



Analysis Of The Impact Of Hospital Management Information System (HMIS) Use On The Efficiency Of Outpatient Service Flow At Maranatha Hospital

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Abstract

Outpatient services require a reliable information system to accelerate work processes, improve information accessibility, and support coordination among service units. This study aimed to analyze the impact of the Hospital Management Information System (HMIS) on the efficiency of outpatient service processes at Maranatha Hospital and to identify supporting and inhibiting factors in its implementation. A descriptive qualitative approach with a case study design was employed. HMIS implementation was analyzed using the Human–Organization–Technology Fit (HOT-Fit) framework proposed by Yusof et al. (2008), operationalized through technology, human, and organizational dimensions according to the scope and available data. Data were collected through semi-structured interviews, observations, documentation, and questionnaires as supporting data. The study involved 19 purposively selected informants, consisting of 10 outpatient registration officers and 9 medical record officers. The findings indicate that HMIS supported efficiency through faster registration, easier access to patient information, reduced movement of physical records, and improved coordination among units. However, these benefits were not yet optimal because of unstable networks and servers, limited system features, inconsistent data integration, and users' competency needs. Optimization should focus on strengthening technological infrastructure, improving data integration and validation, developing user-oriented features, strengthening downtime procedures, and providing regular training and user assistance.

Keywords: HMIS, Efficiency, Service Flow, Outpatient Care, HOT-Fit

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1. Introduction

Digital transformation in healthcare has encouraged hospitals to develop information systems that function not only as recording tools but also as mechanisms that support continuity of service processes, information availability, and coordination across units. The World Health Organization positions digital transformation as part of health-system strengthening, requiring the integration of technology, human resources, work processes, and organizational governance (World Health Organization [WHO], 2021). In Indonesia, strengthening health information systems is also an integral component of the national health system. Law of the Republic of Indonesia Number 17 of 2023 concerning Health emphasizes the obligation of hospitals to implement hospital health information systems integrated with the National Health Information System (Republic of Indonesia, 2023). Therefore, successful implementation of a hospital information system should be assessed not merely by the existence of the application, but also by its contribution to service work processes.

Maranatha Hospital is a private hospital in Bandung Regency under the Maranatha Christian Higher Education Foundation (YPTKM). The hospital began operating on 18 October 2018 under the name Unggul Karsa Medika Hospital and officially transformed into Maranatha Hospital in August 2025, concurrently with the inauguration of its VIP Inpatient Building (Maranatha Christian University, 2025). According to the Hospital Information System profile of the Ministry of Health of the Republic of Indonesia, Maranatha Hospital is a privately owned Class C general hospital providing outpatient, inpatient, emergency, and various specialist services (Ministry of Health of the Republic of Indonesia, 2026). These institutional changes and service developments make information-system readiness an important element in maintaining smooth service processes, particularly in outpatient units.

The development of services at Maranatha Hospital has also been accompanied by strengthened information-technology infrastructure. Information regarding the hospital transformation indicates the integration of information technology, electronic medical records, and readiness for telemedicine services (Mbinews.id, 2025). The hospital's official profile also records the availability of information-technology support personnel, including network, data, information-system, and database administrators (Ministry of Health of the Republic of Indonesia, 2026). These conditions indicate that the use of HMIS forms part of the hospital's service-development process. Accordingly, the outpatient unit provides a relevant context for assessing how HMIS is used in daily work and the extent to which its use is associated with service-flow efficiency.

The implementation of electronic medical records is an important component of digital transformation in healthcare. Regulation of the Minister of Health of the Republic of Indonesia Number 24 of 2022 concerning Medical Records regulates the implementation of electronic medical records with attention to data security, confidentiality, integrity, and availability (Ministry of Health of the Republic of Indonesia, 2022). In outpatient practice, electronic medical records and HMIS provide patient information required by staff at





various stages of care. Consequently, the quality of system implementation may influence working time, the need to move documents, and the smooth exchange of information.

