

INTERNSHIP TRAINING

at

ERNST & YOUNG INDIA LLP, New Delhi

**Gap Analysis of Functional Requirements of Existing Building
Blocks for Digital Health Interventions of National Health
Authority.**

by

**Saloni Chawla
PG/20/065**

Under the guidance of

**Dr. Rohini Ruhil
Assistant Professor**

Post Graduate Diploma in Hospital & Health Management

2020-2022



International Institute of Health Management Research New Delhi

The certificate is awarded to

Saloni Chawla

in recognition of having successfully completed her
Internship in the department of

Government and Public Sector- Strategy & Transactions

and has successfully completed her Project on

**Gap Analysis of Functional Requirements of Existing Building Blocks for
Digital Health Interventions of National Health Authority**

7th March 2022 - 31st May 2022

At

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She comes across as a committed, sincere & diligent person
who has a strong drive & zeal for learning.

We wish her all the best for future endeavours.



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Partner- Strategy & Transactions (SaT)
Ernst & Young India LLP

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I wish her all success in all her future endeavours.

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Associate Dean, Academic and Student Affairs
IIHMR, New Delhi

Dr. Rohini Ruhil
Assistant Professor (Mentor)
IIHMR, New Delhi



Ernst & Young LLP
Golf View Corporate Tower-B
Sector-42, Sector Road,
Gurgaon-122 002, Haryana, India

Tel : +91 124 443 4000

June 14, 2022
Delhi

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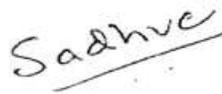
Dr. Sumesh Kumar

Mr. Sukesh Bhardwaj

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This is to certify that **Saloni Chawla**, a graduate student of the **PGDM (Hospital & Health Management)** has worked under our guidance and supervision. She is submitting this dissertation titled “**Gap Analysis of Functional Requirements of Existing Building Blocks for Digital Interventions of National Health Authority**” at “**ERNST & YOUNG INDIA LLP, New Delhi**” in partial fulfilment of the requirements for the award of the **PGDM (Hospital & Health Management)**.

This dissertation has the requisite standard and to the best of our knowledge no part of it has been reproduced from any other dissertation, monograph, report or book.



Dr. Rohini Ruhil
Assistant Professor
IIHMR, New Delhi

Sadhvee Sharma
Senior Manager (Technology Consulting)
EY India LLP



Mr. Amit Goyal
Partner (SaT)
EY India LLP

INTERNATIONAL INSTITUTE OF HEALTH MANAGEMENT RESEARCH,
NEW DELHI

CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled

**“Gap Analysis of Functional Requirements of Existing Building Blocks for
Digital Health Interventions of National Health Authority”**

at

ERNST & YOUNG INDIA LLP, New Delhi

Submitted by

Saloni Chawla

Enrolment No. PG/20/065

Under the supervision of **Dr. Rohini Ruhil, Assistant Professor** for award of PGDM
(Hospital & Health Management) of the Institute carried out during the period from 7th

March 2022 to 31st May 2022 embodies my original work and has not formed the basis for
the award of any degree, diploma associate ship, fellowship, titles in this or any other Institute
or other similar institution of higher learning.



Saloni Chawla

FEEDBACK FORM

Name of the Student: Saloni Chawla

Dissertation Organisation: ERNST& YOUNG INDIA LLP

Area of Dissertation: Gap Analysis of Functional Requirements of Existing Building Blocks for Digital Health Interventions of National Health Authority.

Attendance: 100%

Objectives achieved: Timely completion of all assigned deliverables.

Deliverables: Technical documentation including BRD, FRS, SRS, GAR and preparing Wireframes and UI/UX designs for various building blocks such as Website, Dashboard, Grievance Portal, Drug Registry.

Strengths: Intuitive, sharp & adaptive. Can work with agility in ambiguous environment. Keen observer and sincere.

Suggestions for Improvement: Can improve technical and design skills so that implementation, presentation and recommendations are more impactful.

