

# Integrating AI Imaging Tools in Healthcare: Opportunities, Challenges, and Strategic Approaches for Adoption

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## Abstract

This study investigates the integration of artificial intelligence (AI) imaging tools within India's healthcare system, focusing on both the transformative potential and the challenges associated with their adoption. As the sector expands, issues such as limited access in rural areas, strained infrastructure, and rising healthcare demands underscore the need for innovative solutions. AI-driven imaging technologies offer significant promise by enhancing diagnostic accuracy, streamlining clinical workflows, and improving early disease detection, particularly in underserved regions. Through a qualitative analysis supported by secondary data, this research applies the Ansoff Matrix and Force Field Analysis to examine strategic approaches for implementing AI tools in healthcare. The findings highlight key drivers of adoption, such as increased efficiency and patient outcomes, alongside critical barriers including data privacy concerns, regulatory constraints, and high initial costs. Ultimately, the study emphasises that with thoughtful implementation and policy support, AI imaging tools can make healthcare more accessible, effective, and future-ready in the Indian context.

**Keywords:** Artificial Intelligence, Healthcare, Ansoff Matrix, Force Field Analysis.

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## Introduction

The healthcare sector is one of the most significant markets in India in terms of

earnings and employment. It includes hospitals, medical devices, clinical trials, telemedicine, medical tourism, health insurance, and medical equipment, making it the most diversified sector. The sector has emerged as a fundamental pillar of the Indian economy and has offered significant growth and innovation opportunities since 2016, with an approximate annual growth rate (CAGR) of 22% (Ani, 2024). India's healthcare sector has seen remarkable growth; the hospital market was USD 98.98 billion in 2023 (Online Bureau et al., 2024). The sector for the year 2024-25 is seen to be growing at 12.59 per cent. The sector value of the latter reached USD 372 billion in 2023 (Sarwal et al., 2021) through the policies of the government and private investment. It also gives rise to one of the largest providers of employment in India, with 7.5 million staff (*Centre Aims to Establish ₹50,000cr Credit Incentive Program to Upgrade Health Infra*, 2025) and many more to be developed as telemedicine and data analytics tools evolve into the future. There are, however, some significant barriers to achieving sustainable growth (the practice of providing healthcare services in an environmentally friendly way while also promoting health and the community) in health relating to accessibility, mainly in rural areas, and high costs and low quality of care mainly in urban areas.

The Indian healthcare sector has significant challenges, with accessibility being one of the most pressing concerns. Poor transportation and infrastructure in rural areas, as does unfair resource distribution, worsen the situation. The two main segments of Indian healthcare are the public and private sectors. In rural areas, the public sector mostly uses Primary Health Centers to offer essential healthcare services. However, these establishments frequently struggle with inadequate funding, a shortage of competent labour, and poor infrastructure. Government and private sector expenditure on healthcare are less than 2% and 3% of GDP, respectively, far below the global average of 9.5% (*Economic Survey Strongly Recommends Increase in Public Health Spending From 1% to 2.5-3% of GDP*, 2021).

Despite the introduction of government initiatives such as Ayushman Bharat, quality

medical services remain financially inaccessible for a large portion of the population. Additionally, the rapid spread of non-communicable diseases such as diabetes, heart disease, and cancer is placing further strain on the already overburdened healthcare system. Emphasizing the urgent necessity of reforms to solve the problems of overpriced, ineffective, and inaccessible healthcare, these challenges draw attention to how reasonable and approachable quality medical services should be for everyone. The development of new technologies, specifically artificial Intelligence (AI), can change the way healthcare is delivered. Artificial Intelligence can help healthcare providers make care safer, more effective, and standardized. It would be very helpful to patients with chronic conditions or those living in remote areas where, with AI-powered remote monitoring, their vital signs are monitored and analyzed in real-time. AI will allow healthcare practitioners to access relevant information on time, indispensable for diagnosing and treating various conditions. For instance, AI-based imaging technologies are now speeding up and making better diagnoses of diseases such as cancer and cardiovascular conditions even where the specialist is not around. Indeed, AI scanning vast medical data and learning from such patterns could dramatically reduce the risk of disease diagnosis errors and improve patient outcomes while also improving clinical workflows (Pinto-Coelho, 2023).

