



The transformative pill : Redefining operational excellence within private hospital settings in digital era

Dissertation Presentation

Himanshi Pandey | 1511 | MBA –HOM



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Introduction

Key Insights



Healthcare in India, one of the country's largest sectors by revenue and employment, employs over 7 million individuals, with projections from the IBEF 2024 report indicating the creation of nearly 3 million new jobs by 2028 through AI integration. Despite significant technological advancements, service delivery remains disproportionate, necessitating a reevaluation of network agencies



70% of the urban and 63% of the rural population are directly or indirectly depended on the private healthcare system. As insurance costs drop, India's reliance on private healthcare surges. However, despite growing demand, inadequate provider support leaves care delivery disproportionate and fragmented, hindering equitable access to quality health services

What are we Expecting ?

This thesis explores how holistic digital interventions can enhance patient outcomes, revamp services in private healthcare, and redefine structures through digitalization, using a hypothetical multispecialty hospital as a case study for significant operational and experiential changes.

Setting the Context Right



The private sector in India, by leveraging digital interventions and modern technology, promises a platter that aims at elevating patient care standards and pressures.



Digital health solutions, such as AI-led risk assessments and mobile-based diagnostics, position private providers to offer cutting-edge services that complement public health efforts³



However, the adoption rate lags behind other industries, impacting patient access, operational efficiency, cost reduction, and outcomes.



Post-pandemic, operational excellence in private healthcare systems is critical than ever, involving streamlining processes, reducing inefficiencies, and ensuring timely, appropriate care



This transformative power of digital technology in India's private hospitals promises to revolutionize patient care and operational excellence

Review of Literature

AUTHOR/INDUSTRY REPORT REVIEWED	YEAR	SALIENT FEATURES OF PUBLICATION
PwC. Next in Health 2024	2024	Emphasizes future healthcare trends, particularly the integration of AI and digital health solutions. Highlights the potential of data analytics to enhance patient care and operational efficiency. Discusses the importance of personalized medicine and patient-centric care models. Identifies challenges such as regulatory barriers and the need for workforce training. Provides insights into the evolving roles of healthcare providers in a digital era.
Gjellebaek et al.	2020	Highlights the necessity for comprehensive digital strategies in healthcare. Emphasizes the importance of effective management practices and stakeholder engagement. Discusses potential benefits such as improved patient outcomes and operational efficiency. Identifies challenges related to technological integration and change management. Suggests ways to align digital initiatives with organizational goals.

AUTHOR/INDUSTRY REPORT REVIEWED	YEAR	SALIENT FEATURES OF PUBLICATION
Eden et al.	2018	Provides a thorough synthesis of existing research on eHealth impacts. Highlights the benefits of eHealth tools in improving hospital workflows and patient care. Discusses the challenges faced by hospitals in integrating eHealth systems. Identifies the need for standardized evaluation metrics for digital health interventions. Suggests areas for future research and development in eHealth.
Marques and Ferreira	2020	Provides a historical overview of digital transformation in healthcare. Identifies key trends and milestones in digital health adoption. Discusses the barriers to digital transformation and proposes strategies for overcoming them. Highlights the potential benefits of telemedicine, EHRs, and AI in healthcare. Suggests areas for future research and practical applications of digital technologies.

Review of Literature

AUTHOR/INDUSTRY REPORT REVIEWED	YEAR	SALIENT FEATURES OF PUBLICATION
Kruk et al.	2018	Emphasizes the need for equitable access to high-quality healthcare. Highlights the role of digital technologies in improving health outcomes. Discusses the challenges and opportunities associated with implementing high-quality health systems. Identifies the importance of data-driven decision-making in healthcare. Suggests policy recommendations for achieving the SDGs in healthcare.
PwC. Digital Healthcare	2024	Highlights the potential benefits of digital healthcare solutions in improving patient outcomes. Discusses the challenges faced by healthcare providers in adopting digital tools. Emphasizes the importance of integrating digital technologies into healthcare workflows. Identifies the need for workforce training and education in digital health. Suggests areas for future research and development in digital healthcare.

AUTHOR/INDUSTRY REPORT REVIEWED	YEAR	SALIENT FEATURES OF PUBLICATION
Raj A.	2022	Discusses the progress and challenges of healthcare innovation in India. Highlights the role of digital health technologies in driving innovation. Identifies barriers to healthcare innovation and proposes strategies for overcoming them. Emphasizes the importance of collaboration between public and private sectors in healthcare innovation. Suggests policy recommendations for fostering healthcare innovation in India.
<u>Sfantou</u> et al.	2017	Reviews the importance of leadership styles in healthcare quality. Highlights the impact of different leadership styles on patient outcomes. Discusses the role of leadership in driving digital transformation in healthcare. Identifies the need for leadership training and development in digital health. Suggests areas for future research on the relationship between leadership and healthcare quality.

Review of Literature

AUTHOR/INDUSTRY REPORT REVIEWED	YEAR	SALIENT FEATURES OF PUBLICATION
Statista. Share of Government Health Expenditure	2024	Provides comprehensive data on government health expenditure trends. Highlights the impact of government spending on health outcomes. Discusses the challenges and opportunities associated with health expenditure. Identifies the need for more insights into spending efficiency and outcomes. Suggests policy recommendations for improving government health expenditure efficiency.
PwC. Global Top Health Industry Issues	2021	Discusses major challenges and trends affecting the global health industry. Highlights the role of digital health technologies in addressing key issues. Identifies opportunities for innovation and improvement in healthcare delivery. Emphasizes the importance of data-driven decision-making in healthcare. Suggests areas for future research and development in the health industry.
Clement F.	2023	Analyses the concept of value-based healthcare and its potential benefits. Discusses the challenges and opportunities associated with implementing value-based healthcare. Highlights the importance of patient-centred care and outcome-based metrics. Identifies the need for clear guidelines and strategies for implementing value-based healthcare. Suggests policy recommendations for fostering value-based healthcare adoption.

AUTHOR/INDUSTRY REPORT REVIEWED	YEAR	SALIENT FEATURES OF PUBLICATION
Sfantou et al.	2017	Reviews the importance of leadership styles in healthcare quality. Highlights the impact of different leadership styles on patient outcomes. Discusses the role of leadership in driving digital transformation in healthcare. Identifies the need for leadership training and development in digital health. Suggests areas for future research on the relationship between leadership and healthcare quality.
WHO. Health Expenditure	2024	Provides comprehensive data on global health expenditure trends. Highlights the impact of health financing on health outcomes. Discusses the challenges and opportunities associated with health expenditure. Identifies the need for more region-specific analysis of health financing. Suggests policy recommendations for improving health expenditure efficiency.
PwC. Enabling Healthcare with Technology	2024	Highlights the potential benefits of technology in improving healthcare delivery. Discusses the challenges faced by healthcare providers in adopting technology. Emphasizes the importance of integrating digital tools into healthcare workflows. Identifies the need for workforce training and education in digital health. Suggests areas for future research and development in healthcare technology.

Objectives



To analyze the current state of private healthcare units in India.



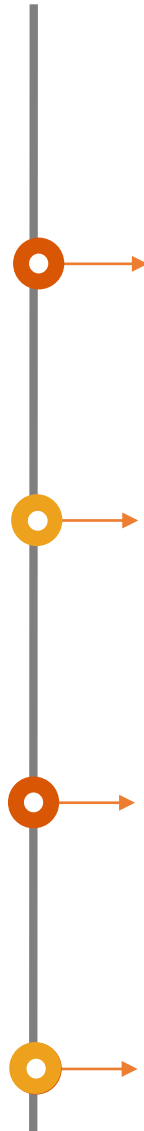
To identify operational inefficiencies and systemic laggards in private hospitals.



To propose strategic recommendations for technology adoption to enhance operational efficiency of private hospitals.



Develop a phased implementation plan for digital transformation in private hospitals in four selected depts.



What are we trying to accomplish ?