Suggestions for Institute (course curriculum, industry interaction, placement, alumni): --

Sadhvee

Date: 24/06/2022

Place: New Delhi

Sadhvee Sharma

Senior Manager (Technology Consulting)

Acknowledgement

I would like to take the opportunity to devote my thanks and express deep sense of gratitude to my IIHMR mentor **Dr. Rohini Ruhil (Assistant Professor)** and organization mentor **Sadhvee Sharma (Senior Manager-Technology Consulting)**. I am highly thankful to **Dr. Satyam Shivam Sundaram (Partner- Strategy & Transactions)** and **Mr. Amit Goyal (Partner- Strategy & Transactions)** for providing me the opportunity to work on this assignment. I am greatly indebted to them for providing their valuable guidance, advice, constructive suggestions, positive and supportive attitude and continuous encouragement, without which it would have not been possible to complete the project.

I owe my wholehearted thanks and appreciation to the entire **EY team**.

I hope that I can build upon the experience and knowledge that I have gained and make a valuable contribution towards community in coming future.



Saloni Chawla

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Organisation Profile

Ernst & Young Global Limited(EY) is a Multidisciplinary professional services organization with worldwide services network whose headquarter is located in London, England. It is one of the Big Four accounting firms along with Deloitte, KPMG and PricewaterhouseCoopers. Its main services to clients include assurance (which includes financial auditing), tax, consulting, and advisory. EY has extended beyond accounting into areas such as strategy, operations, human resources, technology, and financial services consulting.

Organization is driven by the purpose- **Building a better working World for our clients, our people and communities.**

EY has 300,000 employees in around 700 offices in more than 150 countries around the globe. The current partnership was created in 1989 when two accounting companies, Ernst &Whinney and Arthur Young & Co, merged to form the firm. Ernst & Young was the company's name until a rebranding drive in 2013 formally changed it to EY.

For the past 21 years, EY has remained on *Fortune* magazine's list of the *100 Best Companies to Work* longer than any other accounting company.

Geographically, the firm is structured in Europe, Middle East, India and Africa(EMEIA), Americas, Asia-Pacific.

Over the previous ten years, EY has significantly changed its business strategy to provide a broader range of services.

Service lines based on services provided to clients

- **Assurance:** It incorporates Financial Accounting Advisory Services, Financial Audit and Forensic & Integrity Services.
- **Tax:** It incorporates of International Tax Services, Business Tax Compliance, Transfer Pricing, Global Trade, Indirect Tax, People Advisory, Tax Technology and Transformation, Transaction Tax, Tax Accounting & Risk Advisory Services.
- **Consulting:** It incorporated two sub-service lines – Business Consulting and Technology Consulting.
- **Strategy and Transactions or SaT:** It focuses on the capital transformation of businesses, including Business Valuation and Economics, Due Diligence, Real Estate Advisory, M&A, Financial and Operational Restructuring, and Corporate Finance Strategy.

Through these services, EY help their clients to subsidize on transformative opportunities and fulfilling regulatory requirements. They keep their investors informed and cater to all of their stakeholders' needs.

Achievements

- The firm was ranked No. 44 in the *Fortune* list of "100 Best Companies to Work For", and the highest among the "Big Four", for 2009.

- In 2013, EY earned 100% rating on the "Human Rights Campaign Corporate Equality Index".
- In 2016, EY was ranked 3rd in Universum World's Most Attractive Employers, and ranked 1st in area of professional services employers, in a survey that reveals perception of future employers among business students by an employer branding firm.
- Forbes list EY as one of the Best Management Consulting Firms for 2017.

