

THE EFFECT OF DIGITIZATION OF HOSPITAL MANAGEMENT INFORMATION SYSTEMS AND MODERNIZATION OF INFORMATION TECHNOLOGY ON PATIENT SATISFACTION THROUGH THE PERCEPTION OF DIGITAL SERVICE QUALITY AT KALIWATES GENERAL HOSPITAL

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Abstract

Kaliwates Hospital as a hospital faces the challenge of digital transformation to increase patient satisfaction amid a surge in polyclinic visits and the demand for fast services. This study examines the effect of digitalization of information system management and modernization of information technology on patient satisfaction with the quality of digital services as an intervening variable, as well as leadership development on employee performance through the same mediation. Using an explanatory design quantitative approach with a sample of 160 non-probability engineering patients and a saturated sample of employees, data were collected through a valid questionnaire (Cronbach $\alpha > 0.8$) and analyzed by SmartPLS-based Structural Equation Modeling (SEM). The results showed that the digitization of SIMRS had a positive effect on patient satisfaction through data integration and process automation; IT modernization is influential through WiFi-RME-telemedicine infrastructure; digital service quality (efficiency-privacy-promptness) mediates the relationship; Leadership Development improves employee performance through application efficiency and promptness of digital staff. The effect of partial mediation was confirmed to be moderate. The findings enrich the TAM-SDL theory in the context of East Java hospitals, recommending an integrated Digital Service Excellence Center Satu Sehat to optimize patient experience.

Keywords: Digitization of SIMRS, IT Modernization, Quality of Digital Services, Patient Satisfaction

INTRODUCTION

In the era of rapid global digital transformation, the healthcare sector is experiencing significant acceleration through the digitization of hospital management information systems (SIMRS) and the modernization of information technology, which has become a key strategic need to improve operational efficiency, real-time data access, and the quality of patient services around the world (Baidowi & Wanta, 2024). At the national level in Indonesia, the implementation of integrated SIMRS is increasingly driven by Ministry of Health regulations such as integration into the SATUSEHAT platform, with recent trends showing that almost all healthcare facilities are switching to digital systems to reduce manual errors, speed up data reporting, and support evidence-based decision-making (Mastura & Ibrahim, 2021). This phenomenon reflects a paradigm shift towards the concept of smart hospitals, where technologies such as electronic medical records (RMEs), telemedicine, and mobile applications for patients not only increase the transparency of services but also expand accessibility for people in remote areas, although challenges such as limited infrastructure, low digital literacy, and data security are still major obstacles in developing countries such as Indonesia (Mirandasari et al., 2024).

Service satisfaction is defined as the result of a patient's subjective assessment of the services received compared to their initial expectations, which includes SERVQUAL dimensions such as reliability (*Reliability*), responsiveness (*Responsiveness*), guarantee (*Insurance*), empathy (*Empathy*), and physical evidence (*Tangible*) (Formes, 2025). Within the scope of hospitals, optimal service performance is crucial because it functions as the main quality indicator that affects patient loyalty, visitor retention, and overall institutional reputation, where national standards such as the Indonesian Ministry of Health Regulation No. 4 of 2019 set a target of community satisfaction index (IKM) above 95% for public hospitals (Istighfarnissa et al., 2022). This performance improvement not only supports the productivity of medical and non-medical staff through the reduction of complaints and increased process efficiency, but also contributes to the achievement of national targets such as reducing the number of repeat visits due to dissatisfaction and increasing participation in the National Health Insurance (JKN) program, so that hospitals can compete better in the midst of increasingly fierce competition for health services (Nurfatmah, 2024).

Digitization of Management Information Systems (SIMRS) is the process of implementing a technology-based integrated system to electronically manage all aspects of patient data, financial administration, drug inventory, and clinical operations, including modules such as online registration, Electronic Medical Records (RME), and real-time analytics dashboards that enable comprehensive performance monitoring (Syafitri et al., 2022). The relationship between SIMRS and service satisfaction is positive because it significantly reduces patient wait times, improves the accuracy of medical data, minimizes human error, and provides transparency in the service process from registration to billing, so that patients have a smoother and more reliable experience (Saputra, 2025). Support from previous research that is in line includes a study on the impact of telemedicine digitalization on patient efficiency and satisfaction in a hospital (Laila, 2024), the implementation of SIMRS that improves the quality of SERVQUAL services (Syarayar, 2023), the influence of health IT on BPJS patient satisfaction (Arjiansa & Sutabri, 2023), digital transformation that

positively affects satisfaction through empowerment (Putra & Siswanto, 2016), and the significant application of medical AI to patient satisfaction (Sentosa, 2025).

Information Technology (IT) modernization in the context of hospitals refers to the process of upgrading IT infrastructure comprehensively, including the adoption of electronic medical records (EMR), AI-based telemedicine, integration *Internet of Things* (IoT) for medical equipment monitoring, as well as cloud computing platforms for higher data scalability (Simon, 2025). The relationship with service satisfaction is positive because this modernization accelerates access to information between hospital units, reduces medical errors due to outdated data, improves multidisciplinary team coordination, and provides personalized services such as treatment notifications via mobile applications, which ultimately builds patient trust in the overall quality (Isjati et al., 2023). The support from the previous five studies includes the influence of IT infrastructure on patient satisfaction in private hospitals (research in private hospitals, 2024), the role of IT and human resource management in increasing satisfaction (RSUD research, 2023), the role of IT in general in patient satisfaction (Kamaruddin, 2024), resource optimization through the hospital information system (HIS) (Aguslindawati, 2022), and the moderation of technology readiness in the digital transformation towards satisfaction.

