SUMMER DISSERTATION REPORT
At

IQVIA

(February 14th to June 13th 2024)

ASSESSMENT OF DIGITAL HEALTH ECOSYSTEM OF ARMENIA WITH FOCUS ON HEALTH FINANCING

A REPORT

By

Dr. RAMANJEET SINGH

PGDM (Hospital and Health Management)

2022-2024

Under the guidance of
Dr Altaf Yousuf Mir
(Associate Professor)

International Institute of Health Management Research, New Delhi

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The certificate is awarded to

Name: Dr Ramanjeet Singh

in recognition of having successfully completed his dissertation in the department of "Public Health" IQVIA, New Delhi as **"Management Trainee"**

and has successfully completed his Project on

ASSESSMENT OF DIGITAL HEALTH ECOSYSTEM OF ARMENIA WITH FOCUS ON HEALTH FINANCING

DATE: 14-02-2024 to 13-06-2024

Organisation: IQVIA, New Delhi

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

We wish him all the best for future endeavors.

Dr Santosh Moses
Principal- Public Health, South Asia
IQVIA, New Delhi
(Training & Development)

Himanshi
IQVIA,
New Delhi
Zonal Head-Human Resources

Certificate of Approval

The following dissertation titled "Assessment of digital health ecosystem of Armenia" at "with focus on health literacy - IRMA, New Delhi" is hereby approved as a certified study in management carried out and presented in a manner satisfactorily to warrant its acceptance as a prerequisite for the award of **PGDM (Hospital & Health Management)** for which it has been submitted. It is understood that by this approval the undersigned do not necessarily endorse or approve any statement made, opinion expressed, or conclusion drawn therein but approve the dissertation only for the purpose it is submitted.

Dissertation Examination Committee for evaluation of dissertation.

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FEEDBACK FORM

Name of the Student: Dr. Ramanjeet Singh.

Name of the Organisation in Which Dissertation Has Been Completed: IQVIA, New Delhi

Area of Dissertation: Assessment of digital health ecosystem of Armenia with focus on health financing.

Attendance: 100%

Objectives achieved: YES

Deliverables: All met

Strengths: Punctual, Hardworking, Focused.

Suggestions for Improvement: Nothing Significant

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

23/07/2024

Signature of the Officer-in-Charge/ Organisation Mentor (Dissertation)

Date: 3/07/2024
Place: Delhi.

Certificate from Dissertation Advisory Committee

This is to certify that **Dr Ramanjeet Singh,** a graduate student of the **PGDM (Hospital & Health Management)** has worked under our guidance and supervision. He is submitting this dissertation titled "**ASSESSMENT OF DIGITAL HEALTH ECOSYSTEM OF ARMENIA WITH FOCUS ON HEALTH FINANCING** at "**IQVIA, New Delhi**" in partial fulfillment 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 ALTAF YOUSUF MIR
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Annexure I

INTERNATIONAL INSTITUTE OF HEALTH MANAGEMENT RESEARCH, NEW DELHI

CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled **ASSESSMENT OF DIGITAL HEALTH ECOSYSTEM OF ARMENIA WITH FOCUS ON HEALTH FINANCING** and submitted by Dr Ramanjeet Singh Enrollment No PG/22/087 under the supervision of Dr Altaf Yousaf Mir for award of PGDM (Hospital & Health Management) of the Institute carried out during the period from 14/02/2024. to 13/06/2024 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.

Signature

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Dr Ramanjeet Singh** student of PGDM (Hospital & Health Management) from International Institute of Health Management Research, New Delhi has undergone dissertation at **IQVIA**, New Delhi from 14-02-2024 to 13-06-2024.The Candidate has successfully carried out the study designated to him during dissertation and his approach to the study has been sincere, scientific and analytical. The dissertation is in fulfillment of the course requirements. I wish him all success in all his future endeavors.

Dr. Sumesh Kumar
Associate Dean, Academic and Student Affairs
IIHMR, New Delhi

Mentor: Dr Altaf Yousaf Mir
Associate Professor
IIHMR, New Delhi

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Title of the Dissertation/Summer Assignment	"Assessment of Digital Health ecosystem of Armenia with focus on health financing".		
Plagiarism detect software used	"TURNITIN"		
Similar contents acceptable (%)	Up to 15 Percent as per policy		
Total words and % of similar contents Identified	7%		
Date of validation (DD/MM/YYYY)	04/ 07/ 2024		

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Dean (Academics and Student Affairs)
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Date:
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Abstract

The phrase "digital health ecosystem" describes a networked system of digital instruments, platforms, and technologies supporting the administration, delivery, and enhancement of healthcare. This ecosystem aims to improve healthcare services' efficacy, accessibility, and efficiency. The digital health ecosystem aims to reduce costs, enhance patient satisfaction, improve healthcare outcomes, and facilitate proactive, individualized care. Achieving these goals requires collaboration among patients, legislators, technology developers, and healthcare providers.

Armenia is working to improve access to healthcare, especially in remote areas, streamline healthcare processes and reduce administrative burdens, enhance the quality of care through standardized protocols, increase patient engagement through digital platforms, educate providers and the public on health issues, facilitate data-driven research and development.

The Government of Armenia (GoA) has made significant strides in integrating digital technology into healthcare, benefiting insurers, patients, and providers. Under the "Digital Health Financing Support to Developing Member Countries in Asia and the Pacific" initiative, IQVIA conducted secondary research to understand Armenia's digital health financing ecosystem and propose key intervention areas to enhance efficiency, efficacy, and transparency in implementing universal health coverage (UHC).

