patients who had been admitted as inpatients were still recorded in the system as outpatients. Similarly, within the organizational aspect, suboptimal system implementation by staff contributed to the limited realization of system benefits. This situation occurred due to the lack of consistent system utilization across employees, preventing users from fully experiencing the advantages of the system. Finally, regarding the technological aspect, comparable to the previous two factors, insufficient system execution by personnel resulted in the system's benefits not being fully realized.

These findings are consistent with the study conducted by Zulfa (2018), which reported that the human, organizational, and technological aspects of SIM Farmasi had not yet provided optimal benefits to the pharmacy department at UGM Hospital, Yogyakarta. One of the main barriers within the human dimension was the insufficient number of human resources responsible for system operation. In addition, service delays frequently occurred due to limited staff computer skills and inadequate collaboration among employees. Regarding the organizational aspect, although the pharmacy department had established

standard operating procedures implemented across each unit—resulting in reports and information relevant to operational needs and decision-making—managerial decisions were still largely performed manually. This occurred because staff did not fully trust the outputs generated by SIM Farmasi; consequently, the system was primarily utilized only for financial transactions and patient registration. The software used also frequently experienced errors and was unable to fully accommodate organizational needs. Furthermore, the development of SIM Farmasi was constrained by substantial financial requirements. To address this issue, the hospital attempted to incorporate SIM Farmasi costs as part of the unit cost in hospital tariff determination. With respect to the technological aspect, the study indicated that SIM Farmasi at UGM Hospital demonstrated suboptimal information quality, particularly in terms of timeliness, reliability, data updating, and security. However, the system outputs were considered sufficiently accurate, complete, and easy to understand.

Furthermore, the study conducted by Murnita et al. (2016) revealed that the performance of SIM Farmasi was categorized as good only in the technological aspect, while the human and organizational aspects were classified as poor. The human aspect was considered inadequate because pharmacy staff occasionally retrieved medicines from the Askes inventory when regular drug stocks were depleted, resulting in discrepancies between system-recorded inventory levels and actual warehouse stock. Prescription cancellations also occurred frequently when prescribed medicines were out of stock, even though the system still indicated availability at the time of prescription entry. Similarly, the organizational aspect was categorized as poor due to insufficient management support, particularly from the head of the pharmacy department, in the operation of SIM Farmasi. In addition, pharmacy staff experienced difficulties in contacting SIM Farmasi technical personnel when system-related problems occurred. Conversely, the technological aspect was classified as good. Nevertheless, challenges remained, particularly regarding inaccurate drug data within the system. These inaccuracies further exacerbated weaknesses in the human and organizational aspects, ultimately affecting the overall performance of SIM Farmasi.

In contrast, the study conducted by Haryanti et al. (2024) reported that all aspects were highly effective in the implementation of SIM Farmasi and significantly supported pharmaceutical services. The human component achieved a score of 80%, while the organizational and technological components each reached 90%, indicating a strong overall system performance. Similarly, the study by Sholistiyawati et al. (2020) found that all aspects had met the indicators of SIM Farmasi implementation. In the human aspect, both system use and user satisfaction indicators were fulfilled. However, user satisfaction required further attention, as users still expressed dissatisfaction with system facilities and features that did not fully match operational needs or adequately support daily tasks. The organizational aspect also met the indicators related to organizational structure and environment. Nevertheless, SIM Farmasi had not yet been optimally utilized to support managerial decision-making, particularly in drug stock ordering, pharmaceutical planning and supervision, and control of drug procurement termination processes within the pharmacy department. Regarding the technological aspect, the indicators of service quality, system quality, and information quality were generally fulfilled. However, service quality remained suboptimal due to the lack of comprehensive SIM Farmasi user guidelines, slow response from system developers, and limited system accessibility, as the application could not yet be accessed from multiple locations.

Human Aspect

Most of the reviewed studies identified that user competence in operating SIM Farmasi remains suboptimal. Rivai et al. (2024) found that system implementation by employees was not optimal, resulting in data discrepancies such as drug stock records that were not updated in real time. This condition led to drug shortages and inaccuracies in patient care status. Similarly, Zulfa (2018) reported that limited human resources—particularly insufficient computer skills and weak inter-employee collaboration—contributed to delays in pharmaceutical services. Furthermore, Murnita et al. (2016) observed that pharmacy staff frequently withdrew drugs manually from physical stock when system-recorded inventory was depleted, thereby exacerbating data inaccuracies between the system and actual warehouse conditions. These findings indicate that the human aspect has not fully supported the benefits of SIM Farmasi, as system utilization remains highly dependent on subjective factors such as individual discipline, technical skills, and user compliance.