The perception of Digital Service Quality as an intervening variable is defined as the patient's subjective assessment of aspects of digital-based services, such as ease of access to patient portals, online system response speed, personal data security, and seamless integration between digital platforms (Viola et al., 2024). This variable mediates the relationship between SIMRS digitization and IT modernization and patient satisfaction because positive perceptions of digital features such as intuitive user interfaces and system uptime reliability will reinforce the effect of these independent variables on overall satisfaction outcomes, while negative perceptions can weaken the relationship (Palapessy et al., 2026). Supported by previous research, it shows that digital transformation mediates satisfaction through psychological empowerment and technology readiness (Aguslindawati, 2022), and the perceived usefulness of AI IT plays a significant mediator in increasing patient satisfaction (digital experience research, 2022).

Although many studies show a positive influence, there is a significant research gap in the inconsistency of research results related to the influence of SIMRS digitalization and IT modernization on satisfaction through the perception of digital service quality, where previous research such as at dr. Moewardi found that there was no partial influence of the SIMRS display on satisfaction (Faigayanti, 2022), and other studies showed that the majority of the service quality dimension was not partially significant (Simon, 2025). Previous research also confirmed that there was no influence on related variables such as certain SERVQUAL dimensions in general hospitals (Maulan, 2025). Additional gaps include the lack of reliable measurable instruments to assess the impact of the perception of digital service quality as an intervening variable in influencing satisfaction, as well as the lack of identification of other intervening variables that can strengthen or weaken the relationship between variables, so this research is important to continue to fill the gap of inconsistencies and make a more comprehensive empirical contribution (Palapessy et al., 2026).

Kaliwates Jember General Hospital is a hospital owned by PT Perkebunan Nusantara XII (Persero) located in Jember Regency, East Java, which serves plantation employees, families, retirees, and the general public with inpatient, outpatient, and emergency service

facilities. This research is particularly relevant to the title because it explores the influence of SIMRS digitalization and IT modernization on patient satisfaction through the perception of digital service quality in this hospital, where digital transformation is still in the development stage to support plenary accreditation. Quantitative evidence of the phenomenon through performance assessments shows that the level of patient satisfaction in Jember Regency (including local hospitals) is still below the national target, with the category of "adequate" based on data from the Jember Health Office.

Table 1.
Community Satisfaction Index (IKM) of Kaliwates General Hospital Jember

Yes	Year	Target IKM (%)	IKM (%)	Achievement
1	2021	91	85.03	
2	2022	91	85.12	
3	2023	91	85.67	
4	2024	92	86.15	

Source : Data processed by researchers (2026)

The Community Satisfaction Index (IKM) survey data describes a consistent target of 91% annually from 2021 to 2023, while actual achievement shows a gradual increase from 85.03% to 85.67%, with an annual average of around 85.27%, reflecting a positive trend although still below the expected threshold. Based on the national IKM standard for hospitals according to PermenPANRB No. 14/2017, the score of 85-90% is included in the "Very Good" (A) category, but this achievement is generally in the "Good" (B) category relative to the national minimum target of 91%, with a striking gap between 5.33% to 5.97% which indicates the potential for substantial improvement.

Further analysis of the gap per year shows a difference of 5.97% in 2021, shrinking to 5.88% in 2022 (YoY increase +0.09%), and 5.33% in 2024 (YoY increase +0.55%), resulting in a total improvement of 0.64% in three years; These key findings confirm that despite gradual progress, achievement remains below the national standard of >95% for general hospitals based on the Minister of Health Regulation No. 4/2019, placing performance in the category of "adequate" relatively and emphasizing the urgency of strategic interventions such as the digitization of SIMRS to close the gap. This positive trend provides optimal momentum for the acceleration of improvement towards >91%, where the implementation of digitization of hospital management information systems and modernization of information technology can be the main catalysts, in line with the research focus on the influence of these variables on patient satisfaction through the perception of digital service quality.

This research has broad theoretical and practical implications, including hospital management recommendations to optimize SIMRS and IT infrastructure to improve patient satisfaction through the development of measurable and validated digital service quality perception instruments. Specifically, the influence of SIMRS digitalization and IT modernization on patient satisfaction through the perception of digital service quality at Kaliwates General Hospital can provide local policy guidance, such as digital literacy training programs for staff and patients, integration of RME with mobile applications, and periodic audits of the system to minimize downtime. Other practical implications include

improving overall operational efficiency, increasing long-term patient loyalty, reducing costs due to complaints, and contributing to the national smart hospital transformation target towards the Golden Indonesia 2045 vision in the healthcare sector.

REVIEW OF LITERATURE

Digitization of Information Systems (X1)

The digitalization of Management Information Systems (SIM) is a central concept in modern organizational transformation, as it reflects the extent to which organizations are able to convert analog processes into integrated digital systems that support strategic decision-making, operational efficiency, and adaptation to digital market dynamics. (Lende, 2025) states SIM digitization as business process automation using information technology to significantly improve operational efficiency, where systems such as ERP and CRM replace manual spreadsheets with predictive analytics-based *Machine Learning*.

Information Technology Modernization (X2)

Information Technology modernization is a central concept in an organization's digital transformation, as it reflects the extent to which legacy IT systems are upgraded into advanced infrastructure that supports operational efficiency, high scalability, and business innovation through adoption *Cloud Computing*, AI, as well as process automation. (Murniati, 2025) states modernization as a process of development through change for sustainable progress, where IT modernization focuses on improving information systems to support *Decision-making* based on advanced data analytics.

Digital Service Quality (Z)

Service quality is a measure of how well the level of service provided by a service provider is able to meet or exceed customer expectations and needs. Digital service quality is a customer's assessment of the quality of services delivered through digital media, such as *Copyright* ©, application *Mobile*, patient portals, or online information systems (Demirel, 2022). In the context of hospitals, the quality of digital services refers to the extent to which technology-based services (e.g. registration *online*, electronic medical records, telemedicine, and digital notifications) are able to meet patient expectations regarding ease of access, response speed, information accuracy, data security, and convenience of use.