Leadership

- Mr. Carmine Di Sibio- Chairman & CEO, EY Global
- Mr. Rajiv Memani- Chairmen and Regional Managing Partner, EY India
- Mr. Anurag Malik- People Advisory Services Partner, EY India
- Mr. Rohan Sachdev- Consulting Leader, EY India
- Mr. Abizer Diwanji- Financial Services Leader, EY India

Infrastructure

EY develops and compares financial strategies and delivery methodologies for projects including public or private funding, project revenues, and grants, and assists clients in putting those plans into action. Infrastructure consulting services include the following:

- Assisting local and regional governments in achieving city mobility
- Strategic planning and policy
- Procurement and transaction advisory

- Program management and infrastructure delivery
- Strategy and process improvements in technology and information and communication technology (ICT).

Organizational Structure

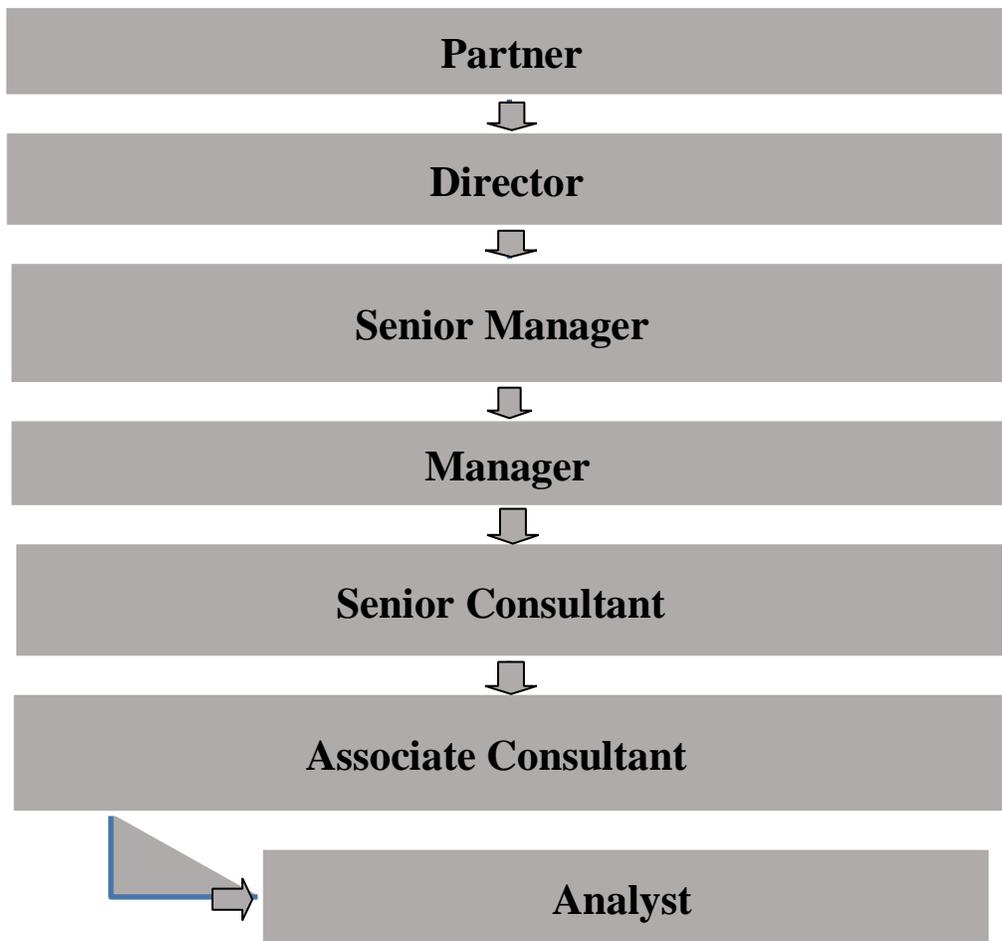


Figure 1- Hierarchy of Organization (May vary slightly across different service lines)*

Introduction

Digital Health Intervention

The intervention aims to develop the backbone necessary to support the integrated digital health infrastructure. It will bridge the existing gap amongst different stakeholders of Healthcare ecosystem through digital highways.

