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## ENHANCING MULTISPECIALITY HOSPITALS PERFORMANCE WITH DIGITAL AND TECHNOLOGICAL ADVANCEMENTS

Ms. J. Sangavi<sup>1</sup> and Dr. S. Sudhamathi<sup>2</sup>

<sup>1</sup>Research Scholar, Alagappa Institute of Management, Alagappa University, Karaikudi.  
sangavi.kalaivanan13@gmail.com

<sup>2</sup>Associate Professor, Alagappa Institute of Management, Alagappa University, Karaikudi.  
sudhamathis@alagappauniversity.ac.in

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### ABSTRACT

**Purpose:** The purpose of the study is to examine the impacts of technological interventions in multispecialty hospitals and to analyse how technologies such as electronic health records, artificial intelligence, telemedicine, hospital information systems, robotic surgery, and automated patient monitoring influence patient care, clinical efficiency, and hospital administration.

**Methodology:** The study adopts a descriptive and analytical research design. Both primary and secondary data were used for the study. Primary data were collected from 200 respondents comprising doctors, nurses, administrative staff, IT personnel, and patients from selected multispecialty hospitals. A structured questionnaire based on a five-point Likert scale was used to collect responses. Purposive sampling was adopted for selecting hospitals, while stratified random sampling was used to select respondents. Percentage analysis and mean score analysis were employed to interpret the data.

**Findings:** The findings indicate that electronic health records are the most significant technological intervention with the highest mean score, followed by artificial intelligence and telemedicine. These technologies improve interdepartmental coordination, diagnostic accuracy, accessibility of specialist services, and administrative efficiency. The study also reveals that respondents from private multispecialty hospitals have greater exposure to advanced technologies compared to those from government hospitals. Technologies such as IoT, blockchain, and cloud-based systems received comparatively lower scores due to limited implementation, lack of awareness, high cost, and cybersecurity concerns.

**Practical Implications:** The study suggests that multispecialty hospitals should invest more in digital infrastructure, staff training, and cybersecurity measures to ensure effective implementation of emerging technologies. Wider adoption of advanced technological systems can improve patient



satisfaction, operational efficiency, and quality of healthcare services.

**Originality/Value:** The study provides a comprehensive understanding of the role of technological interventions in multispecialty hospitals by combining the perspectives of healthcare professionals, technical staff, and patients. It highlights both the benefits and challenges associated with digital transformation in healthcare.

**KEYWORDS:** Technological Interventions, Multispecialty Hospitals, Artificial Intelligence, Healthcare Technology.

## 1. INTRODUCTION

The rapid advancement of digital technologies has transformed the functioning of multispecialty hospitals, leading to significant improvements in patient care, clinical efficiency, and hospital management. Technological interventions such as electronic health records, artificial intelligence (AI), telemedicine, robotic surgery, Internet of Things (IoT)-based monitoring systems, wearable devices, and automated diagnostic tools have become integral to modern healthcare delivery Alsabab (2025). These innovations have enabled hospitals to move from conventional paper-based and manually driven systems toward smart, data-oriented, and patient-centred care environments. In multispecialty hospitals, where different departments and specialists must work together, technological integration plays a vital role in ensuring seamless communication, faster diagnosis, coordinated treatment, and better resource utilization. Electronic health records allow physicians across specialties to access complete patient histories, laboratory reports, imaging results, and prescriptions instantly, thereby reducing medical errors and improving continuity of care. One of the major effects of technological interventions is the enhancement of diagnostic accuracy and clinical decision-making. Artificial intelligence and machine learning systems can analyse large volumes of medical data, including radiology images, laboratory findings, and patient histories, to assist doctors in identifying diseases at an early stage and recommending suitable treatment plans. In multispecialty hospitals, AI-supported tools are widely used in radiology, cardiology, oncology, and pathology to reduce human error and improve the speed of diagnosis. Furthermore, robotic- assisted surgeries and computer-guided procedures have enhanced precision in complex operations, reduced complications, minimized recovery time, and improved patient safety. These technological advancements help hospitals deliver high-quality care while also increasing operational efficiency.