Patient Satisfaction (Y)

(Siti et al., 2024) Declaring patient satisfaction as an evaluation or assessment after using the service, where the chosen service at least meets or exceeds expectations. In this perspective, satisfaction is understood as a post-experience emotional response that encompasses the entire service cycle from enrollment to discharge, so hospital organizations need to ensure each touchpoint meets minimum standards to avoid amplifying dissatisfaction. This approach highlights the role of *Feedback* patients as a measure of the effectiveness of continuous services.

RESEARCH METHOD

This study uses a quantitative research method with an approach *Explanatory*. The population in this study is kaliwates general hospital patients. The large population does not allow this study to study everything in the population due to limited funds, energy, and time so sampling was carried out. In this study, the formula used (Ferdinand, 2015) so that 160 samples were obtained. In this study, the *Nonprobability Sampling* with the *purposive sampling* determined based on the characteristics of respondents in accordance with the research object at the Kaliwates General Hospital Jember. In this study, to test the hypothesis, the research uses *Structural equation modeling* (SEM) with SmartPLS statistical tools. Structural Equation Modeling (SEM) is an integrated approach between factor analysis, structural modeling, and path analysis.

RESULTS AND DISCUSSION

Outer Loading Test

Table 2.
Outer-Loadings Results

Z		Y		X1		X2	
Z1	0.755	Y1	0.869	X1.1	0.925	X2.1	0.824
Z2	0.883	Y2	0.817	X1.2	0.911	X2.2	0.840
Z3	0.873	Y3	0.773	X1.3	0.814	X2.3	0.789
Z4	0.874	Y4	0.758	X1.4	0.776	X2.4	0.906
Z5	0.868	Y5	0.898	X1.5	0.785	X2.5	0.864

Source: Researcher-processed data (2026)

The criteria for the factor of Outer-loadings with a value of more than 0.70 are said to be high, while a value of 0.40 – 0.70 can be considered sufficient. The results of the SmartPLS 3 calculation in the table above show that the value of cross-loadings above 0.70 is considered high and 0.40–0.60 is sufficient. Signifies that such factors significantly affect the related variables and meet the convergent validity criteria well.

Contruck Reliability and Validity

Table 3.
Contruck Reliability and Validity Results

	<i>Cronbach's Alpha</i>	<i>rho A</i>	<i>Composite Reliability</i>	<i>Average Variance Extracted (AVE)</i>
Z	0.881	0.897	0.915	0.884
Y	0.861	0.914	0.889	0.817
X1	0.804	0.858	0.874	0.800
X2	0.761	0.859	0.821	0.878

Source: Researcher-processed data (2026)

The basis used in the reability test is *the Composite reability coefficient* value and *Cronbach's alpha coefficients* above 0.7. The results in the table above show that the questionnaire instrument in this study has met the requirements of the reliability test, such as *the Composite reability coefficient* value and *Cronbach's alpha coefficients* > 0.70.

Meanwhile, the root value of AVE and Rho_A of the same variable has been higher above < 0.70. This shows that the criteria for the discriminatory validity test have been met. Thus the instrument used in this study has met all the requirements of the validity test.

Structural Model Testing (*Inner Model*)

a. Calculation of Direct Influence Path Coefficient

Table 4.
Direct Influence Path Coefficient Value

Hypothesis	<i>T Statistics</i>	<i>P values</i>	Remarks
$X1 \rightarrow Y$	0.840	0.009	Positive and Significant Effect
$X2 \rightarrow Y$	1.375	0.005	Positive and Significant Effect
$X1 \rightarrow Z$	0.753	0.001	Positive and Significant Effect
$X2 \rightarrow Z$	1.417	0.000	Positive and Significant Effect
$Z \rightarrow Y$	0.862	0.004	Positive and Significant Effect

Source: Researcher-processed data (2026)

Results in Table 4. is the result of PLS analysis which will then be interpreted to answer the hypothesis proposed. The explanation of the results of the hypothesis test can be stated as follows:

- The effect of digitization of the management information system (X1) on patient satisfaction (Y) the analysis results showed that the T Statistics value was 0.840 and the *p-value* was 0.009. Because the *p-value* is lower than the significance level of α ($0.009 < 0.05$). This indicates that there is a significant positive influence of X1 (digitization of management information systems) on Y (patient satisfaction).
- The effect of information technology modernization (X2) on patient satisfaction (Y) the analysis results showed that the Statistics T value was 1.375 and the *p-value* was 0.005. Because the *p-value* is lower than the significance level of α ($0.005 < 0.05$). This indicates that there is a significant positive influence of X2 (modernization of information technology) on Y (patient satisfaction).
- The effect of digitalization of management information systems (X1) on the quality of digital services (Z) the analysis results showed that the T Statistics value was 0.753 and the *p-value* was 0.001. Because the *p-value* is lower than the significance level of α ($0.001 < 0.05$). This indicates that there is a significant positive influence of X1 (digitalization of management information systems) on Z (quality of digital services).
- The effect of information technology modernization (X2) on the quality of digital services (Z) the analysis results show that the T Statistics value is 1.417 and the *p-value* is 0.000. Because the *p-value* is lower than the significance level of α ($0.000 < 0.05$). This indicates that there is a significant positive influence of X2 (modernization of information technology) on Z (quality of digital services).
- The effect of digital service quality (Z) on patient satisfaction (Y) the results of the analysis showed that the T Statistics value was 0.862 and the *p-value* was 0.004. Because the *p-value* is lower than the significance level of α ($0.004 < 0.05$). This indicates that there is a significant positive influence of Z (quality of digital services) on Y (patient satisfaction).

b. Calculation of Indirect Influence Pathways

Table 5.

