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HOSPITAL DIGITALIZATION AND PATIENT SATISFACTION: THE MEDIATING ROLE OF OPERATIONAL EFFICIENCY IN JAKARTA

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Abstract. This study aims to empirically investigate the impact of hospital digitalization as an independent variable, patient satisfaction as a dependent variable, with operational efficiency acting as a mediating variable. Employing a quantitative methodology, the research utilizes explanatory research to examine the causal relationships among sample variables through a survey conducted with 105 respondents who have received services from hospitals equipped with digital technology. A questionnaire featuring Likert scale-based questions was utilized for data collection. Data analysis was conducted using Partial Least Squares Structural Equation Modeling (PLS-SEM). The results indicated that digitalization in hospitals influences patient satisfaction, with operational efficiency significantly mediating the relationship between digitalization and patient satisfaction. The implications of this study for hospital management include the importance of prioritizing investments in digital infrastructure development and enhancing human resource capacity to optimize the implementation of digital transformation. This study establishes that digitalization extends beyond mere technological innovation; it constitutes a strategic element that plays a vital role in significantly enhancing the quality of health services and overall hospital performance.

Keywords: hospital digitalization; waiting time reduction; medical staff optimization; patient satisfaction

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I. INTRODUCTION

The development of digital technology during the era of the Industrial Revolution 4.0 has led to significant changes across various sectors, including healthcare. According to Reis et al. (2020), digitalization refers to the process of converting analog data into a digital format. This transformation enhances the relationships between service providers and consumers while also contributing to the economy and society as a whole. It is important to recognize that digitalization is a crucial aspect of modern societal transformation, impacting various facets of daily life such as social, economic, and organizational areas, with the goal of creating and obtaining additional value.

The rapid advancement of technology and information during the Industrial Revolution 4.0 has prompted the health service sector, particularly hospitals, to undergo comprehensive digital transformation. Digitalization in hospital services is no longer optional; it has become essential for improving operational efficiency, enhancing access to information, and elevating the quality of service and patient safety (Varnosfaderani & Forouzanfar, 2024). The primary goal of hospital digitalization is to boost operational efficiency and patient satisfaction. As such, research on hospital digitalization is highly relevant for understanding its impact on patient satisfaction and the effectiveness of the health service system as a whole.to understand its impact on patient satisfaction with the effectiveness of the health service system as a whole.

The Ministry of Health has actively promoted the adoption of digital devices through various regulatory initiatives, including the issuance of Minister of Health Regulation Number 24 of 2022, which addresses Medical Records. This regulation encourages all health service facilities, including hospitals, to implement the EMR (Electronic Medical Records) system (sehatnegreriku.kemkes.go.id, 2022). However, a survey conducted by the Indonesian Hospital Association (PERSI) in March 2022 revealed that only about 50% of the approximately 3,000 hospitals in Indonesia have successfully implemented the EMR system (sehatnegreriku.kemkes.go.id). This finding underscores the ongoing challenges associated with the widespread integration of digital solutions in hospital environments.

According to Xavier et al. (2024), digitalization in the hospital health service sector includes the use of various technologies such as Hospital Management Information System (HMIS), Electronic Medical Records (EMR), telemedicine services, artificial intelligence (AI), and other innovations designed to improve service efficiency and treatment quality, with the ultimate goal of increasing patient satisfaction. Patient satisfaction reflects their perception of the quality of service received, which includes their experience of various aspects of service such as the friendliness and empathy of health workers, waiting time, ease of communication, and response to patient needs (Donabedian, 1985). Patient satisfaction is a crucial indicator of health service quality, reflecting overall service

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outcomes (Greenslade & Jimmieson, 2011).