The broad vision of this ecosystem is to:

- i. support universal health coverage in an efficient, accessible, inclusive, affordable, timely and safe manner
- ii. provides a wide-range of data, information, and infrastructure services, duly leveraging open, interoperable, standards- based digital systems; and
- iii. ensures the security, confidentiality, and privacy of health-related personal information.

The role of the intervention is to provide information and data to different components of the health ecosystem to work together. It will also provide the technological infrastructure for collection and storage of core/master data through various registries. The intervention will implement the core and common digital building blocks required for healthcare and make them accessible as digital public goods to both the public and private ecosystem

BUILDING BLOCKS

The digital intervention provides an approach to establish a Federated Architecture. Key building blocks have been identified by taking into consideration, the most common requirements of the overall health ecosystem. Building blocks are designed

to be cross-functional.

The Existing building blocks: These are building blocks which have already been launched under pilot intervention and were live as of 20th August,2021.

<u>Sl. No.</u>	<u>Building block Classification</u>	<u>Building Blocks</u>
1	Existing Building Blocks	ABHA ID
2		Healthcare ProfessionalsRegistry (HPR)
3		Health Facility Registry (HFR)
4		Health Professional ID (HPID)
5		PHR App
6		Sandbox
7		Grievance Portal
8		Website

Table 1: List of Existing Building Blocks

Background

To strengthen the accessibility and equity of health services, including continuum of care with citizen as the owner of data, in a holistic healthcare programme approach leveraging IT & associated technologies and support the existing health systems in a ‘citizen-centric’ approach, a digital intervention has been adopted to create a national digital health ecosystem. The digital health ecosystem aims to support universal health coverage in an efficient, accessible, inclusive, affordable, timely and safe manner, that provides a wide-range of data, information and infrastructure services, duly leveraging open, interoperable, standards-based digital systems, that ensures the security, confidentiality and privacy of health-related personal information.

Various building blocks have been identified by taking into consideration, the most common requirements of the overall health ecosystem. All these blocks are designed to be cross-functional in nature.

Currently there are 8 existing building blocks which have already been launched under the pilot National Level Roll out of the digital intervention and are in use, namely; ABHA ID,

Healthcare Professionals Registry (HPR), Health Professionals ID (HPID), Health Facility Registry (HFR), PHR App , Sandbox, Grievance Portal and Website.

Review of Literature

1. ABDM Handbook, Resources, Publications and Consultation papers (NHA/ ABDM Website)- It is a complete resource handbook which allows one to understand the various different aspects and building blocks, including its architecture. Similarly, various building block specific resources and publications shared by NHA and Internal teams throw deeper light into different aspects of the operations and applications of the Building Block.
2. A descriptive study by Luis Manuel Gonzalez Amara, et.al. on Gap Analysis Methodology for the Team Software Process describes various gap analysis methodology for software gap analysis. It suggests new and old methods and frameworks for conducting a gap analysis study for software implementation
3. A descriptive study by Domenico Amalfitano, et.al titled A model-driven engineering approach for supporting questionnaire-based gap analysis processes through application lifecycle management systems describes a questionnaire-based gap analysis process for conducting a gap analysis study.

Objectives

General Objective:

To perform a Gap Analysis Study of Functional Requirements of Existing Building Blocks for Digital Health Interventions of National Health Authority.

Specific Objectives:

1. To study the functional requirements and operations of the national level pilot roll out of each existing building block of the digital intervention.
2. To provide suggestions for improvement of the gaps identified in the existing building blocks based on the pilot roll out.

Research Design & Methodology

RATIONALE OF THE STUDY

- The existing building blocks are currently in its initial stages of adoption and use.
- There still exists certain functionalities which are yet to be added to the system.
- There are certain functionalities of the system which have not been launched into the public domain and are being worked upon.
- Continuous feedback from key stakeholder's is helping improve the existing functionalities and add new functionalities to the ecosystem.
- Hence, to ensure a seamless national digital health ecosystem it is important to timely identify any product backlogs, shortcomings and gaps in the specified functionalities of the system and those currently in its operations. Once these gaps are identified it shall be easier to address the same and work on their improvement to ensure efficient functioning of the digital health ecosystem. It will allow the stakeholders to deploy necessary resources to improve the system and meet its vision.

