


# Chapter 16


## Technology, Artificial Intelligence, and the Era of Information in Healthcare and Allied Sciences

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### ABSTRACT

*This chapter examines the transformative impact of technology, artificial intelligence (AI), and information proliferation on healthcare and allied sciences. It explores advancements in telemedicine, wearable devices, and AI applications in diagnostics and drug discovery. The role of big data analytics in identifying health trends and informing policy is discussed, alongside ethical considerations of AI-driven health-*

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*care. The chapter also addresses future trends, including genomics-AI integration and quantum computing in drug development. This overview illuminates how these interconnected forces are reshaping healthcare, driving precision medicine, and evolving the roles of healthcare professionals in an increasingly tech-driven landscape.*

## **1. INTRODUCTION**

The 21st century saw an unprecedented combination of technology, AI, and healthcare. This partnership has ushered in information-centric medicine, changing healthcare delivery, research, and experience. AI and advanced technology in healthcare and related sectors have opened new doors for diagnosis, treatment, and patient care, but they have also presented new ethical challenges. Due to an aging population and increased rates of chronic diseases, global societies require better healthcare (Ghosh et al., 2024ab; Taneja et al., 2025; Shakil et al., 2024). Because of growing demand and financial constraints that cannot be resolved by resource augmentation, society must provide healthcare in a sustainable manner. Innovation and quality enhancement lead to better health outcomes without increasing expenditures (Bergman et al. 2015; Ghosh et al., 2024b).

In this chapter, the intersection of information systems, technology, and artificial intelligence in healthcare and related fields is examined. It uses the Technological Innovation Systems (TIS) paradigm to identify systemic difficulties in AI integration, analyzes current applications of AI, and assesses the transformative potential of AI across clinical, administrative, and organizational dimensions. Data-driven decision-making, robots, machine learning, and natural language processing are all discussed, with an emphasis on the advantages and disadvantages of each. Digital health, medical practice, diagnostics, medical equipment, and life sciences innovation are all included in the scope.

AI might accelerate healthcare innovation. Healthcare is data-intensive, and the availability of large amounts of data, processing capacity, and artificial intelligence methods have created promising opportunities. AI-driven advancements aim to mimic human cognitive powers, and robots using large volumes of data may be swiftly interpreted and managed by AI systems. AI can algorithmically identify tiny patterns and correlations in data in the big data age, eliminating the need for more healthcare professionals to examine it. The development of intelligent artificial prostheses (Ortiz-Catalan et al. 2013), the prediction of cardiac surgery mortality (Nilsson et al. 2006), and the diagnosis of skin cancer with an efficacy on par with or superior to dermatologists (Esteva et al. 2017; Haenssle et al. 2018) are just a few of the numerous healthcare applications of AI. However, compared to other

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