A STUDY ON IMPLEMENTATION CHALLENGES IN THE AYUSHMAN BHARAT DIGITAL MISSION (ABDMM): A MULTISTAKEHOLDER ANALYSIS

Dissertation Submitted to

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Hospital and Health Management

By

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Under the Supervision and Guidance of

Dr Neetu Purohit

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CERTIFICATE

This is to certify that **Ms Swati Saha** in partial fulfilment of the requirements for the award of the degree of MBA (Hospital and Health Management) from the IIHMR University, Jaipur has successfully completed her internship at Enira Consulting Private Limited during 18th March 24 – 18th June 2024.

Place: New Delhi
Date: 18th June 2024

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DECLARATION BY STUDENT

I hereby declare that this dissertation titled **"A Study on Implementation Challenges in the Ayushman Bharat Digital Mission (ABDM): A Multistakeholder Analysis"** is the bonafide record of my original research work. I declare that it has not been submitted to any other university or institution for the award of any degree or diploma. Information derived from the published or unpublished work of others has been duly acknowledged in the text.

Swati Saha

SWATI SAHA

18th June 2024

IIHMR UNIVERSITY

CERTIFICATE

This is to certify that the dissertation titled "**A Study on Implementation Challenges in the Ayushman Bharat Digital Mission (ABDM): A Multistakeholder Analysis"** is a record of the research work undertaken by **SWATI SAHA** in partial fulfilment of the requirements for the award of the degree of MBA (Hospital and Health Management) from the IIHMR University, Jaipur under my guidance and supervision and her approach to the research study has been sincere, scientific, and analytical.

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ABSTRACT

Submitted by: Swati Saha **Guided by:** Dr Neetu Purohit

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Title of study: A Study on Implementation Challenges in the Ayushman Bharat Digital Mission (ABDM): A Multistakeholder Analysis

Research Questions:

1. What major operational challenges are faced in implementing the Ayushman Bharat Digital Mission (ABDM)?
2. How can these challenges be effectively addressed?

Objectives:

- To identify the key operational challenges in the implementation of ABDM.
- To analyse the perspectives of various stakeholders on these challenges.
- To propose solutions/recommendations to address the identified challenges.

The Ayushman Bharat Digital Mission (ABDM) aims to entirely reform the Indian healthcare system through digital transformation, yet numerous barriers are standing in its way. Many major issues are revealed by a multi-stakeholder inquiry using quantitative and qualitative methodologies, such as unstructured interviews with public, corporate sector, government, and healthcare representatives. While 23% of people are aware of ABHA cards, only 48% of the general population is aware of ABDM. This implies that the general population is not well-informed about ABDM. It is common to confuse ABHA with Ayushman cards. Health Professional and Facility Registries (HPR/HFR) are too complex to be implemented widely. Healthcare workers commonly report using technology for personal purposes and they worry about data privacy, security, and surveillance. The companies that apply ABDM technology face certain problems: difficult integration processes, instability of the technology, and the lack of qualified technical support. This is made worse by the high costs and system crashes that are a common sight in major organizations. This will

imply that the problems can only be addressed by ‘package’ solutions that will include the development of specific IEC strategies for increasing awareness of the public, clear provision of directions and standard processes for the healthcare workers, the improvement of the IT equipment reliability and integration support for HMIS suppliers, and Federal/State coordination. By ensuring that these issues addressed involve multiple stakeholders, ABDM can move beyond the implementation challenges that have been discussed in this paper and achieve its possibility of transforming healthcare in India thus improving the overall health of citizens and their ability to access quality care.

Keywords: Digital transformation, Healthcare delivery, Public awareness, Data security, Technology integration, Multi-stakeholder approach

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Swati Saha

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LIST OF ABBREVIATIONS

ABBREVIATIONS	MEANING
ABDM	Ayushman bharat digital mission
ABHA	Ayushman Bharat Health Account
HFR	Health Facility Registry
HPR	Health Professional Registry
CAGR	Compound annual growth rate
DPGs	Digital Public Goods
NHP	National Health Policy
NHS	National Health Stack
EHRs	Electronic health records
EUAs	End User Applications
DHIS	District Health Information System
HSPs	Health service providers
UHI	Unified Health Interface

1. INTRODUCTION

INDIA has risen to the second position in the world for the quickest digital adoption in the last five years. The Indian economy has significant potential to generate an additional US$ 1 trillion in economic value through inclusive growth across all socioeconomic strata, with over 350 million smartphone users and over half a billion internet users, each of whom consumes 8.3 GB of data each month (1). Aadhaar serves as the cornerstone for DPGs (Digital Public Goods) developed under Digital India, with over 90% of users having access to it (2).

The rapid adoption of cell phones and the internet, along with beneficial government initiatives, have propelled the health market forward. A compounded annual growth rate (CAGR) of 28.50% is predicted for the Indian digital healthcare industry between 2022 and 2027, taking it from a projected value of INR 524.97 billion in 2021 to INR 2528.69 billion by 2027 (2).
With the announcement of the government's goal to serve high-quality healthcare services at a reduced price, the National Health Policy of 2017 has initiated the procedure for the healthcare sector in India's digitalization(2).

Platforms such as the Ayushman Bharat Digital Mission (ABDM) are slowly introducing the digital aspect to the functioning of India's healthcare plan. The usage of the Ayushman Bharat Digital Mission (ABDM) has remained limited, particularly in private healthcare organizations. According to a 2023 National Health Authority (NHA) report, only about 20% of private healthcare providers have registered under ABDM, compared to 60% in the public sector. Of the 100 million Health IDs created, less than 15% were generated by private entities, with the majority issued through government facilities. A 2022 Federation of Indian Chambers of Commerce & Industry (FICCI) survey revealed that 70% of private providers face interoperability issues and integration challenges with existing systems. Additionally, a 2023 PwC study found that 65% of private healthcare professionals were unaware or inadequately trained on ABDM. Financial constraints further hinder adoption, as a 2023 Indian Medical Association (IMA) survey indicated that 55% of small and

medium-sized private facilities found the costs of digital health infrastructure prohibitively high. However, the private sector comprises 30% of the HFR and only 17% of the HPR although it has a 70% market share. (3)In response to India's adoption of the Sustainable Development Goals 2030, particularly Goal 3: As part of SDGs 03 – Good Health and Well Being and under the Universal Health Care Framework, launched by the UN General Assembly in 2019, Prime Minister Narendra Modi launched ABDM on 26 September 2021 (4).

In this regard, the Indian government has recently launched a massive scheme called Ayushman Bharat Digital Mission (ABDM) which forms the core structure to support the Integrated digital health system of the country (4).
The Indian government outlined the fundamental tenets of the National Health Policy (NHP) plan (2017), which include accountability for performance, quality of service, universality, and citizen-centricity.