Despite the vast potential of artificial intelligence, its adoption in India's health sector is still very preliminary. The digital divide between rural and urban areas is a challenge, as most healthcare facilities in rural areas lack the basic infrastructure to deploy AI tools. Data, patient security, and privacy remain significant concerns that must be appropriately addressed to ensure that AI is used responsibly in healthcare delivery. Therefore, AI-based solutions must comply with all relevant legislation concerning data protection, which creates trust among patients and healthcare providers. We focus on these large gaps with the efficient working of AI-powered imaging technology in Indian health setups in particular rural and underprivileged zones. Our research focuses on the current scenario of AI adoption in the healthcare

sector, which helps in strategic decision-making.

Further, this study employs two strategic frameworks, the Ansoff Matrix and Force Field Analysis, to systematically analyze the adoption and implementation of AI imaging tools in healthcare. These frameworks offer complementary perspectives on evaluating the opportunities for growth, the challenges to overcome, and the strategic pathways for successful integration into healthcare systems.

**Literature review:**

### ***Introduction to AI in Healthcare***

In contemporary times, artificial intelligence (AI) has swiftly grown, bringing an impressive wave across diverse sectors, where the healthcare sector is the fastest growing field. This development in India, known for its immense number of people, can lead to enhanced healthcare facilities and more precise patient data and will wane the burden on medical management. This review will look into the vast range of AI's implementation in India's healthcare system, focusing on diagnostic precision and AI's early detection of diseases (Pinto-Coelho, 2023).

AI is pivotal in transforming healthcare in India and can even introduce many challenges. The major problem with AI's introduction is the poor data structure and protection laws, which can cause malicious hacking of the patient's data. To solve this, large, varied datasets for training and validation of AI algorithms would be required; safe and responsible ethical data-sharing practices will have to be established with guarantees to keep patient confidentiality. Moreover, another obstacle to implementing AI in such a sector is the initial substantial capital investments in the technological framework, and the training individuals require to use these advanced technologies effectively (Ghosh & Singh, 2020).

### ***Overview of AI imaging tools and their functionalities***

Digital healthcare in India has improved the efficiency of processes and enhanced patient care. New health technologies such as wearable devices, the growth of telemedicine, virtual reality, artificial Intelligence (AI) and robotics are changing the landscape of the Indian healthcare sector (Markets, [2020](#)). A model-based shift in the healthcare delivery system is observed through the application of AI to radio-diagnosis, drug discovery, patient risk identification, and electronic health monitoring (Kumar et al., 2021). Substantial growth in AI technologies has supported the healthcare service providers in essential patient guidance, problem-solving, and support for various medical issues (Daugherty et al., [2019](#)). Healthcare practitioners emphasize that AI-based technologies are helpful in identifying the intensity of treatment and classifying them into high-risk or very high-risk groups. Researchers further envisage that market, liability laws, external regulations, and internal motivation may force the healthcare industry to adopt responsible AI sooner than later. The demonstrable productivity of responsible AI improves market performance in healthcare. Additionally, the patients' adoption of AI-driven solutions is expected to exponentially increase in the next few years (Kumar et al., 2021).

