Ranah Research
Journal of Multidisciplinary Research and Development
E-ISSN: 2655-0865
082170743613 ranahresearch@gmail.com https://jurnal.ranahresearch.com
DINASTI RESEARCH

DOI: https://doi.org/10.38035/rrj.v8i3

AI-Based Digital Transformation Strategy: A Case Study of XYZ Hospital

Rizki Ananta[1], Deasy Farah Utari[2], Riri Satria[3]
[1]Department of Computing, University of Indonesia, Jakarta, Indonesia.
rizki.ananta@ui.ac.id
[2]Department of Computing, University of Indonesia, Jakarta, Indonesia.
deasy.farah@ui.ac.id
[3]Department of Computing, University of Indonesia, Jakarta, Indonesia.

Corresponding Author: rizki.ananta@ui.ac.id[1]

Abstract: Teaching hospitals in developing countries face a critical challenge in adopting artificial intelligence (AI) due to the absence of structured roadmaps aligned with institutional strategy and business processes. This study presents an AI-based digital transformation roadmap for XYZ Hospital, a university-affiliated teaching hospital in Indonesia with a triple mission of clinical service, medical education, and health research. A qualitative case study approach was employed, with primary data collected through interviews with the hospital's Project Management Office and analysis of institutional documents including an IT assessment, a business process mapping workbook of 54 processes cross-referenced against STARKES 2024, JCI 8th Edition, and HIMSS EMRAM standards, and the hospital's Strategic Plan 2025-2029. An IS/IT Strategy framework was applied through three sequential analytical tables translating organizational strategy into information systems and technology requirements. The analysis revealed significant digital maturity gaps across infrastructure, data integration, governance, and talent dimensions. The resulting roadmap spans three phases: digital foundation (2025-2026), initial AI deployment covering clinical decision support systems for real-time diagnostic alerts and automated discharge summary generation (2026-2027), and advanced analytics with smart hospital features (2028-2029). This roadmap provides structured guidance for XYZ Hospital and serves as a replicable reference for other teaching hospitals pursuing AI adoption.

Keyword: Artificial intelligence adoption, Digital transformation roadmap, Teaching hospital, IS/IT strategy, Healthcare information systems.

INTRODUCTION

The rapid advancement of artificial intelligence (AI) in healthcare has created an unprecedented opportunity for hospitals to improve clinical outcomes, operational efficiency, and patient experience (Varnosfaderani & Forouzanfar, 2024). AI technologies, including machine learning, natural language processing, and predictive analytics, are increasingly being integrated into hospital workflows, ranging from clinical decision support to administrative

automation (Simpson & Qasim, 2025). In Southeast Asia, healthcare systems are beginning to recognize the strategic importance of AI adoption, yet many institutions continue to face significant infrastructure, governance, and capacity challenges that hinder full-scale implementation (Wibowo et al., 2025).

Indonesia's healthcare sector is undergoing a major digital transformation, driven by national policies such as the Satu Sehat platform, which mandates integration of all hospital information systems, and the STARKES 2024 accreditation standard, which reinforces the urgency of structured digital governance (Sriharan et al., 2024). Despite these national directives, many Indonesian hospitals, particularly academic or teaching hospitals, have not yet established a formal roadmap to guide AI adoption. This gap creates a strategic misalignment between available AI capabilities and actual business process needs, threatening the quality, safety, and efficiency of healthcare delivery (Hassan et al., 2024).

XYZ Hospital is a teaching hospital affiliated with a major public university in Indonesia, operating under a triple mission of clinical service, medical education, and health research. As a university-affiliated institution, XYZ Hospital occupies a unique position in the national healthcare landscape: it is expected to be at the forefront of clinical innovation while simultaneously meeting complex accreditation standards across service, education, and research domains. However, an internal assessment conducted in 2025 revealed that the hospital's digital infrastructure remains severely underdeveloped, with legacy information systems in place since 2018, fragmented data integration, and a digital maturity score well below industry benchmarks such as HIMSS EMRAM (Chow et al., 2025).