One significant form of digitalization in healthcare is the implementation of Electronic Medical Records (EMR), which provides a modern, digital alternative to traditional paper-based medical records. Healthcare professionals utilize EMRs to efficiently document patient data and examination results (Albagmi, 2021). While EMRs present numerous advantages, their implementation is not without challenges. For instance, field data indicates that the completeness of inpatient medical records at the Port Medical Center Hospital in Jakarta is currently at only 81.56%, well below the ideal target of 100%. Additionally, the involvement of medical personnel in the EMR system's implementation is limited, reflecting both a lack of authority and insufficient readiness to adapt to new workflows. Further challenges include the absence of a comprehensive framework for effective EMR implementation and ongoing difficulties in adapting to a digital infrastructure that is not fully supportive. Despite these obstacles, the potential benefits of digitalization in healthcare, especially through EMRs, are considerable. The success of EMR implementation largely depends on the preparedness of human resources, the adequacy of infrastructure, and the effectiveness of change management strategies employed. Furthermore, as noted by Salem Albagmi (2021), the outcomes of EMR implementation can vary significantly depending on the specific systems used by each healthcare facility.

The implementation of another digital technology, known as Hospital Management Information System (HMIS), holds significant potential for reducing waiting times during the registration process (Jabour, 2020). It is also expected to enhance operational efficiency, particularly in the BPJS and insurance claims and verification process, by digitizing data to enable faster and more systematic recording and delivery of documents. However, the effectiveness of this implementation faces several challenges, including technical constraints, data inaccuracies, and limited competencies among personnel. To address these issues, mitigation strategies are essential, such as staff training, internal audits, periodic evaluations, and improved system integration (Winarsih, 2024). Given that these challenges still exist, an in-depth study is needed that includes an assessment of organizational readiness in terms of technological infrastructure, work culture, and human resources, an analysis of staff competency gaps as a basis for targeted training planning, and an information system audit to assess the reliability of digital systems, data integrity, and the level of information security according to standards such as ISO 27001.

Digital transformation in hospital services also involves the integration of artificial intelligence (AI) technology. AI has the potential to significantly transform the hospital service system in various ways, including data-driven clinical diagnosis, personalized treatment planning, operational management, and enhancing patient interactions through digital services. In the clinical setting, AI is increasingly used to support medical decision-making, such as the early detection of diseases through radiological imaging, predicting the risk of complications, and classifying laboratory results. AI enhances personalized medicine (precision medicine) by analyzing genetic data, medical history, and patient lifestyle patterns to deliver more targeted interventions.

According to Varnosfaderani and Forouzanfar (2024), the implementation of deep learning techniques, including Convolutional Neural Networks (CNN), Recurrent Neural Networks (RNN), and Long Short-Term Memory (LSTM) networks, has created substantial opportunities in the realm of medical data analysis. CNNs have demonstrated their effectiveness in processing medical images, such as X-rays, CT scans, and MRIs, to identify abnormalities like tumors and bone fractures. In contrast, RNNs and LSTMs excel in analyzing signals such as electrocardiograms (ECGs), enabling earlier predictions of a patient's clinical decline. For instance, Cipto Mangunkusumo Hospital has successfully employed AI to develop an early detection system for breast cancer, utilizing deep learning technology to assess mammogram results (Media Indonesia, 2023).

However, the implementation of AI in Indonesia's hospital system faces several challenges. Key obstacles include limited digital infrastructure, a shortage of professionals knowledgeable about AI technology in healthcare, high costs, and inconsistent training for medical staff. Additionally, ethical considerations and the protection of patient data are critical issues that must be addressed in the development of AI-based systems within hospitals. Given the significant potential and complexity of AI applications in the digital transformation of healthcare, a comprehensive study is necessary to evaluate how this technology has impacted operational efficiency and enhanced the quality of hospital services.

One device that can enhance patient safety is the implementation of Clinical Decision Support Systems (CDSS). A comprehensive study analyzing hospital data in the United States from 2010 to 2017 revealed that the use of CDSS has significantly decreased hospitalization rates for conditions such as heart failure, acute myocardial infarction, and pneumonia (Dhawan, 2024). A notable example of a CDSS in healthcare is the drug interaction warning system. This system alerts doctors to potential dangerous interactions between medications prescribed to patients. Additionally, when CDSS is integrated with electronic medical records, it has been shown to reduce medication errors in practice (Smith, 2016). With the digital transformation of hospitals, operational efficiency improves, leading to faster administrative processes. As a result, medical staff can work more effectively, providing empathy and maintaining good communication with patients.