The NHP aims to achieve the highest level of health and well-being for everyone at all ages through universal access to high-quality healthcare services without placing anyone in financial hardship as a result, as well as a preventive and promotive healthcare orientation in all developmental policies. The National Health Stack (NHS, 2018) gave rise to the current ABDM (2021).

The ABDM's journey provides insight into the process of turning policy into an electronic blueprint complete with goals, components, and instructions for implementation. The National Health Stack (NHS) implementation framework is outlined in the National Digital Health Blueprint. The implementation of digital or smart technology is guided by worldwide best practices, which are considered in this blueprint.
The NHS is a comprehensive platform that unifies health information technology with coordinated efforts from federal, state, and ministry levels. It emphasises nutritional management, teleradiology and diagnostic technology, e-learning platforms, and prevention (5).
However, the success of the ABDM depends on a thorough evaluation of the difficulties in implementing smart healthcare solutions, particularly in the Indian

setting. This review seeks to close this information gap. It makes sense that the mission was given the name "National Digital Health Mission." "Ayushman Bharath Digital (Health) Mission" (ABDM) is the current name. The National Digital Health Blueprint, an implementation plan centred on implementing digital technologies, was created in response to the explicit policy statement (4).

In other words, the vision calls for universal health coverage in an efficient, accessible, inclusive, affordable, timely, and safe manner that ensures the security, confidentiality, and privacy of health-related personal information and provides a wide range of data, information, and infrastructure services, duly leveraging open, interoperable, standards-based digital systems. It is therefore clear that the delivery of the overall health mission depends on digital technology. Nevertheless, embracing technology itself comes with a lot of risks and difficulties. Applying technology and related adoption practices might be accompanied by certain risks. Hence, it is necessary to identify them and ensure that the ABDM implementation plan addresses them (4).

The dissertation focuses on explaining the implementation challenges of ABDM using Multi-Stakeholder analysis to understand the various challenges experienced in the implementation of ABDM. Thus, the current study aims to reveal the mentioned challenges by involving as many agents of the system as possible, including government bodies, healthcare organizations, patients, and IT companies. The study is therefore planned to bring out an appreciation of the challenges that arise from the interaction of different stakeholders; government bodies, healthcare organizations, people and IT firms. This study would focus on the identification of such problems, the factors that cause their development, and the available possible solutions. Any opinions of the stakeholders can be received in detail with the use of qualitative research that includes interviews, case studies, and document reviews (2).

1.1 Historical Context of Digital Health in India

India has come a long way in the subject of digital health in the past couple of decades. The first trials of the use of technologies in the healthcare system started with a venture with the support of telemedicine programs during the early 2000s. Such progressive

programs are aimed at providing deprived populations in distant and immobile areas with remote healthcare facilities (6).

The launching of the National Health Portal (NHP) in 2014 was one of the such events which marked history (National Health Portal of India, 2014) (7). Ideally, the initiation of such type of web portal in the country can be viewed as the further development of the concept of interacting the country's healthcare system with the digital world. The NHP was intended to help not only the patients and citizens but also the HCPs themselves to use evidence-based approaches in the delivery of health services.
This encompassed disease information, treatment procedures, wellness information, and locator services of health care centres. Through this portal, various sources of health knowledge were made easily accessible, which may help in improving the health literacy or HHD of the users.
The National Health Stack was proposed the in the year 2018 as another step to further strengthen the base of the digital health ecosystem in India (8). This ambitious move by NITI Aayog, the governing government think tank for India's highest policies aimed at centrally attaching a seamless framework for health data exchange.

The National Health Stack was designed to provide a standardized architecture that would interconnect hospitals, clinics, pharmacies and insurance. In this way, it will facilitate secure and efficient sharing of EHRs improving care coordination; personalized medicine and better public health practices (8).

India's journey towards digital health has been marked with two significant milestones: the setting up of a national health portal and the suggestion of a national health stack. These are what underlaid the ABDM – an all-inclusive plan launched in 2021 which seeks to bring about major changes in healthcare delivery through the use of technology (8,9)

National Health Policy 2017 laid down the foundation stone for ABDM followed by the launch of National Health Stack 2017 and National Digital Health Blueprint 2019.

The national health stack was designed to create a common ecosystem of healthcare stakeholders such as hospitals, clinics and pharmacies with insurance companies. A top-notch interoperable system would act as an enabler for the successful and secure

sharing of EHR data amongst various providers, thus enabling improved care coordination, personalized medicine and efficiency in creating public health reports the creation of the national health portal and the proposal of national health stack form one small but significant plank that has been laid out in India towards providing a much desired digital infrastructure within this prospect which will enable digital health accomplishments. The ABDM has been set in motion by the landmark and far-reaching national health policy, 2017 followed by one of its one-of-a-kind national digital backbone-national digital health blueprint (NDHB) launched only last year(10).

1.2 Digital India: Genesis and Vision

To ensure that citizens can access government services electronically, the Indian government created Digital India. This was accomplished by enhancing the nation's technological know-how, expanding Internet access, and enhancing online infrastructure.

This expansive initiative is supported by nine pillars:

1. Broadband Highways
2. Universal Access to Mobile Connectivity
3. Public Internet Access Programme
4. e-Government: Using Technology to Reform Government
5. Electronic Service Delivery, or e-Kranti
6. Information for All
7. Electronics Manufacturing
8. IT for Jobs
9. Early Harvest Programmes

Together, these pillars seek to offer a strong digital infrastructure, provide services online, and encourage citizen digital literacy. (11)

1.3 Ayushman Bharat Digital Mission (ABDM)

On September 27, 2021, Prime Minister Narendra Modi unveiled the Ayushman Bharat Digital Mission (ABDM), which builds on the foundational work of Digital India. Leveraging open, interoperable, standards-based digital systems aims to provide

a wide range of data, information, and infrastructure services to create a seamless online platform.

The ABDM was first introduced as a pilot programme on August 15, 2020, in six union areas. After the test programme proved successful, the programme was expanded nationwide. To create a seamless and all-encompassing healthcare ecosystem, the effort intends to create an Ayushman Bharat Health Account and a Universal Healthcare Interface for all Indians. It will integrate with current government programmes and private actors.

The National Health Authority (NHA) established the ABDM sandbox, a testing environment for products and technologies to be assessed and matched with the ABDM framework, to ease this integration and guarantee seamless functioning.

