

DIGITAL TRANSFORMATION IN HEALTHCARE




The future of healthcare lies in digital empowerment, patient-centric innovations, and data-driven decisions.

— Dr. D.K. Gupta

Overview- Digital Transformation

Digital transformation in healthcare is a cornerstone of a patient-focused outlook to healthcare. It helps healthcare providers in the best feasible way to streamline operations, understand what the patient needs, build trust, and also offer a better user experience.

Around 92% of healthcare professionals & institutes achieved better performance from digital transformation.

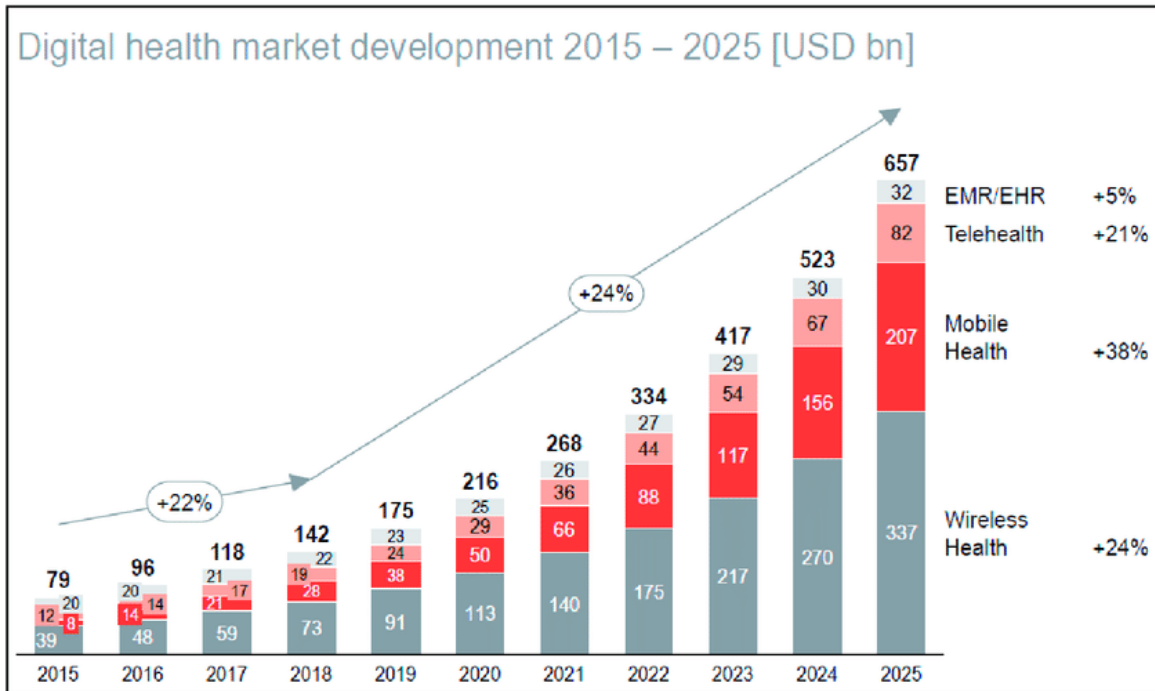


Why Digital Transformation in Healthcare?

- Enables **predictive, personalized, and preventive care**
- Reduces human error and improves efficiency
- Enhances **patient experience** and access to care
- Strengthens **data-driven decision-making**
- Supports real-time monitoring and remote consultations

Growth Drivers for Digitalization in Healthcare

Based on recent data, the Indian healthcare sector is projected to reach approximately **\$638 billion by 2025**, growing from **\$372 billion in 2023**. This represents a **Compound Annual Growth Rate (CAGR) of 22.5%** between 2016 and 2023.



Challenges/Shortcomings in Traditional HealthCare Sector



1. **Low Doctor-Patient Ratio:** Disparity between the number of doctors available and the population needing medical attention is a significant challenge.
2. **Absence of Medical Records:** The lack of centralized medical records or integrated databases makes it difficult for healthcare providers to access patients' complete medical history, leading to inefficiencies in diagnosis and treatment.
3. **Urban-Rural Divide:** 65% rural population, but 80% doctors in urban areas, leading to limited access to immediate care

Challenges/Shortcomings in Traditional HealthCare Sector

4. **Limited Access to Immediate Care:** Many patients, especially those in remote or underserved areas, are deprived of immediate care due to geographical barriers, further widening the gap in healthcare accessibility.