STUDY DESIGN: Descriptive Study

TYPE OF DATA: Secondary Data

DURATION OF STUDY: 2 Months (15th March 2022- 15 May 2022)

METHODOLOGY

Documentation analysis and discussions with stakeholders/functional leads for different building blocks shall help in understanding of all functional business requirements for each building block. A mixed methodology encompassing stakeholder reviews, process mapping, existing system review, and a dedicated gap analysis matrix shall be used to identify issues in the functionalities of the existing building blocks. Stakeholder discussions and team review meetings shall be utilized to decide upon action plans/opportunities/recommendations for improving the identified issues.

MIXED APPROACH

1. **STAKEHOLDER CONSULTATIONS-** Meetings and discussions with various stakeholders including functional leads, technical leads, software development team were conducted to gather understanding of the building blocks.
2. **TEAM REVIEW MEETINGS-** Internal team review meetings were conducted regularly to understand different aspects of functionalities of different building blocks and to identify certain issues in their functionalities.
3. **DOCUMENTATION REVIEW-** All available documents and literature including Publications and Consultation papers on the Website related to the concerned building blocks were reviewed and studied.
4. **PROCESS MAPPING-** Workflows, Use-Cases and Activity maps of the building blocks were studied to map processes and functionalities of the building blocks.

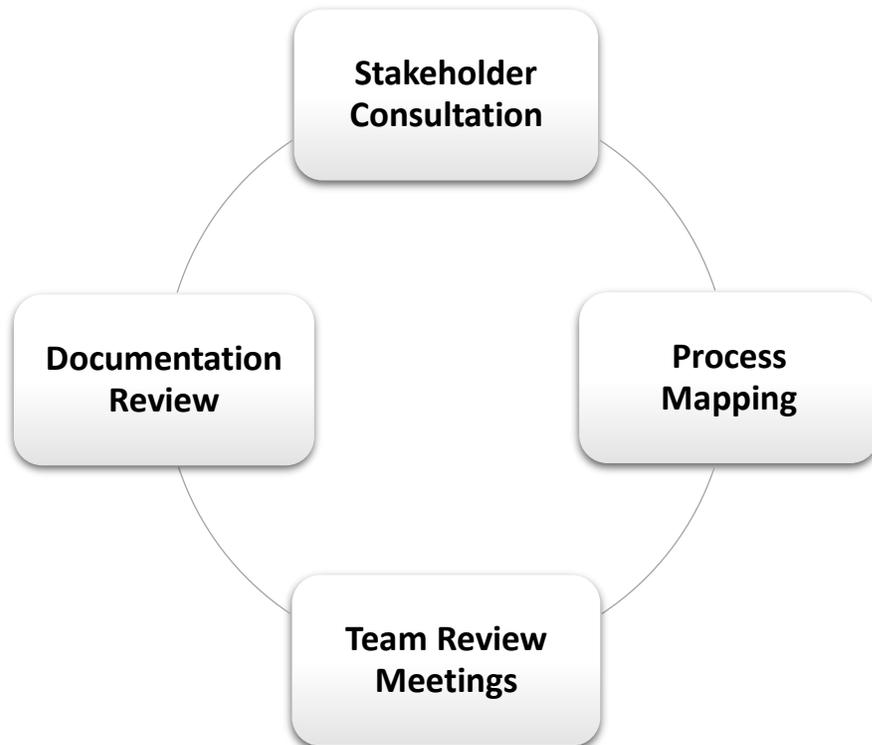


Figure 2: Mixed Approach Methodology

Results and Analysis

A gap analysis matrix was prepared to identify issues in various functional requirements of the existing Building Blocks of the concerned digital interventions. These existing blocks being considered are those which were live as of 20th August 2021 under the pilot National Level Roll out of the digital health intervention. The gap analysis matrix captures the following details:

- Requirement Sub-category
- Functional Requirement
- Category of issue identified
- Suggested improvements

Upon detailed analysis of existing products of the building blocks, workflow mapping, existing technical document review and multiple stakeholder consultations gap analysis matrix was filled for each of the building blocks.