The research identified several areas needing reform:

- **Claim Processing System:** Manual submission risks errors and fraud.
- **Beneficiary Verification System:** Poor integration hinders automated status retrieval.
- **Anti-Fraud System:** Lacks efficient mechanisms for detecting suspicious activities.
- **E-Prescription System:** Inadequate integration increases medication error risks.
- **E-Referral System:** Incomplete information affects continuity of care.
- **Monitoring and Evaluation System:** Data inconsistency challenges decision-making.

Armenia is working to strengthen its digital health financing ecosystem, focusing on scaling up technologies for insurers, providers, and health analytics. The report recommends the State Health Agency (SHA) and Ministry of Health (MoH) shortlist and implement one of the proposed mature digital technologies, facilitated by IQVIA, to enhance the current health financing system and achieve UHC goals.

ACKNOWLEDGMENT

I would like to express my heartfelt gratitude and appreciation to all those who have supported and guided me throughout my summer dissertation at **IQVIA**. The experience I gained during this dissertation has been truly transformative, and I am grateful for the support and guidance I have received throughout my journey.

First and foremost, I would like to extend my heartfelt thanks to **Dr Santosh Moses sir**, **Mrs Jyoti Mittal mam**, **Mrs Parul Sharma mam** and **Kanishak Gautam sir**, my Reporting Manager, for their exceptional guidance and unwavering support throughout my dissertation. Their expertise in thefield of public health and their dedication to my learning has been instrumental in shaping my understanding of the public health consultancy. I am truly grateful to Kanishak Gautam for his mentorship, constructive feedback, and encouragement, which have played a crucial role in my professional development. I would also like to thank **Dr Altaf Yousuf Mir**, Associate Professor of IIHMR Delhi who took the time to mentor and guide me during my dissertation.

I would also like to express my sincere appreciation to the entire team at of IQVIA for their warm welcome and for creating a positive and collaborative work environment. Their willingness to share their knowledge and experiences has provided me with unique insights into the complex world of Public Health.

I would also like to acknowledge my fellow team mates and colleagues for their collaboration and support throughout my internship. The exchange of ideas, brainstorming sessions, and shared experiences have created a dynamic and stimulating environment. I am thankful for their camaraderie and for fostering a senseof teamwork and shared learning.

I am deeply thankful to IIHMR DELHI for their continuous support, guidance, and commitment to my educational and professional development. The opportunities and resources provided by the college have played a vital role in shaping my internship experience and preparing me for the future.

In conclusion, my dissertation experience at IQVIA has been a remarkable journey, and Iam honored to have been a part of such a dynamic and innovative organization. This experience has equipped me with valuable skills and knowledge that will undoubtedly shape my future endeavors in the field of public health.

Sincerely,

Dr. Ramanjeet Singh

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LIST OF ABBREVIATIONS

ARMED	Armenia Online Electronic Health Information System
BBP	Basic Benefit Package
COVID-19	Coronavirus Disease
DMCs	Developing Member Countries
EHIS	Electronic Health Information System
EHIU	e Health Implementation Unit
EHR	Electronic Health Record
EMR	Electronic Medical Record
GOA	Government of Armenia
HIS	Health Information System
HMIS	Health Management Information System
ICD-10	International Classification of Diseases-10
KPIs	Key Performance Indicators
MIS	Management Information System
MoH	Ministry of Health
MoHTI	Ministry of High-Tech Industry
MoLSA	Ministry of Labor & Social Affairs
NCDs	Non-Communicable Diseases
NEO	National e health operator
NIH	National Institute of Health
OOP	Out-Of-Pocket
PHR	Personal Health Record
QIs	Quality Indicators
SDGs	Sustainable Development Goals
SHA	State Health Agency
UHC	Universal Health Coverage
UID	Unique ID

DIGITAL HEALTH ECOSYSTEM

The phrase "digital health ecosystem" describes the networked system of digital instruments, platforms, and technologies that support the administration, delivery, and enhancement of healthcare. It includes a broad spectrum of digital solutions intended to improve healthcare services' efficacy, accessibility, and efficiency.

Typical essential elements of an ecosystem for digital health include:

1)Electronic Medical Records (EMR), Electronic Health Records (EHR), and other health information systems that handle and store patient data are examples of healthcare information systems.

2)Platforms and technologies that provide remote consultations, monitoring, and diagnosis—often with the use of video conferencing and remote monitoring equipment—are known as telemedicine and telehealth.

3)Wearables and mobile apps that track health indicators (such as fitness trackers and smartwatches) or offer direct health services (such as reminders for medications or mental health support) are referred to as health apps and wearables.

4)Big Data and health analytics are methods for examining huge datasets to gain understanding of population health patterns, customized treatment plans, and operational efficiency in the provision of healthcare.

5)Applications of artificial intelligence and machine learning (AI/ML) in healthcare include diagnostic image identification, predictive analytics, and image recognition for diagnosis.
6)Digital therapeutics: Software-based interventions that are used in addition to conventional treatments to treat medical diseases or improve clinical results.

The goals of the digital health ecosystem are to save costs, enhance patient satisfaction, improve healthcare outcomes, and facilitate the provision of more proactive and individualized care. For these digital solutions to be successfully incorporated into the larger healthcare landscape, cooperation between patients, legislators, technology developers, and healthcare providers is required.

NEED FOR DIGITAL HEALTH IN ARMENIA:

- Access to Healthcare: Improve access to healthcare services, especially in remote or underserved areas.
- Efficiency: Streamline healthcare processes and reduce administrative burden. Telemedicine: Facilitate remote consultations and diagnosis, crucial for areas with limited specialist availability.
- Health Data Management: Enhance storage, accessibility, and security of patient health records.
- Healthcare Quality: Enhance the quality of care through standardized protocols and digital tools.
- Patient Engagement: Increase patient engagement through digital platforms, promoting proactive healthcare.
- Education and Awareness: Educate healthcare providers and the public on health issues and preventive measures.
- Research and Development: Facilitate data-driven research and development in healthcare practices.
- Emergency Response: Improve emergency response systems and coordination through digital technologies.
- Policy and Regulation: Develop policies and regulations to support the integration and adoption of digital health solutions.