Research has demonstrated that hospitals with advanced digital maturity, particularly those achieving HIMSS EMRAM Stage 6 or 7, exhibit significantly better quality and safety outcomes compared to institutions at lower maturity levels (Snowdon et al., 2024). This evidence underscores the urgency for XYZ Hospital to not only modernize its technology infrastructure but also to develop a structured, strategically aligned AI adoption roadmap.

Existing literature on AI adoption in developing country healthcare settings highlights that the absence of standardized roadmaps and governance frameworks is one of the most critical barriers to sustainable implementation (Zuhair et al., 2024). While AI holds significant promise for hospitals in resource-constrained environments, success depends heavily on aligning AI initiatives with the organization's strategic objectives, existing business processes, and available infrastructure (Adnan et al., 2025).

This paper addresses this gap by developing an AI-based digital transformation roadmap for XYZ Hospital, grounded in the hospital's strategic plan (Renstra 2025-2029) and analyzed through an Information Systems and Information Technology (IS/IT) Strategy framework. The research question guiding this study is: What AI-based digital transformation roadmap is needed to achieve the strategic objectives of XYZ Hospital as defined in its Renstra 2025-2029?

The objective of this study is to design an AI-based digital transformation roadmap that is aligned with the strategic needs and operational realities of XYZ Hospital. The intended outcomes are twofold: first, to provide structured guidance for XYZ Hospital in pursuing AI adoption in a phased and sustainable manner and second, to serve as a reference model for other teaching hospitals seeking to develop similar AI adoption roadmaps.

METHOD

This study employs a qualitative case study approach, designed to produce a practical artifact in the form of an AI-based digital transformation roadmap. The overall research workflow is structured as follows: (1) Data Collection, (2) IS/IT Strategy Analysis, (3) AI-Based Strategic Plan (Renstra AI Based), and (4) Roadmap Design, which then leads to Recommendations and Conclusions.

Data Collection

Primary data were collected through in-depth interviews with the Project Management Office (PMO) of XYZ Hospital, who is responsible for coordinating the hospital's IT transformation initiatives. A single in-depth interview was conducted to capture the hospital's current digital landscape, strategic aspirations, and operational challenges. In addition to interviews, three key documents were collected and analyzed: (1) an IT Assessment document for the period 2025-2026, authored by the hospital's PMO and covering gap analysis across infrastructure, clinical applications, data integration, cybersecurity, and governance; (2) a business process mapping document in the form of an Excel workbook containing 54 Level-0 and Level-1 business processes cross-referenced against STARKES 2024, JCI 8th Edition, HIMSS EMRAM, and PSAK standards; and (3) the hospital's official Strategic Plan (Renstra 2025-2029) containing the hospital's vision, mission, strategic objectives, key performance indicators (KPIs), and roadmap.

While the interview provided contextual understanding of the hospital's strategic aspirations and operational challenges, the primary basis for validating all 54 business processes was the documentary analysis. The business process mapping workbook, authored by the hospital's PMO and cross-referenced against STARKES 2024, JCI 8th Edition, HIMSS EMRAM, and PSAK standards, served as the principal source of process-level data. The interview was therefore used to triangulate and contextualize findings derived from document analysis, rather than as the sole basis for process validation.

IT/IS Strategy

The IS/IT Strategy analysis is conducted using a structured three-table framework adapted from information systems strategic planning methodology (Septiana et al., 2020). This framework translates organizational strategy into IS and IT requirements through three sequential tables.

The first table, Strategy to Innovation, maps each relevant strategic objective from the Renstra to its Critical Success Factors (CSFs), required business processes, existing business processes, and identified gaps and innovation opportunities. This table identifies where AI can bridge the gap between current and desired performance.

The second table, From Business Process to Application and Data (IS Strategy), translates the innovation gaps identified in Table 1 into specific IS requirements, including required applications, required data, required regulations and SOPs, and the appropriate governance model. Governance is classified into three models: Decentralized (each unit manages its own IT independently), Federated (units maintain autonomy but comply with centralized standards), and Centralized (all IT decisions are managed by a central authority).