1. ABHA ID

ABHA ID (ABHA ID) is a 14-digit unique system generated random number, that can be created with the help of Aadhaar or validated KYC documents. ABHA ID is designed as a patient identifier linking health records across multiple systems. It is one of the Core building blocks of the Architecture.

GAP ANALYSIS MATRIX

S. No	Requirement Sub-Category	Functional Requirement	Category of issue identified	Suggested improvements
1	ABHA ID creation	Self-Registration through Passport	Process Gap	To create ABHA ID, a passport supported KYC option shall be made available to users.
2	Consent Recording	Consent Recording with name and mobile number	Process Gap	Users shall be provided with the functionality to record consent for ABHA ID creation using name and mobile number.

S. No	Requirement Sub-Category	Functional Requirement	Category of issue identified	Suggested improvements
3	Communication	Communication of ABHA ID through email	Process Gap	The functionality to communicate users about the ABHA ID details via email should be enabled.

2. Healthcare Professionals Registry (HPR)

HPR has been designed to serve all healthcare professional categories across all systems of medicine and can be expanded to include any required category. Some of the categories of healthcare professionals considered include doctors, nurses & midwives, health service managers, paramedical personnel, support staff, personal care workers, council representatives etc.

All the relevant details such as name, registration, academic and employment details are recorded. Presently, doctors who are enrolled in the HPR are verified by National or State Councils of their respective system of medicine. In case of government doctors, their work details are additionally verified by State / UT administration.

GAP ANALYSIS MATRIX

S. No	Requirement Sub-Category	Functional Requirement	Category of issue identified	Suggested improvements
1	Healthcare Professionals ID Generation	KYC Authentication	Software Deficiency	HPR should have the functionality and be integrated with the Council Software to allow easy access, verification, and authorization of health professionals for registration in HPR.
2	Integration with other systems	Linkage with Health Records and HFR	Software Deficiency	The HPR system should support Open API Integration with Health Records and HFR so that users are able to view correct and updated health professional's information fetched from HPR in Health Records.
3	Other Functionalities	e-Sign	Software Deficiency	A digital signature tool should be made available to HP to create and add digital signature during the verification/approval stage.

3. Health Facility Registry (HFR)

Health Facility Registry is a comprehensive repository of health facilities of the country across modern and traditional systems of medicine.

It includes both public and private health facilities including hospitals, clinics, diagnostic laboratories and imaging centres, pharmacies, etc.

GAP ANALYSIS MATRIX

S. No	Requirement Sub-category	Functional Requirement	Category of issue identified	Suggested improvements
1	Authentication & Verification	e-Sign	Process Gap	A Digital Signature tool should be provided HF during completion of authentication & verification flow
2	Integration & Mobile Application	Mobile application (Android/IOS)	Software Deficiency	Development of mobile based HFR tool can be taken into consideration.
3	Application Improvement	Not Applicable	UI/UX design issue	There should be back button available on the HFR webpage for ease of user navigation.
4	Bug	Not Applicable	Validation Issue	System should be designed such that an error message is displayed if mandatory fields are not filled in by the user.
5	Bug	Not Applicable	UI/UX design issue	The functionality to view full health facility profile should be made available to all authorized users who log into the system.

4. Health Professional ID (HPID)

The Healthcare Professionals ID is a comprehensive, structured and verified master dataset that aims to be a single, authoritative, digital source of healthcare professionals in the country.

