

# Artificial Intelligence based Strategic Management to Improve Operational Efficiency in Hospitals : Literature Review

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ARTICLE INFO ABSTRACT

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#### **Keywords:**

Artificial Intelligence, Hospitals, Operational Efficiency, Strategic Management, Literature Review Artificial Intelligence (AI) is revolutionizing multiple sectors, including healthcare, by performing tasks that traditionally require human intelligence. AI's ability to analyze large datasets, adapt to new inputs, and automate processes offers substantial in healthcare, particularly management and operational efficiency. In Indonesia, AI is increasingly seen as a transformative technology in hospitals, enhancing decision-making, patient care, and resource management. Despite its potential, AI implementation in healthcare faces significant challenges, including data privacy, ethical concerns, and integration complexities. This study employs a literature review approach combined with descriptive analysis. Data was collected from academic journals, databases such as Google Scholar, PubMed, and accredited national publications, focusing on AI's application in strategic management and operational efficiency in hospitals. The analysis includes data classification into key themes—strategic management, AI applications, and operational efficiency—and thematic analysis to identify trends and relationships across the literature. The literature was categorized based on the main themes of AI applications, operational efficiency, and strategic management frameworks in hospitals. Thematic analysis highlighted the role of AI in optimizing hospital operations, improving patient flow, automating administrative tasks, and enhancing diagnostic accuracy. The synthesis of the data provides insights into the integration of AI in hospital management and its impact on resource utilization, staff productivity, and patient satisfaction. AI is transforming hospital operations, particularly through predictive analytics, robotic process automation, and advanced diagnostic systems. It aids in predicting patient flow, optimizing staff schedules, and improving patient outcomes by automating administrative tasks. However, challenges such as algorithmic bias, data privacy issues, and a lack of standardization in AI models remain significant barriers. These challenges are particularly evident in Indonesia, where limited infrastructure and resistance to change hinder widespread AI adoption. Despite these hurdles, AI's potential to improve operational efficiency in hospitals is undeniable, especially in streamlining processes



and enhancing decision-making. AI holds tremendous potential for enhancing operational efficiency in hospitals, optimizing resource management, and improving patient care. However, its successful implementation depends on overcoming significant challenges such as data privacy, algorithmic bias, and regulatory issues. For AI to be effectively integrated into Indonesian hospitals, a robust framework that includes infrastructure development, healthcare worker training, and regulatory support is necessary. With these efforts, AI can significantly improve hospital management, leading to more efficient, effective, and sustainable healthcare systems in Indonesia.



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#### 1. INTRODUCTION

AI – it is a science and technology branch which makes it possible for the computer (intelligent computer programs) to do works that typically need the human intelligence (Chomutare et al., 2022). Therefore, the crux of AI's appeal is that it has many of these capabilities and it can do what humans can do and become better from experience and new inputs in a variety of settings. AI uses such sources of information as Big Data (Alowais et al., 2023) for performing currently earlier

AI has made impressive progress in recent years and has brought considerable benefits to various fields, including the lifesaving medical industry (Rong et al., 2020). The increasingly fast development of artificialintelligence (AI) technology has offered a great chance for clinical use and positively influenced clinical practice, giving opportunities to revolutionary healthcare. In many domains, AI has automated manual health systems, so that in some applications, humans have been relegated to less sophisticated operations in medicine, and to managed operations done by or based on AI components. AI driven health care systems are rapidly growing, especially in the early stage diagnostic applications. The AI adoption into patient care requires for information on the use to be systematically recorded and shared to enable the clinical community to have the knowledge and it' means to implement effectively. AI systems could be an intelligent solution to ease the burden on health care providers in an overwhelmed healthcare system. Artificial Intelligence (AI) is not just a technology-based intervention for managing information—it further serves as advice and guidance that shape the clinical decision-making process (Sarker et al., 24).



Although the future scenario for AI appears to be bright both in terms of the potential and opportunities, it must however be recognized that AI brings forth a wealth of challenges mainly because of the complexity involved in blending health systems with AI-systems that are purely machine learning based (Mudgal et al., 2022). Key risks and challenges inherent in the usage of AI include patient harm from system errors; privacy implications for restricted access to data; and ethical, legal and medical aspects in decisions related to human life and medical situations using AI (Ali et al., 2023).