5. **High Healthcare Costs:** Affordability remains a significant barrier to accessing quality healthcare services.

6. **Lack of Telemedicine and Remote Care:** Limited availability of telemedicine services and remote healthcare options restricts access for individuals in remote or underserved areas.

Opportunities of Digitization in Healthcare

1. Automation

The global AI market reached a value of \$119.78 billion in 2022 and is expected to expand at a CAGR of 38% from 2022 to 2030.

Automation helps healthcare with the following:

- It enhances the quality of their care and reduces the time of their stay at the hospital.
- It enhances the safety of the patient.
- It expands efficiency.
- It improves access to care.
- It engages the patients.

On demand Healthcare Solutions

It reduces the paperwork.

It offers people immediate access to medical care.

It gets rid of various hassles.

It provides effective patient interactions.



Telemedicine and Virtual Visits

Telehealth and telemedicine market is expected to hit US\$ 912 Billion by 2033, growing at a compound annual rate of 24% from 2023 – 2033, according to Future Market Insights.

Telemedicine and virtual visits can help you with the following:

- Comfort and convenience.

- It can control infectious illnesses.

- It offers a better assessment.

- It supports the management of chronic conditions and primary care.

Patient Portals

Using patient portals, you can get test results, ask questions, or update patient profiles and insurance companies.

You can benefit from a patient portal in the following ways:

- It provides rapid growth.

- Implementing a patient portal increases office efficiency.

- It streamlines the workflow.

- It supports telemedicine facilitation, which enables patients to consult with you via message or video calls.

- Patient engagement is improved.



Benefits of Digital Transformation in Healthcare

1. It Offers an Optimized Workflow

helps in cutting down on paperwork.

2. It Offers Better Interaction with Clients

Through chats and videocalls

3. It Helps in Creating a Secure Database of EHR (Electronic Health Record)

4. It Offers Advanced Communications

Accurate patient diagnosis, quicker data transmission, and other internal communication are all made possible for organizations because of enhanced communications.



Digital Transformation Benefits for Patients

- It provides personalized medical care services.
- It provides simple access to individual health records.
- It provides easy appointment scheduling.
- It offers excellent communication with Doctors online.

Digital Trends in Healthcare Industry

1. Artificial Intelligence

The global healthcare AI market is expected to reach \$188 billion by 2030, increasing CAGR of 37% from 2022 to 2030. Several hospitals and physicians are using AI to enhance patient treatment based on the data compiled by medical practitioners.

1. Telehealth

A few impactful technologies under telehealth are mobile health apps , telemedicine, remote patient monitoring, and video conferencing.



Digital Trends in Healthcare Industry

Medical IoT

They are utilized to track the real-time location of medical equipment including wheelchairs, nebulizers, oxygen pumps, and numerous other monitoring devices since they are fitted with sensors.

On-demand Healthcare

With its help, patients can book appointments at home, make payments with the app, and get instant summaries of their medical reports that they can use for future medical consultations.



Smart Hospitals -

Smart hospitals are technology enabled hospitals where hospital infrastructure, equipments, systems and processes are redesigned and reengineered to improve patient care, patient experience and operational efficiency.