This collaborative approach aims to enhance healthcare accessibility and efficiency across the nation, driving forward the mission's vision of a digitally empowered healthcare system (12–14)

Figure 1: ABDM Framework (15)

The ABDM encompasses several pivotal components designed to enhance the efficiency, accessibility, and interoperability of healthcare services across India. These key components are as follows:

1. **ABHA Number:** With ABHA Number, sharing and accessing digital health records is simple. You may conveniently get your digital lab results, prescriptions, and diagnoses from licenced medical professionals and other health service providers, as well as communicate with participating healthcare providers. (9)
2. **Healthcare Facilities Registry (HFR):** This comprehensive database lists all healthcare facilities that are part of different medical systems. This register ensured the proper flow of information, cooperation and control which ensures equal and proper access to healthcare services (9)
3. **Healthcare Professionals Registry (HPR)**: This comprehensive register also contains all practitioners in the traditional and emerging health delivery system. Since it deals with the standardisation of identity and accreditation of healthcare workers, the HPR aims to enhance the quality and reliability of treatment (9)
4. **Unified Health Interface (UHI)**: Consequently, what UHI is meant to be is an open standard for several digital health services. The above-mentioned UHI Network is planned to be an open network for all participating Health Service Provider (HSP) apps and End User Applications (EUAs). UHI will provide several e-health services to the patient and HSPs; appointment booking, teleconsultation, and service offerings among others (9)
5. **ABHA Application (Personal Health Records)**: People now have control over their health information thanks to the PHR system, which also promotes proactive patient involvement and protects security and privacy. Together, these components form ABDM, furthering the mission's goal of creating a unified, digital healthcare environment that easily integrates with both private sector initiatives and existing governmental rules (9,16).

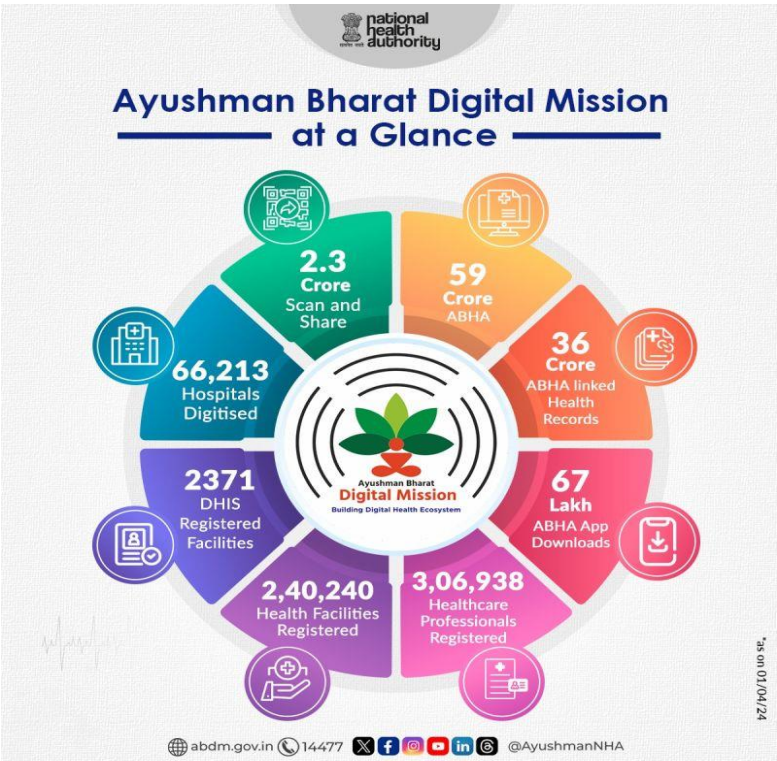

Figure 2. ABDM at glance (17)

1.4 ABDM at a Glance

The ABDM as of April 1, 2024:

- **ABHA Health IDs:** 59 Crore citizens have linked their ABHA IDs with their health records.
- **Healthcare Professionals Registered:** 3,06,938 healthcare professionals have registered on the ABDM platform.
- **Health Facilities Registered:** 2,40,240 health facilities have registered on the ABDM platform.
- **Hospitals Digitised:** 66,213 hospitals have been digitized.
- **ABHA App Downloads:** 67 Lakh (6.7 million) users have downloaded the ABHA app.
- **Scan and Share:** 2.3 Crore health records have been scanned and uploaded to the ABDM platform.
- **DHIS Registered Facilities:** 2371 DHIS facilities have been registered (18)

1.5 Awareness/Penetration of ABHA IDs among Patients/Public:

Despite the ambitious goals of the Ayushman Bharat Digital Mission (ABDM), the adoption rate of Ayushman Bharat Health Account (ABHA) IDs remains relatively low. As of now, only 64.798 million ABHA IDs have been created, representing a modest penetration rate in a country with a population of approximately 1.44 billion. This indicates that less than 5% of the population has registered for an ABHA ID, highlighting significant challenges in widespread adoption. The low penetration rate underscores potential issues such as lack of awareness, concerns about data privacy, and the perceived complexity of the registration process. Addressing these barriers is crucial for achieving the ABDM's vision of a unified digital health ecosystem that can enhance healthcare delivery and accessibility across India.

1.6 Challenges in the Digitalisation of Healthcare in INDIA

Digitalization has impacted various industries, such as banking, finance, travel and tourism, and hospitality. The data generated and used in these sectors is more organized and straightforward than the data obtained during healthcare. Healthcare data is composed of many file formats and uses medical jargon that not everyone is familiar with.

Radiology pictures, test results, prescriptions, OP notes, in-patient records, etc. are some examples of these. Furthermore, these are all written in various forms and standards. More significantly, the information in the healthcare system is highly private and sensitive. Consequently, in comparison to other industries, the digitization of the healthcare industry is unique, complicated, and more challenging (19).

The Ayushman Bharat initiative was not well received for a variety of reasons. The Unified Theory of Acceptance and Use of Technology (UTAUT) model is one way to approach this problem. Four essential UTAUT model variables—performance expectancy, simplicity of use, positive social impact, and facilitating conditions for service delivery—have been identified by Venkatesh et al. (2003) as either enhancing or facilitating service uptake. Performance expectancy is based on the assumption that everyone wants to be well enough to perform better at work (20).

1.7 ABDM Architecture

A strong and all-encompassing framework called the ABDM architecture was created to make it easier for digital healthcare services to integrate and work together seamlessly throughout India. Scalability, adaptability, and security are guaranteed by the open, interoperable, standards-based digital technologies upon which the architecture is based.