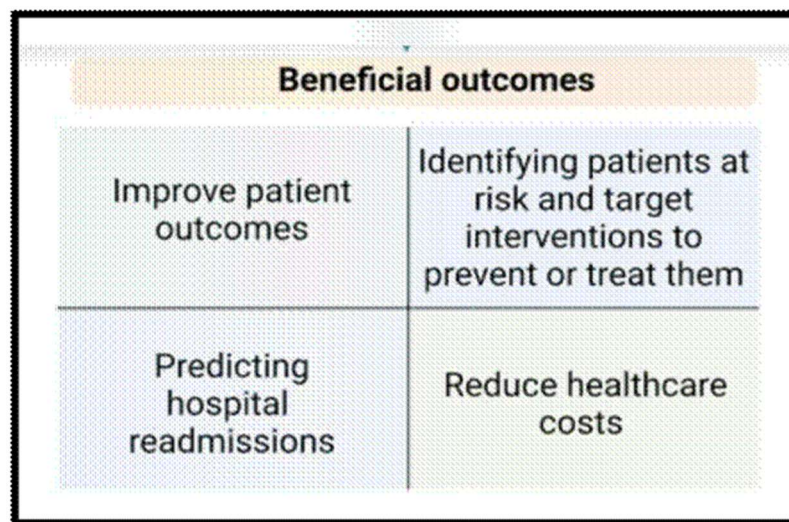
The efficiency of the processes and patient care has been significantly improved after digitalizing each aspect of healthcare in India. Technologies, including wearable devices, AI, robotics and even the growth in telemedicine, have been revolutionizing the Indian healthcare sector. A fundamental change in the healthcare provision system can be seen through the applications:

1. AI for radio signals helps improve imaging diagnostics.
2. Patient risk variegation identifies patients who are at high or very high risk.
3. Electronic health observation allows continuous health monitoring.
4. Drug discovery accelerates the development of novel medications.
5. Personalized treatment, also known as precision medicine, tailors care to a patient's genetics, environment, lifestyle, and biomarkers. AI improves on this method by analyzing complex data, forecasting outcomes, and optimizing

therapies. Real-time suggestions are now possible thanks to advances in machine learning and pre-emptive genotyping, enhancing the safety and efficacy of tailored interventions on a larger scale (Alowais et al., 2023).

Further, the rapid development of this technology has bolstered caregivers in a rudimentary direction to the patient's way to treat them effectively and aid in multiple health problems. Not only a medical specialists highlight the importance of AI-based advancements but also express that AI can recognize the critical situation of a patient, dividing them into specific categories. Moreover, the direction of this industry tends to use AI sooner which emphasizes the:

1. Improving productivity of responsible AI
2. Enhancing market performance in the coming years
3. Predicted rapid extension in patient adaptation of AI-given solutions in the distant future.
4. Predictive analytics uses AI, ML, and data modeling to analyze historical and current data, identifying at-risk patients and improving outcomes in chronic disease prevention and management.



Source: adapted from (Alowais et al., 2023)

### *Role of AI in Strategic Decision-Making*

The term artificial Intelligence (AI) alludes to a variety of technologies that enable computer systems to learn and evolve, including machine learning and natural language processing. AI can evaluate massive amounts of data, detect patterns and trends, and deliver insights to help businesses make sound decisions. Predictive analytics, which uses algorithms to find patterns in data and generate predictions, is one of the most important uses of AI in commercial decision-making (Dwivedi et al., 2019). Because modern technology is developing so quickly, AI systems are consistent and have perfect accuracy when diagnosing illnesses. They assist doctors by enabling them to use accurate information from multiple sources to give the patient helpful advice (Nguyen et al., 2022).

AI significantly enhances decision-making in healthcare by extending human capabilities through efficient data analysis. They can utilize their analytical tools to unstructured information, forming answers from rule sets and permutations and searching for similarities in information from various sites that may impact a decision. AI supports semi-structured decisions by using analytical models to locate and select appropriate data, solve decision models, and interpret outcomes under defined conditions. Additionally, AI-driven business intelligence and analytics effectively tackle big data challenges, offering solutions to complex problems. The integration of AI with decision-support systems creates Intelligent Decision Support Systems (IDSS), enabling more informed and accurate healthcare decisions (Phillips-Wren, 2012).

#### **Theoretical Background:**

As India is a developing nation, it is advised that TAM can be used in situations where technology adoption is still in its early stages. A majority of people in several countries still lack an internet connection. TAM components include external variables, attitude, behavior intention to use (BI), perceived usefulness (PU),

perceived ease of use (PEU), and actual use (AU). According to the TAM model, external variables have a direct effect on the two cognitive belief factors—PU and PEU. Further, PEU affects the PU and attitude, whereas PU impacts the mood and BI, which simulates AU (Wang et al., 2023).