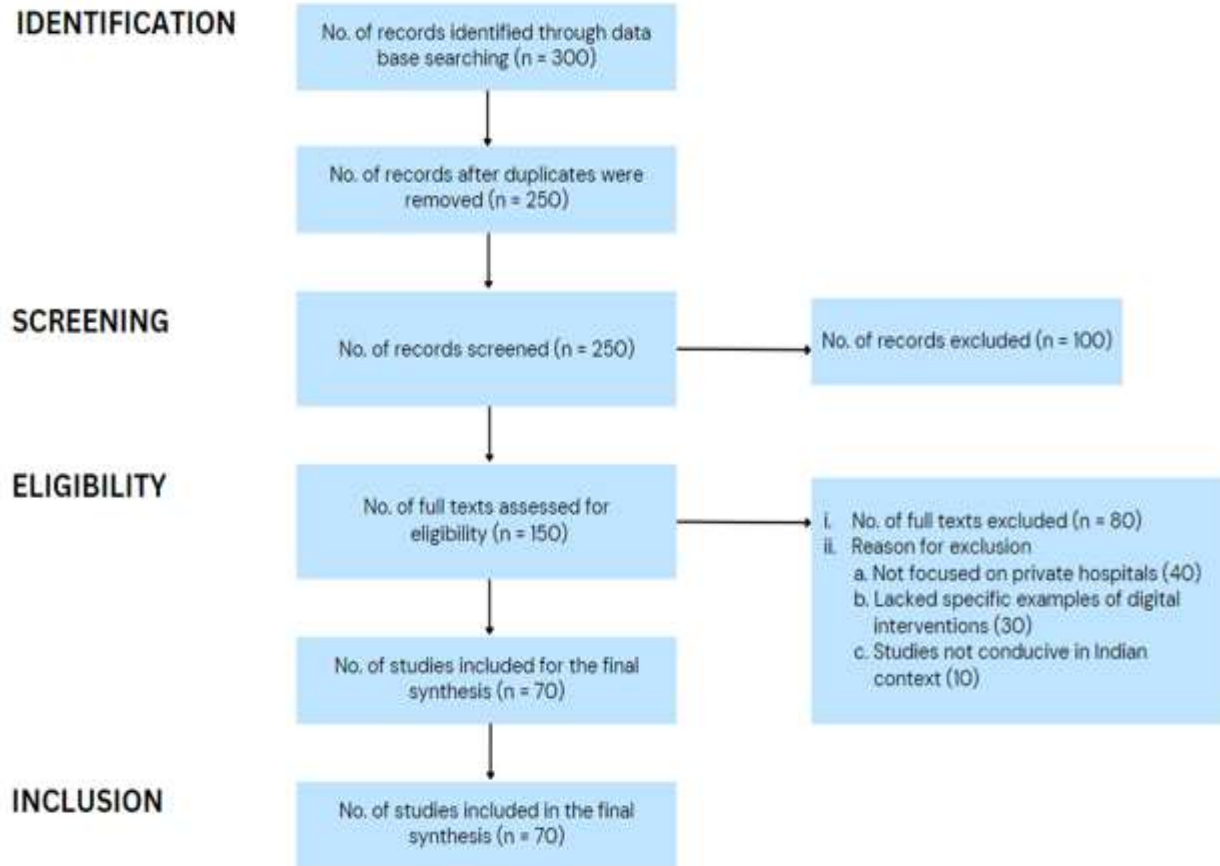
The study aims to **provide a comprehensive assessment** of the **current landscape and significance of private healthcare units in India**, establishing a **baseline for understanding** their **role and performance** within the broader healthcare system. This is crucial for **contextualizing the need for revamping private healthcare units**.

By pinpointing **operational inefficiencies and systemic laggards**, this **objectives seeks to uncover the underlying issues that hinder optimal performance** in private hospitals. Identifying these gaps is essential for **developing targeted strategies** to enhance efficiency and service quality **laying the baseline for their digital facelift**.

This study furthers the focus on **investigating the key potential areas** where digital health technologies can be integrated within private hospitals and **how would the phasal integration take place against the existing laggards**. By identifying these areas, **the study aims to propose innovative solutions that can transform healthcare delivery**, making it more efficient and patient-centric.

Further the **departmental evaluation** of the **impact of digital health solutions** (against their **existing laggards and use cases**) post-implementation is critical for understanding their effectiveness. This objective also includes **developing a phased implementation plan** for digital transformation **in four selected departments, ensuring a structured and systematic approach to adopting new technologies**.

Methodology



How was it accomplished ?

This study employed a **systematic review approach** to synthesize **existing literature and empirical studies** on the **impact of digital interventions in private hospital settings in India**.

The articles were synthesized and searched based on the **keywords** involving but not limited to **“Digital Health Interventions”**, **“Healthcare Technology Adoption”**, **“Operational Efficiency in Hospitals”**, **“Cost Optimization in Healthcare”**, **“Patient Care Management”**, **“Automation”**.

The timeline decided was on published data from **January 1st, 2017, to March 31st, 2024**. The study period was chosen based on recent social, technological, and political developments in the last decade regarding revamping healthcare institutional structures.

Although the wave of such **developments resounded** much earlier worldwide, **the cracks within the system** were highlighted much later in India. We carried out literature searches between **April 1st, 2024, up until 20th May 2024**.

Key Findings/Results



Uneven resource distribution & care standards

In India, disparities in resource distribution and care standards persist within the private healthcare sector. Rural and semi-urban areas are underserved compared to urban centers, with fewer healthcare facilities and medical professionals per capita (WHO, 2023). This imbalance leads to higher patient loads and longer wait times in urban hospitals, affecting care quality. Private hospitals play a crucial role in enhancing accessibility and affordability, as emphasized by the National Health Profile of India (MOHFW, 2022; Patil et al., 2023). Targeted resource allocation and standardized care protocols are essential to improve healthcare equity and efficiency nationwide.



Private hospital units need a digital facelift

Private hospitals face significant operational and administrative challenges, including prolonged patient wait times, outdated processes, and inefficient resource management. Recent studies highlight that integrating digital solutions, such as hospital information systems and automated patient management tools, can effectively mitigate these issues (Agarwal et al., 2022). Technologies like cloud-based management systems, AI for patient triage, and automated billing processes streamline workflows, reduce administrative burdens, and enhance patient satisfaction by improving service delivery and minimizing wait times (Raman et al., 2023). Digital transformation is crucial for enhancing operational efficiency, reducing costs, and ultimately improving patient care and hospital performance, as emphasized in a report by PwC (PwC Health Research Institute, 2023).

Key Findings/Results



Integrating AI-driven diagnostic tools and HER can drastically reduce diagnostic errors and streamline patient management

The adoption of AI in healthcare enables more accurate and faster diagnostics, significantly reducing the risk of human error (Topol, 2022). Moreover, EHR integration improves data accessibility and coordination among healthcare providers, leading to better patient outcomes. Recent studies have shown that hospitals employing EHR systems experience substantial improvements in efficiency, data management, and patient care quality (Buntin et al., 2023). Additionally, a Gartner report (2023) highlights that AI and EHR systems facilitate predictive analytics and personalized medicine, thereby revolutionizing healthcare delivery by ensuring timely, accurate, and coordinated patient care (Gartner, 2023).



Targeted digital transformation

Targeted digital transformation in key hospital departments can drive broader improvements, boosting operational efficiency and patient care. Focusing on front-end patient dynamics, supply chain management, laboratory operations, and pharmaceutical departments can synergize efforts to overcome operational challenges. Studies indicate that digital advancements in these areas can reduce wait times, enhance diagnostic accuracy with AI-powered imaging systems in Radiology, and expedite test results through automated laboratory systems (Wachter, 2023; Lee et al., 2022; Singh & Kumar, 2021). This phased approach ensures manageable implementation and measurable outcomes, serving as a model for comprehensive digital integration across hospitals to enhance overall performance (KPMG, 2023).

Discussion

01

Reimagining India's Healthcare System: The Private Lens



The Questionable Boom: Did we miss the Mark ?

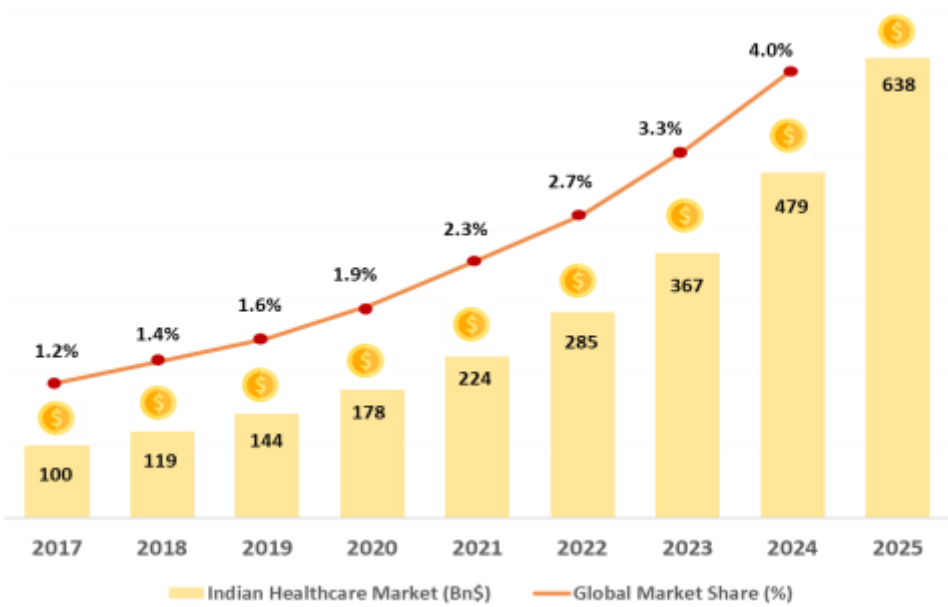


Fig: The growth of Indian Healthcare Market (Bn\$) in the last decade against the Global Market Share | OECD Analysis

In 2022, the healthcare sector in India was valued at approximately ₹29.76 lakh crores, with hospitals comprising 80% of the industry's net worth. The sector has witnessed a rise from a modest \$45 billion in 2008, reflecting an impressive 700% surge over the past decade. In FY 2023, the private hospital sector in India was valued at ₹11.67 lakh crores and is projected to escalate to ₹26 lakh crores in the coming years, expanding at a compound annual growth rate (CAGR) of 18.6%. This paradox underscores the urgent need for strategic interventions to ensure the equitable distribution of the benefits arising from this growth.