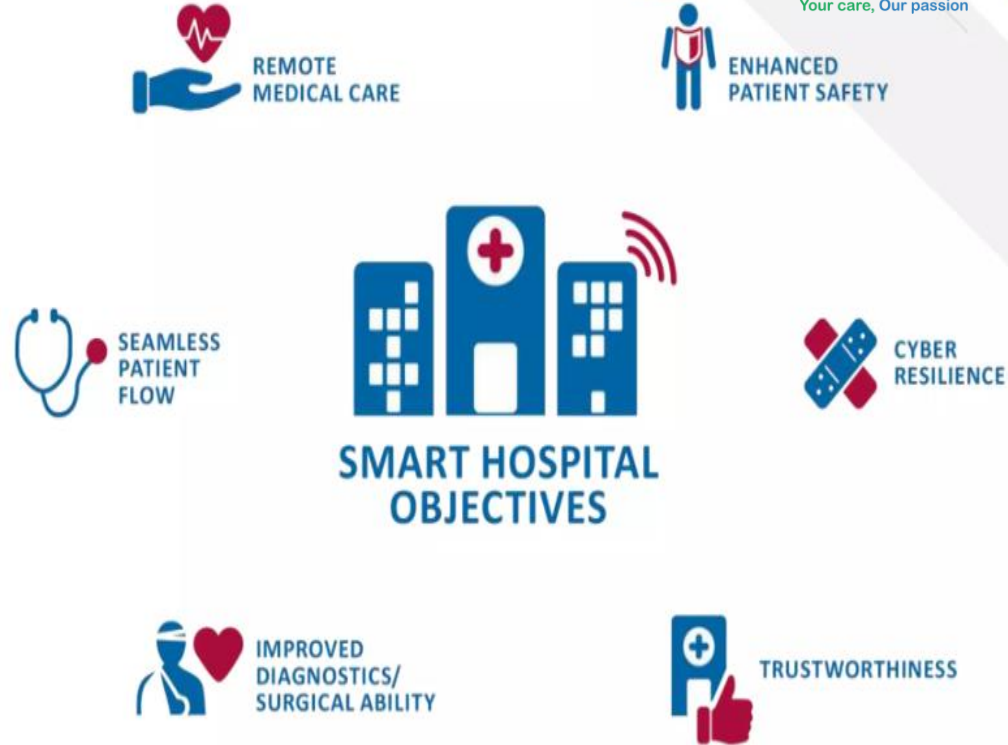
Benefits of smart hospitals -

- **For Providers/hospitals** -
 - Improving operational efficiency
 - Control over systems and processes
 - Hospital asset management
 - Cost optimization
 - Reducing manpower
 - Improving EBITDA and profitability
- **For Patients'** -
 - Improvement in quality of treatment
 - Better patient experience
 - Patient safety (less chances of medication error, wrong surgery/wrong treatment)
 - Electronic health records/ availability of records for future references
 - Lower infection rate,better prognosis.



Components of Smart Hospitals -

- Digitization & Automation
- The Internet of (medical) Things - IOT
- Augmented reality/virtual reality
- Artificial intelligence (AI) and robotics
- 3-D printing
- Telemedicine
- Precision medicine
- Blockchain and cloud computing
- Genomics



Digitization & Automation

This includes -

- **Robotic Process Automation (RPA)** - Robotic process automation, or RPA, is the first component of AI. It is used for back office operations, like in admission and discharge, where bots are used to capture data and fill the forms automatically.
- **Business Process Management (BPM)** - To streamline operations of the hospital wherein different processes are automated through ERP/SaaS. It helps in data capturing, tracking and controlling the processes at each step. It also helps in providing various MIS reports to take strategic management decisions.

The Internet of (medical) things

It includes health wearables like asthma inhalers, digital stethoscope, digital thermometer, wrist watches, health ATM including smartphones with mobile health apps which can easily collect clinical data and patient feedback, This helps clinicians and hospitals to monitor patients 24*7 which further helps in better treatment and outcomes.

IoT with Real-Time Location Systems (RTLS) /GPS can help hospitals for their asset management like equipments, instruments and human resources inside the hospital.



AR and VR -

In healthcare AR and VR can provide simulation trainings to medical students, clinicians, surgeons to update and enhance their clinical/surgical skills.

For patient's, AR and VR can help in different type of rehabilitation programme for early recovery from various Ortho/Neurological problems.



AI and Robotics -

Benefits of AI in smart hospitals -

AI & Data Analytics -Accumulated clinical data can be used for prevention, early diagnosis, early treatment, minimising complications and better outcomes. Data is retrieved from Clinical notes, lab reports, radiological images etc.

AI Chatbots- For management of chronic lifestyle diseases including mental disorders.

Wearables with AI- Wrist watches/patches/monitors for detecting cardiac arrhythmias/abnormal heartbeats.