The TAM model, in our context, explains how patients and healthcare professionals embrace AI-based technologies that have the potential to support the decision making in the healthcare sector. In the context of our study, perceived usefulness (PU) and perceived ease of use (PEU) form the main component leading to actual usage. Healthcare being integrated with AI enables professionals to provide accurate diagnosis and improve the system, which influences PU. Adding to this, PEU is achieved through usability, trust and recommendations.

Research objective/ question: How does integrating AI help strategic decision-making in the Indian healthcare sector?

### **Methodology:**

We conducted qualitative research to explore the integration of AI in developing nations like India, where AI is still an emerging tool. Understanding how AI is being adopted and its implications requires an in-depth, exploratory approach, making qualitative research the most suitable method. The benefits of qualitative research are that the information gathered is valuable and generates more honest and representative answers. This study mostly depends on secondary data as industry knowledge and current research offer a complete basis for examining trends in artificial intelligence integration. The benefits of secondary data are that there is a huge range of secondary sources, which makes it more accessible, and the results are mostly statistically valid. Thus, in order to understand the nuances of the adoption of AI in healthcare, we used various sources of secondary data which includes news stories (PTI,2025), research papers (Marda, 2018), industry publications (Muñoz, Parry, & Aneja, 2020), and industry blogs (Dialogue, 2025).

**Framework for analysis:**

The tool Ansoff Matrix can assist marketers and executives in understanding how to expand and devise plans to achieve further growth. Market development, product development, diversification, and market penetration are all growth options a business can employ to expand its product offerings or reach new markets. The matrix combines these options. Before employing any of these tactics, organization leaders can evaluate the degree of risk involved in their implementation.

Force Field Analysis is a decision-making and strategic planning method used to examine a proposed change's viability by identifying and assessing the driving and restraining factors connected with the entity in the issue. The framework distinguished two groups: driving forces favouring and supporting the proposed change and restraining forces aiming to resist it. Users can methodically weigh all of these influences, serving as a foundation for strengthening driving forces while reducing the effects of restraining forces to achieve a successful path. This strategy helped achieve strategic alignment among various resources and operations.

**Table 1: The Ansoff matrix**

	Topic	Descriptions	What are the products or services leading to market penetration?	Function	How is AI penetrating the markets?
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1	Market Penetration	The concept of sales	<p>1)-Qure.ai, an Indian company</p> <p>2)- Chatbots and virtual assistants from Apollo Hospitals</p>	<p>1)-It offers diagnostic imaging solutions that interpret radiology scans that detect diseases.</p> <p>2)-handles routine queries and appointment scheduling, reducing administrative burdens.</p>	<p>1)-With AI integration, patient volume and service efficiency have increased in larger hospitals, enabling a 15-20% rise in patient throughput.</p> <p>2)-Apollo Hospitals has handled over 1 million consultations through this virtual platform, demonstrating significant adoption among patients</p>
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2	Market Development	Selling products into new markets	Swasth Alliance	AI-powered telemedicine platform designed to cater to rural India, providing virtual consultations, remote diagnostics, and preventive care advice. The platform is accessible via mobile phones and supports multiple languages.	Swasth has served over 5 million patients across rural and underserved regions. By collaborating with local healthcare workers, Swasth enables rural populations to access specialist consultations remotely, with 60% of its users from rural areas.
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3	Product Development	Introducing new products to existing markets	Optima IGS 320 2024	Provides precise imaging and real-time analytics, aiding cardiologists in diagnosing and treating heart conditions more effectively	Found in urban areas such as Ahmedabad and tier 2 cities only.
4	Diversification	Entering new market with new products	Docty.ai 2024	integrates AI technologies like symptom checkers and emotion recognition to provide timely healthcare consultations and improve diagnostic accuracy	As of now, it is used in 300 healthcare facilities, and the platform has registered approximately 10,000 patients

