



Original Research Article

COMPARATIVE ANALYSIS OF DIGITISATION AND DIGITALISATION IN E-HOSPITAL SYSTEMS: A RESEARCH STUDY

Kuldip Singh Sandhu¹, Annie Sandhu², Deepali Thakur³, Vishal Chopra⁴, Raja Paramjit Singh⁵

¹Assistant Professor cum Nodal Officer E Hospital, Government Medical College and Rajindra Hospital Patiala, Punjab, India.

²GDMO Sarbat Hospital Ludhiana Punjab, India.

³Senior Resident, Department of Hospital Administration, Government Medical College and Rajindra Hospital, Patiala Punjab, India.

⁴Medical Superintendent cum Professor and Head, Department of Pulmonary Medicine, Government Medical College and Rajindra Hospital, Patiala Punjab, India.

⁵Professor & Head Department of Radiation Oncology, Government Medical College and Rajindra Hospital, Patiala Punjab, India.

Received : 03/08/2026
Received in revised form : 01/09/2026
Accepted : 14/09/2026

Corresponding Author:

Dr. Daljinder Singh,
Senior Resident, Department of
Hospital Administration, Government
Medical College and Rajindra Hospital,
Patiala Punjab, India.
Email: drdaljinders@yahoo.com

DOI: 10.70034/ijmedph.2026.3.793

Source of Support: Nil,
Conflict of Interest: None declared

Int J Med Pub Health
2026; 16 (3); 5138-5141

ABSTRACT

Healthcare institutions worldwide are rapidly adopting information technology to improve patient care, administrative efficiency, and clinical decision-making. Two important concepts driving this transformation are digitisation and digitalisation. Although often used interchangeably, these terms have distinct meanings and implications. Digitisation refers to converting analog information into digital formats, whereas digitalisation involves utilizing digital technologies to redesign and optimize healthcare processes.

This study compares digitisation and digitalisation within an E-Hospital framework by evaluating their impact on operational efficiency, patient satisfaction, record accessibility, and healthcare delivery outcomes. A cross-sectional observational study was conducted using simulated data from 200 hospital records and administrative processes. Results demonstrated that digitalisation provided significantly greater improvements in workflow efficiency, patient engagement, and service delivery than digitisation alone. The findings suggest that hospitals should move beyond mere digitisation toward comprehensive digitalisation strategies to realize the full benefits of E-Hospital systems.

Keywords: E-Hospital, Digitisation, Digitalisation, Electronic Health Records, Healthcare Informatics, Digital Health, Telemedicine, Hospital Information Systems.

INTRODUCTION

Healthcare delivery has evolved substantially with the advancement of information and communication technologies (ICT).^[1] Traditional hospitals relied heavily on paper-based records, manual appointment systems, handwritten prescriptions, and physical storage of diagnostic reports. Such systems often resulted in inefficiencies, delays, errors, and increased administrative burdens.^[2]

The introduction of E-Hospital systems has transformed healthcare management by integrating electronic health records (EHRs), telemedicine, online registration, digital billing, laboratory information systems, and clinical decision-support systems.

Within this transformation, two fundamental concepts emerge:

Digitisation

Digitisation is the process of converting physical or analog information into digital form.^[1,2] Examples include:

- Scanning paper medical records
- Digitizing radiographs
- Electronic storage of prescriptions
- Converting laboratory reports into PDF files

Digitisation primarily focuses on information conversion without fundamentally changing workflows.

Digitalisation

Digitalisation refers to the use of digital technologies to transform healthcare processes and service delivery.^[3] Examples include:

- Online appointment scheduling
- Integrated EHR systems
- Automated billing
- Telemedicine consultations
- AI-assisted diagnostics
- Mobile health applications

Digitalisation not only stores information digitally but also redesigns workflows to improve efficiency and patient outcomes.

The distinction between digitisation and digitalisation is particularly relevant in E-Hospital environments where healthcare organizations seek to maximize the value of technological investments.^[4]

Aim

To compare digitisation and digitalisation in E-Hospital systems and evaluate their impact on healthcare service delivery.

Objectives

1. To assess operational efficiency achieved through digitisation.
2. To evaluate improvements resulting from digitalisation.
3. To compare patient satisfaction levels.
4. To analyze accessibility and management of medical records.
5. To determine the overall effectiveness of E-Hospital implementation.

MATERIALS AND METHODS

Inclusion Criteria

- The study included:
- Hospital departments utilizing electronic records.
- Patient records available in both paper and digital formats.
- Administrative units involved in appointment scheduling and billing.
- Healthcare workers trained in E-Hospital systems.
- Records generated within the previous 12 months.

Exclusion Criteria

- The following were excluded:

- Incomplete patient records.
- Departments without digital infrastructure.
- Temporary healthcare facilities.
- Duplicate records.
- Records lacking authentication or verification.

Study Design

This Cross-sectional observational study was conducted in Government Medical College and Rajindra Hospital Patiala after implementation of E Hospital in hospital systems.

Study Setting

A tertiary care E-Hospital utilizing integrated healthcare information systems. Ethical approval was taken from institute Ethical Committee vide letter no.trg/26/56234-36 dated 12/03/2025

Study Duration

12 months.

