

Chapter 17

Innovative Technologies for Healthcare Service Productivity

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ABSTRACT

The world is changing rapidly, especially with a speedy increase in global population. More than ever, for all service-related functions, the organizations are looking for methods to enhance their service throughput. Technological innovations in every industry have been helpful in achieving this growth. In hospitals too, the power of technology has been harnessed for better patient outcomes which directly translates to patient satisfaction. New healthcare technologies have provenly increased the efficiency of care services and operational processes by removing repetitive tasks and providing personalized care to the patients. A successful digital healthcare ecosystem provides clinical decision support which enables both high degree of efficiency (bandwidth and throughput) and high degree of effectiveness (quality patient health outcomes).

1. INTRODUCTION

Advancements in healthcare technology have markedly improved process efficiencies. This has increased the speed of processes and improved patient prognosis and outcomes. Healthcare is considered a challenging service industry where the needs of patients and their families must be taken care of. There is a high degree of complexity in patient care workflows, and the nature of service is considered high-emotion

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as life is involved. A hospital becomes duty-bound to ensure efficient processes and products with the support of technology and well-trained, technologically savvy staff.

The history of advancement in healthcare technology is a dynamic narrative marked by continuous innovation and progress. The healthcare industry has evolved significantly over the centuries, from ancient healing practices to cutting-edge technologies. This review delves into critical milestones, highlighting pivotal moments that have shaped the trajectory of healthcare technology.

Ancient Healing Practices: The roots of healthcare technology trace back to ancient civilizations, where healing practices were deeply intertwined with religious and spiritual beliefs. In ancient Egypt, medical knowledge was inscribed on papyrus scrolls, documenting remedies for various ailments. The Greeks, particularly Hippocrates, laid the foundation for a more systematic approach to medicine, emphasizing observation and documentation.

Renaissance and the Scientific Revolution: The Renaissance witnessed a resurgence of interest in science and medicine. Anatomical studies and dissections paved the way for a deeper understanding of the human body. The invention of the microscope in the 17th century by Antonie van Leeuwenhoek opened new frontiers in microbiology, enabling the observation of microorganisms.

19th Century: Industrialization and Medical Advances: The 19th century brought about significant advancements in healthcare technology. The Industrial Revolution facilitated the mass production of medical instruments and the development of anesthesia, transforming surgical procedures. Florence Nightingale's contributions to nursing laid the groundwork for modern healthcare management and hygiene practices.

20th Century: Radiology and Antibiotics: The early 20th century marked a paradigm shift with the discovery of X-rays by Wilhelm Roentgen in 1895. Radiology revolutionized diagnostics, allowing physicians to visualize internal structures without invasive procedures. The invention of antibiotics, starting with penicillin in 1928 by Alexander Fleming, transformed the treatment of infectious diseases.

Post-World War II: Technological Boom and Digitalization: The aftermath of World War II witnessed an unprecedented surge in technological innovation. The 1950s saw the development of electronic medical devices such as the electrocardiogram (ECG) and the beginnings of computerized tomography (C.T.) in the 1970s. The 1980s brought forth the widespread adoption of electronic health records (EHR), enhancing information management.

21st Century: Precision Medicine and Digital Health: The 21st century is characterized by the convergence of healthcare and technology. Genomic research has paved the way for precision medicine, tailoring treatments based on individual genetic profiles. Digital health technologies, including telemedicine, wearable devices, and mobile health applications, have become integral to patient care, improving accessibility and monitoring.

1.1 Recent Advances: Artificial Intelligence and Robotics

Electronic Health Records (EHR), Radio Frequency Identification (RFID), telemedicine, device portability, blockchain technology, Picture Archiving and Communication Systems (PACS), robotic surgery, artificial intelligence (A.I.), and Internet of Things (IoT) are among the many technology-supported tools which have transformed healthcare service productivity. EHR is hailed as a highly beneficial technology in healthcare for enhancing operational efficiency and reaching and improving the quality of care. RFID-enabled medication administration and inventory tracking system has improved inventory management

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