Since the COVID-19 pandemic, telemedicine has significantly contributed to the healthcare system by expanding access and enhancing the convenience of service delivery. Patients in remote areas or those who have difficulty accessing healthcare can consult a doctor without the need to travel long distances. Additionally, telemedicine plays a crucial role in managing chronic diseases and facilitates the continuous monitoring of treatment (Alawiye, 2024). Digital transformation can enhance operational efficiency by automating workflows and integrating data systems. For instance, the implementation of customer service and healthcare management solutions at Pega

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led to a 30% reduction in administrative costs and a 25-35% decrease in operational costs (Munnangi, 2024). Additionally, in hospitals, digital technology can improve patient care by facilitating better care coordination and case management, which ultimately results in fewer patient readmissions (Munnangi, 2024).

Digital technology plays a crucial role in enhancing the patient treatment experience, making it both more enjoyable and accessible. Patient portals enable individuals to easily access their treatment history, schedule appointments, and communicate seamlessly with healthcare providers online. This empowering approach encourages patients to take an active role in managing their health, while simultaneously strengthening the relationship between them and their healthcare service providers (Dhawan, 2024).

Recognizing the significance of digitalization as a strategy to enhance hospital service quality, an empirical study is essential to evaluate the impact of digitalization on patient satisfaction and the underlying mechanisms of operational efficiency involved in this relationship. Therefore, this study aims to thoroughly investigate the connections between hospital digitalization, operational efficiency, and patient satisfaction in hospitals located in the Jakarta area.

This study aims to analyze the impact of digitalization on operational efficiency and patient satisfaction in hospitals in Jakarta. It addresses several key questions: How does hospital digitalization affect operational efficiency? How does operational efficiency influence patient satisfaction? How does hospital digitalization impact patient satisfaction? Additionally, it explores whether operational efficiency serves as a mediating variable in the relationship between hospital digitalization and patient satisfaction in Jakarta's hospitals. By examining these questions, this study seeks to contribute valuable insights to the development of hospital management strategies aimed at improving the quality of healthcare services in Jakart

This study employs three theoretical frameworks: the Technology Acceptance Model (TAM), Service Quality (SERVQUAL) theories, and the Resource-Based View (RBV) theory to investigate the connections between hospital digitalization, operational efficiency, and patient satisfaction.

Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM), developed by Davis in 1989, explains two key factors that influence how individuals accept and use technology: Perceived Usefulness (PU) and Perceived Ease of Use (PEOU). Perceived Usefulness refers to the degree to which a person believes that using technology will enhance their performance. Perceived ease of use refers to an individual's belief that a technology is easy to operate without requiring significant effort. This perception, along with the perceived benefits of the technology, influences a person's willingness to adopt a system.. In the hospital context, In the context of hospitals, the Technology Acceptance Model (TAM) is essential for understanding how willing health workers and patients are to engage with digital technologies such as EMR, online registration systems, and telemedicine services. When the perceived benefits and ease of use are high, the acceptance of digitalization increases, which can enhance the operational efficiency of hospitals and increase patient satisfaction.

Service Quality (SERVQUAL)

SERVQUAL, developed by Parasuraman et al. in 1988, is an effective framework for assessing perceptions of service quality through five essential dimensions: Tangibles, this dimension focuses on physical elements, such as facilities and equipment, which play a crucial role in enhancing the service experience; Reliability, which relates to the ability to deliver consistent and accurate services, thereby fostering trust among consumers; Responsiveness, which is the ability to respond and the speed of staff in responding to consumer needs; Assurance, which includes the competence and professionalism of service personnel; and Empathy, which is the attention and concern of service personnel towards patients. Servqual is a concise scale with a high level of accuracy, making it useful for understanding consumer perceptions and expectations regarding the services provided (Salomon, Saryatmo, & Meliana, 2015).

In the context of healthcare services, the integration of technology in hospitals offers a significant opportunity to enhance these five dimensions. For instance, technology can strengthen Reliability by ensuring accurate data presentation and reducing errors, improve Responsiveness by streamlining service processes, and enhance Tangibles through modern digital facilities and infrastructure. By advancing in these areas, healthcare providers can significantly improve perceptions of service quality, leading to greater patient satisfaction and better overall outcomes.