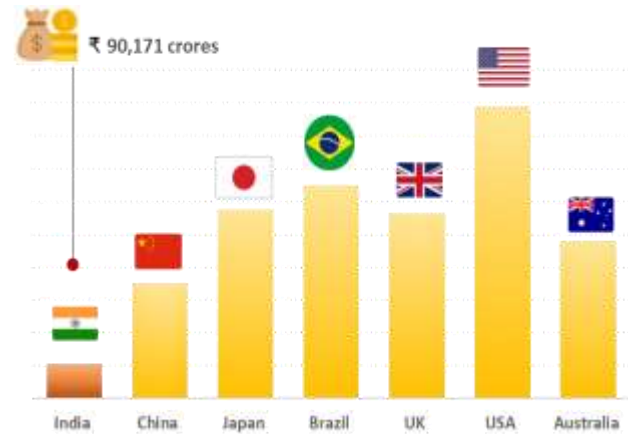


Fig: India's healthcare expenditure as % of its GDP, comparison to the developing and developed countries | WHO

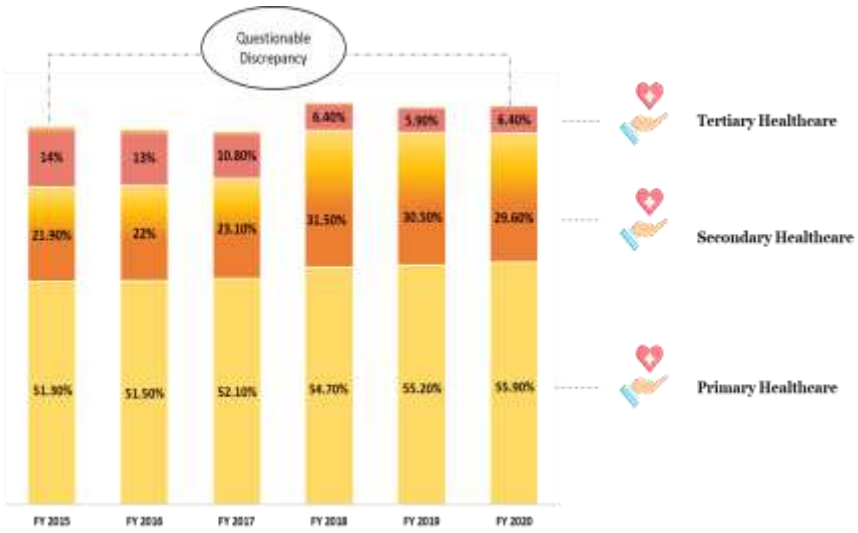
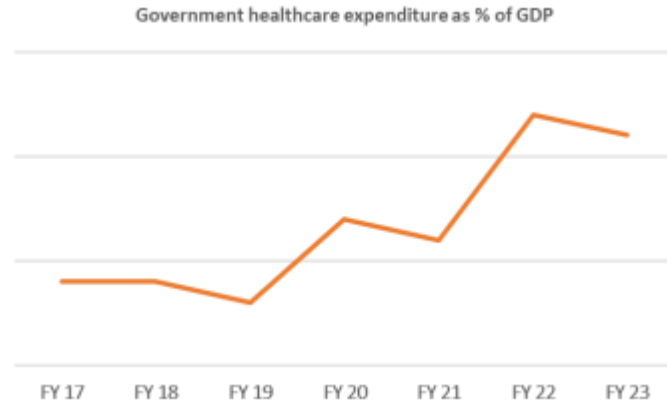


Fig: Distribution of Government Health Expenditure in India from FY 2015 to 2020 | Source Statista

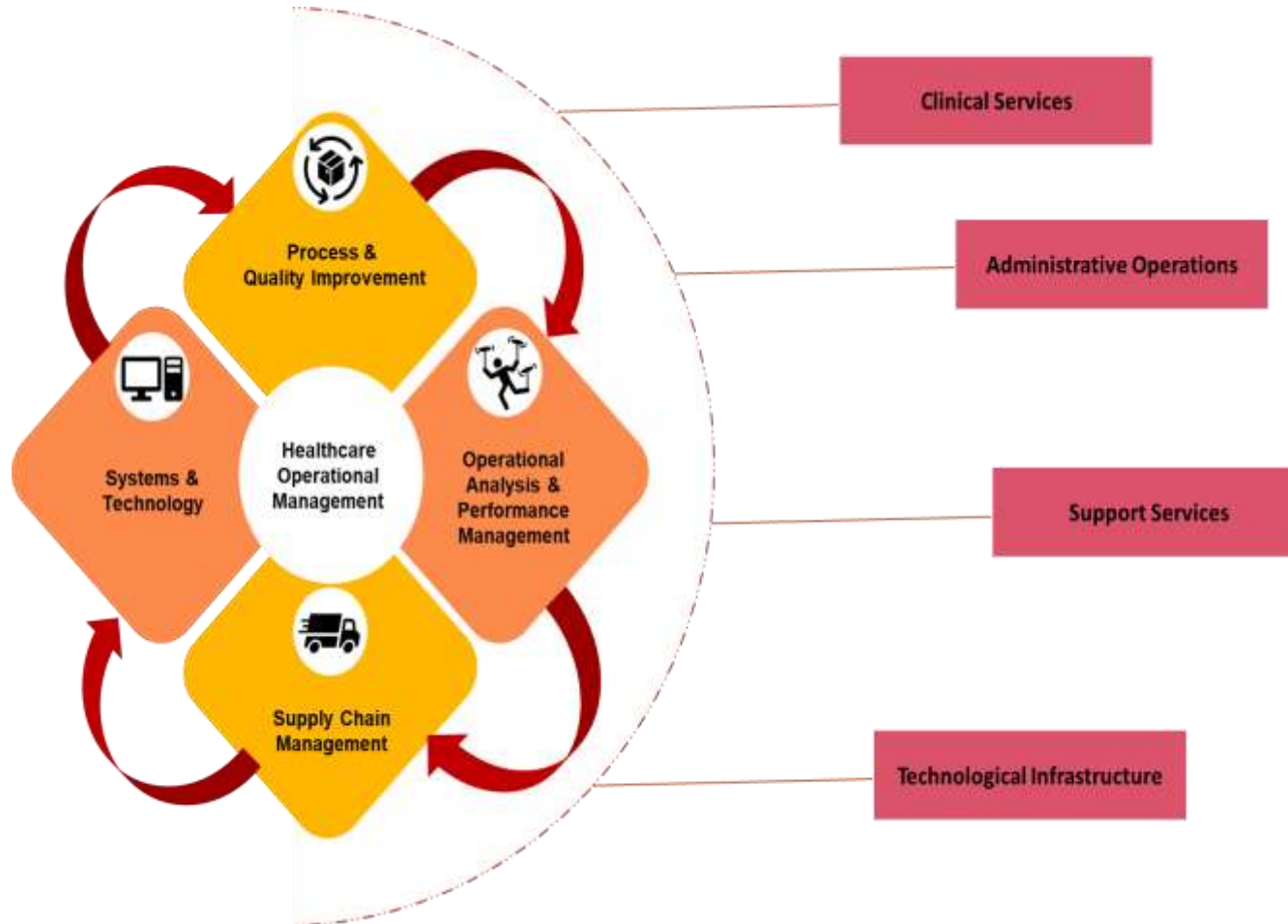
Picture a country wrestling with its questionable increase in disease burden, how would it ever sustain itself against the market dominance of low resource allocation. These equations further strain the public healthcare institutions to revamp any of its current modalities against the expected tenants of service delivery.

02

Elevating Private Hospitals: Necessitating Major Facelift



Impetus for change: the bleeding operational ecosystem



Do we really need a change?