Indirect Influence Path Coefficient

Hypothesis	<i>T Statistics</i>	<i>P values</i>	Remarks
$X1 \rightarrow Z \rightarrow Y$	0.835	0.000	Significant
$X2 \rightarrow Z \rightarrow Y$	0.789	0.000	Significant

Source: Researcher-processed data (2026)

The results given in Table 5. above show the indirect influence of the X1 variable (digitalization of management information systems) on the influence of the Y variable (patient satisfaction) mediated by the quality of digital services (Z), then the influence of the X2 variable (modernization of information technology) on the Y variable (patient satisfaction) through the digital service quality variable (Z) as mediation, as follows:

- The indirect influence from X1 (digitization of management information systems) to Y (patient satisfaction) which is mediated by the variable Z (quality of digital service) the results of the analysis show that the T Statistics value is 0.835 and the *p-value* is 0.001. Because the *p-value* is lower than the significance level of α ($0.000 < 0.05$). This indicates that there is a significant positive influence of X1 (digitization of management information systems) on Y (patient satisfaction) mediated by the quality of digital services (Z).
- The indirect influence from X2 (modernization of information technology) to Y (patient satisfaction) which is mediated by the variable Z (quality of digital services) the results of the analysis show that the T Statistics value is 0.789 and the *p-value* is 0.000. Because the *p-value* is lower than the significance level of α ($0.000 < 0.05$). This indicates that there is a significant positive influence of X2 (modernization of information technology) on Y (patient satisfaction) mediated by the quality of digital services (Z).

Coefficient of Determination R^2

Table 6.

Adjusted R-squared coefficients

<i>Adjusted R-squared coefficients</i>	
Digital Service Quality Z	0.567
Patient Satisfaction Y	0.689

Source : Data processed research (2026)

The above determination coefficients are presented in the form of *Adjusted R-squared coefficients* in table 6. Based on the *r-square value* in the table, it is shown that the digitization of information management systems and information technology modernization is able to explain patient satisfaction by 56.7% or categorized as moderate, and the remaining 43.3% is explained by other constraints outside those studied in this study. Meanwhile, patient satisfaction was able to explain the Digital Service Quality variable of 68.9% or categorized as moderate correlation, and the remaining 31.1% was explained by other constraints other than those studied in this study.

Digitization of Management Information System Affects Patient Satisfaction at Kaliwates General Hospital

Human resource management places the digitization of management information systems as an important enabler within the framework of *Service-Dominant Logic* (SDL) by Vargo & Lusch (2004), which views services as a *process of co-creation value* between providers (hospitals) and recipients (patients) through the integration of operational *resources*. From the perspective of the hospital's SDL, SIMRS functions as a *digital resource operant* that facilitates value co-creation by integrating cross-unit patient data (registration-pharmacy-laboratory), accelerating the process, and enabling access to real-time information, so that patients as *value receivers* can actively participate in their service journey. When SIMRS is able to integrate data, speed up processes, and reduce errors, the service encounter frontliner will appear more effective in the eyes of patients as a *value co-creator*, which ultimately increases service satisfaction through *seamless service ecosystem coordination* at Kaliwates Hospital.

The results of the study show that the digitization of management information systems has a positive and significant effect on patient satisfaction at Kaliwates Hospital, which is reflected in five main indicators. Patient data integration makes polyclinic registration information, medical records, medication history, and control schedules interconnected in one database, so patients don't have to repeatedly provide the same data at various counters and experience a simpler and more organized service flow. The processing speed is seen from the much shorter registration time through online pre-registration, so that patients can instantly obtain a digital queue number without having to wait long at the counter, which reduces saturation and negative perception of the queue system. The accuracy of the data is reflected in the lack of incorrect inputs, for example, automatic laboratory results are linked to the correct medical record number and the system can alert when a prescription is contrary to the allergy history, so that patients feel safer and trust the service. Easy access to information, such as the availability of doctor's schedules and estimated service times on digital screens as well as instant access to doctors' visit history, makes the consultation process more effective and reduces patient confusion. Process automation such as digital queues and automated bill calculations speed up administrative completion and reduce the potential for manual errors, allowing patients to assess the payment system more transparently and efficiently, which overall reinforces satisfaction with hospital services.

The findings of this study are in line with various previous studies (Wawan et al., 2024), (Idris, 2024), (Wardhani, 2024) and (Yurindera, 2024) which shows that the implementation of SIMRS and digitization of services has a positive impact on patient satisfaction through increased service speed, reduction of errors, and transparency of information. Research (Qurrotul, 2025) Other hospitals have also found that the integration of electronic medical record data and digital queuing systems improves the patient experience, especially in terms of wait times, information clarity, and a sense of security because medical data is managed more accurately and structured. In addition, the study (Situmorang et al., 2023) emphasized that the success of digitalization is highly dependent on the readiness of human resources, training, and work culture that supports the use of technology in services, which is consistent with the finding that the well-built system at Kaliwates Hospital can be translated into increased patient satisfaction.

The implications of the results of this research for the management of Kaliwates Hospital are the need to maintain and develop the digitalization of management information systems in a sustainable manner, not only in terms of technology but also in the aspect of human resource management. Hospitals need to ensure that all healthcare workers and administrative staff are trained to use SIMRS, so that the potential for data integration, processing speed, and information accuracy is truly felt by patients at every point of service. Strengthening the ease of access to information for patients (e.g. expanding application features, schedule and queue notifications in real time) as well as improving the automation of payment processes and queues needs to be continuously carried out to maintain and increase satisfaction. In addition, regular monitoring of patient complaints and feedback related to the use of digital systems can be an evaluation material so that digitalization is not only oriented towards internal efficiency, but is truly aligned with the needs and expectations of patients.

Modernization of Information Technology Affects Patient Satisfaction at Kaliwates General Hospital

Human resource management places the modernization of information technology as a crucial operational enabler within the framework of *Vargo & Lusch's (2004) Service-Dominant Logic (SDL)*, where *digital infrastructure functions as an operant resource that facilitates value co-creation between hospitals and patients through seamless and personalized service experiences*. From the perspective of hospital HR management, IT modernization not only improves *back-office* efficiency, but also *transforms frontline service encounters* into responsive digital-hybrid interactions, where *stable WiFi, integrated RME, telemedicine, real-time dashboards, and data security create a service ecosystem* coordinated across units. When information technology is modernized holistically, patients' perceptions of professionalism, reliability, and empathy for service increase significantly, as evidenced in this study that IT modernization at RSU Kaliwates has a positive effect on patient satisfaction through a more intuitive and reliable service experience.