But more than this, one of the best things about AI is that it helps with preventative care in our health systems, it helps to ensure that everyone remains, not just healthy (it's for those who are already healthy) but stays healthy. For instance, apps have been integrated to empower patients for being more in control of their health status and take informed decisions regarding prevention of type 2 diabetes and hypertension (Siala & Wang, 2022). Yet to many AI applications the timely recognition and diagnostic of health information is a must. These applications are how different diseases are diagnosed in different booknhire aspects accurate and very fast and reliable results. At a bohmian level of description, AI big data work involves vast amounts of comparison, so that information on a patient can be compared against that and digital images on thousands/millions of other patient data in certain situations. This self-learning mechanism enables pattern recognition and supplies information to the healthcare professional for their diagnostic and intervention procedures. In addition to facilitating these intricate medical procedures, AI can enhance the administration of healthcare (Manickam et al., 2022).

This paper is intended to review to what extent the use of AI technology in strategic management will increase the efficiency of hospital operation in Indonesia. Further, this paper can be used as a research to realize the barriers that physicians and health institutions in general face when trying to implement AI and design appropriate recommendations to promote successful integration of technology in health. Accordingly, this review is anticipated to provide insight into the possibility of use of AI in healthcare, thereby promoting AI applications in clinical practice.

#### 2. LITERATURE REVIEW

# **Artificial Intelligence**

AI systems "technological systems that can perform the tasks defined as (at least equivalent to) those performed by human beings" UNESCO Artificial



intelligence (AI) systems as defined by UNESCO as follows: UNESCO 2019 defines artificial intelligence (AI) systems as, "A computerized system of technology tools able to process information in a manner that both is similar to the way humans do, and is capable of automated learning and processing of information". A straightforward description of AI in health is to be able to apply computer programs to tasks or to reason in some way about health issues, such as diagnosis and treatment. This is identical to the intelligence that we link to human intelligence. AI in health also involves the application of machine learning algorithms or software models to replicate human intelligence to interpret and make meaning from complex medical and health data (solution & Mudgal, 2022)

Artificial Intelligence (AI) has garnered much interest in healthcare ranging from diagnostics, patient care to operations. AI technologies, such as machine learning (ML) and deep learning (DL), provide powerful tools for decision making, prediction, and optimization of healthcare. AI in hospital management can reduce hospital costs, improve patient management, and increase operational efficiency to allow hospitals to implement better customer management techniques (Dash et al., 2019).

# **Strategic Management**

Strategic management in healthcare involves planning of goals and objectives as well as the analysis through which it is decided, which are the actions and decisions pertaining to an organization and which has significant influence on the matter, which may have a substantial impact on it. This is an important step in order to keep hospitals running effectively, paying attention to patient demands and remaining competitive in a continually shifting health sector. Strategic management in hospitals requires regular assessment of the performance and ability to respond to its environment (technological changes, regulations, patients population's evolution) (Kaplan, 2001).

Management theory, for example, through SWOT analysis (Strengths, Weaknesses, Opportunities, and Threats) and Porter's Five Forces, can inform and guide investment decisions in resource investment, service delivery and competitive positioning. In the case of AI, establishing a strategy for managing AI can help to align AI initiatives with the overall organization in order to improve business operations (Porter, 1985).

### **Improve Operational Efficiency**

Efficiency of performance in the hospital setting is important in terms of the wise use of resources, cost saving and the expectation that this will lead to greater patient satisfaction. There are a lot of things which are carried out within the hospital such as patient flow, staffing, purchasing and inventory of



medical supplies. Inefficient operation can have bad side-effects, such as long waiting times, exhausted staff and overly high costs of treatment, which can actually reduce the quality of treatment (Dubey et al., 2023).

AI has the potential to transform efficiency by automating mundane tasks, supporting decision making and forecasting patient demand. AI applications including predictive analytics for patient flow management (e.g., prediction of bed occupancy), robotic process automation for administrative tasks and AI-enabled diagnostic tools are some examples of how AI could automate hospital operations and remove inefficiencies (Guo et al., 2024).

Utilizing AI with strategic management in hospitals leads to operational efficiency in significant ways. AI offers data-driven logic for informed decision-making that can be infused into (and not undermine) strategic and creative management to enhance patient and operational outcomes alike. For instance, AI can help to predict patient inflow and thereby optimize the number of staffing (Adam, Khumanji, & Reier, 2020), automate the management of supply chain and support resource allocation (Dubey et al., 2023).