01

In the complex landscape of private hospital systems in India, traditional operations management practices have become increasingly obsolete and detrimental to efficiency and effectiveness. These systems, often heavily reliant on manual processes, are hemorrhaging resources and impeding progress in a rapidly evolving healthcare environment.

02

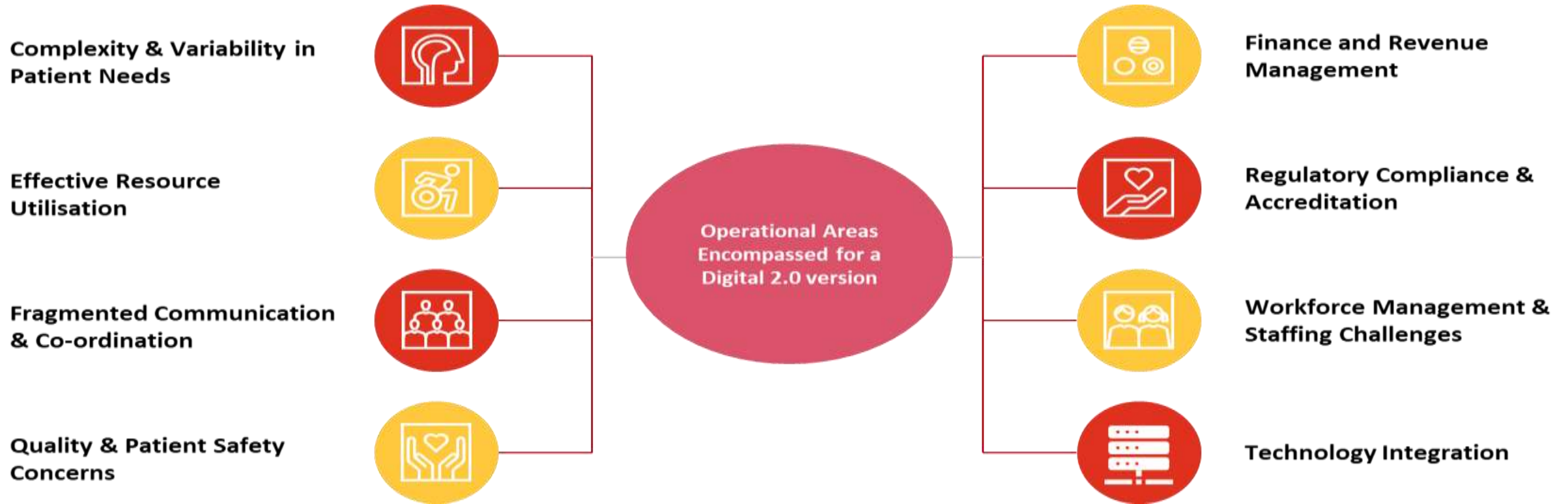
In many private hospitals, information is siloed, with departments functioning in isolation rather than as part of a cohesive unit. This disjointed approach can lead to critical lapses in patient care, such as miscommunication about patient histories, medication errors, and redundant diagnostic tests.

03

Moreover, the infrastructure supporting these legacy systems is often outdated, unable to handle the volume and complexity of modern healthcare demands. Equipment failures, lack of real-time data access, and inadequate support for advanced medical procedures underscore the need for a comprehensive overhaul.

Therefore, it is imperative to recognize that the current state of operations management in private hospitals in India requires a digital revamp.

Complexities in Hospital Operations: Necessitating the 2.0 version



01

Achieving operational excellence in hospital management is like navigating a vast, intricate labyrinth where each turn must be precisely coordinated to reach the goal of superior patient care and financial sustainability. Hospitals face diverse patient needs that demand adaptable models, while resource constraints necessitate meticulous planning and technological investment.

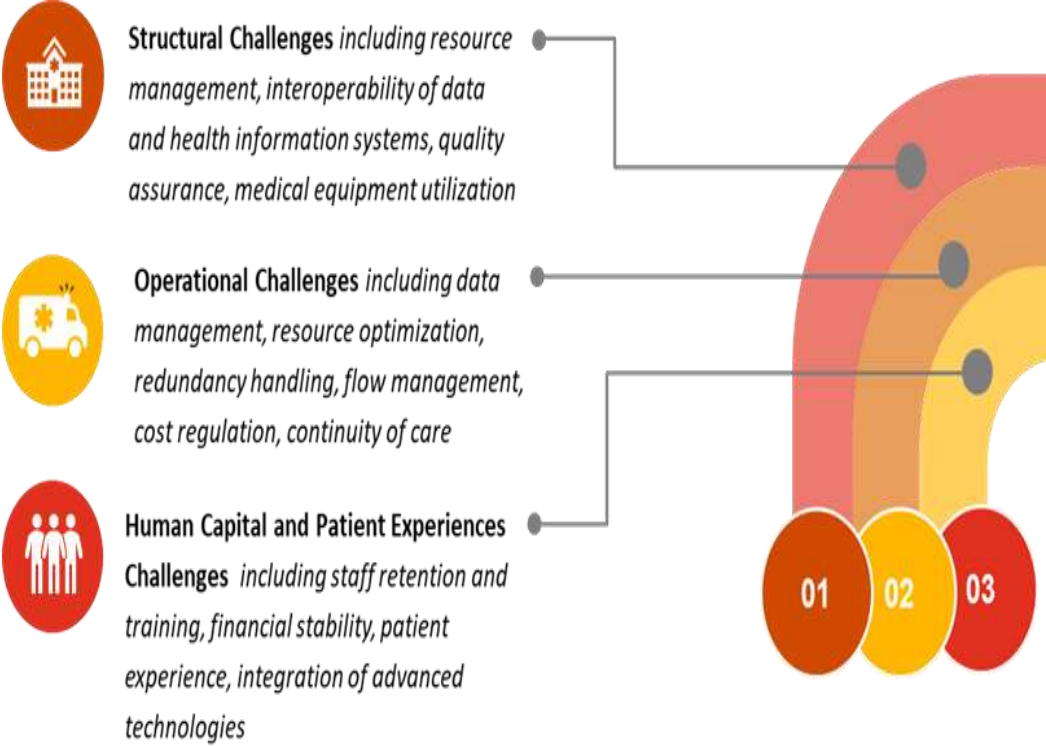
02

Communication silos and fragmented systems disrupt the seamless flow of care. Quality and safety issues, financial pressures, and regulatory compliance add layers of complexity. Workforce management challenges, including staff shortages and burnout, further strain operations.