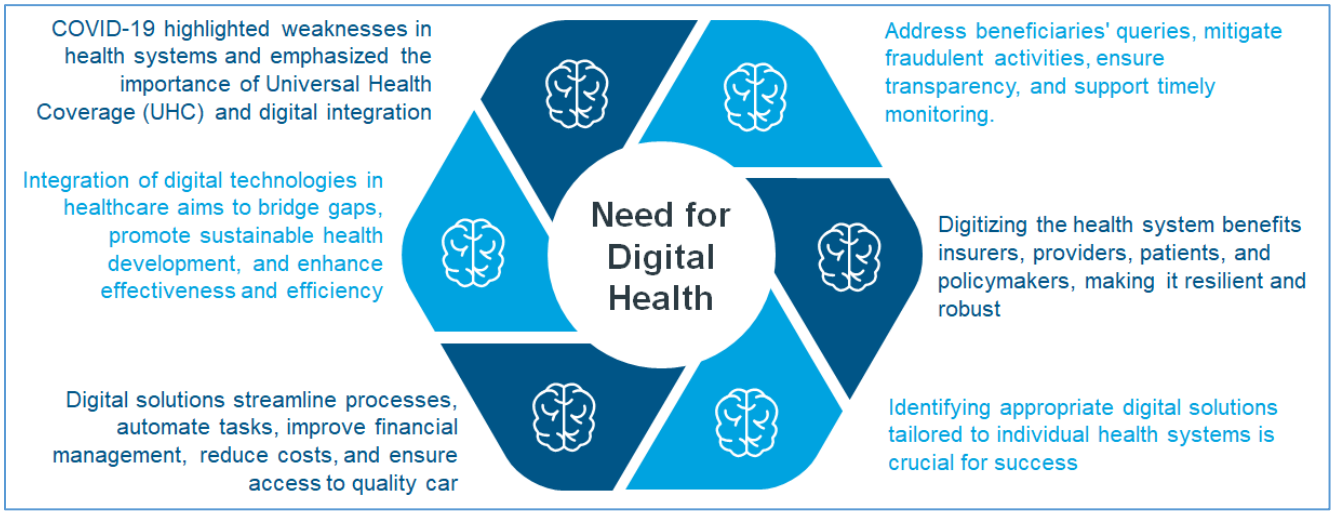

Figure 1: Need for Digital Health

INTRODUCTION OF ORGANIZATION

IQVIA is a leading global provider of advanced analytics, technology solutions, and clinical research services to the life sciences industry. IQVIA creates intelligent connections across all aspects of health care through its analytics, transformative technology, big data resources and extensive domain expertise. IQVIA is a Fortune 500 company providing Healthcare Consultancy services with over 60 years of experience and operations in over 100 countries. In India, IQVIA has been operational for 20 years now with nearly 20,000 employees in 30 registered offices across 15 cities and 60+ project offices in all states and UTs in India. IQVIA has dedicated Technology Centre in Noida, Chennai, Coimbatore and Bangalore which enables us to deliver very large projects. IQVIA's vast network of healthcare professionals, data scientists, market researchers, industry experts**,** vast infrastructure and openness for collaboration enables us to deliver tailored solutions to address specific client needs.

The primary areas of the business's attention are:

1.**Real-World Evidence**: To offer real-world evidence and insights, IQVIA makes use of its wide access to healthcare data, including electronic health records, claims data, and other real-world sources. This aids clients in comprehending treatment regimens, assessing the efficacy and safety of medications, and enhancing patient results.

2.**Technology solutions**: IQVIA creates cutting-edge technology platforms and tools to help clients easily gather, examine, and visualize healthcare data. Clinical trial management, data integration, and patient involvement are some of the areas that these systems serve.

3.**Research and Development**: For businesses in the pharmaceutical, biotechnology, and medical device industries, IQVIA provides extensive research and development (R&D) services. To maximize R&D plans, this includes managing regulatory procedures, performing clinical trials, and offering strategic advising.

4**.Health economics and outcome research**: IQVIA conducts health economics studies and outcomes research to assess the effectiveness and value of healthcare interventions, medications, and technologies.

5.**Consulting and Services**: The consulting division of IQVIA offers knowledgeable direction and strategic counsel to healthcare organizations, such as pharmaceutical companies, payers, and providers. Their knowledge spans topics including healthcare policy, pricing and reimbursement, market access, and portfolio optimization.

IQVIA conducts business internationally and has offices in more than 100 nations. The vast network of experts at the organization, which consists of scientists, physicians, technicians, and data analysts, works together to provide creative solutions and promote improvements in healthcare.To equip clients with the knowledge and resources they need to make data-driven decisions, enhance patient outcomes, and

influence the future of healthcare, IQVIA combines deep domain expertise, cutting-edge analytics capabilities, and a full array of services

SPECIFIC OBJECTIVES :

VISION OF THE ORGANIZATION: The mission of IQVIA is to rethink healthcare, expand scientific understanding, and enhance human health by leveraging data, analytics, and technology. The business wants to be a reliable partner, fostering innovation and providing useful information to help people make better decisions and change the face of healthcare..

MISSION OF THE ORGANIZATION: IQVIA's goal is to assist clients in navigating the intricacies of the healthcare sector, provide cutting-edge solutions, and enhance patient outcomes. To improve healthcare knowledge and promote positive change, the organization works to deliver high-quality services, derive useful insights from data, and work in partnership with stakeholders.