Resource-Based View (RBV)

This theory states that an organization's competitive advantage stems from the management of unique, valuable, difficult-to-imitate, and irreplaceable internal resources (Barney, 1991). In a healthcare context, digital tools like the Hospital Management Information System (HMIS) are considered vital strategic assets and a competent workforce. The implementation of digitalization in hospitals has the potential to enhance operational efficiency through automation processes, reducing waiting times, and optimizing resource management. Therefore, from the RBV perspective, digitalization is not merely a supporting tool but a strategic resource that can become a competitive advantage. Hospitals that can effectively manage and integrate digital assets will be in a more advantageous position in the healthcare industry competition.

Relationship Between Variables

The Relationship Between Hospital Digitalization and Operational Efficiency

Digitalization in hospital healthcare services includes the use of information technology, such as EMR, HMIS, and telemedicine. Hospital Digitalization improves operational efficiency by automating processes, enabling hospitals to reduce the time spent on administrative tasks and allowing healthcare providers to focus more on patient care. Additionally, digitalization improves resource allocation and utilization. It improves communication among medical staff, leading to better teamwork and more effective patient management. Improved operational efficiency enhances diagnostic accuracy and

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optimizes the medical staff, thereby improving coordination among medical personnel. Digital implementation enables quick access to patient data and reduces medical errors.

H1: Hospital digitalization positively impacts operational efficiency.

Relationship between Operational Efficiency and Patient Satisfaction

Operational efficiency in a hospital is defined as the optimal use of resources to increase the medical personnel's productivity, accelerate services, and reduce waste of time and costs. Implementing hospital digitalization technology can reduce patient care costs by eliminating the need for paper and administrative labor, as well as speeding up the registration, billing, and insurance claim processes. Digitalization also prevents duplicate examinations by integrating medical data. Implementing EMR can reduce administrative time for medical staff by up to 45% (Poissant et al, 2005). Hospitals with efficient service processes are practical, faster, more accurate, and more organized.

H2: Operational efficiency positively affects patient satisfaction.

Relationship Between Operational Efficiency and Patient Satisfaction

Hospital digitization improves patient satisfaction by enhancing the patient experience through more accessible, accurate, and efficient healthcare services. Technologies such as telemedicine and online queuing systems provide convenient access to healthcare services, improving overall satisfaction.

H3:Hospital digitalization positively affects patient satisfaction.

The Role of Operational Efficiency as a Mediator

Operational efficiency plays a pivotal role as a mediating factor linking hospital digitalization with patient satisfaction. The implementation of digital systems in hospitals not only has a direct positive impact on patient satisfaction but also enhances it indirectly by improving operational performance. When hospitals adopt digital technologies, their efficiency in operations increases, leading to more timely and accurate services, which in turn elevates overall patient satisfaction.

H4: Operational efficiency acts as a mediator in the relationship between hospital digitalization and patient satisfaction.

Conceptual Framework and Hypothesis

This study aims to empirically examine the effect of hospital digitization on patient satisfaction with operational efficiency as a mediating variable. The subjects of this study are patients who use digital hospital services in Jakarta.

Based on the description of the relationship between variables and the conceptual framework above, the research hypotheses are as follows:

H1: Hospital digitization has a positive effect on operational efficiency in hospitals in Jakarta.

H2: Operational efficiency has a positive effect on patient satisfaction in hospitals in Jakarta.

H3: Hospital digitization has a positive effect on patient satisfaction in hospitals in Jakarta.

H4: Operational efficiency mediates the relationship between hospital digitization and patient satisfaction in hospitals in Jakarta.

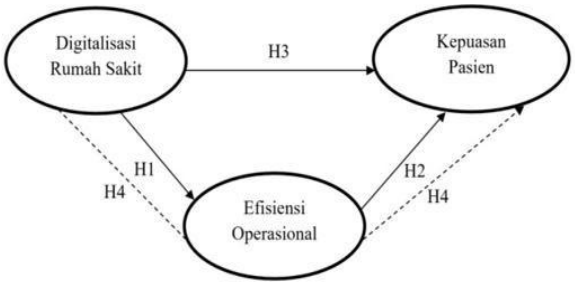

Figure 1. Research Model Source: Researcher (2025)

II. RESEARCH METHODS

This research adopted a quantitative methodology to examine variables through objective, numerical measurements analyzed with statistical tools. Utilizing a combination of surveys and direct observation, the study followed an explanatory design to systematically explore the causal links among hospital digitalization, operational efficiency, and patient satisfaction. Data were gathered using structured questionnaires administered to patients who had engaged with digital hospital services. The data collection process took place between September 2024 and May 2025.