Robotics -

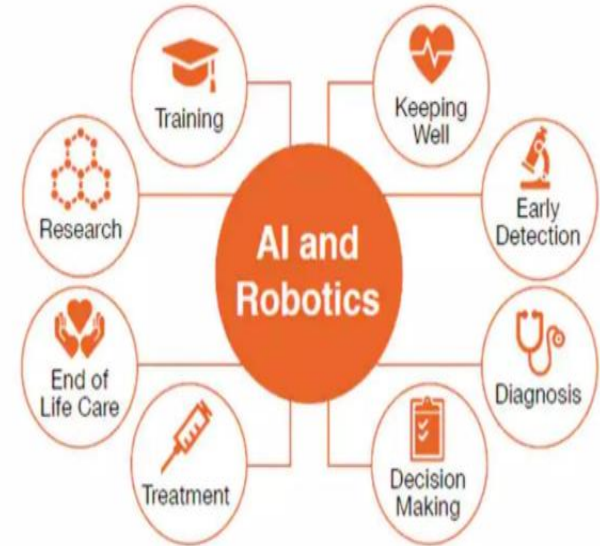
Robotic exoskeletons- are wearable electromechanical devices to enhance the physical performance of patients suffering from ortho/neuro/gait/locomotor problems.

These are also used especially during COVID for routine tasks such as lab sample/ medicine and food delivery, or room cleaning.

Allows the surgeons/doctors to perform many types of complex surgeries with more precision, minimal invasion and better control than conventional services.

Benefits - Fewer complications, such as surgical site infection, Less pain and blood loss, Shorter hospital stay and quicker recovery and Smaller, less noticeable scars

No longer science fiction, AI is transforming healthcare



3- D printing -

Types -

1. **Implants and Prosthetics** - 3D technology can improve how prosthetics fit and function
2. **Anatomical Models** -3D printers can produce highly accurate and detailed anatomical models, assisting surgeons in preparing for complex procedures, improving outcomes and reducing costs
3. **Medical Equipment** - Fabrication of customized medical devices — including forceps, clamps, hemostats and retractors — are among the most common medical uses for 3D printing.