MODE OF DATA COLLECTION

- Observational findings
- Survey reports

GENERAL FINDINGS

I got the chance to learn a lot about the numerous departments that support the operations and accomplishments of the organization during my summer internship at IQVIA. IQVIA is a leading global provider of advanced analytics, technology solutions, and clinical research services to the healthcare industry. It offers a wide range of services and operates through several departments or business units. Here are some of the key departments of IQVIA:

DEPARTMENTS IN THE ORGANISATION

1.**Research & Development Solutions**: This department focuses on providing comprehensive clinical research services, including clinical trial design, patient recruitment, data management, andregulatory support. It helps pharmaceutical, biotechnology, and medical device companies in the development of new treatments and therapies.

2.**Real-World Solutions**: This department specializes in real-world data and evidence generation. It leverages various data sources, including electronic health records, claims data, and patient-reported outcomes, to generate insights on treatment effectiveness, safety, and patient outcomes. These insights help clients make informed decisions and optimize patient care.

3.**Technology Solutions**: IQVIA's Technology Solutions department focuses on developing and providing advanced software and technology platforms to support healthcare and life sciences companies. This includes data analytics tools, electronic data capture systems, clinical trial management systems, and digital health solutions

4. **Health economics and outcome research**: IQVIA conducts health economics studies and outcomes research to assess the effectiveness and value of healthcare interventions, medications, and technologies.

5.**Consulting Services**: IQVIA's Consulting Services department offers strategic consulting and advisory services to healthcare and life sciences organizations. It provides expertise in areas such as market access, commercial strategy, regulatory affairs, & health economics. The consulting team works closely with clients to address their specific challenges & develop tailored solutions.

6.**Contract Research Organization (CRO) Services**: IQVIA operates as a CRO, offering a comprehensive range of services to support clinical research activities. This includes study design, site selection, project management, monitoring, data collection, and statistical analysis. The CRO services department helps clients conduct clinical trials efficiently and effectively.

7.**Analytics Center of Excellence**: This department focuses on advanced analytics and data science capabilities. It leverages IQVIA's vast healthcare data assets to provide insights and predictive analytics for various stakeholders in the healthcare industry. The Analytics Center of Excellence helps clients make data-driven decisions, optimize resource allocation, and improve patient outcomes.

These are some of the key departments within IQVIA, each specializing in different aspects of healthcare analytics, research, technology, and consulting services.

ROLE OF IQVIA IN PUBLIC HEALTH :

IQVIA plays a significant role in public health through its expertise in healthcare data analytics, research capabilities, and technology solutions. Here are some ways in which IQVIA contributes to public health:

1.Epidemiological Research: To examine disease trends, therapeutic outcomes, and population health trends, IQVIA performs epidemiological research utilizing real-world data. This study aids in the understanding of disease burden, the identification of risk factors, and the development of efficient interventions by public health authorities and healthcare institutions.

2.**Patient Support Programs**: IQVIA designs and implements patient support programs to improve health outcomes and adherence to treatment plans. These programs can be particularly valuable in managing chronic diseases and reducing healthcare costs.

3.Public Health Surveillance: By utilizing its substantial healthcare data assets, IQVIA supports public health surveillance. IQVIA can give information on disease outbreaks, trends, and other topics by examining data from electronic health records, claims databases, and other sources.

4.Healthcare Resource Optimization: IQVIA's analytics capabilities assist in streamlining healthcare spending and enhancing patient care. IQVIA can pinpoint inefficient processes and offer ideas for improving resource allocation and utilization by evaluating data on healthcare utilization, costs, and results. This may lead to healthcare systems that are more efficient and fair.

5.Patient Engagement and Adherence: To increase patient adherence to treatment recommendations, IQVIA creates digital health solutions and patient engagement technologies. These tools can assist patients in managing their diseases, receiving reminders, getting access to educational materials, and corresponding with medical professionals. IQVIA helps to improve patient engagement and adherence, which improves health outcomes and lowers healthcare costs.

6.Support for Pandemic Response: IQVIA's skills are put to use in pandemic emergencies to aid in the response process. To assist public health organizations and governments in making wise decisions about interventions, resource allocation, and vaccination distribution plans, it can offer real-time data analysis, modeling, and forecasting.

7.Health Policy and Consulting: By advising governments, policymakers, and healthcare organizations on matters like healthcare system optimization, value-based healthcare, pricing and reimbursement strategies, and health technology assessments, IQVIA's consulting services and health policy expertise contribute to public health. This advice assists in establishing plans and policies that directly affect public health.

Overall, IQVIA's data analytics, research, technology, and consulting capabilities contribute to public health by providing valuable insights, supporting evidence-based decision-making, and optimizing healthcare resources and interventions.

CONCLUSIVE LEARNING

With its broad healthcare data assets and analytical skills, IQVIA provides insightful information about public health. IQVIA supports public health initiatives by identifying disease trends, evaluating treatment outcomes, and analyzing real-world data. Its research aids in the planning of public health by helping to understand disease burden and risk factors. Early disease epidemic detection is made possible by IQVIA's surveillance capabilities, which also help to influence response plans. IQVIA promotes efficient and fair healthcare systems by identifying inefficiencies and suggesting solutions through the optimization of healthcare resources. Its patient interaction tools improve self-management and adherence, which enhances health outcomes. IQVIA provides real-time data analysis and modeling to enhance response activities during public health emergencies. In order to create evidence-based health policies, policymakers often use consulting services.

LIMITATIONS:

There are no such limitations observed in the Organisation.

SUGGESTIONS:

- **Embrace Artificial Intelligence**: Invest in AI technologies to improve data analysis, predictive modeling, and decision-making abilities. AI can assist with pattern recognition, clinical trial design optimization, and patient treatment personalization.