The study population comprised patients from hospitals in Jakarta who had accessed digital services, including online registration, electronic medical records, or telemedicine. A purposive sampling method was utilized to select participants with prior experience using digital systems within Jakarta hospitals. Data were gathered through a structured questionnaire employing a Likert scale to evaluate patients' perceptions of digital technologies in hospitals, the efficiency of hospital services, and their overall satisfaction with the services provided. To determine the appropriate sample size, we adhered to the recommendations of Hair et al. (2019), which advise that the minimum sample size should be calculated by multiplying the number of indicators per latent variable by a factor of 5 to 10. Given that this study involved 21 indicators, the required sample size was determined as follows: 21 indicators × 5 = 105 respondents. Thus, a minimum of 105 participants was deemed necessary for this research.

Primary data were obtained through the administration of questionnaires employing a 5-point Likert scale. The Likert scale is widely recognized as a reliable tool in quantitative research for assessing respondents' perceptions, attitudes, or reactions to specific statements (Joshi et al., 2015). Participants indicated their level of agreement or disagreement with each statement on an ordinal scale ranging from "Strongly disagree" to "Strongly agree." This approach enables the transformation of qualitative responses into quantitative data suitable for statistical analysis,

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facilitating the evaluation of respondents' attitudes or perceptions regarding the constructs under investigation. The questionnaire addressed three key constructs: Patient Satisfaction, Operational Efficiency, and Hospital Digitalization. Patient Satisfaction was measured through indicators such as ease of service access, quality of medical care, speed of service delivery, and overall patient experience. Operational Efficiency was assessed using indicators including productivity, reduction in patient waiting times, accuracy of patient information, and optimization of medical staff. Hospital Digitalization was evaluated based on indicators like digital registration systems, hospital information systems, utilization of electronic medical records, digital queuing systems, and telemedicine services.

Data analysis was performed using using Partial Least Squares Structural Equation Modeling (PLS-SEM) with the support of SmartPLS software version 4.1.0.0. This approach was selected due to its ability to manage complex relationships among latent variables and its suitability for theory testing focused on prediction. The analysis proceeded in two phases: the first phase involved assessing the outer model by evaluating the validity and reliability of the measurement constructs, while the second phase focused on the inner model through structural evaluation to test the hypothesized relationships among digitization, operational efficiency, and patient satisfaction.

According to Sugiyono (2022), validity refers to the extent to which the data collected by the researcher accurately reflects the actual data of the object being studied, serving to measure the validity of research items. Validity testing evaluates how effectively a research instrument measures the intended concept (Sekaran & Bougie, 2020). In this study, validity was assessed using SmartPLS version 4.1.0.0, focusing on two key aspects: convergent validity and discriminant validity. Convergent validity was evaluated through factor loadings and Average Variance Extracted (AVE). An indicator is deemed to have adequate convergent validity if its factor loading exceeds 0.7; however, during early research phases, loadings between 0.5 and 0.6 are acceptable (Chin, 1998, as cited in Ghozali & Kusumadewi, 2023). The AVE threshold for acceptable convergent validity is greater than 0.5 (Hair et al., 2019). Discriminant validity is also critical, ensuring that the constructs within the model are distinct and measure different concepts.

Discriminant validity aims to evaluate the extent to which one construct differs from another (Hair et al., 2019). It can be evaluated by analyzing the cross-loading values of each indicator, where an indicator should exhibit a higher loading on its own construct compared to its loadings on other constructs (Ghozali & Kusumadewi, 2023). Reliability refers to the consistency and dependability of a measurement tool (Sugiyono, 2022), indicating how stable the measurement results are when repeated under the same conditions. A measuring instrument is considered reliable if it produces consistent outcomes across multiple administrations. High reliability means the instrument yields stable results even when applied to the same respondents at different times, making reliability a key characteristic of a valid measurement tool. According to Sekaran & Bougie (2020), reliability testing determines the extent to which a measurement is free from bias and consistently measures a construct over time. In this study, reliability was assessed using SmartPLS version 4.1.0.0, based on Cronbach's alpha and composite reliability values. Hair et al. (2019) suggest that constructs are reliable when these values exceed 0.7, with an ideal range between 0.8 and 0.9.