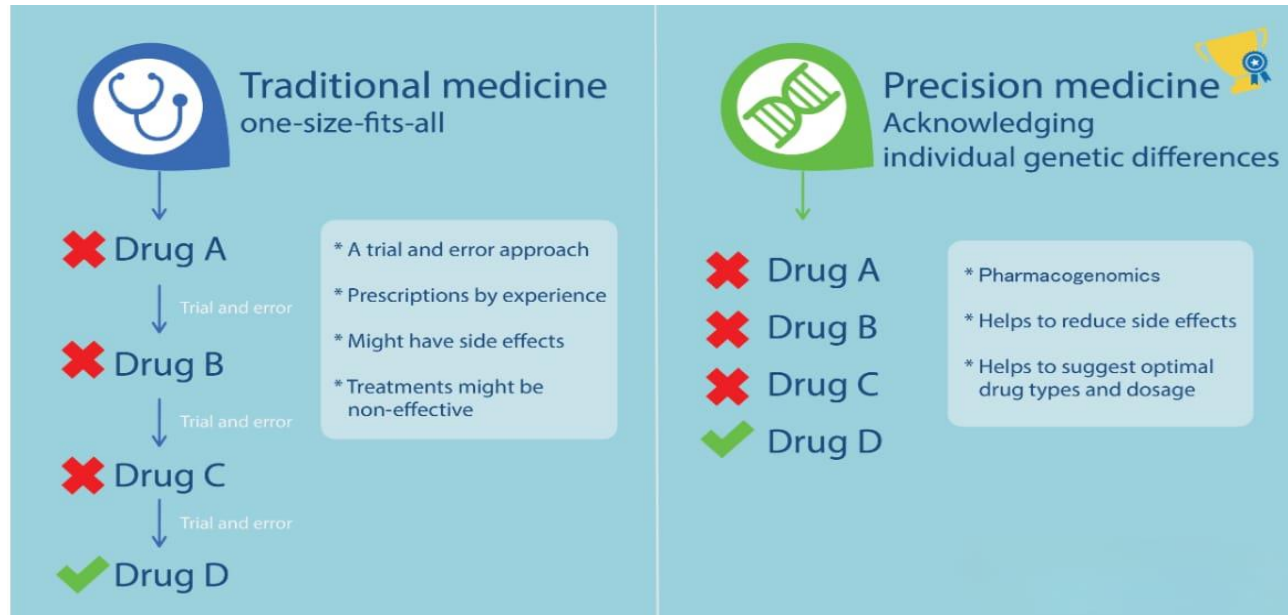


Telemedicine

- **70% of Indian population is residing in rural areas and 70% of hospital infrastructure and medical manpower is confined to Tier 1 cities. Telemedicine is a great tool for providing primary healthcare services to remotest rural areas.**
 - Patients can communicate with physicians from their homes or E-clinics for most of their basic medical needs. Telemedicine can reduce hospital visits of patients and therefore reducing the risk of hospital acquired infections.
 - Telemedicine can help in improving doctors' operation efficiency for medical management in outdoor department.
 - \$5.5 bn telemedicine market by 2025, growing at a CAGR of 31%
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- Telemedicine adoption during COVID - 19 : 80% North India, 50% - South/Western region and more than 30% - Eastern India
 - 30 million tele consultations through Health Ministry's e-Sanjeevani telemedicine as of March 2022.

Precision Medicine

The goal of precision medicine is to target the right treatments to the right patients at the right time based on DNA blueprint, environment, and lifestyle factors.



Blockchain, Cloud computing & Data Analytics -

Blockchain - Helps in information sharing, data security, data exchange and data privacy and it is also useful to prevent malingering of patient/hospital

Cloud Computing & Data Analytics - This helps to store and analyze large quantities of data with various MIS reports.



Genomics

Genomic medicine is the study of our genes (DNA) and their interaction with our health. Genomics investigates how a person's biological information can be used to improve their clinical care and health outcomes.

How is genomics used in medicine?

- **Diagnosis** — for example, where the cause of a range of symptoms cannot be pinpointed by any other means.
- **Prenatal tests that take place during pregnancy** — either to screen (just in case something is wrong with the baby) or where there is already a family history. It helps the parents to make informed choices and plans for the future. **Where there is a family history of serious genetic disorders**, it can tell prospective parents whether or not they are a carrier and if they can pass it on to their children. It can also tell someone if they are likely to develop the inherited condition later in life, even if they don't yet have any symptoms.
- **To assess risk** — someone's genetic makeup can show their susceptibility to suffer **certain illnesses, like heart disease, stroke, and cancer**. Perhaps they're likely to have **high cholesterol levels or to suffer problems with their veins**.

Possessing this knowledge means they can manage the risk through medicines, medical intervention, or making positive lifestyle changes.



Conclusion -

Smart hospitals include the following-

- **Smart Clinicians and Nurses** - Clinicians and nurses have 24*7 access to patients vitals, lab and other reports, critical alerts and medical notes through their mobile phone and this data is used with AI tools for better treatment and outcomes.
- **Smart Infrastructure** - equipped with IOT devices, nurse call bell through voice control, digital equipments for virtual clinical rounds.
- **Smarter ICU** - All the information and triggers directly available to treating consultants for better results. Integration of RTLS processes with existing ICU technologies can improve infection control, personnel and patient location and oversight of the patient room. For example, staff handwashing compliance may be enhanced through the automatic monitoring of tagged staff using RTLS sensors incorporated within.
- **Smart operating theatres** - equipped with touch screens/sensors and voice recognition to prevent surgical infections. Use of AR/VR for training & telemedicine, Robotics for precision and better outcomes.

Ayushman Bharat Digital Mission – Successes

- 50+ Crore **ABHA IDs generated**
- Over 2.4 Lakh **Health Facilities Registered**
- Digital health records improving care continuity
- Boost to **telemedicine**, e-pharmacy, and insurance linkages

ABDM – Challenges

- Limited **digital literacy** in rural areas
- Infrastructure gaps in **remote regions**
- Hesitation among **private healthcare providers**
- **Data privacy & security** concerns
- Lack of training among healthcare staff

Felix Hospitals – Leading by Innovation

- **Paperless systems**, AI-powered diagnostic tools
- Integration with **ABDM** & patient health records
- **Mobile App** for appointments, reports & video consults
- Digital **pharmacy**, inventory & consent workflows
- Empowering **women doctors & digital leaders**

The Way Forward

- Scale up **PPP models** in digital health
- Strengthen cybersecurity & **data protection laws**
- Incentivize **health tech startups** and innovations
- Upskill doctors, nurses, and technicians in **digital tools**
- Bridge the **rural-urban tech divide** with infrastructure investment



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