Table 2: Force Field Analysis:

Names of products	Consumer factor	Business factor
Qure.ai	Timely Diagnostics <a href="https://yourstory.com/2018/05/pooja-rao-affordable-diagnostics-quire-ai">https://yourstory.com/2018/05/pooja-rao-affordable-diagnostics-quire-ai</a> Affordable Healthcare <a href="https://indiaai.gov.in/startup/quire-ai">https://indiaai.gov.in/startup/quire-ai</a>	Operational Efficiency <a href="https://www.quire.ai/news_press_coverages/quire-ai-interprets-medical-images-for-rapid-diagnoses-startup-stories">https://www.quire.ai/news_press_coverages/quire-ai-interprets-medical-images-for-rapid-diagnoses-startup-stories</a>
Chatbots and virtual assistants from Apollo Hospitals	Access to Information <a href="https://www.apollohospitals.com/apollo-in-the-news/apollo-hospitals-launches-ask-apollo-a-first-of-its-kind-medical-platform-in-the-country-for-remote-patient-care/">https://www.apollohospitals.com/apollo-in-the-news/apollo-hospitals-launches-ask-apollo-a-first-of-its-kind-medical-platform-in-the-country-for-remote-patient-care/</a> Preventive Care <a href="https://softwarestreets.com/blog/virtual-health-assistants/">https://softwarestreets.com/blog/virtual-health-assistants/</a> 24/7 availability <a href="https://www.weforum.org/stories/2024/06/apollo-hospitals-leveraging-ai-and-other-technologies-to-increase-access-to-healthcare-741609b12b/">https://www.weforum.org/stories/2024/06/apollo-hospitals-leveraging-ai-and-other-technologies-to-increase-access-to-healthcare-741609b12b/</a>	N/A

Swasth Alliance	Access to healthcare <a href="https://theprint.in/india/swasth-the-alliance-of-billionaires-start-ups-that-hopes-to-fix-indias-healthcare-system/446848/">https://theprint.in/india/swasth-the-alliance-of-billionaires-start-ups-that-hopes-to-fix-indias-healthcare-system/446848/</a> Affordability <a href="https://mcnultyfound.org/impact/stories/swasth-alliance">https://mcnultyfound.org/impact/stories/swasth-alliance</a>	N/A
Optima IGS 320 2024		Cost-Efficiency and scalability <a href="https://indiaai.gov.in/article/how-docty-aims-to-knit-fragmented-healthcare-system-in-india-with-ai-solutions">https://indiaai.gov.in/article/how-docty-aims-to-knit-fragmented-healthcare-system-in-india-with-ai-solutions</a>
Docty.ai 2024	Consumer factor - Chronic Disease Management and access to Immediate Medical Assistance <a href="https://indiaai.gov.in/article/how-docty-aims-to-knit-fragmented-healthcare-system-in-india-with-ai-solutions">https://indiaai.gov.in/article/how-docty-aims-to-knit-fragmented-healthcare-system-in-india-with-ai-solutions</a>	Technological factors - Data Security <a href="https://indiaai.gov.in/article/how-docty-aims-to-knit-fragmented-healthcare-system-in-india-with-ai-solutions">https://indiaai.gov.in/article/how-docty-aims-to-knit-fragmented-healthcare-system-in-india-with-ai-solutions</a>