- **Encourage Collaborations:** To gain access to a variety of data sources and expertise, IQVIA can work with academic institutions, research groups, and healthcare providers. IQVIA may utilize complementary strengths and create creative solutions to address difficult healthcare challenges by forming strategic collaborations.

- **Embrace Digital Transformation:** IQVIA can be a key player in advancing the substantial digital transformation that is currently taking place in the healthcare sector. To enable more effective and patient-centered care delivery, IQVIA may design and execute digital health solutions like telemedicine platforms, remote patient monitoring, and digital therapies.

- **Expand Global Presence:** IQVIA should keep strengthening its presence globally, especially in developing nations with booming healthcare sectors. Strategic acquisitions, collaborations with neighborhood organizations, and service customization to address area requirements can all help achieve this.

These suggestions aim to position IQVIA at the forefront of innovation and help the company continue its mission of driving healthcare forward through data-driven insights and advanced technologies.

PROJECT:- ASSESSMENT OF DIGITAL HEALTH ECOSYSTEM OF ARMENIA WITH FOCUS ON HEALTH FINANCING

ARMENIA

Background:

Armenia, a landlocked country in Western Asia, shares its borders with Turkey, Georgia, Azerbaijan, Iran, and the Azerbaijani exclave of Nakhchivan. Serving as the capital, largest city, and financial hub, Yerevan holds significant importance for Armenia. Positioned strategically between Europe and Asia, Armenia enjoys advantageous access to neighbouring nations and former territories of the Soviet Union. This favourable geographical location enables the country to foster strong connections with its regional counterparts. Despite being landlocked, Armenia benefits from its position as a gateway between two continents, i.e., Western Asia AND Europe facilitating trade, cultural exchanges, and diplomatic ties. With Yerevan at its core, Armenia harnesses its strategic placement to maximize its potential and engage with the wider international community.

Figure 2: Map of Armenia

Introduction:

Universal Health Coverage (UHC) aims to provide access to affordable and quality healthcare services to the population of a country without subjecting them to financial hardships. UHC encompasses a comprehensive range of services, starting from health promotion, prevention, treatment, rehabilitation, and palliative care. Attaining UHC is one of the key targets of Sustainable Development Goals (SDGs). Achieving UHC is not only essential for improving the population's health status but also for enhancing economic resilience, thereby contributing to the broader SDG goal of ending poverty. UHC consists of three fundamental dimensions:

- Reducing Out-of-Pocket (OOP) expenditure and cost sharing to protect citizens from the burden of catastrophic health expenditure and impoverishment.
- Expanding coverage for health services to reach a broader population.Incorporating new services to provide a comprehensive benefit package.
- Incorporating new services to provide a comprehensive benefit package.

Thus, by expanding all facets of the illustrated cube, countries aim towards achieving UHC.

COVID-19 and the responses to it had a devastating impact on global health and economic development. It exposed the shortcomings and vulnerabilities of health systems, revealing weaknesses in preparedness, response, and equitable access to healthcare. This highlighted the importance of UHC in adopting and integrating digital technologies within the health system. This integration aims to bridge gaps and promote sustainable health development. After COVID-19, the global movement towards adoption of UHC increasingly started incorporating digital solutions within health financing ecosystem. The term "digital solutions" encompasses IT-based products & interventions designed to support the entire health financing system offering support to all stakeholders involved. In principle, the astute use of digital technologies in healthcare can significantly improve effectiveness and efficiency of the system by streamlining processes, automating tasks, improving financial management thus reducing costs, ensuring efficacious access, enabling delivery of quality care, improving safety, accessibility & timeliness, and ensuring sustainability due to unlimited demand and limited resources. Additionally, digital technologies can aid in addressing beneficiaries' queries, mitigating fraudulent activities, ensuring transparency, and supporting timely, relevant, and actionable monitoring.

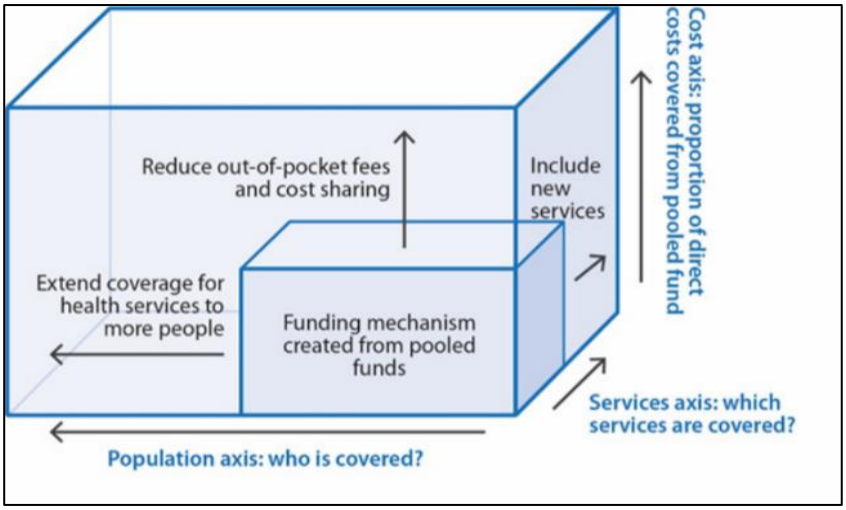

Figure 3: Action lines for realizing UHC
Source: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8645240/

Digitizing the nation's health system can in principle be highly beneficial for insurers, providers, and patients and can assist key policy makers in making informed decisions. Therefore, incorporating suitable digital solutions may help making the system resilient and robust. The key is identifying digital solutions which are appropriate and applicable to the individual health system.