AI-enabled strategic management models can aid hospitals in predicting the future, managing risk, and allocating resources optimally. When applied to hospital management, strategic decision support based on AI helps managers to make the right decisions at the right time by delivering up-to-date facts and predictive insights. This integration of AI and strategic management allows for a more nimble hospital system, which can adjust more rapidly to evolving healthcare needs (Guo et al., 2024).

# **Hospitals**

There are some AI use cases that do translate to hospitals today:

Predictive Analytics on Patient Flow: AI can predict the number of patients expected to be admitted and hence provide for an optimized hospital bed occupancy to avoid overcrowding and reduce wait time for patients.

Robotic Process Automation (RPA) RPA combined with AI can further automate administrative roles like billing, coding, scheduling appointments to allow staff to concentrate on more vital responsibilities.

AI in Diagnostic Imaging: AI algorithms can help interpret medical images with very accurate results, leading to faster diagnosis and treatment plan (Lelyana, 2024).

#### Literature Review

Literature review A literature review consists of a synthesis of existing knowledge that provides a comprehensive summary and critical analysis of



information on a subject Related Topics Table of content Definition of the problem Validity of the study (internal and external) Research design Sampling and sample key characteristics Data collection methods Subject Variables Data collection instruments Results The literature review sets the study in an historical context, which narrows down the scope of what the writer is going to talk about and how, considering the available information. It provides the background for what is known and what is not, and for how further research can contribute to the field. A literature review is a written debate based on a critical examination of the most relevant, recent and authoritative knowledge in an area of study. It assesses, categorizes and compares the works in the literature which have already been published about the topic. The role of a literature review is to characterize what is available, and situate the current work in context of what is already known about the topic, show evidence of familiarity with the state of knowledge, and make a case for why there is good reason to embark upon the new work. Add that a good literature review -Defines the problem to be examined by the research, sets the foundation upon which theoretical and methodological rigor is placed, demonstrates scholarly and intellectual competence (Machi & McEvoy, 2016) (Boote & Beile, 2005).

Roles of a Literature Review to summarization: Gathers all available findings, extensive overview analysis: Summarizes the main point of each study conducted on the research topic, critical review: Evaluates the strengths and weaknesses in the research, synthesis: Comes up with an evaluation of all the findings or what connects and does not connect the same, identification of gaps: that shows where further research is needed. Types of Literature Reviews: – Narrative Review: Descriptive and qualitative – Systematic Review: A systematic approach to identify, evaluate and synthesize all evidence-based information and facts on a topic – Scoping Review: Broad review searching for all related information – Meta-analysis: The statistical synthesis of the results of two or more independent studies. Characteristics of a Good Literature Review is complete: Addresses all relevant sources, analytical: Moves beyond describing toward examining and assessing, organized: A clear, well-organized structure (e.g., by topic, by time period), and unbiased: Without bias (Machi & McEvoy, 2016).

#### 3. METHODS

This journal article applies the literature review with descriptive analysis technique. This method includes the collection, analysis, and synthesis of various scientific documents addressing the use of the Artificial Intelligence (AI) on the strategic management of operations in hospitals.



Sources of data were scientific journals and international literature on the topic. References were chosen according to the following criteria: Publications between 2020 and 2025 that involve AI for strategic management and operational efficiency in the hospital. The analysis procedure included the following steps:

- 1. Methodology Search Strategy– We searched the literature using databases including: Google Scholar, PubMed, and nationally recognized medical journals.
- 2. Data Categorization of references Strategic management, AI application and operational efficiency.
- 3. Thematic Analysis Patterns, Trends, and Relationships Loerinc et al 21 identified patterns, trends and relationships of concept in the literature.
- 4. Synthesis Summarizing the analysis to finish conclusions and strategic recommendations.

In this regard, the journal AI in strategic turn, it is anticipated that the publication will contribute conceptually and empirically to incorporate AI in the strategic management of hospitals, particularly in the Indonesian Setting (Zhafran Zharif et al., 2025).

#### 4. RESULTS AND DISCUSSION

AI technology has been a revolutionary trend in the health care industry, particularly in hospitals. This technology is used in different domains, including big data analysis, decision systems based on algorithms, automatization of health systems. Research by Rong et al. (2020) demonstrated that AI can be beneficial in increasing diagnosis accuracy and efficiency of healthcare data management however, technology integration and communications issues need to be overcome for this to occur (Zhafran Zharif et al., 2025).