The efficiency of outpatient service flow is not determined solely by the speed of a single stage, but by the interconnection of processes from registration and identity verification to medical-record management, examination, and information exchange across units. In this study, efficiency is understood through changes in working time, simplification of stages, reduction of repetitive administrative work, ease of access to information, reduced document movement, and smoother coordination. The use of electronic systems has the potential to reduce manual document-search activities and accelerate access to patient information. Several studies have shown that electronic medical records can support service effectiveness and efficiency by improving information access, reducing repetitive administrative work, and increasing user productivity (Anjani & Yunengsih, 2024; Fitrah et al., 2025; Nugroho & Pramudita, 2024).

Nevertheless, HMIS implementation does not always produce optimal efficiency. Network disruptions, slow system response times, system errors, limited features, and integration problems can impede users' work. Raharjo et al. (2024) reported network disruption as one of the constraints in HMIS use, while Wujani et al. (2024) showed that slow system performance and errors are aspects that require attention in HMIS evaluation. In addition to technology, human and organizational factors also determine implementation success. Users require adequate capability to adapt to system features and workflows, while organizations need to provide procedural support when disruptions occur. Through the Human–Organization–Technology Fit (HOT-Fit) framework, Yusof et al. (2008) position human, organizational, and technological aspects as components that should be evaluated in an integrated manner when assessing health information systems.

Previous studies of outpatient services indicate that HMIS and electronic medical records can benefit service processes, but their use continues to face network and server constraints, system limitations, and the need to improve user competence (Rinekasari & Ulfah, 2024). However, further investigation is required to more specifically connect technological, human, and organizational dimensions with the forms of efficiency that emerge in outpatient service flow, particularly in a hospital undergoing service and information-system development. This gap underlies the present study, which not only describes HMIS use but also traces the relationship between implementation characteristics and changes in work processes as experienced and observed by staff.

Based on this framework, the study focuses on the relationship between HOT-Fit dimensions and outpatient service-flow efficiency. The technology dimension includes ease of use, system performance and stability, data security and accuracy, feature suitability, and information integration and availability. The human dimension includes user capability and adaptation as well as the impact of system use on work productivity. The organizational dimension is limited to work-process support and disruption-handling procedures that can be traced through interviews, observation, and documentation. Efficiency is analyzed through process speed, work simplification, reduced document movement, information access, interunit coordination, and continuity of service during disruptions. The study was conducted at Maranatha Hospital because the institution transformed into Maranatha





Hospital in August 2025 and continues to develop its services and information-technology infrastructure. This condition provides an empirical context for examining HMIS implementation in outpatient service flow. The study aims to analyze the impact of HMIS use on outpatient service-flow efficiency at Maranatha Hospital and to identify supporting and inhibiting factors in its implementation.

2. Research Methods

This qualitative study explored staff experiences of Hospital Management Information System (HMIS) implementation and its impact on outpatient workflow efficiency at Maranatha Hospital from November 3, 2025, to January 3, 2026. The Human–Organization–Technology Fit (HOT-Fit) framework (Yusof et al., 2008) guided thematic analysis across technological, human, and organizational dimensions as an analytical framework rather than a statistical model. Purposive sampling recruited 19 informants: 10 outpatient registration officers and 9 medical-record officers. Data were collected through semi-structured interviews, observations, documentation, and supporting questionnaires covering system usability, service speed, information access, data accuracy, interunit coordination, user competence, technical constraints, and workflow continuity. Data were analyzed through reduction, coding and thematic categorization, data display, and conclusion verification. Workflow efficiency was assessed qualitatively in terms of registration speed, document digitization, information accessibility, interunit coordination, and service continuity. Data credibility was ensured through source and method triangulation by comparing information across informants and data-collection techniques.

3. Results and Discussion

a. Result

Table 1. Analysis of the Impact of HMIS Application Use at Maranatha Hospital

HOT-Fit Dimension and Indicator	Questionnaire Results (n=19)	Supporting Interview Findings
Technology – Ease of use	The items on ease of learning and operating the application were positively rated by 18 of 19 respondents (11 agreed, 7 strongly agreed).	Most informants experienced no substantial adaptation difficulties; new users required time to understand the complexity of the features.
Technology – System performance and stability	The fast-response-time item was positively rated by 13 of 19 respondents; the item stating that errors/crashes rarely occurred was positively rated by only 5 of 19 respondents (the lowest score).	Slow networks and server disruptions were the technical constraints most frequently mentioned by users during peak service periods.
Technology – Data security and accuracy	Patient-data security was positively rated by 15 of 19 respondents; prevention of duplicate medical records was positively rated by 11 of 19 respondents.	The system's effectiveness in preventing input errors was assessed variably; several informants stated that automatic notifications/locking for identity errors or physician schedules were not yet available.