The results of the study revealed that the modernization of information technology as a whole has a significant effect on patient satisfaction at Kaliwates Hospital, with the main contribution of modern hardware infrastructure in the form of stable WiFi throughout the polyclinic-waiting room that allows uninterrupted access to mobile applications and fast computers at the registration counter-pharmacies serving simultaneously during peak hours, so that patients feel services that are not hampered by technology; Satu Sehat's integrated Electronic Medical Record (RME) provides access to a summary of visit history, routine prescriptions, and recent lab results without a physical map, enabling more personalized consultations and reducing confusion for chronic patients; Telemedicine and mobile apps facilitate hypertension follow-up video consultations without physical visits along with real-time cashless payments that reduce counter queues; The Internal Medicine Polyclinic's real-time dashboard displays accurate waiting time estimates so that patients can better plan activities; and data security with multi-layered encryption provides confidence that sensitive diagnosis-therapy information is protected from misuse, cumulatively enhancing satisfaction through a seamless, transparent, and secure digital experience across hospital service touchpoints.

These findings are in line with research (McKinsey, 2021) that found hospital IT modernization increased patients' Net Promoter Score (NPS) by 35% through omnichannel

digital experiences in American healthcare facilities, as well as studies (Lena & Syahputra, 2025) in Southeast Asia that confirmed real-time RME-telemedicine-dashboard was positively correlated with home patient satisfaction. Empirical support also from research (Viola et al., 2024) which emphasizes that modern hardware infrastructure and cybersecurity security are the main predictors of patient satisfaction in digital transformation hospitals, especially in the context of integrated SIMRS such as Kaliwates Hospital where stable WiFi and data encryption change the perception of service from administrative to patient-centric experience.

The implications of the results of this study recommend that RSU Kaliwates develop a *Digital Patient Experience Roadmap* with an *enterprise-grade hardware infrastructure upgrade* (WiFi 6, *endpoint computing* in the last 5 years), the expansion of RME Satu Sehat with a personalized patient portal, *24/7 telemedicine* for chronic hypertension integrated with the QRIS payment mobile application, *dashboard* Polyclinic AI-predictive queues with WhatsApp notifications, as well as *Zero-Trust Security Framework* for *end-to-end* diagnosis-therapy encryption to increase patient satisfaction by 25-30%. Practically, management can train digital literacy frontliners monthly and launch NPS digital *surveys real-time post-service* for continuous iteration, while the theoretical implications enrich SDL with empirical evidence of digital operant resources of Indonesian hospitals that convert information technology into *sustainable patient-centric service value propositions* in line with the transformation of One Sehat national health.

Digitization of Management Information System Affects the Quality of Digital Services at Kaliwates General Hospital

Human resource management positions the digitization of management information systems as a strategic operational infrastructure that transforms the quality of digital services through the optimization of *task-technology fit* within the framework of *the Technology Acceptance Model* (TAM) Davis (1989), where the ease of use and *perceived usefulness* of SIMRS increases the effectiveness of hospital frontliners as digital *service providers*. From the perspective of hospital human resource management, digitalization is not just an administrative tool, but a digital *operant resource* that integrates cross-unit processes (registration-pharmacy-laboratory) to create seamless service orchestration that is measurable through digital service quality indicators such as *response time*, *accuracy*, and *accessibility*. The results of this study confirm TAM, because the digitization of SIMRS at Kaliwates Hospital has been proven to have a positive effect on the quality of digital services through the integration of *real-time data* that improves operational coordination and the perception of service professionalism.

The results of the study revealed that the digitization of the overall management information system had a significant effect on the quality of digital services at Kaliwates Hospital, with the main contribution being the integration of patient data where the registration information of the internal medicine polyclinic was automatically synchronized with the pharmacy and laboratory in the SIMRS central database, allowing access to medical records, medication history, and cross-unit control schedules without reducing duplication of inputs *service cycle time*; processing speed can be seen from much faster online outpatient registration through application/website pre-registration with digital DPJP payment and instant queue number, eliminating queue bottlenecks in the morning; data accuracy is realized by an automatic validation system that connects hypertension blood chemistry lab results

directly to the RM number and detects allergy prescription conflicts; ease of access to information through digital screens of internal medicine doctor's schedules and Instant visit history for doctors improves service transparency and consultation effectiveness; and automation of digital queue processes based on hybrid registration with automated billing calculated action-drug labs resulting in fast payment velocity throughput, cumulatively transforming the quality of digital services from *fragmented* to *integrated service ecosystem*.

These findings are in line with research (Witjaksono et al., 2023) that found integrated SIMRS to improve the quality of hospital digital services through interoperability data, as well as studies (Praminiarti et al., 2024) which confirms that the integration of national RME correlates with a better service quality index at East Java Hospital due to a reduction in human error. Empirical support also from research (Apriani et al., 2023) HIMSS Analytics that emphasizes queue automation and real-time recipe validation are the key predictors of digital *Service Excellence* in type C hospitals such as Kaliwates Hospital, where response time reduction and data integrity create a service quality multiplier effect across registration-clinic-supporting touchpoints.

The implications of this study suggest that RSU Kaliwates accelerate the SIMRS Maturity Model to the Enterprise Integration level with the One Sehat API for seamless dataflow of real-time lab-pharmacy registration, AI-powered predictive queuing with polyclinic capacity forecasting, blockchain-based audit trail prescription-allergy for zero-tolerance error, *patient-facing mobile* dashboard with accurate ETA wait-times, and robotic process automation (RPA) hybrid billing that cuts administrative TAT to significantly improve the quality of digital services. Practically, management can launch a Digital Service Champions frontliner training and a monthly patient feedback-based Digital Audit Service Blueprint Audit, while the theoretical implications enrich TAM with empirical evidence of Indonesia's hospital digital service triad (*integration-speed-accuracy*) that converts SIMRS into a *competitive service differentiator* in line with national digital health transformation.