Telemedicine and remote patient monitoring have further widened the scope of healthcare services in multispecialty hospitals. Through virtual consultations, hospitals can provide specialist services to patients living in rural and remote regions, thereby reducing travel time, treatment delays, and healthcare inequalities. Remote monitoring devices and wearable technologies continuously track



patients' vital signs, enabling physicians to detect abnormalities and intervene promptly. This has become particularly useful in the management of chronic diseases, postoperative care, and emergency situations. Technological interventions also support better patient engagement, as mobile health applications and online portals allow patients to schedule appointments, access reports, receive reminders, and communicate with healthcare providers conveniently Mishra (2025). Smart hospital technologies using sensors, cameras, and integrated digital infrastructure enable real-time monitoring of patient movement, resource availability, and hospital performance. Such systems contribute to better utilization of beds, medical equipment, and staff, ultimately lowering operational costs and enhancing patient satisfaction. However, despite these benefits, hospitals also face challenges such as high implementation costs, data privacy concerns, cybersecurity risks, and the need for staff training and digital literacy. Nevertheless, the overall impact of technological interventions in multispecialty hospitals has been overwhelmingly positive, making them indispensable for the future of healthcare.

## **2. REVIEW OF LITERATURE**

Sureka et.al, (2023) the modified STS model applied to the case studies improves our understanding of the critical implementation factors of a multidisciplinary approach and the importance of coordinating radical changes in the technical and the social subsystems of health care organizations. The analysis informs that the multidisciplinary effort is not a sequential process and that the interplay between the two subsystems needs to be managed efficaciously as an integrated organizational whole to deliver the goals set. Agnikula et, al. (2021) Studies conducted after the COVID-19 pandemic emphasize that hospitals are increasingly adopting electronic health records, telemedicine, artificial intelligence, robotics, and Internet of Things (IoT)-based systems to improve healthcare delivery and operational efficiency. Early literature in 2021 highlighted the importance of EHRs in integrating patient data from multiple departments and specialists. Result found that digital patient records improved continuity of care, minimized duplication of tests, and enhanced coordination among clinicians. In addition, the use of natural language processing within EHR systems enabled hospitals to extract meaningful information from clinical notes and thereby improve decision-making and patient outcome prediction.

During 2022 and 2023, the focus of research shifted toward the integration of artificial intelligence with hospital information systems. Several studies reported that AI-supported diagnostic tools were increasingly used in departments such as radiology, cardiology, oncology, and pathology. observed that machine learning algorithms improved diagnostic accuracy by analysing large volumes of clinical and imaging data. Studies also noted that the combination of EHR data and medical imaging through AI produced more precise disease prediction models than traditional single-source systems. Such interventions were particularly useful in multispecialty hospitals where physicians from different disciplines need rapid access to integrated patient information Mohsen et.al, (2022). Artificial



intelligence-enabled telehealth systems improved communication between doctors and patients and facilitated continuous monitoring through wearable devices and connected sensors. These technologies reduced hospital visits, shortened waiting time, and increased access to healthcare services. Scholars also emphasized that telemedicine became a permanent component of hospital service delivery rather than a temporary response to the pandemic Amjad et.al, (2023). Recent reviews have shown growing interest in the use of large language models, predictive analytics, and AI- assisted clinical decision support systems. These technologies are increasingly being incorporated into EHR platforms to support diagnosis, automate documentation, summarize patient histories, and provide treatment recommendations. Finding also observed that AI-driven telemedicine, robotics, and remote patient monitoring are making hospitals more responsive and patient-centric Mizna et.al, (2025). Despite these advancements, contemporary literature continues to underline concerns regarding data privacy, ethical issues, staff training, and the need for stronger regulatory frameworks to ensure safe and effective implementation of technology in multispecialty hospitals.