Thus, in this report we aim to assess the current situation of the nation's digital health ecosystem in terms of infrastructure, governance, digital health services for insurers, providers, and citizens, and health analytics system. This will be followed by identifying gaps and proposing interventions that may be considered for implementation to enhance efficiency, efficacy, and transparency of the digital health financing system.

ARMENIA:

The Government of Armenia (GoA) has taken various measures to build a strong digital infrastructure and has a clear vision. The country has made significant strides in integrating digital technology into the healthcare sector, benefiting all stakeholders i.e., insurers, patients, and healthcare providers. Under the "Digital Health Financing Support to Developing Member Countries in Asia and the Pacific", IQVIA undertook secondary research to understand the status of Digital Health Financing ecosystem of the country and propose key areas of intervention (specifically in terms of identifying an existing mature technology which might be implemented to enhance efficiency, efficacy, and transparency of UHC implementation). Nevertheless, there are areas where reforms are needed to enhance the current health financing system and achieve the goal of universal health coverage (UHC). State Health Agency (SHA), Ministry of Health (MOH), may find interesting statistics and proposed intervention areas that this secondary investigation came up with.

RATIONALE:

To achieve UHC, SDGS, coverage of essential health services, financial protection against health expenses, and access to quality healthcare without discrimination in Armenia healthcare system.

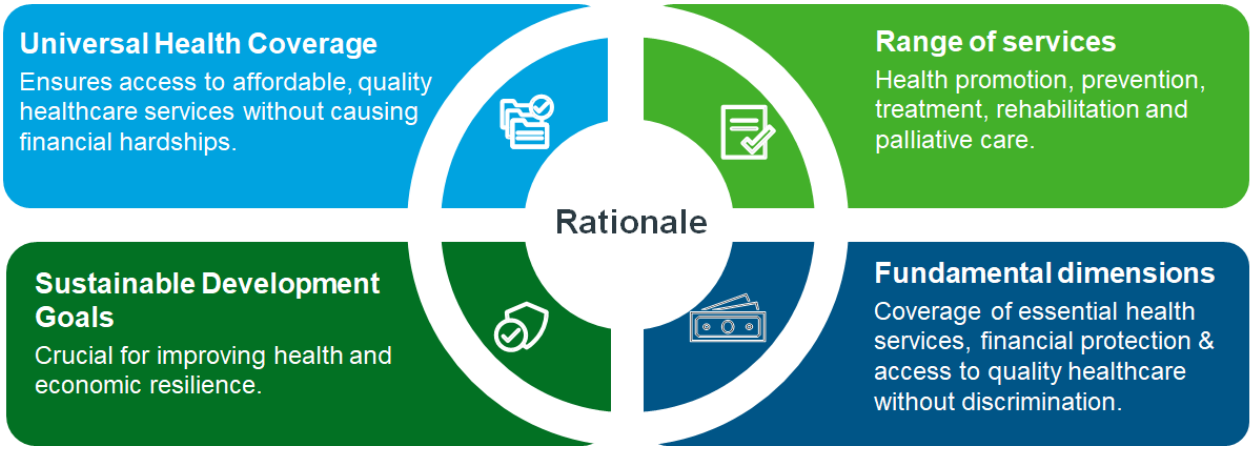

Figure 4:Rationale for digitalising healthcare

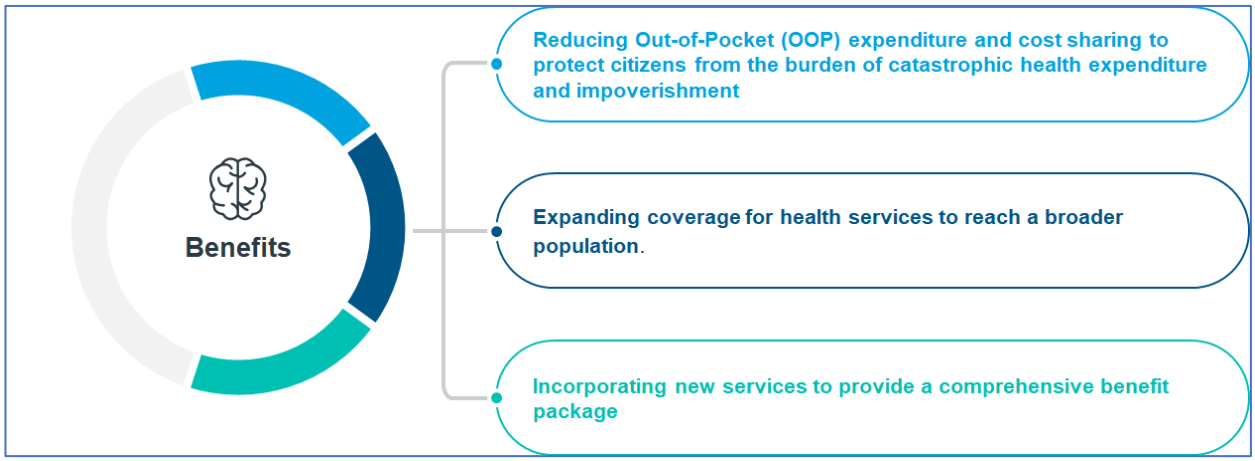

Figure 5: Benefits of Digital Health

PROJECT AIM :

To assess the digital health ecosystem of armenia with focus on health financing.

OBJECTIVES :

1) **General objective:**To do the baseline assessment of the digital health financing ecosystem in Armenia.
2) **Specific objective:** To give recommendations to improve efficacy,efficiency and transparency.

METHODOLOGY:

Secondary Research - The six thematic areas have been subdivided into various parameters that are essential aspects for fulfilling the thematic areas, with an aim to undertake as-is analysis via secondary research and recommend intervention areas. To further refine and standardize the evaluation process, a scoring scale have been devised to capture the as-is status of Armenia, from basic to advanced stages across all thematic areas.