Inner model analysis involves evaluating the structural model to determine the validity and strength of relationships among latent constructs, followed by testing the research hypotheses (Hair et al., 2019). The quality of the structural model is assessed using four key criteria: coefficient of determination (R^2), predictive relevance (Q^2), effect size (f^2), and Goodness of Fit (GoF). In the Partial Least Squares (PLS) framework, R^2 indicates how well the independent variables explain the variance in the dependent variables, with values of 0.70 or above considered strong, 0.50 moderate, and 0.25 weak effects. Predictive relevance (Q^2) measures the model's ability to predict dependent variables, where a Q^2 greater than zero reflects good predictive power, and a value below zero indicates poor prediction (Hair et al., 2019). Effect size (f^2) quantifies the influence of an exogenous variable on an endogenous variable by comparing changes in R^2 when the variable is included or excluded; values of 0.02, 0.15, and 0.35 represent small, moderate, and large effects respectively, while values under 0.02 suggest no effect. Goodness of Fit (GoF) evaluates the overall fit of the structural model to the data, with thresholds of 0.01 for small, 0.25 for medium, and 0.36 or higher for large model fit (Hair et al., 2019). Hypothesis testing is a crucial part of determining whether the formulated hypothesis (alternative hypothesis) is rejected. In this study, hypothesis testing was conducted using the bootstrapping procedure with SmartPLS software. Hair et al. (2019) stated that in social research, the acceptable level of error or significance level is 0.05 or 5%. There are two criteria used for decision-making: the hypothesis is supported if the path coefficients are > 0; the t-statistic is > 1.96; and the p-value is > 0.05.

In the PLS-SEM approach, mediation analysis is conducted by comparing the indirect effect of the independent variable on the dependent variable through a mediating variable with the direct effect of the independent variable on the dependent variable. Three types of mediation relationships can be identified. First, No Mediation occurs when the direct effect between the independent and dependent variables is significant, but the indirect effect via the mediator is not significant. Second, Full Mediation is present when the direct effect is not significant, while the indirect effect through the mediator is significant. Third, Partial Mediation is observed when both the direct effect and the indirect effect through the mediator are significant.

III. RESULTS AND DISCUSSION

Data Analysis Results

Research Data Analysis done use PLS-SEM method with Smart PLS software version 4.1.0.0. A sample of 105 respondents who are patient House sick in Jakarta who ever get digital services

Results of Outer Model Analysis

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The results of this analysis show that all indicators in the variables of hospital digitalization, operational efficiency, and patient satisfaction have loading factor value > 0.70 and Average Variance Extracted (AVE) values > 0.50, which means they are convergently valid. Cronbach's Alpha and Composite Reliability values also show results > 0.70 indicating that all constructs *are reliable* . This can be seen in Figure 2 and Table 1.

Inner Model Analysis Results

In the inner model testing, the R-square value for the patient satisfaction variable was 0.771 and for the operational efficiency variable was 0.711, indicating that the independent variables had a strong contribution to the dependent variables. Where the R2 result of 0.771 indicates that 77.1% of the variation in patient satisfaction is due to the influence of hospital digitization and operational efficiency variables. Similarly, the R2 result of 0.711 for the operational efficiency variable shows that 71.1% of the variation in operational efficiency is influenced by the digitization implemented in hospitals.

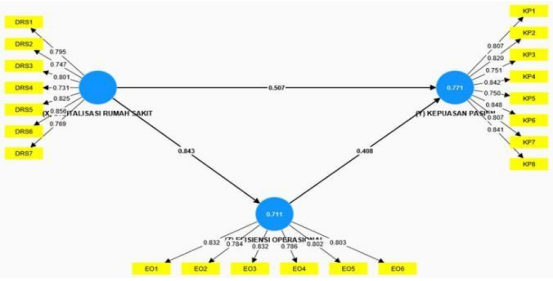

Figure 2 . Results of Testing *Loading Factor*
Source : Processing data with SmartPLS version 4.1.0.0 (2025)