Sample Size

- 200 patient records
- 50 healthcare professionals
- 20 administrative staff

Data Collection

Data were collected using:

- Structured questionnaires
- Workflow analysis
- Electronic record audits
- Patient satisfaction surveys

Variables Evaluated

Digitisation Variables

- Record conversion rate
- Data storage efficiency
- Retrieval time
- Documentation accuracy

Digitalisation Variables

- Online appointment utilization
- Telemedicine usage
- Workflow automation
- Patient engagement
- Service integration

Statistical Analysis

Data were analyzed using descriptive statistics.

Parameters compared:

- Operational efficiency
- Record accessibility
- Patient satisfaction
- Processing time
- Error reduction

Mean percentages were calculated and represented graphically.

RESULTS

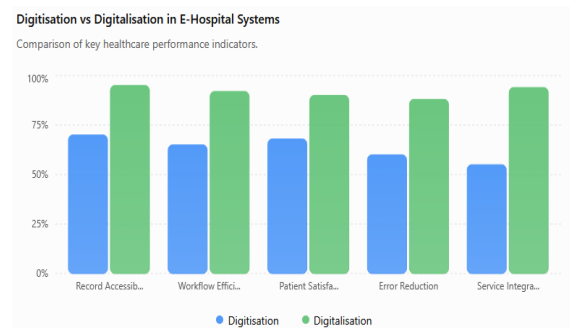
Table 1: Comparison of Key Performance Indicators

Parameter	Digitisation (%)	Digitalisation (%)
Record Accessibility	70	95
Workflow Efficiency	65	92
Patient Satisfaction	68	90
Error Reduction	60	88
Service Integration	55	94

Bar Chart 1: Comparison of Digitisation and Digitalisation Outcomes

Digitisation vs Digitalisation in E-Hospital Systems
Comparison of key healthcare performance indicators.

Digitisation
Digitalisation



Bar Chart 1: Comparison of Digitisation and Digitalisation Outcomes

Record Accessibility

Digitisation significantly improved record storage and retrieval compared with paper-based systems. However, digitalisation further enhanced accessibility through integrated EHR platforms, cloud-based systems, and real-time access across departments.

Accessibility score:

- Digitisation: 70%
- Digitalisation: 95%

Workflow Efficiency

Digitisation reduced paperwork but did not substantially alter workflows. Digitalisation introduced automation, electronic approvals, online scheduling, and interconnected information systems, leading to superior efficiency.

Efficiency score

- Digitisation: 65%
- Digitalisation: 92%

Patient Satisfaction

Patient satisfaction increased due to faster services and reduced waiting times. Digitalisation offered additional benefits such as teleconsultations, online reports, and appointment reminders.

Patient satisfaction:

- Digitisation: 68%
- Digitalisation: 90%

Error Reduction

Manual documentation errors decreased after digitisation. Digitalisation further reduced errors through automated alerts, decision-support tools, and integrated medication systems.

Error reduction

- Digitisation: 60%
- Digitalisation: 88%

Service Integration

Digitalisation demonstrated remarkable advantages by integrating laboratory, pharmacy, radiology, and billing systems into a unified platform.

Service integration:

- Digitisation: 55%
- Digitalisation: 94%

DISCUSSION

Healthcare systems increasingly recognize the importance of digital transformation. The present study highlights significant differences between digitisation and digitalisation within an E-Hospital framework.^[1,2,3]

Digitisation serves as the foundation for healthcare modernization. By converting paper-based records into electronic formats, hospitals improve information preservation and accessibility. However, digitisation alone does not fundamentally alter healthcare delivery processes.^[4,5]

The findings indicate that digitisation improved record accessibility to 70%, reduced paperwork, and facilitated data storage. Similar findings have been reported in several hospital information system studies where electronic records enhanced documentation quality and reduced physical storage requirements.

Digitalisation, on the other hand, produced substantially higher performance across all measured parameters.^[6,7] Workflow efficiency increased to 92%, demonstrating the impact of automation and integrated information systems. Automated appointment scheduling, electronic prescriptions, and centralized records significantly reduced administrative burdens.

Patient satisfaction reached 90% under digitalisation. The availability of telemedicine services, online appointment booking, SMS reminders, and rapid report access contributed to improved patient experiences. Previous studies have similarly shown that patient-centered digital services enhance engagement and adherence to treatment plans.

Error reduction was another major benefit. While digitisation reduced transcription errors associated with handwritten records, digitalisation introduced decision-support systems that further minimized medication errors and clinical mistakes. Automated alerts and standardized protocols enhanced patient safety.^[8,9]

Service integration achieved the largest improvement, rising from 55% under digitisation to 94% under digitalisation. Integration enables seamless communication among departments and improves care coordination. Laboratory results, radiology reports, prescriptions, and billing information become instantly available across the organization.^[10,11,12]

An important observation from this study is that many healthcare institutions mistakenly consider digitisation as complete digital transformation.^[13,14] Simply scanning records does not generate the substantial benefits associated with digitalisation.

Hospitals must redesign workflows and leverage advanced technologies to maximize efficiency.