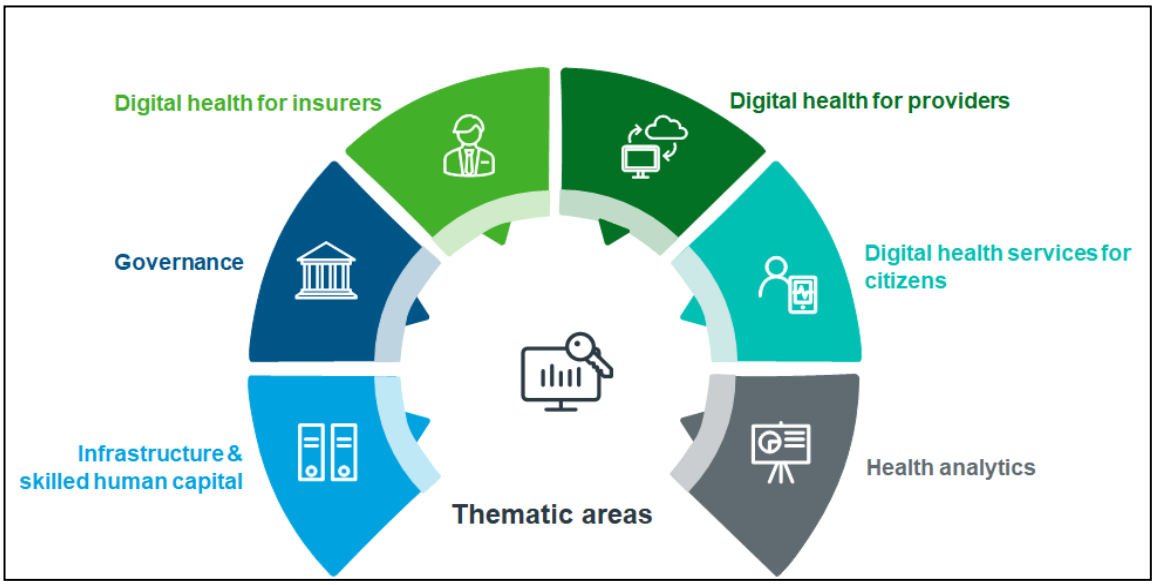

Figure 6: Thematic Areas

Description of the assessment methodology:

- The six thematic areas have been sub-divided into various parameters, with an aim to undertake situational analysis via secondary research and recommend key interventional areas.
- The evaluation matrix was developed which facilitated extensive secondary research to capture as-is status of DMCs, from its basics to advanced stages across all thematic areas.
- To further refine and standardize the evaluation process, a scoring scale has been devised.
- Additionally, to ensure that the evaluation matrix is user-friendly and easy to comprehend, a color-coding system has been introduced

Scoring scale across all parameters

- **0: Non-existent**
- **1: First initial steps taken**
- **2: Existing and in working order**
- **3: Fully developed / advanced**

Figure 7: Scoring Scale

Evaluation matrix:

S. No.	Phases	Description	Comments	Scoring (0-3)
1	**Infrastructure**			
1.1	Network infrastructure (incl. availability of computers)			
1.2	Connectivity–internet			
1.3	Data centers (cloud based, in-premises)			
1.4	Data backup and disaster recovery			
1.5	Data exchange system (secure exchange of health records)			
1.6	Uninterrupted power supply			
1.7	Skilled human capital			
	Maximum score			**21**
2	**Governance**			
2.1	Existence of digital health department at MoH			
2.2	National digital health strategy			
2.3	Regulatory framework for digital health			
2.4	Data security and privacy law(s)			
2.5	Independent complaint institution/ Ombudsman			
2.6	Digital health research institutions/ networks			
2.7	Funding for digital health			
2.8	Digital health standards			
2.9	Advisory board on emerging technologies - AI, ML, Blockchain, Computer Vision			
	Maximum score			**27**
3	**Digital Health for insurers**			
3.1	Digital health financing strategy			
3.2	Unique ID system for citizens/ beneficiaries			
3.3	Clinical coding and costing software			
3.4	Claim Processing System			
3.5	Fraud and abuse management system			
3.6	Income and expenditure dashboard			
3.7	Capacity building			
	Maximum score			**21**
4	**Digital Health for providers**			
4.1	Beneficiary identification system			
4.2	Benefit review & automated stop gap/ denial of additional services			
4.3	Standardized digital medical documentation/ health records			
4.4	Interconnected health systems - EMR/ EHR/ PHR			
4.5	Reimbursement review and payment system			
4.6	Capacity building			
	Maximum score			**18**
5	**Digital Health Services for citizens**			
5.1	Adoption of e-health services			
5.2	e-Market Place for discovery of health care services			
5.3	Digital grievance redressal system			
5.4	Access to patient health records (PHR)			
5.5	Advanced PHR offering with personalized information & services			
5.6	Availability of m-health application for patients			
	Maximum score			**18**
6	**Health analytics**			
6.1	Population level HMIS			
6.2	Anonymized health data available for research			
6.3	Dashboards for M&E of KPIs			
6.4	Population health risk stratification systems for preventive care			
6.5	Health big data & AI analytics connecting with non-health sectors			
6.6	Annual report on digital health			
	Maximum score			**18**
	Total score (Maximum possible score)			**123**

Figure 8: Evaluation Matrix

1) Infrastructure and skilled human capital:

- Health facilities manage their own data until it enters the ARMED system.
- Once in ARMED, the National e-health Operator (NEO) assumes responsibility for data management.
- The technical system components belong to the Government of Armenia (GoA) and are provided to NEO for operational purposes at no cost.
- ARMED permits limited data exchange among users but ensures secure exchanges with healthcare facilities per Ministry of High-Tech Industry (MoHTI) guidelines.
- Full-scale implementation of Electronic Health Information system (EHIS) remains incomplete.
- MoHTI mandates functional, internal and external data security, and technical standards for EHIS.
- Capacity building for skilled human capital is ongoing to support evolving automation needs.
- Armenia's digital infrastructure currently scores 7 out of 21 (33%), indicating a need for further scaling in providing computers, internet connectivity, etc., to health facilities.