Healthcare industry has been revolutionized by the advent of Artificial Intelligence (AI), particularly in the areas of diagnosis, treatment, and patient care. The artificial intelligence tools, like Machine Learning (ML), Deep Learning (DL) and Natural Language Processing (NLP), have proven their potential for increasing accuracy of diagnosis, improving treatment planning and also lowering costs associated with the healthcare services. Recent breakthroughs are shaping the future of disease diagnosis and AI is playing a progressively critical role to predict disease diagnosis and assist with clinical decision-making (Chomutare et al., 2022).



Challenges - Health Care: Health care industry, especially hospitals, has unique challenges such as, manpower to be allocated, patient flow, operational ineffectiveness and to make better clinical decision making. New facets of hospital management In recent years, the use of Artificial Intelligence (AI), has become an advanced transformative force that provides different ways to improve various aspects of hospital management. By employing AI-driven strategic management, the system can deliver actionable, data-driven insights, automate repetitive tasks and optimize decision-making to drive operational efficiency and impact patient outcomes. In this literature review, we look at AI applications in strategic management for hospitals in terms of operational efficiency, decision support and long-term strategic planning. (Maleki Varnosfaderani & Forouzanfar, 2024).

## Artificial Intelligence (AI) in Diagnostics

The incorporation of AI into medicine has demonstrated really impressive prospect, largely in the areas like medical image and disease prediction. As noted[20] by Khanday et al., AI (e.g., deep learning) has rapidly advanced in the analysis of radiology images, as well as pathological images and has, in many instances, outperformed conventional diagnostic techniques. AI applications in the diagnosis of breast cancer by extracting mammography images can be taken as example which has relatively been decreased the numbers of false positive and false negative. Furthermore, the capacity of AI to process and analyze electronic health records as well as genomic data to predict disease risks, personalize interventions, and treatments (Khanday Maya Ahmed, 2024).

#### **AI-based Disease Prediction**

The capability of AI to process massive amounts of medical data has been a linchpin in forecasting disease outcomes. Secinaro et al. point to AI's promise for predicting chronic diseases like heart disease, diabetes and cancer. ML models like SVM and NNs are broadly employed to look for patterns in big datasets in order to proceed with an early diagnosis and provide personalised care plans. These instruments have been successful in detecting diseases before becoming symptomatic, so early preventive efforts have been reinforced (Secinaro et al., 2021).

# Applications and advantages of AI in healthcare

Some of the potential application areas of AI that will have the most impact in healthcare space are better accuracy in diagnosis, faster turnaround for results, and personalized treatment plans. And AI applications are helping physicians not only by automating mundane work, but by enabling them to make more informed clinical decisions based on real-time data. Furthermore, AI can enhance access and quality of healthcare delivery even in the far-flung



or underserved locations by emulating access to expert level diagnosis using telepathology (for example see Aung et al MA 2021).

The future of AI in healthcare is very promising, but the challenges around data quality, algorithm transparency, and implementation within existing healthcare systems need to be solved first. There is also a growing urgency to promote interdisciplinary cooperation to forge AI solutions to better meet healthcare needs and to use this technology safely and ethically (Guo et al., 2024).

# **Challenges and Ethical Considerations**

Despite the promise of AI in health care, there are major obstacles to its use. Data privacy and security are of utmost consideration, particularly in the case of sensitive patient information. Algorithm bias is also a problem and there are fears AI could perpetuate health disparities. There is also a major concern about the explainability and transparency of AI models, especially in life or death medical decision-making. Ethical (and regulatory) frameworks are needed to ensure that AI is introduced responsibly, focusing on patient safety, equity, and responsibility (Al Kuwaiti et al., 2023).

Despite its potential, AI in healthcare presents ethical, privacy, and regulatory challenges. Concerns from algorithmic bias to data privacy and opaque AI decision-making processes are challenges as important as ever. Suryawanshi et al. stress the need to develop strong ethical guidelines and regulatory controls so that artificial intelligence systems are used in a responsible manner. Furthermore, continuing education needs to be provided for health professionals so that they can use AI effectively and satisfy patient needs (Reddy et al., 2020).