The third table, From Application and Data to Technology (IT Strategy), translates IS requirements into infrastructure specifications, including required hardware and network infrastructure, required regulations and SOPs at the technical level, and governance arrangements for technology management.

AI-Based Strategic Plan (Renstra AI Based)

The AI-Based Strategic Plan synthesizes the outputs of the three IS/IT Strategy tables into a cohesive strategic document. The AI use cases proposed in this section are derived from the innovation gaps identified in Table 1 and are validated through a literature review of peer-reviewed studies documenting real-world AI implementations in hospital settings (Maimaitiaili et al., 2025); (DeSilva & Petro, 2024); (Stoumpos et al., 2023); (Hügle et al., 2023). This approach ensures that the proposed AI use cases are both contextually appropriate for XYZ Hospital's current conditions and evidence based.

Roadmap Design

The roadmap is designed based on the outputs of the Renstra AI Based and is structured in three phases aligned with the hospital's own strategic timeline. Each phase is defined by a specific focus, a set of prioritized initiatives, and key milestones. The phased structure reflects the principle that AI adoption in an institution with significant digital maturity gaps must begin with foundational capability building before advancing to higher-order AI applications (Walraven et al., 2022); (Shaik et al., 2023).

RESULTS AND DISCUSSION

Strategy to Innovation

The IS/IT Strategy analysis begins with mapping XYZ Hospital's strategic objectives to innovation opportunities. The relevant strategic objectives are drawn from the hospital's Renstra 2025-2029 and filtered to include those most directly related to digital transformation and AI adoption. Four strategic objectives are identified as relevant: achieving customer and stakeholder satisfaction (SS1), realizing good governance through GCG and cultural transformation (SS2), achieving global competitiveness (SS3), and creating impactful innovation (SS4).

Table 1. Strategy to Innovation

Code	Strategy (from Renstra XYZ Hospital)	Critical Success Factor	Required Business Process	Existing Business Process	Gap and Innovation
SS1	Achieving customer and stakeholder satisfaction (patient, student, researcher, employee)	Integrated and responsive patient journey, reduced administrative waiting time, digital engagement post-discharge	Automated patient registration, real-time bed monitoring, digital discharge summary integrated with national health platform, CRM for post-care engagement	Manual walk-in registration, paper-based discharge summaries, non-integrated bed management, minimal post-care follow-up	**Gap:** No digital patient journey integration. **Innovation:** AI-powered bed management, automated discharge summary, AI-driven CRM for patient retention
SS2	Realizing good governance through GCG and digital cultural transformation	Standardized digital SOP across all units, real-time quality indicator monitoring, integrated audit trail	SOP digitalization across clinical and operational units, real-time clinical quality dashboard, integrated financial and clinical data governance	SOPs remain manual and partially digitized, no real-time quality dashboard, clinical and financial data are siloed	**Gap:** Fragmented data governance and absence of integrated quality monitoring. **Innovation:** AI-powered clinical quality dashboard, automated audit trail and anomaly detection
SS3	Achieving global competitiveness (national and international accreditation)	Achieving HIMSS EMRAM Stage 6 by 2028, full JCI 8th Edition compliance,	EMR integration with HL7/FHIR standards, HIMSS-compliant	Legacy SIMRS with no HL7/FHIR integration, medication	**Gap:** Significant digital maturity gap versus

Code	Strategy (from Renstra XYZ Hospital)	Critical Success Factor	Required Business Process	Existing Business Process	Gap and Innovation
		interoperability with national health platform	closed-loop medication administration, real-time clinical alert systems	administration not closed-loop, clinical alerts non-existent	HIMSS benchmark. **Innovation:** AI-based clinical decision support, closed-loop medication administration, interoperability layer using HL7/FHIR
SS4	Creating impactful innovation through research and education programs	Integration of patient clinical data with research and education systems, digital talent capability for managing AI systems	Research data platform integrated with EMR, AI-assisted medical education tools, digital competency framework for staff	No research data platform, medical education not digitally integrated with clinical systems, no formal digital competency framework	**Gap:** Triple mission of service-education-research is not digitally integrated. **Innovation:** AI-assisted research data mining, AI tools for medical education and clinical training simulation

Source: Research data

From Business Process to Application and Data (IS Strategy)

Building on the innovation gaps identified in Table 1, Table 2 translates each business process innovation into specific IS requirements.