Table 1. Results Test *Cronbach's Alpha* , *Composite Reliability* , and AVE

Variables	*Cronbach's Alpha*	*Composite Reliability* (rho_a)	*Composite Reliability* (rho_c)	*Average Variance Extracted* (AVE)
Digitalization Hospital	0.900	0.905	0.921	0.624
Satisfaction Patient	0.924	0.927	0.938	0.655
Operational Efficiency	0.893	0.895	0.918	0.650

Source : Processing data with SmartPLS version 4.1.0.0 (2025)

These findings reinforce the theory that the application of digital technology can improve the efficiency of service processes and have a positive impact on patients' perceptions of service quality. Thus, hospital digitalization not only serves as a technological innovation but also as a strategic factor in supporting the overall performance and quality of hospital services. The predicted Q2 values for patient satisfaction (0.715) and operational efficiency (0.697) indicate that both have good predictive capabilities. This can be seen in Table 2 below:

Table 2. Results R-Square and Q-Square

Variables	R2	Q2
Satisfaction Patient	0.771	0.715
Operational Efficiency	0.711	0.697

Source : Processing data with SmartPLS version 4.1.0.0 (2025)

In Table 3, the effect sizes (F-Square) reveal the following relationships: the effect of digitization on efficiency is 2.454, indicating a large effect. In contrast, the effect of digitization on patient satisfaction is 0.324, which suggests a moderate effect. Additionally, the relationship between efficiency and satisfaction shows an effect size of 0.210, also indicating a moderate effect.

Table 3. *F- Square*

Variables	Home Digitalization Sick	Patient Satisfa ction	Operation al Efficiency
Digitalization Hospital		0.324	2,454
Satisfaction Patient			
Operational Efficiency		0.210	

Source : Processing data with SmartPLS version 4.1.0.0 (2025)

According to Hair et al. (2019), a Standardized Root Mean Square Residual (SRMR) < 0.08 indicates that the model falls into the category of good fit in the PLS-SEM analysis approach. The results of the model fit evaluation show that the Standardized Root Mean Square Residual (SRMR) value is 0.075, which is still below the threshold of < 0.08. This value indicates that the model has a suitable comparison between empirical data and theoretical models. In addition, the Chi-square value of 423.510 and the Normed Fit Index (NFI) of 0.772 also support that the model used in this study meets the requirements and is suitable for further analysis.

Table 4. Fit Model

	Model Saturated	Estimation Model
SRMR	0.075	0.075
d_ULS	1,293	1,293
d_G	0.811	0.811
Chi-Square	423,510	423,510
NF1	0.772	0.772

Source : Processing data with SmartPLS version 4.1.0.0 (2025)

Hypothesis Test Results

The significance of the relationships between latent variables was tested using the bootstrapping method, which generated T-statistics and p-values that served as the basis for decision-making regarding the hypotheses. The analysis results showed that all relationships in the research model had T-statistics > 1.96 and p-values < 0.05, indicating that all relationships between the variables were statistically significant.

This suggests that the hospital digitization variable significantly impacts both operational efficiency and patient satisfaction, and that operational efficiency also significantly affects patient satisfaction. Consequently, all hypotheses within

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the model can be accepted

Table 5. Path Coefficient Table , T- statistic and *P-Value*

Variables	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistic (IO/STDEVI)	P value (*P value*)
Home Digitalization Sick → Patient Satisfaction	0.507	0.478	0.157	3,229	0.001
Digitalization Operational Efficiency Hospital→	0.843	0.847	0.039	21,605	0,000
Operational →Efficiency Satisfaction Patient	0.408	0.439	0.156	2,607	0.009
Digitalization Operational Efficiency →Hospital→ Satisfaction Patient	0.344	0.373	0.139	2,481	0.013

Source : Processing data with SmartPLS version 4.1.0.0 (2025)

The Effect of Hospital Digitalization on Patient Satisfaction

Based on the results of this study, hospital digitization has also been proven to have a positive and significant effect on patient satisfaction. With a path coefficient value of 0.507, a T-statistic of 3.229, and a p-value of 0.001, it shows that the higher the level of digitization implemented, the greater the satisfaction felt by patients toward hospital services. This indicates a moderate positive influence of hospital digitalization on patient satisfaction, meaning that every increase in digitalization is followed by an increase in patient satisfaction toward the patient satisfaction variable. The research by Kruse et al. (2017) supports this finding, stating that the implementation of digital technologies such as telemedicine and HMIS has been proven to increase satisfaction because the implementation of digital systems supports ease of registration, access to medical information, patient-doctor communication, and ease of service, which are factors that contribute to improving patients' perceptions of hospital service quality. These results are also consistent with the literature stating that digital technology promotes patient engagement and improves patient experience with hospital services (von Wedel, 2022).