In contrast, Haryanti et al. (2024) reported that the human component achieved an effectiveness level of 80%, with users perceiving that SIM Farmasi significantly facilitated

pharmaceutical services. Likewise, Sholistiyawati et al. (2020) found that this aspect met system use indicators; however, user satisfaction remained relatively low due to system features that had not fully aligned with operational needs. These findings suggest that, when supported by adequate training and competency development, the human aspect can become a key strength in SIM Farmasi implementation. Nevertheless, this condition is often exacerbated by the absence of structured and continuous information system training programs for pharmacy personnel, resulting in uneven technical capabilities among users. Consequently, inadequate human resource quality directly affects the low utilization of system outputs in supporting daily pharmaceutical operations.

Organizational Aspect

Several studies reported that the organizational aspect did not significantly influence the benefits of SIM Farmasi due to suboptimal system implementation and insufficient managerial support. Rivai et al. (2024) and Zulfa (2018) found that limited involvement from hospital management hindered effective system utilization. Zulfa (2018) further explained that although standard operating procedures were already established, decision-making processes were still conducted manually because users lacked trust in the system-generated outputs. Similarly, Murnita et al. (2016) highlighted inadequate support from pharmacy leadership and difficulties in contacting SIM Farmasi technical personnel during system disruptions, which negatively affected overall system performance. Sholistiyawati et al. (2020) also reported that SIM Farmasi had not been optimally utilized to support critical managerial decisions, particularly those related to drug procurement, inventory planning, and stock control. These findings indicate that organizational structures and workflows have not been fully integrated with the information system, resulting in operational inefficiencies.

In contrast, Haryanti et al. (2024) reported a high organizational effectiveness rate of 90%, reflecting strong managerial commitment and institutional support in pharmaceutical service delivery. Zulfa (2018) noted that organizational procedures were capable of producing relevant reports, although their utilization in strategic decision-making remained limited. Furthermore, Sholistiyawati et al. (2020) confirmed that organizational environment and structural indicators had been fulfilled, suggesting gradual progress in organizational readiness. However, the absence of a comprehensive master plan or long-term strategic roadmap for pharmacy information systems, coupled with limited supervisory control from hospital leadership, weakens monitoring of staff compliance in data input processes. Ideally, hospital management should possess a clear long-term vision for information system development to ensure sustainability, system integration, and continuous improvement of SIM Farmasi implementation.

Technology Aspect

Several studies identified technology as a critical factor influencing the effectiveness of SIM Farmasi implementation. Rivai et al. (2024) reported that the technology aspect did not significantly affect system benefits due to suboptimal implementation, particularly inconsistencies between system data and actual conditions. Similarly, Zulfa (2018) identified recurring technical problems, including software errors, inaccurate information, and delays in data updates, although the system output was generally considered accurate and understandable. Murnita et al. (2016) also found that drug inventory data were frequently inaccurate, which negatively affected not only the technology aspect but also the human and organizational dimensions. Sholistiyawati et al. (2020) highlighted deficiencies in service quality, such as slow developer response times, limited technical support, and restricted system accessibility across different locations. These issues reduced user confidence and hindered optimal system utilization.

Despite these challenges, several studies reported positive findings. Murnita et al. (2016) categorized the technology aspect as good, supported by accurate and complete system outputs. Likewise, Haryanti et al. (2024) reported a high effectiveness level of 90% for the technology component, indicating that the system performed well in supporting pharmaceutical services. Sholistiyawati et al. (2020) also confirmed that SIM Farmasi met the indicators of system quality and information quality, although weaknesses in service quality remained evident. The instability of technological performance often forces pharmacy staff to conduct manual data verification at the end of each month to reconcile discrepancies between system records and physical stock in the warehouse. If technical constraints—such as software errors and delayed real-time data updates—are not promptly addressed, the effectiveness of SIM Farmasi as a managerial decision-support tool will remain limited.

4. Conclusion

The successful implementation of the Pharmacy Management Information System (SIM Farmasi) in achieving net benefits is highly dependent on the alignment between human, organizational, and technological aspects. Overall, although the technology employed is generally adequate and capable of producing accurate data, these benefits have not been optimally realized due to constraints related to human resources and organizational support. Limited technical skills among users and low discipline in updating data in real time frequently lead to inventory discrepancies, which are further exacerbated by the absence of structured training programs.

In general, the evaluation of SIM Farmasi using the HOT-Fit Model indicates that system implementation remains suboptimal. The human and organizational aspects tend to be the primary weaknesses, particularly issues related to insufficient user competence and limited management commitment, which in turn negatively affect technological performance. However, studies conducted by Haryanti et al. (2024) and Sholistiyawati et al. (2020) demonstrate that with appropriate organizational support, adequate training, and effective system management, all three aspects can achieve high levels of effectiveness.

Furthermore, organizational support plays a vital role in ensuring system sustainability. Without strong leadership supervision and a long-term strategic development plan, SIM Farmasi is often perceived merely as a routine administrative tool rather than a strategic instrument for managerial decision-making. Therefore, the effectiveness of pharmacy information systems can only be enhanced when hospital management strengthens organizational commitment through the establishment of clear operational procedures and continuous improvement of human resource competencies, ensuring alignment with the quality of the available technology.

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