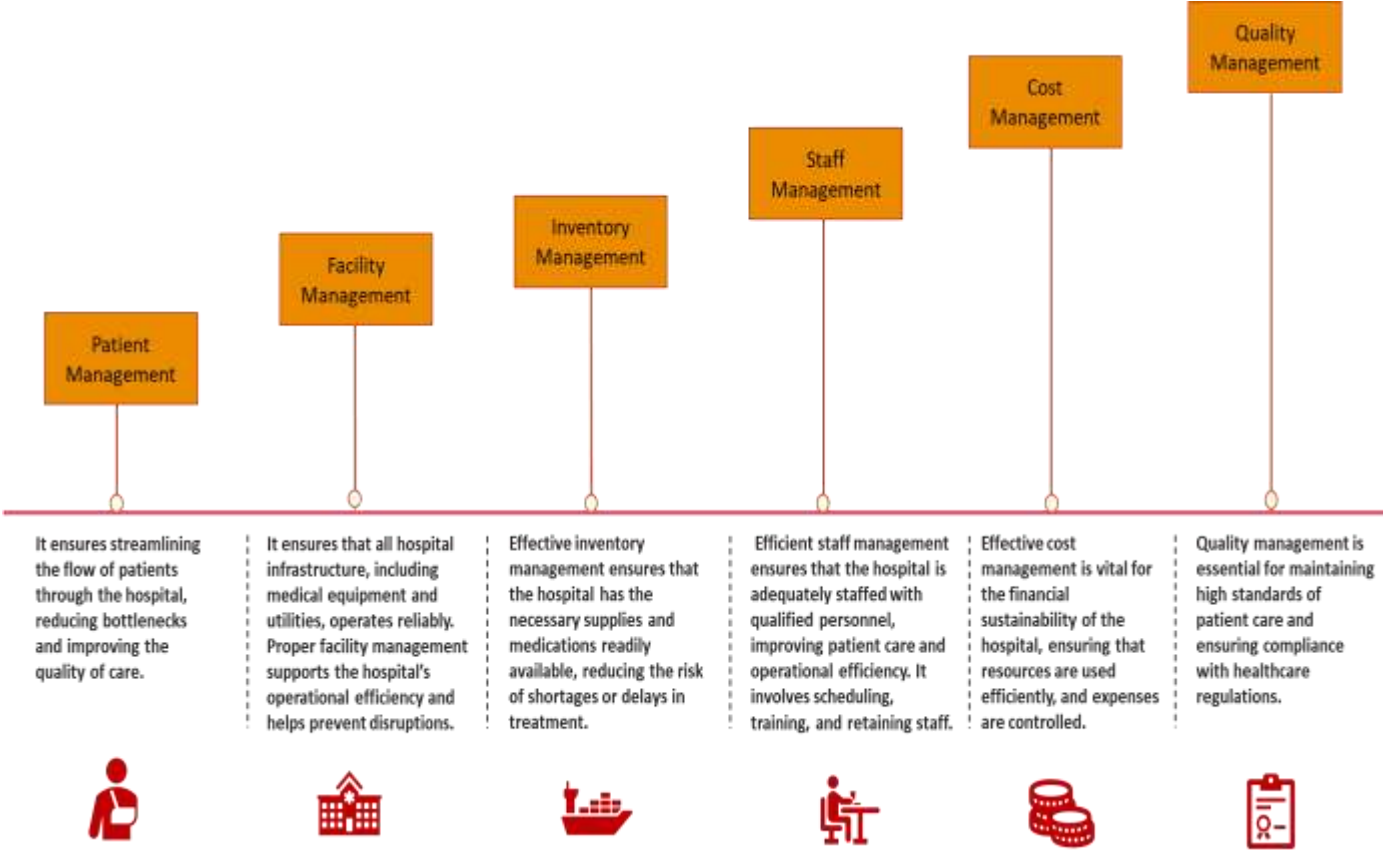
03

Additionally, integrating new technologies without disrupting existing workflows requires substantial investment and training. A strategic focus on continuous improvement, innovation, and cross-departmental collaboration is essential for hospitals to navigate these challenges and achieve operational excellence, ensuring optimal outcomes for patients.

Is it time for the private hospital units to go beyond legacy systems?



Could Leveraging Digital Tools Address the Operational Bottlenecks?



03

From Judicious Adoption to Strategic Implementation: Hospitals of Tomorrow



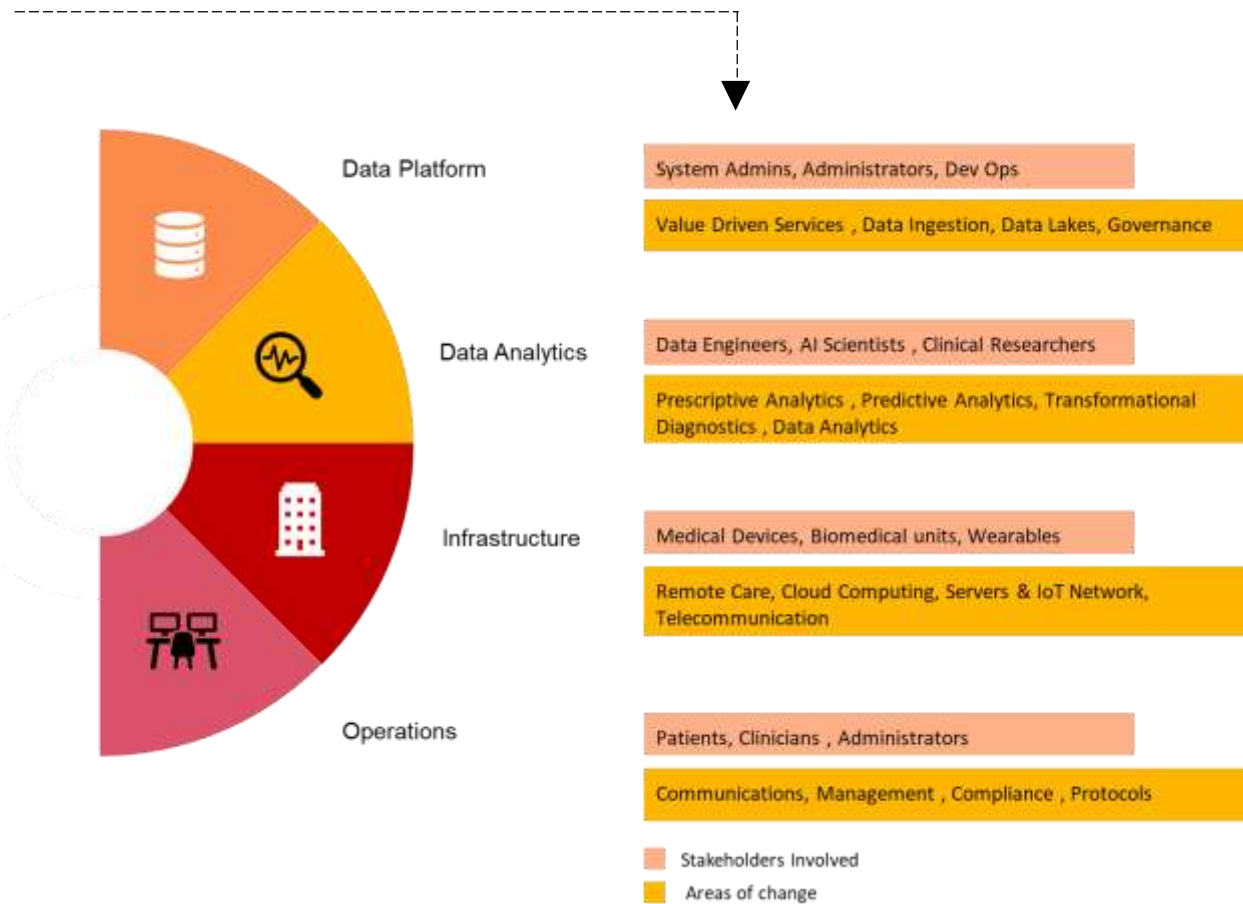
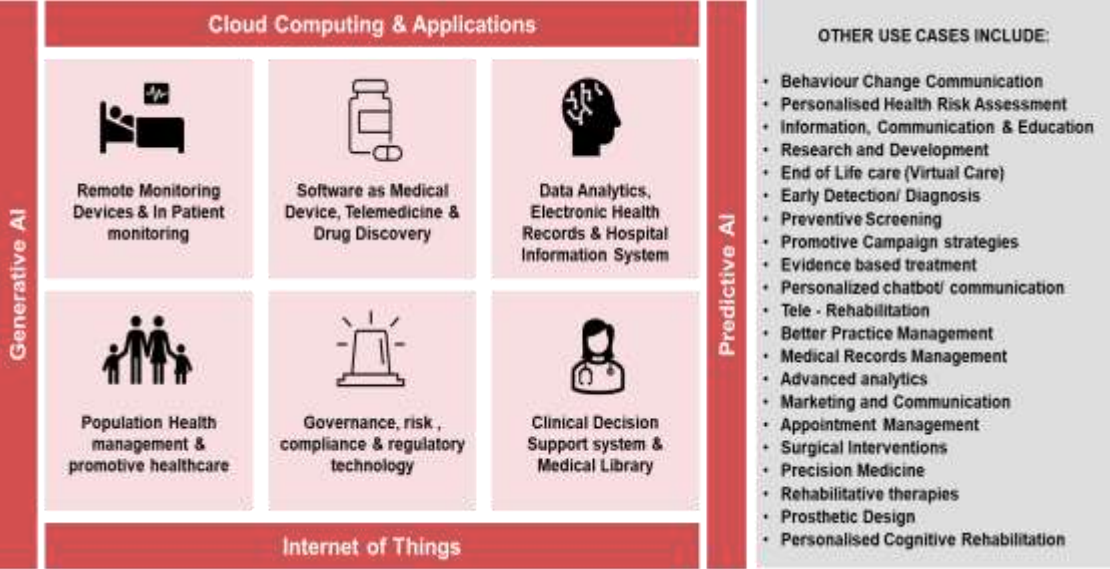
Implementing the Adoption Strategies: Evolution Of “Smart Hospitals”

What is it bringing to the table ?