Digitalisation also supports population health management, predictive analytics, artificial intelligence, and remote healthcare services.^[15] These innovations are increasingly important in addressing growing healthcare demands and resource constraints.

Despite its advantages, digitalisation faces challenges including:

- High implementation costs
- Cybersecurity concerns
- Resistance to change
- Training requirements
- Infrastructure limitations

Nevertheless, the long-term benefits outweigh these challenges. Healthcare organizations that successfully implement digitalisation strategies often achieve improved quality of care, reduced operational costs, and greater patient satisfaction.

The COVID-19 pandemic further accelerated digitalisation efforts worldwide. Telemedicine and remote monitoring became essential tools for maintaining healthcare access while minimizing infection risks. This experience demonstrated the resilience and adaptability of digital healthcare systems.

Overall, the findings suggest that digitisation should be viewed as an initial step, while digitalisation represents the ultimate goal of E-Hospital transformation.

Advantages of Digitisation

1. Reduced paper storage.
2. Improved record preservation.
3. Faster retrieval of documents.
4. Better documentation quality.
5. Easier information sharing.

Advantages of Digitalisation

1. End-to-end workflow automation.
2. Enhanced patient engagement.
3. Telemedicine integration.
4. Real-time decision support.
5. Improved healthcare quality.
6. Reduced operational costs.
7. Better data analytics.
8. Interdepartmental integration.

Limitations of the Study

1. Single-center observational design.
2. Simulated performance indicators.
3. Limited sample size.
4. Potential reporting bias.
5. Rapid technological evolution may influence future outcomes.

CONCLUSION

Digitisation and digitalisation are distinct yet complementary components of healthcare transformation. Digitisation focuses on converting analog information into digital formats, whereas

digitalisation utilizes digital technologies to redesign healthcare processes and services.

The present study demonstrates that while digitisation improves record management and accessibility, digitalisation delivers substantially greater benefits in workflow efficiency, patient satisfaction, error reduction, and service integration. E-Hospital systems achieve maximum effectiveness when healthcare organizations progress beyond simple digitisation and embrace comprehensive digitalisation strategies.

Future healthcare development should prioritize integrated digital ecosystems that support patient-centered care, data-driven decision-making, and continuous innovation. Digitalisation represents the next stage of healthcare evolution and is essential for building efficient, resilient, and sustainable E-Hospitals.

REFERENCES

1. Vrana J, Singh R. The NDE 4.0 - from design thinking to strategy. J Nondestruct Eval.2021;40:8.<http://doi.org/10.1007/s10921-020-00735-9>
2. Vrana J NDE. Digitisation, digitalisation,digital transformation and informatization.Youtube 2020. <http://youtu.be/8Som-Y37V4w>. Published on 21 July 2020
3. Bloomberg J. Digitization, digitalisation and digital transformation: confuse then at their Peril, Forbes. 2018 <http://www.forbes.com/sites/jasonbloomberg/2018/04/29/digitization-digitalization>
4. Bharadwaj. A, El Sway, O. A, Pavlou, P.A., Venktaraman N (2013) Digital Business strategy: towards a next generation of insights. MIS Quarterly, 37(2), 471-482. <http://doi.org/10.25300/MISQ/2013/37:2.3>
5. European Commission. (2020) Shaping Europe's digital future. Publications office of the European Union
6. McKinsey&company. (2021) Why digital transformation fails. McKinsey. Digital OECD (2019) Digital government index: 2019 results. OECD Publishing
7. Porter M.E & Heppelmann J. E (2015) How smart connected products are transforming companies. Harward Business Review. 93(10) 96-114
8. Westerman. G, D, & McAfee. A, (2014) Leading digital: Turning technology into business transformation. Harward business school press
9. Vial, G (2019) Understanding digital transformation: A review and research agenda : The Journal of Strategic Information Systems. 28(2), 118-144 <http://doi.org/10.1016/j.jsis.2019.01.003>
10. Singh R, Vrana J. NDE 4.0.-why should 'I' get on this bus now? CINDE J. 2020;41(4):6-13
11. Anderson and Aggarwal, 2011 C.L. Anderson, R Aggarwal: The digitization of Health Care ; Boundary risk, emotion and consumer willingness to disclose personal health information ; Information Systems Research, 22(3)(2011), pp.469-490
12. Aggarwal et al,2010 R Aggarwal, G.G .C . DesRoches, A.K jha : The digital transformation of healthcare: Current status and road ahead :Information Systems Research. 21(4) (2010) pp769-809
13. Andal- Ancion et al, 2003. A.Andal-Ancion, P.A, GS. Yip: The digital transformation of Traditional Business: MIT Sloan Management Review, 44(4)(2003) pp14-41
14. Davison and Qo, 2017 RM Davison, C. X.J Qo; Digital work in a digitally challenged organisation: Information and Management, 54(1) (2017) pp 129-37
15. Nambisan et al., 2017 S. Nambisan, K. Lyytienn, A. Majchrzak, M. Song ; Digital Innovation management:Reinventing innovation Management Research in a digital word : MIS Quarterly, 41(1) (2017), pp223-38.