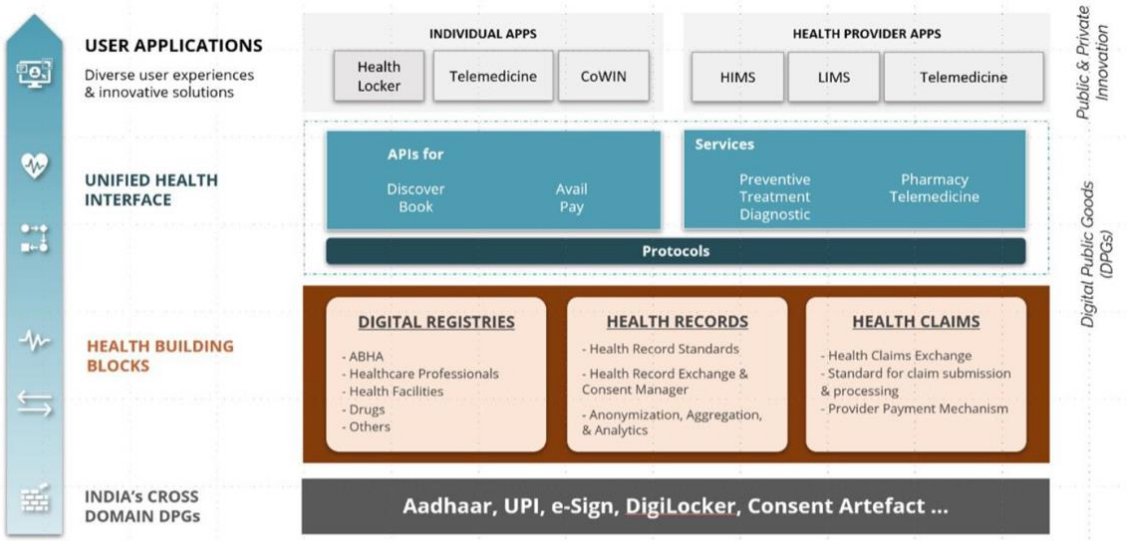

Figure 3: ABDM Architecture (15)

There are different layers of the ABDM architecture, which includes:

The Ayushman Bharat Digital Mission (ABDM) architecture is comprised of several layers designed to create a unified, secure Health Information Exchange (HIE) in India. These layers include user applications, such as Healthcare Provider Apps and Individual Apps, which enable users to transact with health services and manage their records. These apps encompass mobile health, telemedicine, the COWIN immunisation network, Health Locker, HIMS for healthcare provider organizations, and LIMS for laboratory management. The Unified Health Interface (UHI) consolidates users' health records, allowing them to search for services, book

appointments, and make payments. Digital registries store the personal data of patients, doctors, and healthcare organizations, including the ABHA, HPR, and HFR. Health records contain users' medical histories, including prescriptions, tests, and imaging reports. The health claims layer retains data on users' health insurance claims. Health building blocks consist of the protocols, standards, and APIs that form the ABDM ecosystem. Additionally, India's Cross-Domain Digital Public Goods (DPGs) include digital tools and platforms available for both public and private use. Collectively, these components facilitate the creation of a unified, secure HIE to effectively manage health data across India (19).

1.8 Importance of Multi-Stakeholder Analysis in Understanding Implementation Challenges

The ABDM interfaces with a spectrum of entities that have their positions, agendas, and concerns when it comes to the execution of the framework. To recognize these different viewpoints and be able to identify challenges and facilitators of successful implementation. With the help of a multi-stakeholder analysis, the policymakers and implementers can develop respective plans which incorporate the needs and concerns of all the affected sides, which allows for a better understanding of the process's intricacies. This strategy ensures the development of a health systems transformation digital strategy that is accessible, effective, and sustainable (21).

1.9 Stakeholders in ABDM Implementation

There are several stakeholders are involved in the implementation of ABDM, and each one of them is very important:

- **Government Agencies:** in charge of supervision, regulation, and policy development.

- **Healthcare Providers:** Clinics, hospitals, and private practitioners that offer medical care.
- **Patients:** The final consumers of the enhanced healthcare services.
- **IT Companies:** Providers and developers of solutions and infrastructure for digital health.

Comprehending the concerns, contributions, and interests of various parties is crucial to the effective execution of the ABDM.

1.10 Existing Challenges in Implementing Digital Health Initiatives into Practice in Developing Nations

Digital health initiatives in developing countries face numerous challenges that impact their successful implementation. These challenges include:

1. **Inadequate Infrastructure:** It is challenging to implement and scale up digital health solutions in the absence of dependable internet access.
2. **Digital Literacy:** The adoption of digital health solutions is hampered by patients and healthcare practitioners' lack of computer literacy.
3. **Data Privacy problems:** Sensitive personal information particularly in the health industry is faced with various challenges as regards data privacy and security issues.
4. **Resistance to Change:** The introduction of digital health practices can be hindered or prevented by resistance from within an organization or cultural attitudes against the adoption of new technological innovations**.**

1.11 ABDM Enabled Apps and Sandbox Apps

A seamless, compatible digital well-being ecosystem is what ABDM plans for India. This is achieved with the help of various ABDM-enabled apps and sandbox apps that

play key roles in amalgamating different health management information systems (HMIS) as per ABDM standards (22–24).

1.12 ABDM Enabled Apps

ABDM-enabled applications are digital apps that conform to the set standards and guidelines by ABDM to achieve interoperability, data privacy and security. These applications enable seamless interactions among various stakeholders including patients, healthcare providers and insurers within the digital health ecosystem (23–25)

- **ABHA Mobile App**:
    - **Functionality:** With this app, users can create their own health IDs and manage them as well as view or share their medical records with doctors whenever they need.
    - Challenges: Ensuring its wide acceptability by public as well as educating them about its use and gains is a great challenge.(26)
- **e-Sanjeevani**:
    - **Functionality:** It provides an opportunity for doctors to consult patients through remote consultations using a telemedicine platform thus making healthcare reachable, especially in remote areas.
    - **Challenges**: The major concerns are a merge of health records systems with patient safety from possible sharing of information on the consultation (15,27)
- **CoWIN**:
    - **Functionality**: Initially developed for COVID-19 vaccination management, CoWIN now serves as a model for digital health record for vaccine management.
    - **Challenges**: Expanding the app's functionality to cover other vaccinations and health services while maintaining data accuracy and security (28)

1.13 Sandbox Apps

Sandbox apps are experimental applications developed in a controlled environment to test and validate their functionality within the ABDM ecosystem. These apps help developers and healthcare providers identify and address potential implementation challenges before full-scale deployment (22,29).

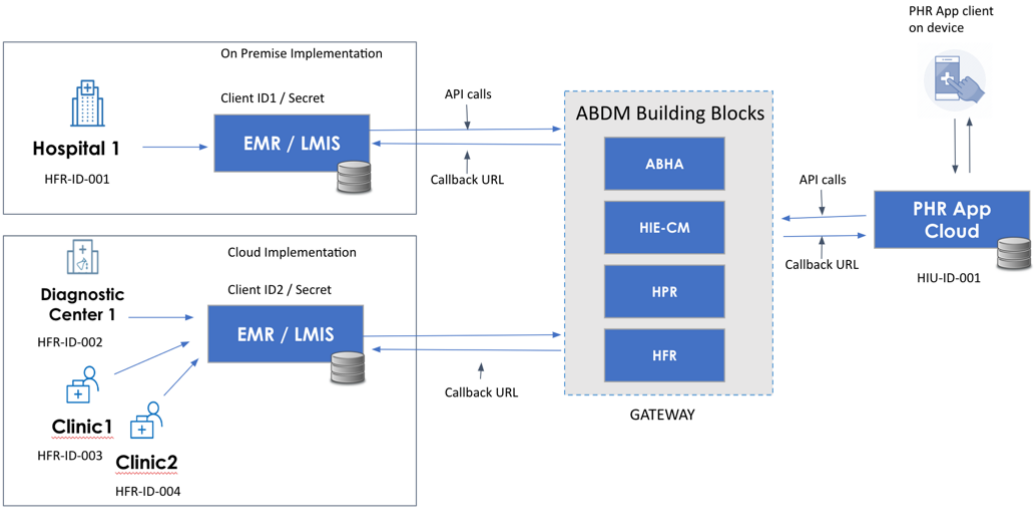

Figure 4. ABDM Sandbox Environment: Hospital, Diagnostic Centre and Clinic Integration