Table 2. Business Process to Application and Data (IS Strategy).

Business Process Innovation	Required Application	Required Data	Required Regulation and SOP	Required Governance
AI-powered bed management and real-time occupancy monitoring	Bed Management System integrated with EMR, AI occupancy prediction module	Real-time bed status data, admission and discharge timestamps, patient census data	SOP for bed status updates, SOP for discharge planning, data entry standards	**Federated:** clinical units maintain local input, central IT governs integration
Automated digital discharge summary integrated with Satu Sehat	EMR with auto-generate discharge summary module, Satu Sehat API integration	Patient diagnosis codes, medication history, lab and radiology results, DPJP signature	SOP for discharge summary completion, regulation on data sharing with national health platform	**Centralized:** governed by hospital IT and regulated by Ministry of Health
AI-driven CRM for post-care patient engagement	CRM platform with AI-based follow-up scheduling, telemedicine integration	Patient contact data, appointment history, diagnosis follow-up schedules, patient satisfaction scores	SOP for patient follow-up, patient consent for digital communication, data privacy policy	**Federated:** CRM managed centrally, units input patient-specific follow-up needs

Business Process Innovation	Required Application	Required Data	Required Regulation and SOP	Required Governance
Real-time AI clinical quality dashboard	Business Intelligence (BI) platform, clinical quality indicators dashboard module	Inpatient quality indicators, infection rates, medication errors, mortality and morbidity data	SOP for quality data entry, regulation on clinical quality reporting (STARKES/JCI)	**Centralized:** quality monitoring governed by Quality and Patient Safety Unit
Automated audit trail and anomaly detection for financial and clinical data	ERP with integrated audit trail module, anomaly detection AI module	Financial transaction records, clinical order records, user access logs	SOP for access control, regulation on data integrity, UU PDP compliance policy	**Centralized:** governed by IT security and compliance unit
HL7/FHIR interoperability layer for HIMSS compliance	Integration middleware (HL7/FHIR engine), API gateway	All clinical data streams from SIMRS, LIS, RIS, and pharmacy	SOP for system integration standards, HIMSS EMRAM compliance checklist	**Centralized:** governed by hospital IT architecture team
AI-based clinical decision support system	Clinical Decision Support System (CDSS) module integrated with EMR	Patient history, lab results, medication records, clinical guidelines database	SOP for CDSS alert response, regulation on AI-assisted clinical decisions, clinical governance policy	**Federated:** clinical units govern use, central IT governs system maintenance
AI tools for medical education and clinical simulation	AI-based simulation platform, digital competency tracking system integrated with HCM	Student and resident clinical records, simulation performance data, competency assessment data	SOP for competency assessment, academic governance policy, STARKES IPKP regulation	**Federated:** education unit governs content, IT unit governs platform
Research data platform integrated with EMR	Clinical Research Data Platform, data anonymization module	De-identified patient clinical data, research protocol data, ethics approval records	SOP for research data access, ethics committee regulation, UU PDP compliance for research data	**Federated:** research unit manages access rights, central IT governs data security

Source: Research data

From Application and Data to Technology (IT Strategy)

Table 3 translates the IS requirements identified in Table 2 into concrete technology infrastructure specifications.