Technology – Feature suitability for task needs	The suitability of menus and features for registration needs was positively rated by 16 of 19 respondents.	Most informants considered the features supportive of core tasks; proposed developments included automatic locking of schedules for physicians on leave, a record-analysis feature, and diagnosis-entry functionality.
Technology – Data integration and availability	The availability of consistently up-to-date physician schedules and patient quotas was positively rated by 12 of 19 respondents.	Most informants stated that data flowed in real time to the Pharmacy, Cashier, and Medical Support units, although speed still depended on the activities of each unit.
Human – User adaptation and work productivity	Overall improvement in work productivity was positively rated by 15 of 19 respondents. Ease of learning and operating the application was also positively rated by 18 of 19 respondents.	Experienced users tended to be more familiar with the system, whereas new users required adaptation to features and workflows. Informants proposed periodic training, stronger network/server stability, and feature development so that HMIS benefits for productivity could be optimized.

Based on Table 1, the technology dimension indicates that HMIS generally supports ease of use, feature suitability, data security, and information integration. Eighteen of 19 respondents gave positive assessments of the ease of learning and operating the application, 16 of 19 considered the menus and features suitable for their work needs, and 15 of 19 positively assessed patient-data security. However, system stability requires the greatest attention because only 5 of 19 respondents positively assessed the statement that the system rarely experiences errors or crashes. Interview findings reinforce this result through reports of slow networks and server disruptions, particularly during peak service periods. In the human dimension, 15 of 19 respondents perceived increased work productivity. More experienced users tended to be more familiar with the system, whereas new users required time to adapt to its features and workflow. Thus, Table 1 shows that HMIS benefits have been experienced in terms of ease of use and productivity, although optimization remains influenced by technological stability and user readiness.

Table 2. Outpatient Service-Flow Efficiency and Organizational Factors at Maranatha Hospital

Service-Flow Aspect	Interview Findings	Implications for Efficiency
Registration Process Speed	Most informants reported registration durations of approximately 1–5 minutes; one informant reported a reduction from 10–15 minutes to around 5 minutes after HMIS implementation.	Accelerates service at registration counters and reduces physical patient queues, although duration varies by patient status (returning/new).





Digitization and Distribution of Medical Records	Most informants stated that physical-record distribution to outpatient clinics was no longer required because the process was fully based on electronic medical records; some noted that certain forms still required wet signatures.	Reduces document-transfer time across units, although a fully paperless process has not yet been achieved.
Interunit Coordination and Data Integration	Most informants stated that data flowed in real time to the Pharmacy, Cashier, and Medical Support units, although the speed of data flow was affected by the workload of the relevant units.	Supports a smooth patient-service flow from registration to examination without waiting for physical-document transfer.
Technical Constraints during Peak Service Hours	Slow networks and server disruptions were the most frequently mentioned constraints; printer/queue-machine problems were also reported in several responses.	Slows service processes and may prolong patient waiting times when system disruptions occur.
Disruption-Handling Procedure (downtime)	The hospital has an SOP for manual registration when the system is down; some informants emphasized that this still disrupts efficiency, while others considered disruptions manageable relatively quickly.	The downtime SOP maintains service continuity, but the service flow remains slower than under normal system conditions.
Patient Complaints Related to the System	Some informants reported patient complaints about waiting times caused by system loading or server disruptions; others stated that complaints rarely or never occurred.	Patient satisfaction with service efficiency remains influenced by system stability, not only by process speed when the system operates normally.