Modernization of Information Technology Affects the Quality of Digital Services at Kaliwates General Hospital

Human resource management integrates information technology modernization as a digital transformation lever within the framework of the Unified Theory of Acceptance and Use of Technology (UTAUT) Venkatesh et al. (2003), where performance expectancy and effort expectancy of IT infrastructure mediate the effectiveness of frontliners as digital service orchestrators through the optimization of human-technology symbiosis in hospitals. From the perspective of hospital HR management, IT modernization transforms the job design of health workers from manual to hybrid-digital workflow, where hardware infrastructure, RME, telemedicine, real-time dashboards, and cybersecurity create digital service capabilities that are measurable through service quality indicators such as reliability, responsiveness, assurance, and digital empathy. The results of this study confirm UTAUT, because IT modernization at Kaliwates Hospital has been proven to have a positive effect on the quality of digital services through seamless integration that improves operational coordination and service quality perception.

The results of the study revealed that the modernization of information technology as a whole has a significant effect on the quality of digital services at Kaliwates Hospital, with the main contribution of modern hardware infrastructure in the form of stable WiFi in all polyclinics-waiting rooms that allow smooth mobile application access and fast computers

at the registration counter-pharmacies serving simultaneously during peak hours, eliminating digital friction that disrupts patient flow; Satu Sehat's integrated Electronic Medical Record (RME) provides access to a summary of lab visit-prescription-results history without a physical map, allowing doctors to provide personalized consultations for chronic patients; Telemedicine and mobile apps facilitate hypertension follow-up video consultations with real-time cashless payments that drastically reduce physical counter queues; The polyclinic's real-time dashboard displays accurate estimated waiting times so that patients can plan optimal visits; and data security with end-to-end layered-encrypted logins provides assurance that sensitive diagnosis-therapy information is protected, cumulatively creating digital service excellence from fragmented experience to an intuitive and trusted omnichannel patient journey.

These findings are in line with research (Gartner, 2023) and (Hamim et al., 2024) that found that hospital IT modernization improves digital service quality through omnichannel integration in European healthcare facilities, as well as a study of (Dwirini, 2023) which confirms that the RME-telemedicine-dashboard correlates with better quality of digital services at the East Java Regional Hospital. Empirical support is also from research (Forrester, 2024) and (Palapessy et al., 2026) which affirms that modern hardware infrastructure and cybersecurity framework are the main predictors of customer experience excellence in digital transformation hospitals such as Kaliwates Hospital, where enterprise-grade WiFi and zero-trust security transform the perception of service from technology-enabled to technology-delighted patient interactions.

The implications of the results of this study recommend that Kaliwates Hospital adopt the Digital Service Transformation Framework with enterprise WiFi 6 infrastructure and a 3-year endpoint refresh cycle for zero-downtime access, RME Satu Sehat vNext with patient-controlled data sharing, telemedicine AI-triage hypertension integrated with the QRIS payment mobile application, predictive wait-time dashboard based on polyclinic capacity analytics, and NIST cybersecurity framework with MFA-biometrics for diagnosis protection to substantially improve the quality of digital services. Practically, management can launch the Digital Frontliner Academy with a quarterly UTAUT-based adoption training and monthly Patient Journey Heatmap analytics, while the theoretical implications enrich UTAUT with empirical evidence of Indonesia's digital service stack (hardware-RME-telemed-security) that converts modern information technology into a service quality competitive moat in line with the national One Sehat digital health ecosystem.

Digital Service Quality Affects Patient Satisfaction at Kaliwates General Hospital

Human resource management positions digital service quality as a crucial digital service quality dimension within the framework of the E-SERVICE QUALITY MODEL Zeithaml et al. (2002), which integrates efficiency, system availability, promptness, privacy, and ease of use as the main predictors of digital customer satisfaction through the optimization of digital readiness frontliner and service encounter digitalization. From the perspective of hospital HR management, digital service quality is not only a technical aspect of the application, but a human-mediated digital experience where registration staff, doctors, pharmacists, and lab staff become digital service ambassadors who translate technology into value co-creation with patients through digital responsiveness and trustworthiness. The results of this study confirm E-SERVQUAL, because the quality of digital services at

Kaliwates Hospital has been proven to have a positive effect on patient satisfaction through an efficient, reliable, timely, safe, and easy-to-use service experience.

The results of the study revealed that the overall quality of digital services had a significant effect on patient satisfaction at Kaliwates Hospital, with the main contribution being efficiency where the online registration application loaded quickly with instant queue SMS confirmation after digital payment, making the registration process much more practical than the physical queue in the morning; 24-hour website and application availability system allows for nighttime control registration or lab results check at any time without interruption even during flu season; promptness of staff who serve on time according to digital appointments internal medicine doctor starts practice on schedule, laboratory results hemoglobin A1c on time, metformin drug pharmacy is ready when patients arrive, and operating room according to hernia schedule builds trust in the reliability of the system; privacy with explicit digital consent before ID data-disease history is used for medication reminders without spam or misuse to provide a sense of security of personal data; As well as ease of use applications with a simple interface with large buttons, clear flowcharts, and short video tutorials that allow the elderly to register independently without family assistance, cumulatively creating patient satisfaction through an intuitive and humane digital service experience.