Table 3. Application and Data to Technology

Required Application	Required Data	Required Infrastructure	Required Regulation and SOP	Required Governance
Bed Management System integrated with EMR, AI occupancy prediction module	Real-time bed status data, admission and discharge timestamps, patient census data	IoT sensors for bed status, network connectivity to all wards, server capacity for real-time processing	SOP for IoT device maintenance, network uptime SLA	**Federated:** ward-level device management, centralized network governance
EMR with auto-generate discharge summary module,	Patient diagnosis codes, medication	Application server upgrade, secure API gateway,	SOP for API key management, data	**Centralized:** IT team manages API

Required Application	Required Data	Required Infrastructure	Required Regulation and SOP	Required Governance
Satu Sehat API integration	history, lab and radiology results	cloud storage for data exchange	encryption standards	and cloud infrastructure
CRM platform with AI-based follow-up scheduling, telemedicine integration	Patient contact data, appointment history, diagnosis follow-up schedules, patient satisfaction scores	Cloud-based CRM server, VoIP infrastructure for telemedicine, mobile app backend	SOP for data backup, telemedicine platform uptime SLA	**Centralized:** IT manages platform, clinical units govern content
Business Intelligence (BI) platform, clinical quality indicators dashboard module	Inpatient quality indicators, infection rates, medication errors, mortality and morbidity data	Data warehouse server, BI application server, high-availability network	SOP for data warehouse refresh cycles, dashboard access policy	**Centralized:** governed by IT and Quality Unit jointly
ERP with integrated audit trail module, anomaly detection AI module	Financial transaction records, clinical order records, user access logs	High-performance server for AI processing, secure log storage,	SOP for log retention, cybersecurity incident response protocol	**Centralized:** IT Security Unit
Integration middleware (HL7/FHIR engine), API gateway	All clinical data streams from SIMRS, LIS, RIS, and pharmacy	Integration engine server (e.g., Mirth Connect or equivalent), upgraded network bandwidth, redundant connectivity	SOP for integration testing, interoperability standards compliance	**Centralized:** Hospital IT Architecture Team
Clinical Decision Support System (CDSS) module integrated with EMR	Patient history, lab results, medication records, clinical guidelines database	AI inference server (GPU-enabled), EMR application server upgrade, low-latency network	SOP for CDSS model update, clinical validation protocol for AI outputs	**Federated:** clinical governance for validation, IT for infrastructure
AI-based simulation platform, digital competency tracking system integrated with HCM	Student and resident clinical records, simulation performance data, competency assessment data	High-performance workstation for simulation, learning management system server	SOP for simulation platform maintenance, software licensing policy	**Federated:** Education Unit governs usage, IT governs infrastructure
Clinical Research Data Platform, data anonymization module	De-identified patient clinical data, research protocol data, ethics approval records	Secure research server with access-controlled environment, data anonymization software	SOP for data anonymization, ethics board regulation, ISO 27001 compliance	**Federated:** Research Unit governs data access, IT governs security

Source: Research data

AI-Based Strategic Plan for XYZ Hospital (Renstra AI Based)

Based on the IS/IT Strategy analysis, the AI vision for XYZ Hospital is formulated as follows: to become a data-driven, AI-enabled teaching hospital that integrates intelligent technology across its triple mission of clinical service, medical education, and health research, in alignment with international accreditation standards and national digital health policies. AI is positioned not as a standalone technology initiative but as an enabler of the hospital's strategic objectives. Table 4 presents the AI-Based Strategic Plan, mapping each strategic objective to its AI contribution, prioritized use cases, and supporting requirements.

Table 4. Strategy to Innovation

Strategic Objective	AI Contribution	Supporting Requirements
SS1: Customer and stakeholder satisfaction	Intelligent patient journey optimization, automated administrative processes, personalized post-care engagement (Suryawanshi et al., 2025)	Stable patient data platform, patient consent framework, CRM infrastructure
SS2: Good governance and digital cultural transformation	Real-time clinical quality monitoring, automated audit trails, data-driven decision making (Freeman et al., 2025)	Data governance framework, UU PDP compliance policy, IT security infrastructure
SS3: Global competitiveness (HIMSS, JCI, STARKES)	HIMSS EMRAM Stage 6 compliance, JCI 8th Edition HCT requirements, clinical safety improvement (Snowdon et al., 2024)	GPU-enabled AI inference server, HL7/FHIR integration engine, cybersecurity infrastructure, clinical governance policy for AI
SS4: Impactful innovation through research and education	Research data analytics, AI-enhanced medical education and simulation (Ning et al., 2025), digital talent ecosystem	Research ethics framework, data anonymization module, digital competency program, collaboration with The University

Source: Research data

AI-Based Digital Transformation Roadmap for XYZ Hospital

The roadmap is structured in three phases, aligned with the hospital's existing strategic timeline (2025-2029). Each phase builds on the previous, following the principle that AI adoption in an institution with significant digital maturity gaps must begin with foundational groundwork (Shaik et al., 2023).