Based on Table 2, service-flow efficiency is evident in faster registration, reduced need for physical-record distribution, and smoother information exchange across units. Most informants reported registration durations of approximately 1–5 minutes, while one informant reported a change from approximately 10–15 minutes to around 5 minutes after the use of the electronic system. Digitization of medical records reduced the need to move physical files to outpatient clinics, although several forms still required wet signatures. From an organizational perspective, Maranatha Hospital has an SOP for manual registration when the system experiences downtime. This SOP maintains service continuity, but the service flow remains slower than under normal system conditions. These findings indicate that organizational support functions as a mechanism for service continuity, whereas the level of efficiency remains dependent on technological reliability.

b. Discussion

The findings show that HMIS use at Maranatha Hospital is associated with outpatient service-flow efficiency through the interaction of technological, human, and





organizational dimensions. The Human–Organization–Technology Fit (HOT-Fit) framework of Yusof et al. (2008) was used to explain how alignment among these three dimensions shapes both the benefits and barriers of system implementation. The findings in Table 1 primarily represent the technological and human dimensions, whereas Table 2 demonstrates forms of service efficiency and the organizational dimension through procedural support when disruptions occur. With this approach, the discussion addresses not only the existence of HMIS benefits but also the mechanisms explaining why those benefits arise and the conditions under which they remain suboptimal.

Within the technology dimension, Table 1 shows that HMIS is relatively easy to learn and operate, provides features suited to most task requirements, supports data security, and supplies information that can be used across units. Eighteen of 19 respondents positively assessed ease of use, and 16 of 19 considered the features appropriate to their work needs. These findings indicate that system–task fit is a prerequisite for efficiency. When staff can locate and use system functions that correspond to their work, administrative activities can be simplified and the need for manual recording or searching can be reduced. These findings are consistent with research on electronic medical records showing that faster information access and electronic data management can support administrative efficiency and productivity (Fitrah et al., 2025; Mukharraz et al., 2024).

However, Table 1 also shows that technological quality is not fully consistent, particularly with respect to performance and stability. Only 5 of 19 respondents positively assessed the statement that the system rarely experiences errors or crashes. Interview findings concerning slow networks and server disruptions, particularly during peak service periods, are directly related to Table 2, which shows that technical constraints can slow services and potentially prolong patient waiting times. These findings are consistent with Raharjo et al. (2024) and Wujani et al. (2024), who identified network disruption, slow system performance, and errors as constraints in HMIS use. Thus, the efficiency generated by technology in this study is conditional: system benefits are more readily achieved when infrastructure and application performance are stable.

Information security, accuracy, and integration are also related to efficiency. Table 1 shows that 15 of 19 respondents positively assessed patient-data security, whereas assessments of the prevention of duplicate medical records were less favorable than those of security. Several informants stated that the system did not yet provide notifications or automatic locking to prevent identity or physician-schedule errors. Such conditions may create corrective work when data errors occur. On the other hand, 12 of 19 respondents positively assessed the availability of up-to-date physician schedules and patient quotas, and Table 2 shows that information can flow in real time to the Pharmacy, Cashier, and Medical Support units. Nevertheless, update speed remains influenced by the activities of each unit. These findings emphasize that information quality is determined not only by the presence of features but also by the consistency of data entry, updating, and utilization.

In the human dimension, Table 1 shows that 15 of 19 respondents considered HMIS use to improve work productivity. Ease of use was also positively assessed by 18 of 19





respondents. Interviews showed that experienced users were more familiar with system features and workflows, whereas new users required an adaptation period. These findings do not indicate that the system is generally difficult to use; rather, adaptation is more appropriately understood as a process of becoming accustomed to features, workflows, and procedural changes following digitization. User competence therefore becomes a factor determining how optimally technological benefits can be realized in daily work. These findings are consistent with Wijayanti and Nurhayati (2024) and Wujani et al. (2024), who identify human factors as an important component of successful HMIS utilization.

The impact on time efficiency is shown in Table 2. Most informants reported registration durations of approximately 1–5 minutes; in interviews, returning patients were generally served within approximately 1–2 minutes, whereas new patients required approximately 1–5 minutes. One informant stated that a process previously requiring approximately 10–15 minutes took around 5 minutes after implementation of the electronic system. Substantively, these findings indicate an experienced shortening of work processes, particularly because data searching and recording can be performed through the system. However, because service times were derived from informants' experiences and perceptions rather than standardized before-and-after time measurements, these figures are not used to infer a causal magnitude of time reduction. This qualification is important to ensure that interpretation remains consistent with the qualitative research design.