A few examples of ABDM sandbox companies are:

1. EVA SOFT PRIVATE LIMITED
2. SRI LAXMI KRAVIA TECHLABS PRIVATE LIMITED
3. SOFTCURE TECHNOLOGY LLP
4. e-Sahaj powered by Medimaze
5. SmartHMS & Solutions Pvt. Ltd.
6. eClinical India Pvt Ltd
7. Prudas Technologies Private Limited
8. Vigorus Healthtech Private Limited

1. **Health Information Provider (HIP) Sandbox**:
    - **Functionality**: This app allows healthcare providers to test the integration of their existing health information systems with the ABDM standards (5)
    - **Challenges**: Compatibility with diverse HMIS platforms and ensuring seamless data flow are key issues
2. **Health Information User (HIU) Sandbox**:
    - **Functionality**: Designed for entities that consume health data (e.g., insurance companies, and research organizations), this app tests data access and usage compliance with ABDM guidelines (29)
    - **Challenges**: Ensuring that data access permissions are properly managed and that patient consent is adequately documented.
3. **Personal Health Records (PHR) Sandbox**:
    - **Functionality**: This app enables patients to aggregate their health data from various sources and control who can access their information (29)
    - **Challenges**: Ensuring data interoperability across different sources and maintaining user-friendly interfaces are significant hurdles.

Figure 5. How ABDM can improve the experience delivery of patient service

2. REVIEW OF LITERATURE

Title	Author	Study location	Year of Study	Salient Features
A strategic roadmap to the successful implementation of digital health records in India	Aggarwal, Lipsa Roy, Mrinmoy	New Delhi	2024	The PDF outlines strategies and challenges for implementing digital health records in India, emphasizing data security, policy frameworks like the National Digital Health Mission, social challenges, legal data processing frameworks, and environmental impacts. It highlights the necessity of stakeholder collaboration and patient-centric approaches to achieve successful digital transformation in the healthcare sector (5).
The Ayushman Bharat Digital Mission (ABDM):	Sharma, R. S. Rohatgi, Aishwarya Jain, Sandeep	New Delhi	2023	The research paper explores the ABDM in India, focusing on

making of India’s Digital Health Story	Singh, Dilip			digitizing healthcare services. It highlights the significance of digital public goods, personal health records, health professional registries, practical use cases like "Scan and Share," and the global impact of platforms like CoWIN. The paper emphasizes the transformative shift towards technology-driven healthcare (2).
Ayush grid: Digital health platform	Thrigulla Saketh Ram	HyderabadTelangana India	2023	The implementation of the Ayushman Bharat Digital Mission (ABDM) faces several challenges, including low awareness, technological infrastructure gaps, and integration issues across states. The mission aims to

				provide universal healthcare coverage by leveraging digital platforms, but effective adoption is hindered by limited resources, varying stakeholder interests, and the need for extensive coordination among diverse healthcare providers and government agencies(16)
Ayushman Bharat: Service Adoption Challenges in Universal Healthcare System	Pandey, Neeraj Jha, Sumi Rai, Vaibhav	Mumbai, Maharashtra, India.	2021	The research paper explores the service adoption challenges of the Ayushman Bharat scheme, a universal healthcare program in India, from patient and physician perspectives. It emphasizes performance expectancy, ease of service access, positive social

				influence, and facilitating conditions. The study aims to inform policymakers, healthcare administrators, and service managers about managing these challenges to improve adoption rates in a developing country context (20).
A perspective on digital health platform design and its implementation at national level	Mantri, Manisha Sunder, Gaur Kadam, Sanjay Abhyankar,Aditya		2024	The design and implementation of digital health platforms at the national level. It emphasizes the importance of accessible and affordable health services through digital technologies. The authors present an approach to implementing digital health platform components in a layered and reusable manner, using standards like HL7 FHIR and

				governance principles. The paper highlights the need for data quality assurance, certification schemes, and information quality frameworks to ensure the completeness and correctness of health records. Additionally, it mentions incentive schemes for digital health adoption and the importance of governance and institutionalization. The work is part of the National Resource Centre for EHR Standards project funded by the Ministry of Health and Family Welfare in India.

The literature review synthesizes key themes and challenges related to the implementation of digital health initiatives, particularly the Ayushman Bharat Digital Mission (ABDM), in India. It underscores the critical importance of data security, policy frameworks like the National Digital Health Mission (NDHM), and stakeholder collaboration in driving successful digital transformation in healthcare. The review identifies significant challenges such as low awareness, technological infrastructure

gaps, and integration issues across states hindering the effective adoption of ABDM. It also explores service adoption challenges from patient and physician perspectives, emphasizing factors like performance expectancy and ease of access. The literature emphasizes the transformative potential of digital public goods, personal health records, and platforms like CoWIN in advancing technology-driven healthcare in India. Moreover, it highlights the need for governance, data quality assurance, and incentive schemes to support sustainable digital health adoption at the national level.

3. OBJECTIVES:

Objectives:

- To identify the key operational challenges in the implementation of ABDM.
- To analyse the perspectives of various stakeholders on these challenges.
- To propose solutions/recommendations to address the identified challenges.

4. RESEARCH QUESTION:

Research Questions:

1. What major operational challenges are faced in implementing the Ayushman Bharat Digital Mission (ABDM)?
2. How can these challenges be effectively addressed?

5. METHODOLOGY

Research design:

A descriptive research design was employed to study the operational challenges and gather stakeholders' perspectives related to the implementation of the ABDM. A Multi-Stakeholder Analysis was performed to identify and analyze the different challenges and recommendations from each stakeholder group, providing a comprehensive overview of the factors influencing the adoption and implementation of ABDM.

Sampling Method:

- **Government Professionals:** Purposive sampling to select 5 professionals from the National Health Authority (NHA) and 5 from state governments involved in ABDM implementation.
- **Information Technology (IT) Companies:** 5 ABDM-enabled companies and 5 companies registered on the ABDM Sandbox were selected randomly.
- **Healthcare Professionals:** 20 doctors were selected from various healthcare facilities(PHCs) in the Delhi NCR region.