However, the adoption of AI in health care is not without challenges. There are also some primary issue such as the unstandardized data infrastructure, doctors' aversion to changes and the cost of using AI. Despite this, the potential of AI for optimizing operating efficiency and as a vehicle for achieving patient care outcomes (e.g., through drug therapy enhancement and personalized medicine) is evident, and the uptake of the technology within healthcare systems is accelerating worldwide (Siala & Wang, 2022).

### AI in Operations and Resource Management

AI has revolutionised the operations of the hospital, with improved efficiency of resource allocation, patient flow and administration. AI algorithms have improved predictive analytics that have enabled hospitals to forecast patient admissions, schedule staff and reduce wait time for patients, as per Suryawanshi et al. Furthermore, supply chain management has been



optimized through AI, with the improvements of inventory optimization, and more beneficial use of resources (Suryawanshi et al, 2025).

For example, AI has been utilized to automate administrative functions, such as billing and claims processing, and has helped to decrease human error and the administrative workload on healthcare professionals. In addition, artificial Intelligence (AI)-based VAs and automatic appointment scheduling systems enhanced patient-consumer engagement by making the scheduling and follow-up appointments easy, which in turn enhance patient satisfaction (Guo et al., 2024).

# Machine learning and artificial intelligence in medical imaging and informatics

AI has fundamentally changed diagnostics, especially in medical imaging and predicting disease. Machine learning models have shown the ability to outperform conventional approaches in diagnosing conditions like cancer, heart disease, and diabetes. For instance, deep learning algorithms in radiology have lead to the enhancement of early breast cancer and lung disease detection, underlining the potential of AI in diagnostics (Al Kuwaiti et al., 2023).

Further, its capacity to handle huge amount of genomic data and clinical data paves the possibility of personalized treatment planning. Using AI, patient data is analyzed to determine the progression of disease (Alowais et al., 2023).

# AI in patient care and monitoring

AI influence on patient care also reaches into remote monitoring and virtual care technologies. As wearable AI technology and telemedicine systems can support continuous monitoring of chronically ill patients, it could be used as a means of real-time management, effectively preventing the relapse of chronic disease and decreasing re-admittance. Under the current pandemic, AI-driven solutions contribute in surveilling of diseases such as diabetes, cardio-vascular, and respiratory-related achievable tracking of the patient and enhance personalized patient monitoring, where the healthcare professionals can have the oversight of patient's health condition and can be able to take instant decision as per the patient needs (Aung et al., 2021).

AI-based Virtual assistants, which also can be chatbots, aid in treatment, guide patients through and provide counseling, medications adherence, and health advice and ultimately help to improve patient engagement and quality of care (Bekbolatova et al.\$IFn 2024).



#### 5. CONCLUSION

AI can transform the healthcare industry in some areas, especially in medical diagnosis, disease prediction and treatment choice. But for AI to fulfill its potential, it requires a strong governance, data privacy, and ethical framework to be created. Further research is necessary to further develop AI and to tackle the challenges that have to be met, especially to ensure the responsible application the clinical routine. AI could transform the healthcare industry increasing operational efficiency, enhancing diagnostic accuracy, providing personalized treatment and easing administrative obligations. But for it to fulfill its promised potential, there need to be solutions to data privacy, algorithmic bias, and the regulatory environment. The future of AI medicine is predicated on continued innovation and teamwork between those from traditional medical disciplines and implementation of robust ethical and regulatory framework.

You can shave a lot of strain off hospital staff and administrators by automating their drudgery with AI. This will speed up patient's registration, medical records process and the booking of appointment. Increasing time savings in addition to reducing the risk of data entry errors are beneficial by offering better quality care to the patients. Supply chain management in hospitals has been successfully optimized by AI. AI can predict when drugs and medical equipment will be required, so that you can ensure you've got stock of both to hand without having too much (or too little) to carry and logistics costs can be reduced. This has been effectively deployed to enhance warehouse optimization and inventory forecasting in certain nations.

But the use of AI in Indonesian hospitals also comes with difficulties. Lack of technology infrastructure, lack of experts, reluctance of change, and issues like data privacy and security are the biggest challenges. Hence, institutional collaboration of government, public sector, and academic institutes is essential to overcome these challenges with infrastructure upgrade, health care personnel skill enhancement, and supportive legislations. Solving these and AI can be utilized to optimal to strategic hospital management and with that can claim improving hospital operational in Indonesia. AI is not just an answer to optimize productivity and healthcare efficacy, but also an inevitable journey for the sustainable transformation for healthcare industry with digital.

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