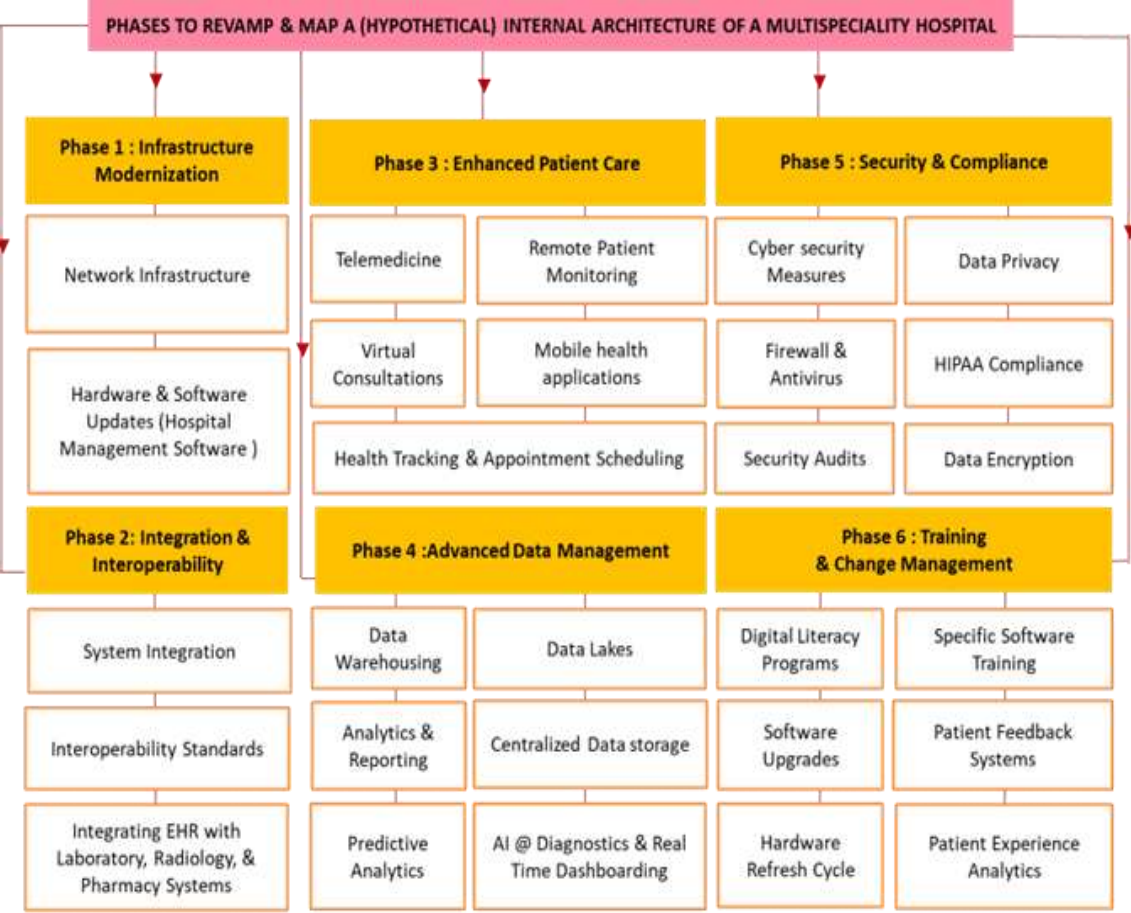
What is a “Smart Hospital”, the functional domains it differentiates ?

A "smart hospital" efficiently utilizes data and technology to enhance operations, management, and clinical care, unlike traditional private healthcare institutions where data is often unstructured and scattered across various records. Smart hospitals centralize and analyze data using AI to improve clinical decision-making, forecasting, surgical interventions, and early diagnosis. This transformation addresses challenges like resource scarcity and workforce shortages, improving care quality, sustainability, and resilience, making it a crucial advancement for private hospitals facing modern healthcare demands.

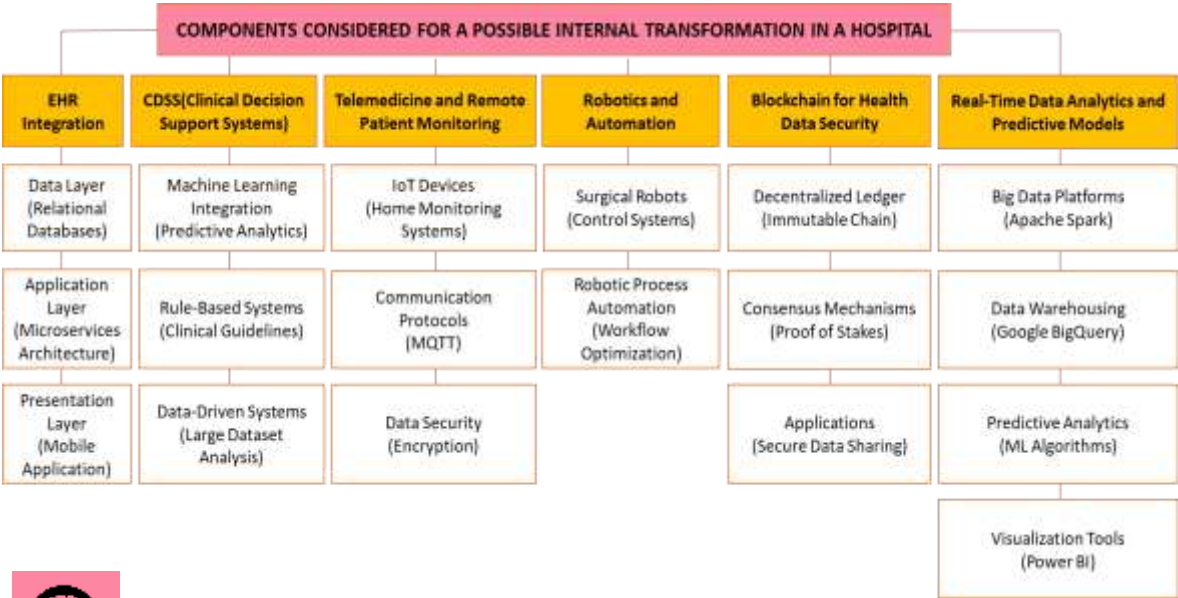
The “Application Suite” and the “Use Cases” impacted in the given setting



Mapping The Framework and Developing the Infrastructure



The above given flowchart for the digital transformation of a multispecialty hospital (though hypothetical in nature) is organized into the following essential phases: **Infrastructure Modernization, Integration and Interoperability, Enhanced Patient Care, Advanced Data Management, Security and Compliance and Training and Change Management**. Each phase encompasses specific tasks that are critical to achieving the overall transformation goals.



The internal transformation of a hospital's digital infrastructure is crucial in promoting the care modality of value-based care. By integrating digital health solutions into their operations, hospitals can streamline administrative processes, reduce errors, and enhance efficiency. Automated systems for scheduling, billing, and inventory management free up healthcare professionals to focus more on patient care. Real-time data sharing across departments improves coordination and reduces redundant tests and procedures, ultimately lowering healthcare costs and improving patient outcomes. This transformation creates a more responsive and efficient healthcare environment, where the emphasis is on delivering high-quality, patient-centered care.