Sample Size:

- Healthcare Professionals: **20**
- Information Technology(IT) Companies: **10**
- Government Professionals: **10**

The sample sizes for the study were determined to ensure a diverse representation of perspectives. Specifically, the study included 20 healthcare professionals, 10 Information Technology (IT) company representatives, and 10 government professionals. This distribution allows for comprehensive multi-stakeholder analysis, capturing varied insights on the implementation challenges of the Ayushman Bharat Digital Mission (ABDM).

These specific groups were chosen for the following reasons:

- **Healthcare Professionals:** Their firsthand experience with patient care and hospital management provides critical insights into the practical challenges and opportunities of integrating digital health solutions within the healthcare system.
- **Information Technology (IT) Companies:** Their expertise in technology development, implementation, and maintenance is crucial for understanding the technical aspects and barriers to the successful deployment of digital health initiatives like ABDM.
- **Government Professionals:** Their role in policy-making, regulation, and oversight ensures that the study captures the administrative and regulatory challenges as well as the governmental support and strategies essential for the mission's success.

By including these three key stakeholder groups, the study aims to identify a comprehensive range of implementation challenges and facilitate the development of well-rounded strategies to address them effectively.

Sources of Data:

- **Primary Data:** Collected through interviews with stakeholders (government, private companies and healthcare professionals,).
- **Secondary Data:** Existing literature, reports, government documents, and industry publications related to ABDM implementation.

Research Method:

This study adopts a qualitative research method. To gather in-depth information, informal interviews were conducted with various stakeholders, including healthcare professionals, Government officials, and technology developers. It involves thematic analysis of interviews, aimed at comprehensive exploration and analysis of the Ayushman Bharat Digital Mission's implementation challenges.

Data Collection Methods:

1. **Interviews:** Conducted in-depth, open-ended interviews with stakeholders using pre-designed interview guides.

Process of Data Analysis:

- Thematic analysis was conducted on the qualitative interview data.

Limitations of Research:

1. **Geographical Limitation:** This research involves the analysis of the problems of the working population in the Delhi NCR area; therefore, the results obtained will not reflect the situation in the rest of India.
2. **Time and Resource Constraints:** This involves the reduction of time and amount of money that may be allocated for the research hence may cause limitations to its outcome.

3. RESULTS

ABDM envisions transforming India's healthcare landscape into a comprehensive digital health ecosystem by bridging existing gaps between patients, healthcare personnel, and technology. However, implementing ABDM faces several operational challenges that must be addressed by various stakeholders. These challenges consist of inadequate consciousness and uncertainty among common people, apprehensions of healthcare personnel concerning data gathering and supervision, the complicated functioning and technical difficulties encountered by HMIS suppliers, and federal and state interrelated issues. The next part addresses the specific issues of each of the stakeholder groups and provides targeted recommendations to enhance the rates of ABDM's utilization and effectiveness to ensure that the mission outcomes are achieved.

The insights from each stakeholder are as follows:

I. HEALTHCARE PROFESSIONALS

The implementation of the Ayushman Bharat Digital Mission (ABDM) faces numerous challenges, primarily centred around perceptions, security concerns, and trust issues among healthcare professionals. Nurses and other healthcare staff perceive themselves under surveillance, raising significant privacy and security issues. There is widespread concern about data security when sharing information within the ABDM framework, contributing to hesitancy among doctors and healthcare providers. Trust issues further complicate matters, with varying levels of support and scepticism among medical professionals regarding ABDM's implementation and objectives.

A doctor expressed concern about the ABDM, saying-

"We feel like we are constantly being monitored through ABDM, and there's a fear that our data might be linked with income tax assessments."

-Doctor, PHC, Bhangel Salarpur

Misunderstandings also prevail, such as the perceived link between ABDM and income tax, which adds to doctors' reluctance to participate fully. Additionally, the

lack of unified advocacy and differing opinions among medical associations hinder cohesive support for ABDM initiatives. The complexity and overlap of Health Provider Registry (HPR) and Health Facility Registry (HFR) systems pose technical challenges, while delays in state verification processes for healthcare facilities discourage timely participation.

Practical adoption issues persist as healthcare workers navigate the transition from traditional methods to digital systems, with some preferring familiar pen-and-paper approaches. Moreover, the perceived lack of practical application of ABDM in daily healthcare practices further slows adoption. Many doctors await a government mandate before fully committing to registering with HPR or HFR, reflecting uncertainties about compliance and operational requirements.

Discussing the Health Provider Registry (HPR) and Health Facility Registry (HFR), a healthcare professional remarked,

"The HPR and HFR are overly complicated. It feels like a parallel registry to the existing state council lists, and the delay from the state in verifying healthcare facilities discourages us from participating."

-Doctor, PHC, MURMURA

Furthermore, similar to the public, patients do not demonstrate a strong demand for digital prescriptions or the benefits offered by the ABHA card, highlighting the broader challenge of generating user acceptance and demand for digital healthcare services. Addressing these multifaceted challenges will require targeted strategies to enhance trust, simplify implementation processes, and demonstrate tangible benefits to both healthcare providers and patients within the ABDM framework**.**

Highlighting the transition from traditional to digital systems, a doctor noted,

"Moving from pen-and-paper to digital systems is a big shift for many of us. There is no real use case for us, and without a government mandate, we don't see the need to register with HPR or HFR."

-Doctor, PHC, BISRAKH

II. Information Technology(IT) Companies

ABDM-Enabled Companies

Thematic analysis was chosen for analysis as it is a commonly used method for the analysis of qualitative data. A total of fifteen interviews were conducted with the representatives of the IT Companies. The ABDM framework faces several critical challenges that hinder its effectiveness. The technology is highly unstable, and frequently plagued by server failures, leading to unreliable service.

Discussing the challenges an IT Developer remarked,

"The technology is highly unstable with frequent server failures. This makes the user journey long and frustrating."

-Developer

The user journey is unnecessarily prolonged due to the integration process, causing frustration among users. There is a notable lack of traction, with minimal demand from hospitals and doctors. The integration process is complex and cumbersome, heavily dependent on an unpredictable UAT status. Over the past three years, there has been a lack of innovation in managed healthcare organizations, with no revolutionary changes observed. Additionally, new APIs are introduced before thorough testing, resulting in system crashes. Technical and operational support from the NHA is poor, with long turnaround times. Integration costs are high, particularly for functional testing and security auditing. Frequent server downtimes disrupt the disbursement of funds through the DHIS. Moreover, the integration process is lengthy and poorly managed, further complicating the adoption and implementation of the ABDM framework.

In an interview with an IT professional and developer from e-Sanjeevani, he remarked-

"Technical and operational support from the NHA is poor, with high turnaround times. This makes the cost of integration very high and adds to our operational challenges."

-IT professional, e-Sanjeevani

"The integration process with ABDM is very complex, and we heavily depend on an already unstable UAT environment. This complexity and instability are major deterrents."