Process efficiency is also evident in Table 2 through the digitization and distribution of medical records. Informants stated that physical-file distribution to outpatient clinics was essentially no longer required because electronic medical records were used, although several forms still required wet signatures. This condition reduces document movement and the potential for delays caused by searching for or delivering records. However, the fact that some processes still require physical documents or signatures indicates that digitization has not yet fully achieved a paperless condition. These findings are consistent with Anjani and Yunengsih (2024), Fitrah et al. (2025), and Mukharram et al. (2024) regarding the benefits of digitization for access to and management of health information.

Interunit coordination efficiency is evident in Table 2 and is related to the technology dimension in Table 1. Most informants stated that information can flow in real time to the Pharmacy, Cashier, and Medical Support units. This allows the service process to continue without waiting for physical-document movement and may reduce the need to record the same information repeatedly. However, the speed of information updates remains influenced by the activities of each unit. These findings show that system integration is determined not only by application capability but also by consistency of work processes and user discipline in updating data. Thus, the benefits of integration result from interaction between technology and organizational processes.

The organizational dimension in this study is not intended to represent all aspects of hospital management, but is limited to work-process support and disruption-handling procedures that can be substantiated through SOPs, interviews, observation, and





documentation. Table 2 shows that Maranatha Hospital has an SOP for manual registration when the system experiences downtime. The SOP allows services to continue when HMIS cannot be used, although service time remains slower than under normal system conditions. These findings indicate that organizational procedures function as mitigation mechanisms to maintain continuity of care, while the most apparent efficiency barriers remain related to the technological dimension, particularly networks and servers. In other words, organizational readiness can reduce the consequences of disruptions but cannot fully substitute for reliable technological infrastructure.

When all findings are linked to efficiency, four forms of benefit are most prominent at Maranatha Hospital: time efficiency through faster registration, process efficiency through reduced searching and movement of records, information efficiency through faster data access, and coordination efficiency through information exchange across units. This pattern demonstrates the relationship between the findings in Tables 1 and 2: technological quality and suitability provide system capability, user competence enables that capability to be utilized, and organizational support maintains service continuity when disruptions occur. Conversely, network and server instability, limited features, suboptimal data validation, inconsistent integration, and the need for adaptation and training constrain the optimization of efficiency. These findings also demonstrate the contribution of the study: HMIS efficiency in outpatient services does not stand alone as a technological outcome, but is formed through alignment among technology, users, and organizational processes.

4. Conclusion

HMIS use at Maranatha Hospital contributes to outpatient service-flow efficiency through four main forms: time efficiency, process efficiency, information efficiency, and coordination efficiency. Time efficiency is reflected in informants' experiences of registration durations of approximately 1–5 minutes and one informant's report of a change from approximately 10–15 minutes to around 5 minutes. Process efficiency is evident in the reduced need to search for and move physical records, while information and coordination efficiency are reflected in easier access to patient data and information exchange across units. However, these time-related findings represent informants' experiences and are not based on objective before-and-after measurements. Based on the HOT-Fit framework, HMIS implementation in this study is associated with three main dimensions: technology, human, and organization. The technology dimension includes ease of use, system performance and stability, data security and accuracy, feature suitability, and data integration. The human dimension includes user capability and adaptation and work productivity. The organizational dimension is limited to work-process support and disruption-handling procedures. The most prominent inhibiting factors are network and server instability, limited features, inconsistent data integration, the need to strengthen validation, and the need for user training and adaptation. For Maranatha Hospital, optimization may be directed toward improving network stability and server capacity, periodically monitoring system performance, developing features based on user needs, strengthening data-validation and warning systems, improving the consistency of interunit





integration, strengthening downtime SOPs, and providing regular user training and assistance. This study shows that HMIS efficiency is contextual and influenced by the interrelationship of technology, humans, and organization. Future studies may complement these qualitative findings with objective measurements of service time before and after interventions, analyses of service-performance indicators, or quantitative evaluations of system quality and user satisfaction.

5. Compliance with Ethical Standards

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Disclosure of Conflict of Interest

The source manuscript does not report a conflict of interest. This statement should be confirmed by the authors before submission.

Statement of Informed Consent

The source manuscript does not provide a specific informed-consent statement. The authors should confirm the applicable consent procedure before submission.

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