Sustaining Knowledge Management: Contribution to business decision making

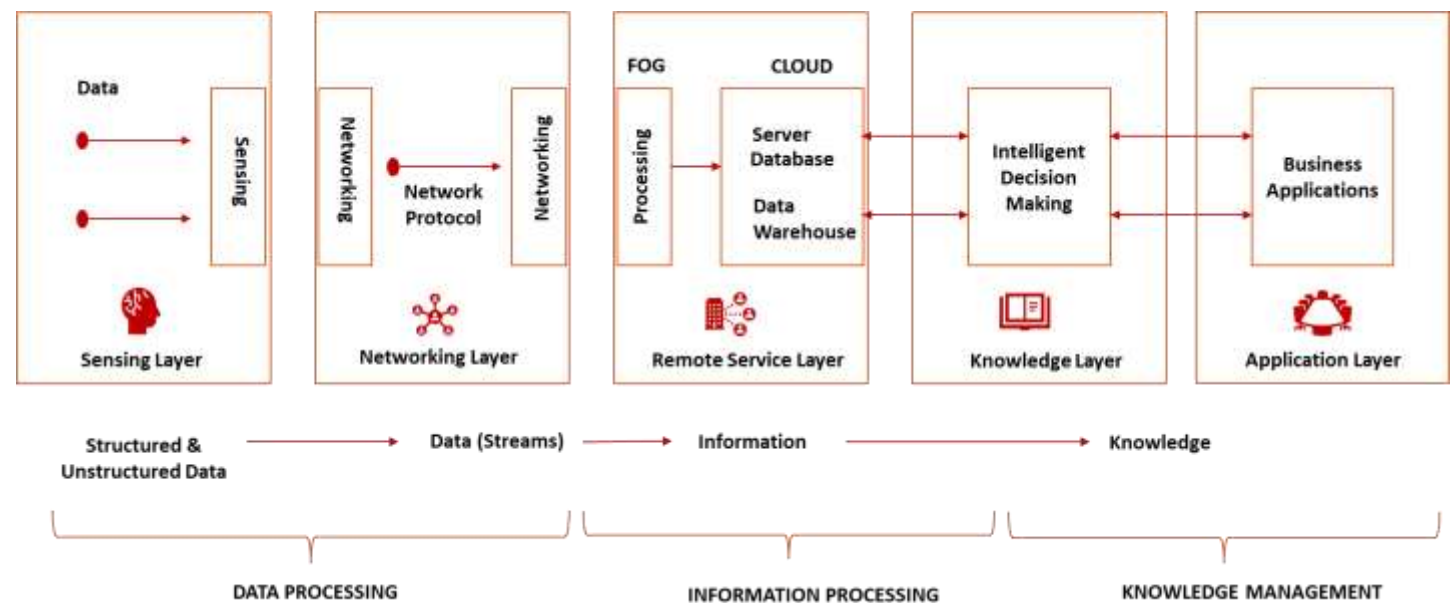
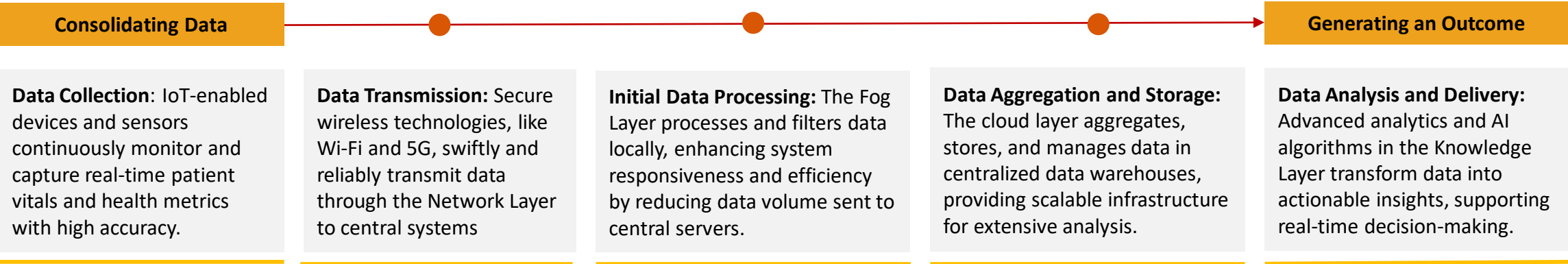
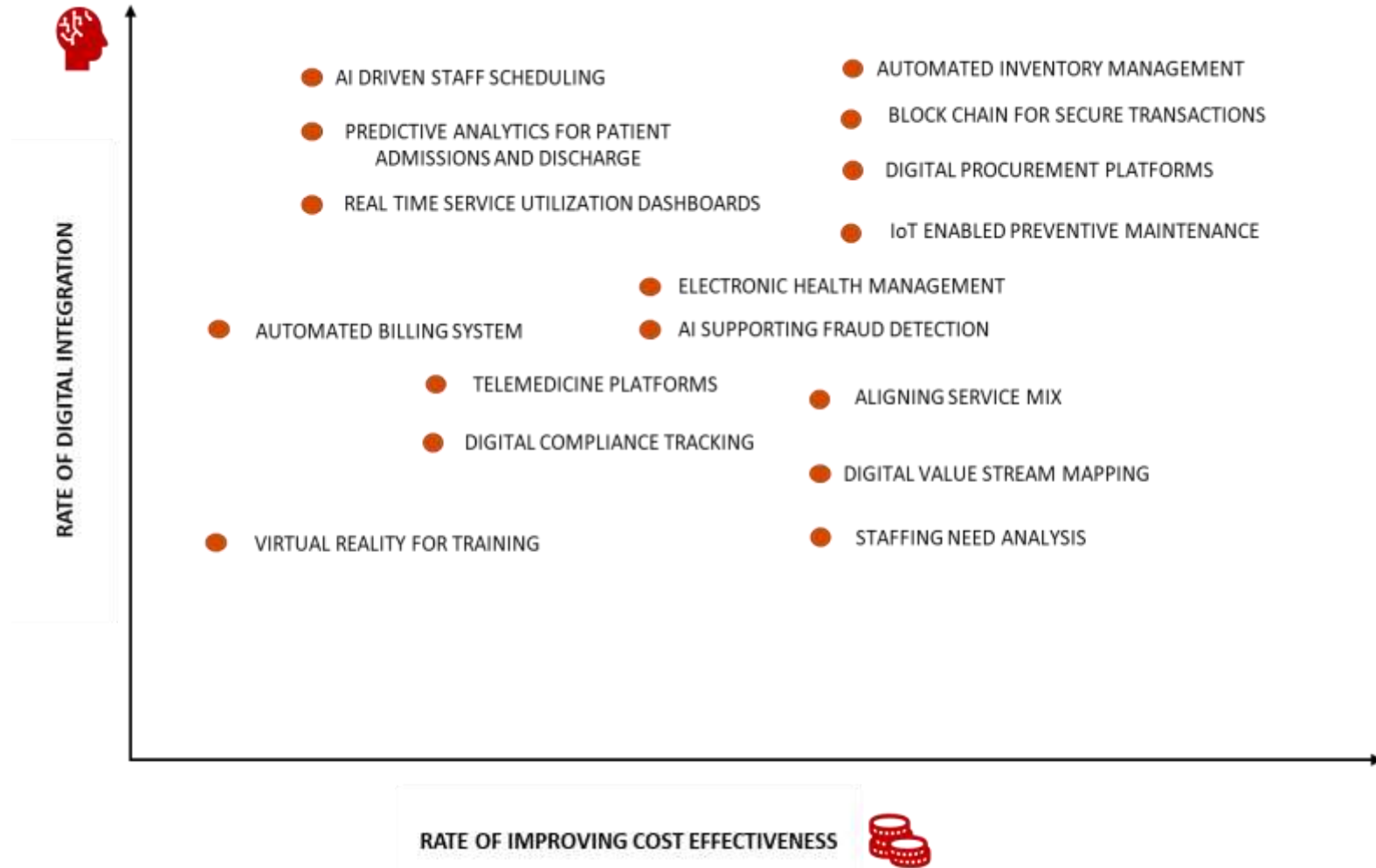


Fig : IoT-based smart hospital design | Source: Journal of Cloud Computing (2020)



How would Digital Intervention forward the idea of Cost Mastery?



01

Challenges in Traditional Healthcare Systems

Hospitals face pressure to provide quality care with limited resources and rising costs, leading to inefficiencies and longer wait times.

02

Benefits of Digital Solutions

Implementing AI-driven inventory management, EHR systems, and automated billing can enhance efficiency, reduce wastage, and streamline workflows.

03

Optimization through Real-time Data

Digital tools offer real-time data insights, aiding informed decision-making and improving patient outcomes and financial sustainability.

04

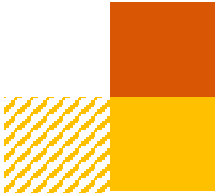
Correlation Between Digital Integration and Cost-effectiveness

Understanding this correlation is crucial for administrators and policymakers to achieve sustainable healthcare delivery.



04

Case In Point:
Supply Chain Department
Laboratory & Diagnostics
Pharmacy Department



Phased Digital Transformation Strategy for Hospital Supply Chain Management

	PHASE1	PHASE 2	PHASE 3	PHASE 4	PHASE 5
USE CASES FOR DIGITAL INTERVENTIONS IN THE SUPPLY CHAIN DEPT.	ASSESSMENT & PLANNING	DESIGN & DEVELOPMENT	IMPLEMENTATION & INTEGRATION	MONITORING & OPTIMIZATION	CONTINUOUS IMPROVEMENT & INNOVATION
PREDICTIVE ANALYTICS FOR DEMAND FORECASTING					
RFID FOR INVENTORY MANAGEMENT					
E-PROCUREMENT & VENDOR MANAGEMENT SOFTWARE					
REAL TIME TRACKING FOR LOGISTICS & DISTRIBUTION					
ASSET MANAGEMENT (GPS,RFID)					
FINANCIAL MANAGEMENT & COST CONTROL					
RISK ASSESSMENT SOFTWARE					
DIGITAL CONTINGENCY PLANS (SC SURGES)					
DIGITAL BACKUP FOR DISASTER RECOVERY					
KPI DASHBOARDS FOR CONTINUOUS QUALITY IMPROVEMENT					

01

Initial Assessment and Planning

Evaluate current supply chain processes, implement predictive analytics and machine learning for demand forecasting, and integrate RFID/barcode technologies for real-time inventory tracking and automated replenishment.

02

Design and Development

Develop tailored digital solutions, including e-procurement systems for purchasing, route optimization software for delivery efficiency, and digital quality control and compliance monitoring systems.