-Developer, e-Sanjeevani

Other Tech Companies (ABDM Sandbox)

Other tech companies working with the ABDM sandbox face significant challenges. The integration process is lengthy and lacks a clear definition, making it difficult to navigate. Technical documentation is insufficient and often consists of obscure references, adding to the complexity. Frequent system downtimes make the system unreliable, with performance regularly interrupted by breakdowns. Additionally, the costs associated with integration are high, posing a financial burden on these companies.

On discussion with the IT personnel from e-Sahaj and Vigorus remarked,

"The integration process is long and undefined. The documentation is poor and filled with technical jargon, making it difficult to understand and implement."

-e-Sahaj powered by Medimaze

"The cost of integration is prohibitively high, especially for smaller companies. This makes it challenging for us to fully participate in the ABDM ecosystem."

-Vigorus Healthtech Private Limited

III. Government (Interview based on recent initiatives done by the government)

National Health Authority (NHA)

The National Health Authority (NHA) has made significant strides recently, starting with the introduction of a stable V3 API, which promises enhanced performance and reliability. Additionally, the extension of DHIS (District Health Information System) for another year underscores the commitment to robust health data management.

A professional from the NHA highlighted the efforts to stabilize the technical infrastructure, stating,

"We have introduced a stable and new V3 API to address the technical issues faced by HMIS and other tech companies. This should provide a more reliable integration process."

-NHA, Government Official

Discussing the continuity of digital health initiatives, the same professional noted,

"The DHIS has been extended for another year to ensure continuity and support for digital health initiatives."

-NHA, Government Official

In a major collaborative effort, the NHA has launched the National Health Claim Platform in partnership with the Insurance Regulatory and Development Authority of India (IRDAI) and the General Insurance Council (GIC), aiming to streamline and enhance the insurance claim process. A noteworthy policy change mandates the use of Ayushman Bharat Health Account (ABHA) numbers for all insurance companies, ensuring standardized health records and facilitating smoother insurance operations. To promote digital health adoption, 100 microsite projects are spearheading initiatives across various regions. At the state level, Project Management Units (PMUs) have been established to oversee and implement these health projects efficiently. Furthermore, to foster better communication and cooperation, workshops are being

organized with various doctor unions, ensuring that healthcare professionals are well-informed and actively participating in these transformative initiatives.

In collaboration efforts, they remarked,

"We've launched the National Health Claims Platform in collaboration with IRDAI and GIC. Additionally, ABHA is now mandated for every insurance company to streamline health claims and benefits."

-NHA, Government Official

State Government

The state government has undertaken several critical initiatives to enhance its healthcare infrastructure and operations. One of the key developments is the establishment of Project Management Units (PMUs) which are pivotal in ensuring the efficient execution and oversight of various health projects at the state level.

A professional from the NHA highlighted the efforts to stabilize infrastructure, stating,

"Project Management Units (PMUs) have been set up at the state level to oversee and facilitate the implementation of ABDM. These units are crucial in managing the digital transition and addressing local challenges."

-BBMP, Bengaluru

Among these projects, 100 microsite initiatives have been launched, with the majority already operational, indicating significant progress in the adoption of digital health solutions. These microsites play a crucial role in localized healthcare management, facilitating better access and more efficient delivery of health services. Additionally, a major improvement has been achieved in the Health Facility Registry (HFR) verification process, where the time frame has been significantly reduced. This acceleration in verification helps streamline the integration of health facilities into the broader health system, ensuring that accurate and up-to-date information is available for better healthcare planning and delivery. These efforts collectively reflect the state

government's commitment to enhancing healthcare services and infrastructure through meticulous planning and rapid implementation of digital health initiatives.

Highlighting the reach of the digital health projects, they said,

"Microsite projects are functional in various states, and we are working to extend these projects to cover more areas and facilities."

-BBMP, Bengaluru

On expediting the verification process, the official mentioned,

"The verification process for Healthcare Facility Registry (HFR) creation has been streamlined to reduce delays. This should encourage more healthcare professionals and facilities to participate in ABDM."

-BBMP, Bengaluru

4. DISCUSSION & RECOMMENDATION

The successful implementation of the Ayushman Bharat Digital Mission (ABDM) faces several challenges across different stakeholder groups. Among healthcare professionals and doctors, lack of trust, security concerns, and inadequate monitoring deter participation. Additionally, misunderstandings about the program's impact on income tax and the complexity of the Health Professional Registry (HPR) and Health Facility Registry (HFR) contribute to reluctance. Enhancing communication, demonstrating the usefulness of these elements, and simplifying their implementation can encourage more doctors to engage with ABDM. Tech companies, both ABDM-enabled and those in the sandbox, face challenges related to technology use and integration management, compounded by insufficient support and high costs. Solutions include increasing technology stability, improving support, and easing the integration process, alongside clearer policies and better documentation. The National Health Authority (NHA) and state governments play crucial roles in ABDM's success. The NHA's initiatives, such as introducing new APIs, extending the Digital Health Information System (DHIS), and mandating ABHA for insurance companies, are critical steps forward. Establishing Project Management Units (PMUs) and organizing workshops reflect a proactive approach to overcoming challenges and fostering adoption. State governments support ABDM through PMUs and microsite projects, and efforts to reduce Health Facility Registry verification times are streamlining processes and encouraging healthcare professional participation. By addressing these multifaceted challenges with targeted strategies, ABDM can move closer to its goal of revolutionizing India's healthcare system into an integrated digital health ecosystem.

Recommendations:

Healthcare Professionals:

1. **Clear Communication and Training:** Dispel the doubts of the healthcare personnel on how examination, information security and trust will be handled through effective communication and specific skills that will be introduced to the

personnel. Sped up conversations on the policies and procedures as to patient records privacy and how they meet the set standards.

2. **Simplify HPR and HFR Processes:** Optimize the HPR and HFR processes to cut down the time required for verification. Simplification should also encompass improved structures, technology, and ways of validating easy registration and modification of the health care providers and institutions.
3. **Promote Advocacy and Unified Opinions:** Advise doctor unions and healthcare associations and promote unity towards support and acceptance of ABDM. Promote unanimous recommendation and positive interaction on matters arising over digital health resolution for enhanced implementation.

Information Technology (IT) Companies:

1. **Enhance the Stability of ABDM Technology:** Reduce the server failures and downtime of ABDM technology to enable improved reliability and stability of the technology. Provide adequate funding to enhance the working of computers and information technology for optimum attainment of ABDM-enabled systems.
2. **Simplify Integration Processes:** Establish clear documentation and guidelines for the HMIS companies' integration to eliminate complex integration procedures. Simplify the API structure concerning the integration and testing processes, thus effectively providing an interface compatible with the existing healthcare systems.
3. **Address Discrepancies in Fund Disbursement:** Negotiate disparities regarding the disbursement of funds from bodies such as DHIS to the different HMIS firms. Establish measures that would enable the organization to eliminate hitches in the financial flow and enhance the kind of financial stability that participating corporations expect from the scheme.