The Effect of Hospital Digitalization on Operational Efficiency

The results of this study indicate that hospital digitization has a significant and very strong effect on operational efficiency, as shown by a path coefficient value of 0.843, a T-statistic of 21.605, and a p-value of 0.000. This reflects that digitization is one of the dominant factors in changes in hospital efficiency. Hospital digitization has a major contribution to hospital operational efficiency, namely in simplifying workflows, reducing manual processes, and improving data integration between service units.

This finding is consistent with previous research showing that digitization accelerates administrative processes and improves hospital productivity (Winarsih, 2024). This was also mentioned by Buntin et al. (2011), who found in their research that the use of information technology in healthcare generally has a positive impact on operational efficiency and the quality of hospital services.

The Effect of Operational Efficiency on Patient Satisfaction

The results of this study indicate that operational efficiency significantly influences patient satisfaction, with a path coefficient of 0.408, a T-statistic of 2.607, and a p-value of 0.009. This means that the more efficient the service processes in the hospital, the higher the level of satisfaction reported by patients. In other words, as operational efficiency in hospital services increases, patient satisfaction also rises. The operational efficiency discussed here includes factors such as service speed, shorter waiting times, and integrated services across different departments, all of which directly affect patients' positive perceptions of hospital services. This finding aligns with research conducted by Greenslade and Jimmieson (2011), who asserted that an efficient organizational climate enhances healthcare staff performance and contributes to patient satisfaction. Additionally, Buntin et al. (2011) found that system efficiency, particularly that which is improved through information technology, plays a vital role in enhancing patients' perceptions of service quality, especially regarding the speed and accuracy of information. This highlights that service quality is not solely determined by clinical factors but also by the operational effectiveness experienced directly by service users.

The Effect of Digitalization on Patient Satisfaction with Operational Efficiency as a Mediating Variable

The results of the indirect path analysis indicate that operational efficiency mediates part of the effect of hospital digitization on patient satisfaction, with an indirect coefficient value of 0.344, a T-statistic of 2.481, and a p-value of 0.013.

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This indicates that digitalization does not automatically create patient satisfaction but will have an impact if the technology used successfully speeds up services, simplifies work processes, and improves coordination between units. In this context, digital technology acts as a catalyst that simplifies service processes and optimizes workflows, thereby indirectly enhancing patients' positive perceptions of service quality. Operational efficiency serves as a partial mediator in the relationship between hospital digitalization and patient satisfaction. This suggests that part of the influence of digitalization on patient satisfaction improvement occurs indirectly through more efficient internal workflow improvements.

IV. CONCLUSION

Based on research examining the impact of hospital digitization on operational efficiency and patient satisfaction, several key conclusions can be drawn Hospital digitization has a positive and significant effect on operational efficiency. This suggests that the implementation of systems such as HMIS, EMR, and the integration of digital services has successfully accelerated administrative processes, enhanced the accuracy of service information, and reduced manual workloads. The digitization of hospitals positively and significantly influences patient satisfaction. Operational efficiency significantly impacts patient satisfaction, indicating that efficient service plays a crucial role in shaping patients' perceptions of service quality. Hospital digitization indirectly affects patient satisfaction through operational efficiency. As digital systems become more optimized, the efficiency of hospital services improves, resulting in increased patient satisfaction. This improvement includes the convenience and speed of services facilitated by digital solutions, such as online registration, access to medical information, and communication with healthcare staff. This study concludes that digitalization is not merely a technological advancement but also a strategic component that plays a crucial role in enhancing the quality of healthcare services and overall hospital performance. According to Resource-Based View (RBV) theory, hospitals that can effectively manage and integrate their digital assets are better positioned to gain a competitive advantage in the healthcare services industry.

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