03

Implementation and Integration

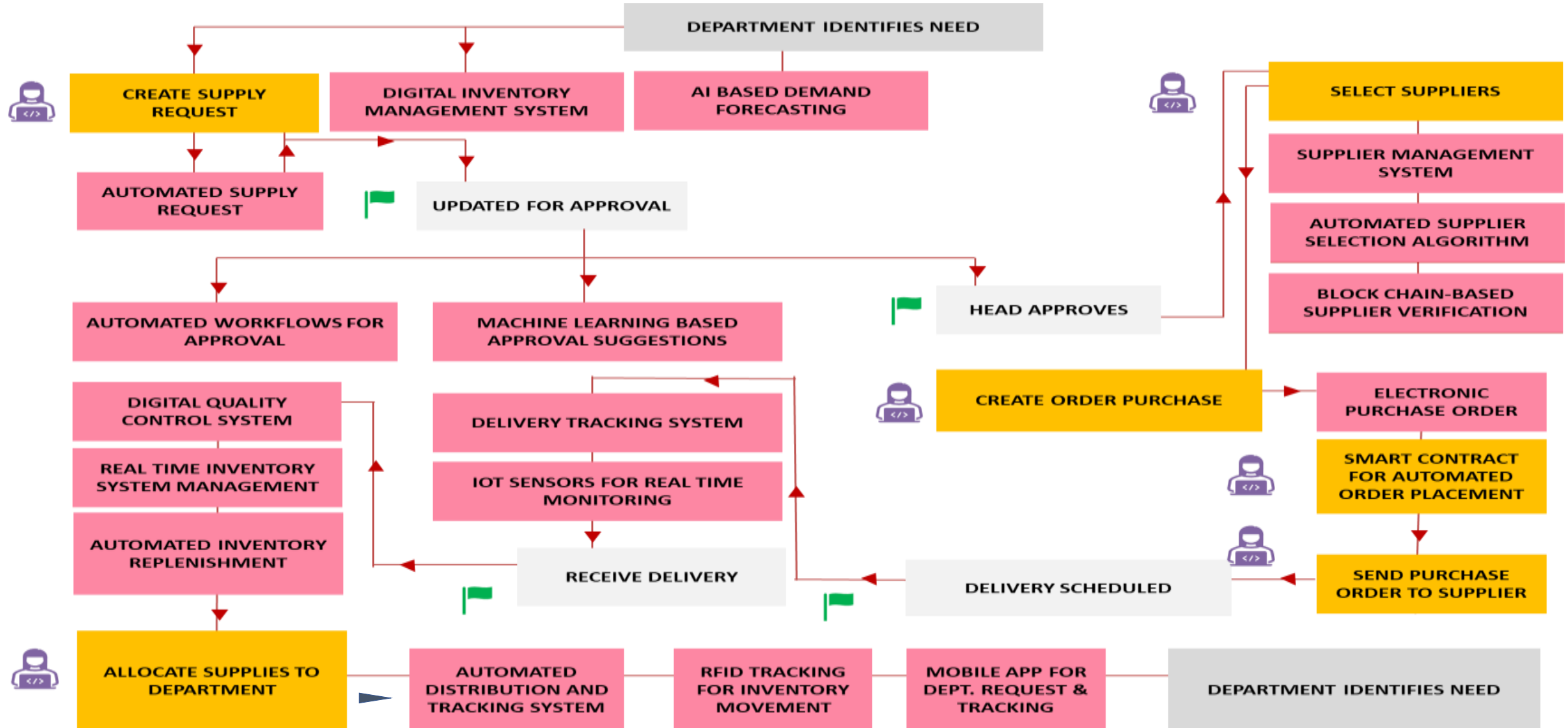
Deploy asset tracking systems (RFID and GPS), financial management software for expense tracking and cost optimization, and robust risk assessment tools for regulatory compliance and disruption mitigation.

04

Continual Monitoring and Optimization

Utilize data-driven insights for iterative supply chain improvements, integrate sustainability initiatives, track environmental impact metrics, and promote sustainable sourcing practices.

Restructuring Process Flow in Supply Chain Operations Post Strategic Phasal Digital Intervention



Digital Transformation in Hospital Laboratory and Diagnostics Department

	PHASE1	PHASE 2	PHASE 3	PHASE 4	PHASE 5	PHASE 6	PHASE 7
USE CASES FOR DIGITAL INTERVENTIONS IN THE LABORATORY DEPT	FOUNDATION & PLANNING	CORE INFRASTRUCTURE & EARLY AUTOMATION	ADVANCED AUTOMATION & AI INTEGRATION	INVENTORY MANAGEMENT & BILLING AUTOMATION	REPORTING, COMMUNICATION & SAFETY	REAL TIME ANALYTICS	CONTINUOUS IMPROVEMENT WITH AI
SAMPLE TRACKING AND CHAIN OF CUSTODY							
DATA INTEGRATION AND LIMS							
AUTOMATED TESTING & EQUIPMENT INTEGRATION							
AI DRIVEN DIAGNOSTIC ANALYSIS SUPPORT							
TELEMEDICINE & REMOTE CONSULTATIONS							
MOBILE APPS FOR PATIENT ENGAGEMENT							
INVENTORY & RESOURCE OPTIMIZATION							
AUTOMATED RESULT REPORTING							
QUALITY ASSURANCE							
APPOINTMENT MANAGEMENT SYSTEM							
WORKFLOW OPTIMISATION							
IMAGING INTEGRATION							
DATA ENCRYPTION AND ACCESS CONTROL							
AUDIT TRAILS & COMPLIANCE REPORTING							

01

Sample Tracking and Data Management

Implement barcoding and RFID for precise sample tracking and Laboratory Information Management Systems (LIMS) for centralized data management and streamlined workflows.

02

Automation and AI Integration

Use robotics and automated instruments to optimize testing processes, reduce turnaround times, and enhance diagnostic accuracy with AI-driven analysis.

03

Telemedicine and Remote Consultations

Introduce telemedicine platforms to enable remote guidance and consultations, expanding access to healthcare services and facilitating quicker decision-making.

04

Inventory Management and Continuous Improvement

Implement real-time inventory tracking and automated billing to ensure resource efficiency, and leverage AI for continuous improvement through data analytics and predictive maintenance.

Strategic Digital Transformation of Hospital Pharmacy Department

	PHASE1	PHASE 2	PHASE 3	PHASE 4	PHASE 5
USE CASES FOR DIGITAL INTERVENTIONS IN THE PHARMACY DEPT	NEED ASSESSMENT & REQUIREMENT GATHERING	DESIGN & DEVELOPMENT	PILOT TESTING & VALIDATION	IMPLEMENTATION & ROLLOUT	MONITORING AND CONTINUOUS IMPROVEMENT
E- PRESCRIPTION PROCESSING					
AUTOMATED DISPENSING SYSTEM (ADS)					
CDSS FOR ERROR PREVENTION					
VIRTUAL MEDICATION THERAPY MANAGEMENT (MTM)					
TELE PHARMACY SERVICES					
AUTOMATED INVENTORY MANAGEMENT & DRUG UTILIZATION					
DATA ANALYTICS FOR CONTINUOUS QUALITY IMPROVEMENT					
E-LEARNING MODULES & VR FOR STAFF TRAINING					
E-PRIOR AUTHORIZATION (EPA) FOR FINANCIAL MANAGEMENT					
RFID FOR EMERGENCY DRUG KITS (PREPAREDNESS)					

01

Assessment and Planning

Evaluate current workflows to identify areas for improvement in prescription processing, medication dispensing, safety protocols, and inventory management. Set clear goals for digital transformation.

02

Design and Development

Develop digital solutions like patient counseling platforms, specialized pharmacy services, and integrated EHR and clinical decision support systems to enhance medication management and safety.

03

Implementation and Integration

Roll out digital tools and protocols, ensure staff training and proficiency, streamline financial management, and support research and innovation in pharmacogenomics and clinical trials.

04

Monitoring and Optimization

Continuously monitor and refine system performance through audits and feedback, ensure emergency preparedness, and foster continuous quality improvement initiatives for excellence and innovation.

Conclusion



Necessity of Digital Transformation: As private hospitals in India face modern healthcare challenges, embracing digital transformation is essential. The potential rewards—enhanced patient satisfaction, operational excellence, and a stronger position in the healthcare value chain—make this transformation imperative.



Current Inefficiencies in Private Hospitals: Private healthcare units often struggle with outdated operational workflows and systemic inefficiencies. Critical areas such as the supply chain, laboratory operations, patient experience, and pharmacy services require a digital overhaul to improve efficiency and effectiveness.



Strategic Integration of Digital Health: Identifying strategic points for digital health integration, the study highlights the potential of advanced inventory management systems, AI-driven personalized care, and automated diagnostic tools. These technologies can streamline operations and enhance patient care.



Phased Implementation of Digital Transformation: The transformation should be implemented in phases, ensuring a structured and systematic approach. This phased strategy allows for gradual integration of digital health technologies, enabling private hospitals to adapt and optimize their operations effectively.



Thank You