Roadmap initiative	2025	2026	2027	2028	2029
PHASE 1 : DIGITAL FOUNDATION					
Upgrade Hardware dan Network					
Re-platforming SIMRS ke HL7/FHIR					
Digitalisasi SOP dan Data Governance					
Penguatan Cybersecurity Infrastructure					
PHASE 2 : AI IMPLEMENTATION					
Pengembangan AI-CDSS					
Pengembangan AI Pharmacy Management					
IoT Patient Monitoring					
Pengembangan BI Quality Dashboard					
Integrasi Satu Sehat					
Pengembangan AI-driven CRM					
PHASE 3 : INNOVATION AND OPTIMIZATION					
Advanced Analytics Seluruh Domain					
Smart Hospital Features dan IoT					
AI Medical Education dan Simulasi					
Research Data Platform					

Source: Research Results

Figure 1. Roadmap Digital Transformation

The primary focus is eliminating technical debt and establishing the foundational digital infrastructure necessary to support AI adoption in subsequent phases. Key initiatives include: replacement and upgrade of critical hardware and network infrastructure, re-platforming of the Hospital Information System (HIS/SIMRS) to a modern, interoperable architecture compliant with HL7/FHIR standards, digitalization and standardization of all core business process SOPs, implementation of an integrated data governance framework and cybersecurity policy, and initial deployment of the speech-to-text AI module for clinical documentation. By the end of

Phase 1, the hospital should achieve a functioning integrated HIS with standardized data flows and initial compliance with HIMSS EMRAM Stage 3. Leadership commitment during this phase is a foundational enabler of AI adoption (Sriharan et al., 2024).

Phase 2 focuses on deploying the first generation of AI applications across clinical and operational domains. Key AI implementations include: AI-powered Clinical Decision Support System integrated with the new EMR, AI-driven pharmacy management including adverse drug reaction prediction and automated inventory optimization, IoT-integrated patient monitoring with AI-based early warning systems, real-time clinical quality dashboard using Business Intelligence and AI analytics, AI-driven CRM for post-care patient engagement, and integration with the Satu Sehat national health platform including automated digital discharge summary generation. By the end of Phase 2, XYZ Hospital should achieve HIMSS EMRAM Stage 5 with multiple AI applications actively supporting clinical workflows.

Phase 3 focuses on advanced AI application across the hospital's triple mission, optimization of existing AI systems, and preparation for international accreditation. Key initiatives include: full deployment of Advanced Analytics and predictive AI across all clinical and operational domains, integration of the research data platform with the EMR to enable data-driven research collaboration with XYZ University, deployment of AI tools for medical education including clinical simulation platforms and adaptive learning systems, implementation of Smart Hospital features including comprehensive IoT integration and advanced telemedicine with AI-assisted triage, and achievement of HIMSS EMRAM Stage 6-7 and preparation for international accreditation survey. AI adoption in academic and research settings creates a virtuous cycle where clinical data feeds research, research outputs improve clinical practice, and AI accelerates both (Chow et al., 2025).

CONCLUSION

This paper presents an AI-based digital transformation roadmap for XYZ Hospital, developed through a systematic IS/IT Strategy analysis grounded in the hospital's Renstra 2025-2029 and validated against peer-reviewed evidence of AI implementations in healthcare settings. The research question posed was: what AI-based digital transformation roadmap is aligned with the capabilities and business process needs of XYZ Hospital?

The analysis reveals that XYZ Hospital's current digital maturity is significantly below the benchmarks required for effective AI adoption, characterized by legacy system technical debt, fragmented data integration, absence of standardized SOPs, and immature governance structures. These conditions necessitate a phased approach: Phase 1 (2025-2026) focused on digital foundation building, Phase 2 (2026-2027) on initial AI deployment across clinical and operational domains, and Phase 3 (2028-2029) on advanced AI optimization and full integration of the hospital's triple mission of service, education, and research.