HPID has been designed to serve all healthcare professional and Health facility and Council bodies, Governing bodies categories across all systems of medicine and can be expanded to include any required category. Some of the categories of healthcare professionals considered include doctors, nurses & midwives, health service managers, paramedical personnel, support staff, personal care workers, council representatives etc.

All the relevant details such as name, registration, academic and employment details are recorded. Presently, doctors who are enrolled in the HPR are verified by National

or State Councils of their respective system of medicine. In case of government doctors, their work details are additionally verified by State / UT administration.

GAP ANALYSIS MATRIX

S. No	Requirement Sub-category	Functional Requirement	Category of issue identified	Suggested improvements
1	Registration	KYC Authentication	Process Gap	The functionality to register and create HPID via PAN and/or Passport as means of KYC authentication should be made available.
2	Registration	Offline Healthcare Professional ID creation	Process Gap	The implementing agency shall take into consideration setting up of offline platforms in areas with no internet access to support creation of HP ID.
3	Linkage	HPID Linkage with public/private applications	Software deficiency	A Software can be developed to enable linkage of public /private domains with the HP ID of all registered health professionals.

5. PHR App

The Personal Health Record (PHR) is a longitudinal health record of an individual. These records will be drawn from multiple sources and should conform to nationally recognized interoperability standards. All health data will be made accessible to the individual via the PHR App and the individual will have complete access control via the consent management framework.

The App acts as a bridge between the Citizen (Patient), the HIP (Health Information Provider) and HIU (Health Information User).

S. No	Requirement Sub-category	Functional Requirement	Category of issue identified	Suggested improvements
1	Enable/disable Biometric	Biometric authentication (face/fingerprint)	Process Gap	The app should provide user with the functionality to login through biometric authentication.
2	PHR app: Opt-out	Opt-Out process (Deactivate/Delete functionality).	Process Gap	The system should allow users to deactivate and move out of ABHA number.

3	PHR app: Opt-in	Opt-in process (Reactivate functionality)	Process Gap	The system should allow users to reactivate the ABHA account.
4	Record Viewing and Management	Viewing of health records of all family members	Process Gap	The system should allow users to view health records of family members using the same registered mobile number.
5	Integrations	Grievance Redressal	Process Gap	The PHR App should support integration with grievance portal for redressal of any complaints registered by the users. The App should have the functionality to allow users to register grievances via the app.

6. Sandbox

The Sandbox environment is a framework developed to allow technologies or innovative products to be tested in a contained environment in compliance with the standards. This will help organizations intending to be a part of the ecosystem, become a Health Information Provider (HIP) or Health Information User (HIU), and Health Locker for efficiently linking with other building blocks.

The environment allows both alpha as well as beta testing of the products.

GAP ANALYSIS MATRIX

S. No	Requirement Sub-category	Functional Requirement	Category of issue identified	Suggested improvements
1	Website Maintenance	Sandbox website content	Process Gap	The sandbox environment should have website maintenance and compliance document.
2	Documentation	Sandbox website content	Documentation error	The Sandbox webpage should display a Help manual for each section of Sandbox.
3	Test Bench availability	Test Environment	Software Deficiency	The test environment can be made more user friendly and easier to comprehend by new users
4	API documentation	API Document availability	Documentation error	API document for each API should be made available

7. Grievance Portal

The Grievance Redressal System primarily aims to enable the submission of grievances by the aggrieved party from anywhere and anytime (24x7). The aggrieved party may submit their grievances through various modes such as post/letter, Contact center, Email and Grievance portal. The portal will also be linked with other health apps to fetch the grievances raised through health applications/solutions and other

social media platform. The aggrieved shall also be able to track their grievance status. The user can also utilize this platform to submit a feedback or suggestion for improving the building blocks.