### **3. METHODOLOGY**

The present study adopts a descriptive and analytical research design to examine the upshots of technological interventions in multispecialty hospitals. The study focuses on identifying the major technological practices implemented in hospitals and analysing their influence on patient care, clinical efficiency, administrative performance, and overall hospital effectiveness. Both primary and secondary data are used for the study. Primary data are collected from doctors, nurses, hospital administrators, technical staff, and patients working or receiving treatment in selected multispecialty hospitals. Secondary data are gathered from journals, hospital reports, government publications, conference proceedings, and other relevant literature related to healthcare technology and hospital management. The study area comprises selected multispecialty hospitals located in urban and semi-urban regions. A purposive sampling technique is adopted to select hospitals that have implemented technological interventions such as electronic health records, telemedicine, hospital information systems, artificial intelligence- based diagnostic tools, robotic surgery, and automated patient monitoring systems. From these hospitals, respondents are selected using stratified random sampling to ensure representation from different categories of stakeholders. The total sample may consist of doctors, nurses, administrative staff, IT personnel, and patients in proportion to their availability within the hospitals.

A structured questionnaire is used as the primary tool for data collection. The questionnaire is divided into different sections covering demographic details, types of technological interventions used in the hospital, perceived benefits of these technologies, challenges in implementation, and their impact on service quality, patient satisfaction, treatment accuracy, cost reduction, and operational efficiency. A five-point Likert scale ranging from “strongly disagree” to “strongly agree” is employed to measure

respondents’ opinions regarding the effectiveness of technological interventions. The collected data are coded, tabulated, and analysed using appropriate statistical tools. Percentage analysis and frequency distribution are used to describe the demographic profile of respondents and the level of technological adoption in hospitals. Mean score analysis is employed to identify the most influential technological interventions. To examine the relationship between technological interventions and hospital performance variables such as patient satisfaction, service quality, and operational efficiency, correlation analysis and regression analysis are applied.

**4. ANALYSIS**

**4.1 Socio Demographic Profile**

Variable	Category	No. of Respondents	Percentage
Gender	Male	110	55.0
	Female	90	45.0
Age	Below 30 years	48	24.0
	31–40 years	72	36.0
	41–50 years	52	26.0
Variable	Category	No. of Respondents	Percentage
	Above 50 years	28	14.0
	Doctors	40	20.0
Occupation	Nurses	60	30.0
	Administrative Staff	35	17.5

	IT / Technical Staff	25	12.5
	Patients	40	20.0
Experience	Below 5 years	58	29.0
	6–10 years	64	32.0
	11–15 years	46	23.0
	Above 15 years	32	16.0
Hospital Type	Private Multispecialty Hospital	130	65.0
	Government Multispecialty Hospital	70	35.0

**4.2 Mean Score Analysis**

<b>Technological Intervention Variable</b>	<b>Mean Score</b>	<b>Rank</b>
Electronic Health Records improve coordination among departments	4.42	I
Artificial Intelligence enhances diagnostic accuracy	4.35	II
Telemedicine improves accessibility of specialist services	4.28	III
Hospital Information Systems improve administrative efficiency	4.21	IV
Automated patient monitoring systems improve patient safety	4.16	V
Robotic surgery enhances treatment precision and reduces complications	4.08	VI
Mobile health applications improve patient communication	3.96	VII



Smart inventory and digital billing reduce operational cost	3.89	VIII
IoT-based technologies improve real-time monitoring	3.82	IX
Blockchain and cloud-based systems improve data security and storage	3.74	X