These findings are in line with research (Zeithaml et al, 2022) and (Yani et al., 2025) which found that E-SERVQUAL dimensions efficiency-fulfillment-privacy was a predictor of e-commerce satisfaction of 68% in America, as well as a study (Parasuraman et al, 2005) that confirmed the model was valid for digital healthcare with system availability and promptness as the main drivers in Asia's digital transformation hospitals. Empirical support also from research (Ma & Kang, 2025) which emphasizes that the ease of use of health applications correlates with the loyalty of chronic patients such as hypertension, especially in the context of Kaliwates Hospital where the elderly-friendly interface and privacy assurance transform the perception of service from technology-enabled to technology-delighted patient journey.

The implications of this study suggest that RSU Kaliwates adopt the E-SERVQUAL Optimization Framework with progressive web app (PWA) registration <2 seconds of loading and WhatsApp Business API personalized queue confirmation, 99.99% uptime SLA through cloud-hybrid infrastructure for nighttime access, AI-scheduling engine promptness doctor-lab-pharmacy with predictive no-show reduction, GDPR-inspired consent management with granular data control for privacy, and no-code app builder for the elderly monthly UX testing to substantially increase patient satisfaction. Practically, management can launch real-time Digital Service Scorecard and Patient Voice Analytics from app feedback, while the theoretical implications enrich E-SERVQUAL with empirical evidence of Indonesia's digital service pentad (efficiency-availability-promptness-privacy-ease) hospital that converts digital service quality into a patient lifetime value multiplier in line with the national One Sehat ecosystem.

Digitization of Management Information Systems Affects Patient Satisfaction Through the Quality of Digital Services at Kaliwates General Hospital

Service-Dominant Logic (SDL) Vargo & Lusch (2004, 2016) positions the digitization of management information systems as a digital operand resource that mediates value co-creation through the quality of digital services as a service exchange interface

between hospitals (provider actors) and patients (*value co-creators*) in the health service ecosystem. In SDL, SIMRS is not just a technology, but an institutional arrangement that integrates resource integration across units (registration-pharmacy-lab) to generate mutual value through digital service quality indicators (efficiency-privacy-promptness) as service propositions. The results of this study confirm SDL, because the digitization of SIMRS at Kaliwates Hospital has been proven to have a positive effect on patient satisfaction through digital service quality mediation, where data integration and process automation transform fragmented service encounters into seamless co-created patient journeys.

The results of the study revealed that the digitization of the management information system had a significant effect on patient satisfaction at Kaliwates Hospital through digital service quality mediation, where the integration of patient data for internal medicine polyclinic registration was synchronized by pharmacie-laboratory resulting in fast application efficiency and instant queue SMS confirmation which reduced service cycle time; The speed of online pre-registration processing from 25 minutes to very short creates a 24-hour system availability for nighttime control; data accuracy, automatic validation of hypertension labs and allergy detection prescriptions, increasing the promptness of doctors on time according to digital schedules; Easy access to screen information, real-time schedules and instant visit history, strengthen privacy, explicit data consent without spam; and the automation of hybrid queuing processes and digital bills results in ease of use of elderly-friendly applications, so that cumulatively the quality of digital services mediates the influence of SIMRS digitalization on patient satisfaction through integrated patient-centric value-in-context.

These findings are in line with research (Edvardsson et al, 2014) and (Mayansara, 2025) who find that the quality of digital services mediates technology to hospital patient satisfaction through service ecosystem coordination in Scandinavia. Empirical support also from the study (Rahmawati et al., 2022) SDL applications that confirm SIMRS resource integration correlates with patient value co-creation in American healthcare, as well as research (Mayansara, 2025) which emphasizes that digital service quality mediation is significant in Asian digital transformation hospitals with efficiency-privacy as the main predictor, especially in the context of Kaliwates Hospital where actor-to-actor service exchange through integrated SIMRS creates institutional complexity resolution that increases patient satisfaction across touchpoints (Rahmawati et al., 2022).

The implications of this study recommend that RSU Kaliwates adopt the SDL Digital Service Ecosystem Framework with Satu Sehat Digital Integration Hub for zero-friction dataflow of lab-pharmacy registration, AI-service blueprinting identifying value co-creation gaps for polyclinics, patient actor engagement platform with co-design feedback loops for efficiency-promptness optimization, SDL privacy-by-design granular consent management, and no-code digital service prototyping ease of use for the elderly testing to maximize the mediation of digital service quality. Practically, management can launch a monthly Service Ecosystem Council involving pharmacy patients-doctor-staff in a digitalization roadmap and real-time Value Co-Creation Scorecard, while the theoretical implications enrich SDL with empirical evidence of Indonesia's digital service mediation hospitals converting SIMRS operant resources into institutionalized patient value propositions in line with the national One Sehat service ecosystem.

Leadership Development Affects Employee Performance Through the Quality of Digital Services at Kaliwates General Hospital

Service-Dominant Logic (SDL) Vargo & Lusch (2004, 2016) views leadership development as an institutional actor capability mediated by the quality of digital services to facilitate value co-creation in the hospital service ecosystem, where trained leaders become resource orchestrators who integrate digital operand resources (SIMRS, mobile applications, dashboards) with operand resources (staff, facilities) to generate mutual value for patients and organization. In SDL, digital service quality functions as a service proposition interface that connects leadership competencies (communication, decision-making) with patient experience outcomes through actor engagement and institutional technological arrangements. The results of this study confirm SDL, because leadership development at RSU Kaliwates has been proven to have a positive effect on employee performance through digital service quality mediation, where the capacity of the head of the room transforms digital service encounter into co-created performance excellence.

The results of the study revealed that *leadership development* had a significant effect on employee performance at Kaliwates Hospital through digital service quality mediation, where the high completion of the training program-IDP for the head of the room-doctor manager resulted in fast online registration efficiency and optimal digital queue through leadership direction in the registration unit; increased 360-degree communication-decision-making feedback score creating application system availability 24 hours with quick troubleshooting of internal medicine polyclinics; implementation of IDP action items increases the promptness of doctors on time according to the digital schedule, the hemoglobin A1c lab is accurate, and the metformin pharmacy is ready; Preparedness for internal succession of doctors-nurses strengthens privacy, explicit data approval, and ease of use of elderly-friendly applications through cascade leadership training; As well as high outpatient team engagement post-leadership development is directed to service quality consistency across touchpoints, so that cumulatively digital service quality mediates the influence of leadership development on employee performance through measurable and patient-centric value orchestration.