### Ansoff Matrix:

The matrix is critical for the healthcare industry since integrating AI imaging techniques will help discover development possibilities and coordinate plans, as in Table 1. Market penetration strives to promote the adoption of AI solutions in existing markets in order to improve productivity and patient outcomes. For example, Qure.ai, an AI-based diagnostic tool from India, improves radiological diagnosis by automating imaging scan interpretation, thereby increasing the number of patients treated in urban hospitals by 15% to 20%. In contrast, the objective of market development focuses on penetrating new markets where AI can tackle gaps in

access—which are often underserved or rural communities. The example of the Swasth Alliance illustrates this. This AI-based telemedicine platform extends virtual consultation, remote diagnostics, and preventive treatment to more than 5 million rural patients, many of whom lack access to traditional healthcare facilities. Product development emphasizes originality and inventiveness, assisting the industry in implementing cutting-edge technologies to raise the standard of healthcare services. One such example is the Optima IGS 320, which gives doctors in metropolitan and tier-2 cities real-time imaging and analytics for cardiology, enabling them to make more precise diagnoses. Lastly, diversification entails developing fresh AI-powered products to address unmet medical demands. Docty.ai, for instance, integrates AI in emotional identification and symptom analysis to provide early interventions and individualized care in 300 medical facilities. Combined, these tactics highlight how the Ansoff Matrix may direct the successful incorporation of AI in healthcare.

### **Force Field Analysis:**

A strategic tool called force field analysis analyzes the forces that encourage change and the forces that impede it to determine whether a particular plan can be implemented. This study gives parties looking to overcome obstacles and take advantage of opportunities to make a fair assessment of the adoption of AI in healthcare as mentioned in Table 2.

### **Consumers**

One of the main incentives for consumers is the quick development of AI technologies, which allow for faster and more precise diagnosis and increase the operational effectiveness of healthcare systems. The accessibility, lower prices, and superior healthcare solutions through AI-integrated diagnostic tools, such as Qure.AI and Docty.AI, will increase demand. Furthermore, these improvements have shown the promise of lower costs and better health outcomes.

## **Business**

Nonetheless, the constraints of the analysis reveal some challenges that limit the application of AI technologies in strategic decision-making. The lack of strong infrastructure in rural areas, where basic tools for implementing AI are usually insufficient, is a major hindrance. Another major concern is data security because establishing trust depends on protecting patient privacy and following legal requirements. Additionally, financial risks are associated with the large initial expenditure from the businesses needed to develop and implement AI solutions such as Optima IGS 320, especially for small and medium-sized healthcare facilities.

## **Conclusion:**

Recent research indicates that artificial intelligence (AI) imaging technologies have the potential to fundamentally transform healthcare by enhancing both diagnostic speed and accuracy. Specifically, imaging systems driven by AI—and more precisely, those employing deep learning algorithms—have demonstrated notable improvements in detecting diseases such as cancer, neurological disorders, and cardiovascular conditions. These systems not only mitigate the likelihood of human error but also streamline radiological workflows, thereby reducing diagnostic timeframes and ultimately improving patient outcomes. Furthermore, AI imaging tools incorporate predictive capabilities that enable healthcare professionals to identify potential health issues at an earlier stage, facilitating more timely and effective clinical interventions. This proactive approach, underpinned by advanced technological integration, holds significant promise for elevating the overall quality of patient care and enhancing treatment efficacy.

While the potential of artificial intelligence imaging in the medical sector is undisputable, several challenges still complicate its incorporation. Issues related to data privacy, bias in algorithms, regulatory challenges, and opposition from certain medical practitioners are some of the major challenges. Artificial intelligence models

need to have large and heterogeneous datasets to work well; however, the variability of medical imaging data and lack of standardization typically limit their functionality. Moreover, ethical issues surrounding decisions made by AI have led physicians and patients to be reluctant in adopting such technologies. The tendency of the majority of AI systems to be a "black box," whose decision-making mechanism is not apparent, also drives the reluctance, particularly in high-stakes medical settings.

The opportunities, challenges and strategic approaches for the implementation of AI in developing countries' healthcare systems are multifaceted and adopting such techniques can either lead to significant growth in the sector or it can cause failures in the practices, destroying the particular industry.

In conclusion, AI imaging tools present a revolutionary opportunity for healthcare, but careful management is needed for their widespread adoption. By addressing concerns related to data security, ethics, and transparency through regulations, education, and interdisciplinary collaboration, AI-driven imaging can significantly improve diagnostic accuracy, accessibility, and overall patient care in the long run.

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