### 5. DISCUSSION

The demographic profile of the respondents indicates that the study has drawn information from a diverse group of participants representing different genders, age groups, occupations, levels of experience, and types of hospitals. Male respondents constituted a slight majority with 55 percent, while female respondents accounted for 45 percent. The age distribution shows that the largest proportion of respondents belonged to the 31–40 years category (36 percent), followed by 41–50 years (26 percent), below 30 years (24 percent), and above 50 years (14 percent). This suggests that the study largely reflects the opinions of respondents who are in their active professional years and are more likely to be familiar with technological interventions in hospital settings. The occupational distribution further strengthens the reliability of the findings, as it includes doctors, nurses, administrative staff, IT personnel, and patients. Nurses formed the largest group with 30 percent, followed by doctors and patients at 20 percent each, administrative staff at 17.5 percent, and IT or technical staff at 12.5 percent. The inclusion of different stakeholders provides a comprehensive understanding of the influence of technology from both service provider and service user perspectives. The experience profile reveals that most respondents had moderate work experience, with 32 percent having 6–10 years of experience and 29 percent having below 5 years. Respondents with 11–15 years and above 15 years of experience constituted 23 percent and 16 percent respectively. This indicates that the majority of the respondents possess sufficient practical exposure to evaluate the effectiveness of technological systems in multispecialty hospitals.

Moreover, 65 percent of the respondents belonged to private multispecialty hospitals, whereas 35 percent were from government multispecialty hospitals. The larger representation from private hospitals may reflect the greater extent of technological adoption in the private healthcare sector compared to the government sector.

The mean score analysis clearly demonstrates that respondents perceive electronic health records as the most significant technological intervention in multispecialty hospitals, as it obtained the highest mean score of 4.42. This indicates that digital patient records are highly valued for improving communication and coordination among departments, reducing duplication of work, and facilitating continuity of care. The second highest ranked factor, artificial intelligence in diagnostic processes,



received a mean score of 4.35, showing that respondents strongly believe that AI contributes to accurate and faster diagnosis.

Telemedicine, with a mean score of 4.28, emerged as another major intervention, reflecting its importance in extending specialist services to remote and underserved populations. The high ranking indicates that respondents appreciate the role of telemedicine in improving accessibility and reducing the need for repeated hospital visits. Similarly, hospital information systems and automated patient monitoring systems received strong mean scores of 4.21 and 4.16 respectively, implying that these technologies are considered useful in improving administrative efficiency, patient safety, and overall service quality. Robotic surgery and mobile health applications also received favourable responses, indicating that advanced treatment technologies and patient engagement tools are increasingly accepted in multispecialty hospitals. However, relatively lower mean scores were recorded for smart inventory and digital billing systems, IoT-based technologies, and blockchain and cloud-based systems. Although respondents agreed that these technologies are beneficial, their lower rankings indicate that they are either not widely implemented or not fully understood in the selected hospitals. In particular, blockchain and cloud-based systems received the lowest mean score of 3.74, suggesting that concerns regarding data privacy, cybersecurity, and lack of familiarity may limit their acceptance.

## **6. CONCLUSION**

The study concludes that technological interventions have significantly improved the functioning and performance of multispecialty hospitals. The findings reveal that technologies such as electronic health records, artificial intelligence, telemedicine, hospital information systems, automated monitoring systems, and robotic surgery have positively influenced patient care, clinical accuracy, administrative efficiency, and overall hospital service quality. Among these, electronic health records emerged as the most effective intervention, followed by artificial intelligence and telemedicine, indicating that hospitals place greater importance on technologies that enhance coordination, diagnosis, and accessibility of healthcare services.

The demographic analysis also shows that respondents from different age groups, occupations, experience levels, and hospital types generally share a favourable opinion regarding the adoption of technology in hospitals. The greater representation of respondents from private multispecialty hospitals suggests that private institutions are more advanced in implementing modern technologies than government hospitals. Nevertheless, the study highlights that both sectors recognize the importance of digital transformation in healthcare.

Although advanced technologies such as IoT, blockchain, and cloud-based systems were viewed positively, they received comparatively lower levels of acceptance due to limited implementation,



high cost, lack of technical knowledge, and concerns about data security. Therefore, hospitals should invest more in training, awareness, infrastructure, and cybersecurity measures to ensure the effective use of these emerging technologies. The study finally concludes that technological interventions are no longer optional but have become essential for multispecialty hospitals to provide efficient, safe, and patient-centered healthcare services in the modern era.

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