The proposed roadmap makes two primary contributions. First, it provides a structured and evidence-based guide for XYZ Hospital's AI adoption journey, directly aligned with its strategic objectives and organized to respect the institutional readiness constraints identified through primary data collection. Second, it offers a replicable methodology for other teaching hospitals in Indonesia and comparable developing-country contexts, demonstrating how IS/IT Strategy analysis can be used to translate organizational strategy into a concrete AI adoption roadmap.

To ensure the roadmap remains actionable and adaptive, hospital management is recommended to establish phase-specific evaluation checkpoints aligned with the HIMSS EMRAM milestones defined for each phase. Future researchers are encouraged to conduct periodic evaluations of implementation outcomes, measuring the degree to which each phase achieves its intended digital maturity targets and remains aligned with the institution's prevailing strategic objectives, whether defined through a formal strategic plan, institutional master plan, or equivalent governing document. Such evaluations will not only validate the

proposed roadmap but also contribute to a growing evidence base for strategically aligned AI adoption in healthcare institutions and beyond, offering transferable insights for any organization seeking to bridge the gap between strategic objectives and digital transformation readiness

REFERENCE

Adnan, H. S., Shidani, A., Clifton, L., Bankhead, C. R., & Perera-Salazar, R. (2025). *Implementation framework for AI deployment at scale in healthcare systems.* iScience, 28(5). https://doi.org/10.1016/j.isci.2025.112406

Chow, W., et al. (2025). *Building an artificial intelligence and digital ecosystem: A smart hospital's data-driven path to healthcare excellence.* Singapore Medical Journal, 66(Suppl. 1), S75–S82. https://doi.org/10.4103/singaporemedj.SMJ-2025-066

Chow, W., et al. (2025). *Building an artificial intelligence and digital ecosystem: A smart hospital's data-driven path to healthcare excellence.* Singapore Medical Journal, 66(Suppl. 1), S75–S82. https://doi.org/10.4103/singaporemedj.SMJ-2025-066

DeSilva, R., & Petro, J. (2024). *The AI maturity roadmap: A framework for effective and sustainable AI in health care.* NEJM AI. https://doi.org/10.1056/AI-S2400177

Esmaeilzadeh, P. (2024). *Artificial intelligence in medicine: A review of opportunities, challenges, and future prospects.* Artificial Intelligence in Medicine, 151, 102861.

Freeman, S., Wang, A., Saraf, S., Potts, E., McKimm, A., Coiera, E., & Magrabi, F. (2025). *Developing an AI governance framework for safe and responsible AI in health care organizations: Protocol for a multimethod study.* JMIR. https://doi.org/10.2196/75702

Freeman, S., Wang, A., Saraf, S., Potts, E., McKimm, A., Coiera, E., & Magrabi, F. (2025). *Developing an AI governance framework for safe and responsible AI in health care organizations: Protocol for a multimethod study.* JMIR. https://doi.org/10.2196/75702

Hassan, M., Kushniruk, A., & Borycki, E. (2024). *Barriers to and facilitators of artificial intelligence adoption in health care: Scoping review.* JMIR Human Factors, 11, e48633. https://doi.org/10.2196/48633

Hügle, T., Grek, V., & Geisler, B. P. (2023). *Digital transformation of an academic hospital department: A case study on strategic planning using the balanced scorecard.* PLOS Digital Health. https://doi.org/10.1371/journal.pdig.0000385

Maimaitiaili, M., Jiamaliding, Y., Dai, G., Xiao, H., Kuerbanjiang, W., & Yi, Y. (2025). *Artificial intelligence platform architecture for hospital systems: Systematic review.* Journal of Medical Internet Research, 27, e79788. https://doi.org/10.2196/79788

Ning, Y., et al. (2025). *How can artificial intelligence transform the training of medical students and physicians?* The Lancet Digital Health, 7, 100900. https://doi.org/10.1016/j.landig.2025.100900

Septiana, Y., Mulyani, A., Kurniadi, D., & Arifin, D. M. (2020). *Information systems strategic planning for healthcare organizations using Ward and Peppard Model.* International Journal of Science and Technology Research, 9(2), 4718–4721.