Government:

1. **The government should Develop and Implement Comprehensive IEC Strategies:** An improvement of stockholder understanding of the ABHA and ABDM as well as improved public awareness of it requires effective Information, Education, and Communication (IEC) measures. This should involve the launching of campaigns in all media outlets on the need to embrace and use ABHA and ABDM.

2. **Continue API Stabilization and Support Programs:** Continue the ongoing measures to present and standardize novel APIs in ABDM. Expand simple support programs such as the DHIS to further improve the data management strengths and communication interface within various healthcare organizations.
3. **Mandate ABHA Use for Insurance Companies:** Establish the use of ABHA as the standard for all insurance institutions in a bid to make further expansions within the world of insurance. Use incentives and legal procedures to encourage the use of digital health.
4. **Collaborate with State Governments:** Enhance engagement with the state governments to improve HFR verifications' speed and use microsites optimally. Assist states in addressing local factors and guarantee the timely implementation of plans for digital health at the country's base.

5. CONCLUSION

ABDM is a collective initiative comprising several interventions proposed to enhance the access, effectiveness, and quality of health care through the application of digital solutions in India. The analysis carried out in this study for the various stakeholders has demonstrated that these issues are intertwined and has provided crucial information on the challenges in implementing ABDM.

In conclusion, the study highlights the significant and concerning lack of awareness regarding the Ayushman Bharat Digital Mission (ABDM) and its components. The awareness level of ABHA cards is less as mentioned by the stakeholders. This implies that there is a need for enhanced IEC techniques, that is information, education and communication.

Taking into account the current research, the use of adoption of ABDM is still limited due to the concerns raised by healthcare professionals about data protection, privacy and perception of monitoring. These problems are complicated by the complexity of the HPR and HFR procedures. Healthcare providers' trust and engagement thus involve solving these problems through communication, efficient processes, and robust data protection mechanisms.

The problems that businesses experience when using ABDM – fluctuations in the system, problems with integration, and inadequate provision of technical assistance, underline the need for developing corresponding improvements of the support systems and technical aids. Thus, the high costs of integration and constant system failures posing a major threat to interruption of the ABDM-enabled systems hinder their widespread use and optimized function. Measures like the formation of the new APIs and the creation of the Project Management Units (PMUs) signify that the government is active in overcoming the mentioned difficulties. Furthermore, it could be argued that the results indicate that additional and more integrative strategies are called for, to counter the diverse challenges in implementing ABDM.

The suggestions given in this study can be a guide to guiding ABDM to work more efficiently and be embraced in the marketplace.

These are revising and creating specific health promotion campaigns, enhancing information sharing and enquiring procedures for doctors, ensuring steady IT stability and integration services for the HMIS companies at the national level and fostering integration between the national and state governments.

Thus, it is imperative to emphasize that ABDM has significant potential, provided that technological innovation, stakeholders' involvement, and policy measures are equally balanced. Stakeholder interconnectivity shows that none of the stakeholder groups can be addressed in isolation when it comes to implementing solutions to challenges.

In addition, the need to undertake a constant review of the strategies in use as ABDM advances is brought out in the study. Digital health ecosystems are complex and constantly evolving, which means that those interested in this field must be able to quickly adapt to any new threats and possibilities.

In conclusion, thus, it can be said that although ABDM has to work on overcoming multiple implementation issues and barriers, it has boundless possibilities to change the dynamics of the healthcare system in India. Consequently, by engaging all the stakeholders, ABDM can overcome these hurdles, thereby enhancing the adoption and optimization of the application's potential. If this effort is accomplished, it has the potential to transform India's healthcare structure and act as a roadmap for other LMICs seeking to optimize technology use for enhanced populace well-being and UHC.

Peculiarities of ABDM development can be concluded based on the above discussion Future studies should therefore aim at assessing the effectiveness of implemented solutions as well as other emerging issues in the dynamic environment of digital health. Thus, the outcome and effectiveness of ABDM will be decided based on the impact caused on the health of the people subjected in the database and their health policy's accessibility to quality and affordable care with reference to the overall goal of UHC in India.

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ANNEXURE:

Questionnaires (Interviews):

Healthcare Professionals (Doctors):

1. What is your level of awareness and understanding of ABDM and its components?
2. How do you perceive the potential benefits of ABDM for healthcare professionals and patients?
3. What are the major operational challenges you anticipate or have faced in adopting ABDM in your practice?
4. How can ABDM facilitate better continuity of care and care coordination among healthcare providers?
5. What are your concerns regarding data security, privacy, and consent management in the context of ABDM?
6. How can the government and healthcare institutions support healthcare professionals in adopting ABDM?
7. What role can professional associations and bodies play in promoting ABDM adoption among healthcare professionals?
8. How can ABDM be leveraged to enhance preventive healthcare and disease management?
9. What are your recommendations for improving the user experience and usability of ABDM for healthcare professionals?
10. How can ABDM be integrated with existing healthcare systems and workflows to minimize disruption?

IT Companies (ABDM-enabled and Sandbox Companies):

1. What challenges do you face in the integration process with ABDM?
2. How does the lack of clear definition in the integration process affect your work?

3. Can you describe the quality of the technical documentation provided? How can it be improved?
4. How do frequent system downtimes impact your operations?
5. What are the cost implications of integrating with ABDM for your company?
6. What kind of technical and operational support do you receive from NHA? How could it be improved?
7. How do you manage the technical jargon in the provided documentation?
8. What measures could improve system stability and reduce downtimes?
9. How do you perceive the overall support from NHA during the integration process?
10. What are the main obstacles in the integration process with the unstable UAT environment?
11. What recommendations do you have for improving the integration process for tech companies?
12. What are your concerns regarding data security, privacy, and interoperability in the context of ABDM?
13. How can the government streamline the approval processes and facilitate smoother integration with ABDM?
14. What are the technical and infrastructural challenges you have faced in adopting ABDM?
15. How can the government incentivize and support private companies in adopting ABDM?

Government Professionals (NHA and State Governments):

1. Can you describe the process and challenges of introducing the new V3 API for ABDM?
2. How effective has the extension of DHIS been in supporting ABDM implementation?
3. Can you provide insights into the progress and challenges of future projects?
4. What future initiatives are planned to strengthen the implementation of ABDM at the national and state levels?
5. How is the state government involved in the microsite projects and PMU setups?

6. Can you elaborate on the measures taken to reduce the time for HFR verification?
7. What additional support is needed from NHA to enhance the implementation of ABDM?
8. How can the collaboration between national and state governments be improved to ensure the success of ABDM?
9. How is the state government involved in the microsite projects and PMU setups?
10. How can the collaboration between national and state governments be improved to ensure the success of ABDM?
11. What strategies would you recommend for enhancing stakeholder engagement and collaboration?