GAP ANALYSIS MATRIX

S. No	Requirement Sub-category	Functional Requirement	Category of issue identified	Suggested improvements
1	Ticket management	Multiple communication channels	Software Deficiency	The grievance application database should be integrated with other grievance communication channels such as Chatbot, WhatsApp, email, PHR etc.
2	Ticket management	Supporting Documents	Software Deficiency	The system should provide users with option to remove the supporting documents they have uploaded on the grievance portal.
3	Ticket management	AI/ML Support	Software Deficiency	The software can be integrated with AI/ML technology for functionality such as automatic grievance escalation based on aging of submitted grievances.
4	Grievance Resolution	Capturing Details	Software Deficiency	The grievance form on the portal should display a multiple select checkbox option under grievance category to allow users to select and submit grievances for different categories at once.
5	Grievance Resolution	Helpdesk Support	Software Deficiency	The grievance portal application should be integrated with a helpdesk/contact center.
6	Multilingual	Multiple language to raise the grievance issues.	Software Deficiency	The portal design can be upgraded to be displayed at least in two major languages: English and Hindi. It should also support upgradation to other regional languages as well in future.

8. Website

The website contains all details regarding the program, guidelines, consultations etc. The website will also be linked with other health apps to fetch the details related to health applications/solutions. The users can seek various information and insights from the website related to various building blocks, get latest updates and provide feedback and suggestions.

Website ensures compliance with the various accessibility guidelines such as - GIGW (Guidelines for Indian Government Websites); W3C (World Wide Web Consortium); WCAG (Web Content Accessibility Guidelines). The website shall follow all accessibility guidelines of the compliance matrix for each of these.

GAP ANALYSIS MATRIX

S. No	Requirement Sub-category	Functional Requirement	Category of issue identified	Suggested improvements
1	Content management	Regularly update content	Software Deficiency	The Website can be integrated with a Content management system to create, manage, and modify content on the website.
2	Website Analytics	Site analytics	Software Deficiency	The Website can be integrated with an MIS to generate website analytics reports and insights.
3	Mobile Responsive	Mobile responsive user interface.	Software Deficiency	All Website functionalities which are non-functional on mobile shall be identified and necessary action should be taken to improve the same.
4	Multilingual UI	Multiple Languages	Software Deficiency	The Website can be made available at least in Hindi & English. It can also be made available in other common regional languages such as Marathi, Punjabi, Tamil, Telugu, Malayalam, Kannada, Gujrati, Bengali, Odia, Assamese.

Discussion

Gap analysis covers a comprehensive process to identify, understand, address, and bridge gaps in software product functionalities and service delivery. Conducting a gap analysis provides structure to information gathering and the process of finding sustainable solutions to deficiencies. This study has successfully identified various process, technical, documentation and software gaps in 8 existing building blocks of the digital health intervention. Most of the gaps were identified in Grievance Portal followed by PHR App. Least gaps were identified in HP ID, ABHA ID and HPR block. The gaps mapped out shall be overcome by mentioned corrective efforts to close the quality chasm and improve the overall functionality of the Digital Health Ecosystem.

Limitations

The study may have the following limitations:

- It may not be possible to study all aspects of the process and requirements in its entirety thoroughly during the limited time period of this review.
- This report may not necessarily comment on all the function / process related matters perceived as important by the concerned management.
- The issues identified and proposed action plans in this report are based on discussions with the people engaged in the process. Specific efforts shall be made to verify the accuracy and authenticity of the information gathered. The work carried out and the review of the documents thereof is based on the records available in public domain.
- The requirement gap analysis is performed between March – May 2022. Since the blocks are under continuous improvement and enhancement material changes will

occur in further requirements which are not be reflected in this report.

Conclusion

The study was carried out in National Health Authority (NHA) under Ernst & Young India LLP, New Delhi to identify gaps in the functional requirements of the existing building blocks for Digital Health Interventions of National Health Authority. The study established that there still exist various technical, software and process gaps in the existing Building Blocks in the pilot roll out. Improvement suggestions and follow up actions to overcome the issues have also been incorporated in the study. Implementation of these shall help in improving the workflows and user experience of these building blocks as envisioned.

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