Shaik, T., Tao, X., Higgins, N., Li, L., Gururajan, R., Zhou, X., & Acharya, U. R. (2023). *Remote patient monitoring using artificial intelligence: Current state, applications, and challenges.* WIREs Data Mining and Knowledge Discovery, 13(2), e1485. https://doi.org/10.1002/widm.1485

Shaik, T., Tao, X., Higgins, N., Li, L., Gururajan, R., Zhou, X., & Acharya, U. R. (2023). *Remote patient monitoring using artificial intelligence: Current state, applications, and challenges.* WIREs Data Mining and Knowledge Discovery, 13(2), e1485. https://doi.org/10.1002/widm.1485

Simpson, M. D., & Qasim, H. S. (2025). *Clinical and operational applications of artificial intelligence and machine learning in pharmacy: A narrative review of real-world applications.* Pharmacy, 13(2), 41. https://doi.org/10.3390/pharmacy13020041

Simpson, M. D., & Qasim, H. S. (2025). *Clinical and operational applications of artificial intelligence and machine learning in pharmacy: A narrative review of real-world applications.* Pharmacy, 13(2), 41. https://doi.org/10.3390/pharmacy13020041

Snowdon, A., Hussein, A., Danforth, M., Wright, A., & Oakes, R. (2024). *Digital maturity as a predictor of quality and safety outcomes in US hospitals: Cross-sectional observational study.* Journal of Medical Internet Research, 26, e56316. https://doi.org/10.2196/56316

Sriharan, A. I., Sekercioglu, N., Mitchell, C., Senkaiahliyan, S., Hertelendy, A., Porter, T., & Banaszak-Holl, J. (2024). *Leadership for AI transformation in health care organization: Scoping review.* Journal of Medical Internet Research, 26, e54556. https://doi.org/10.2196/54556

Sriharan, A. I., Sekercioglu, N., Mitchell, C., Senkaiahliyan, S., Hertelendy, A., Porter, T., & Banaszak-Holl, J. (2024). *Leadership for AI transformation in health care organization: Scoping review.* Journal of Medical Internet Research, 26, e54556. https://doi.org/10.2196/54556

Stoumpos, A. I., Kitsios, F., & Talias, M. A. (2023). *Digital transformation in healthcare: Technology acceptance and its applications.* International Journal of Environmental Research and Public Health, 20(4), 3407. https://doi.org/10.3390/ijerph20043407

Suryawanshi, M., Suryawanshi, P., & Suryawanshi, A. (2025). *The role of AI in hospital operational efficiency improvement and patient care.* Malque Publishing.

Varnosfaderani, S. M., & Forouzanfar, M. (2024). *The role of AI in hospitals and clinics: Transforming healthcare in the 21st century.* Bioengineering, 11(4), 337. https://doi.org/10.3390/bioengineering11040337

Walraven, P., van de Wetering, R., Helms, R., Canields, M., & Versendaal, J. (2022). *Evolving competencies to align electronic medical records: A dynamic resource-based perspective on hospitals co-evolutionary information systems alignment capability.* Journal of Health Organization and Management, 36(9), 112–132. https://doi.org/10.1108/JHOM-10-2021-0379

Wibowo, M. F., Pyle, A., Lim, E., Ohde, J. W., Liu, N., & Karlstrom, J. (2025). *Insights into the current and future state of AI adoption within health systems in Southeast Asia: Cross-sectional qualitative study.* Journal of Medical Internet Research, 27, e71591. https://doi.org/10.2196/71591

Zuhair, V., et al. (2024). *Exploring the impact of artificial intelligence on global health and enhancing healthcare in developing nations.* Journal of Primary Care & Community Health, 15. https://doi.org/10.1177/21501319241245847