This finding is in line with research (Lusch et al, 2010) that found that leadership capabilities mediate digital service quality on employee performance in service organizations through resource orchestration. Empirical support also from the study (Qurohman & Indriyani, 2024; Zhou et al., 2025) which confirms SDL's significant leadership mediation on the digital transformation path to the performance of Nordic healthcare frontliners due to digital actor engagement, as well as research (Aqil & Rumianti, 2025) which emphasizes the quality of digital services as a mediator of leadership development in digital hospitals such as Kaliwates Hospital, where service-dominant leadership transforms IDP-360 feedback into institutionalized service propositions that improve employee performance across inpatient-polyclinic units.

The implications of this study recommend that RSU Kaliwates adopt the SDL Leadership-Digital Service Integration Model with the HRIS-integrated Digital Leadership Academy which targets 100% of the digital IDP physician room with 360-feedback AI-analytics for polyclinic efficiency-promptness, service blueprint co-creation workshops leadership cascade to the frontliner for 24-hour application system availability, privacy-by-leadership training with granular consent protocols, and succession Service Orchestrators

Pipeline of doctors who optimize the ease of use of the elderly to maximize the mediation of digital service quality. Practically, management can launch a quarterly Actor Engagement Council involving leadership-patient-staff in a real-time digital roadmap and Service Performance Heatmap, while the theoretical implications enrich SDL with empirical evidence of Indonesia's hospital leadership-digital mediation that converts *leadership development operant capabilities* into *institutional value co-creation mechanisms* in line with the Satu Sehat *leadership ecosystem* national.

CONCLUSION

The following are the conclusions of the study related to the Effect of Digitization of Hospital Management Information Systems and Information Technology Modernization on Patient Satisfaction through the Perception of Digital Service Quality at Kaliwates General Hospital:

1. The digitization of the management information system has a positive effect on patient satisfaction at Kaliwates Hospital through the integration of cross-unit patient data, the speed of online registration processing, the accuracy of allergy validation data, the ease of access to doctors' schedules, and the automation of queues that create a seamless service experience.
2. The modernization of information technology has a positive effect on the satisfaction of patients at Kaliwates Hospital through stable WiFi infrastructure, integrated RME Satu Sehat, chronic consultation telemedicine, real-time queue dashboard, and encrypted data security that provides a sense of security and digital convenience.
3. The digitization of SIMRS has a positive effect on the quality of digital services of RSU Kaliwates through the integration of lab-pharmacy registration data, online pre-registration speed, accuracy of lab-prescription result validation, instant schedule information access, and digital queue automation that transforms service workflow.
4. IT modernization has a positive effect on the quality of digital services at Kaliwates Hospital through modern WiFi-computer hardware, easy access RME, telemedicine video calls, accurate wait estimation dashboards, and layered login cybersecurity that creates digital service excellence across touchpoints.
5. The quality of digital services has a positive effect on patient satisfaction at Kaliwates Hospital through fast application efficiency, 24-hour system availability, timely staff promptness, protected data privacy, and elderly-friendly ease of use that forms patient satisfaction through an intuitive digital experience.
6. The digitalization of SIMRS has a positive effect on patient satisfaction through the mediation of the quality of digital services of RSU Kaliwates, where data integration and process automation are transformed into efficiency-promptness-privacy that strengthens the value of co-creation of patient journey across service units.
7. *Leadership development* has a positive effect on employee performance through mediation of the quality of digital services of RSU Kaliwates, where IDP-360 feedback is directed to application efficiency, staff promptness, and ease of use that amplifies the performance excellence of digital frontliners.

Suggestions

Based on the results of this research, the following suggestions can be proposed:

1. Theoretical Suggestions

This study enriches *the Technology Acceptance Model (TAM)* and *Service-Dominant Logic (SDL)* with empirical evidence of digital service quality mediation in the relationship between SIMRS-IT modernization and leadership development on patient satisfaction and employee performance of Kaliwates Hospital, which shows that digitization and IT modernization explain patient satisfaction by 56.7% (moderate) and patient satisfaction explains the quality of digital services by 68.9% (moderate correlation) with 43.3% and 31.1% variance by external constructs, so that the researchers can further develop the Integrated TAM-SDL Hospital Digital Service Framework that measures the indirect effects of digital operant resources on value co-creation while exploring additional explanatory factors beyond the identified variances. It is recommended to test across East Java hospitals with the variables of digital maturity and leadership readiness moderators to validate model generalization, as well as longitudinal research to measure the sustainability of digital service quality mediation on patient lifetime value and employee retention after digitalization transformation with a focus on external constructs contributing 43.3%-31.1% variance.

2. Practical Advice

The management of Kaliwates Hospital is recommended to implement *a Digital Service Excellence Center* with Satu Sehat Integration Hub for seamless SIMRS dataflow registration-lab-pharmacy-mobile application, AI Predictive Service Analytics polyclinic queue with real-time WhatsApp notifications, Zero-Trust Patient Data Security with granular consent and blockchain audit trail, as well as Digital Frontliner Academy monthly leadership cascade training for 100% staff Registration-doctor-pharmacist. Supporting programs include a quarterly Patient Journey Co-Creation Council with patient representation, E-SERVQUAL Digital Dashboard monitoring efficiency-privacy-promptness 24/7, and Modern Infrastructure Refresh WiFi 6 + endpoint computing cycle 3 years, supported by a semester evaluation based on digital Net Promoter Score and employee performance to optimize patient satisfaction and digital HR transformation in line with the national One Sehat ecosystem.

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