Scorecard based on the situational analysis :

Parameter	Description	Score
Hardware capacity	In 2019, MoH distributed 2,400 laptops to PHC doctors, through Global Fund grant. However, specialists at PHC facilities also require computers to connect to ARMED system	1
Connectivity – Internet	Healthcare facilities have access to internet; however, they have limited accessibility to centralized system (ARMED)	2
Data centers (cloud based, in-premises)	Health facilities are responsible for managing their data; however, once data is entered into the ARMED system, NEO manages, operates, & upgrades ARMED system	2
Data exchange system (secure exchange of health records)	ARMED allows limited data exchange amongst all its users, which has its own challenges. However, it does allow secure data exchange with healthcare facilities in accordance with guidelines set by MoHTI.	1
Uninterrupted power supply	Information to be acquired	
Data backup and disaster recovery	Information to be acquired	
Skilled human capital	Capacity building is an ongoing process and has a dynamic requirement with evolution of automation	1
Total score		7

Figure 9: Infrastructure and skilled human capital

2) Governance:

- Protection of Personal Information Law: Addresses data security and privacy concerns, ensuring secure handling of personal data and respecting individuals' privacy.
- Quality Certification of National Electronic Healthcare Operator (CJSC): Demonstrates Armenia's commitment to maintaining high standards in digital health through certification of the ARMED e-Health system.

- E-Health Implementation Unit (EHIU): Operated within NIH, oversees adoption and implementation of health data interchange standards.
- Alignment with International Standards: Efforts ongoing to align with international standards such as HL7, LOINC, DICOM, etc., enhancing Armenia's digital health ecosystem.
- Maturity Score: Armenia's digital health infrastructure scores 10 out of 27 (37%), indicating a need for active interventions in governance. Areas include strengthening the national strategy and regulatory framework.

Scorecard based on the situational analysis :

Parameter	Description	Score
Existence of digital health department at MoH	National Institute of Health has a division for e-health system development	2
National digital health strategy	The strategy document has been signed off by the government for implementation	1
Regulatory framework for digital health	There are gaps in regulatory framework which may be bridged for development of eHealth.	1
Data security and privacy law(s)	Law for "Protection of Personal Information" was passed in 2015	2
Independent complaint institution/ Ombudsman	Information to be acquired	
Digital health research institutions/ networks	E health training courses for PCPs and physicians were launched regarding ArMed training in 2019.	2
Funding for digital health	Information to be acquired	
Digital health standards	Standards such as - HL7, Logical Observation Identifiers Names and Codes [LOINC], Digital Imaging and Localization, creation, and upkeep of Communications in Medicine (DICOM, etc.) are available for data exchange.	2
Advisory board on emerging technologies (AI, ML, Blockchain, Computer Vision)	Information to be acquired	
Total score		**10**

Figure 10: Governance

3) Digital Health for Insurers:

- Digital Health Financing Strategy: Armenia currently lacks a formalized digital health financing strategy, but a draft is under development, pending government approval.
- Unique ID (UID) System: Implemented for approximately 2.9 million citizens, providing personal Electronic Health Records (EHRs).
- Access to ARMED: Citizens can access their EHRs through ARMED using their ID card and PIN, facilitating retrieval of medical histories, diagnosis details, services received, diagnostics, and upcoming appointments.
- Standardization of Medical Data: Ministry of Health (MoH) is responsible for standardizing medical and health data, including terminologies (e.g., ICD-10) and healthcare services classification
- Claim Processing System: Integral to ARMED for delivering Basic Benefit Packages (BBP) services,

handling functions like pre-authorization, claims submission, and reimbursement.

- Enhanced Transparency: Proposed improvement includes displaying the history of actions taken on each claim, enhancing transparency in the process.
- Fraud Detection: Currently, the State Health Agency (SHA), Ministry of Health (MoH) employs a sampling method to detect fraud during claims processing.
- Need for Robust Fraud & Abuse Management: There is a recognized need to implement a robust fraud and abuse management system to improve efficiency in claims management.
- Maturity Score: The current maturity score of 10 out of 21 (48%) suggests functional but improvable operations. Focus areas include digital health financing strategy and strengthening anti-fraud mechanisms

Scorecard based on the situational analysis :

Parameter	Description	Score
Digital health financing strategy	The strategy document has not been signed off by the government for implementation	1
Unique ID system for citizens/ beneficiaries	~2.9 Mn citizens have personal EHRs in the system. Citizens can access their personal page at armed.am website using their ID card and PIN.	2
Clinical coding and costing software	ICD is used for clinical coding ARMED is being used for costing the services provided under BBP and other packages	2
Claim Processing System	The system is built-in ARMED system which has a scope to evolve further.	2
Fraud and abuse management system	No Fraud & Abuse management system is in place	0
Income and expenditure dashboard	Reports are present in ARMED but dashboards dedicated to income & expenditure need to be developed	1
Capacity building	eHealth Academy, to teach the medical community the skills of working with the ARMED electronic healthcare system.	2
Total score		**10**

Figure 11: Evaluation of Digital Health for Insurers

4) Digital Health for providers:

- Beneficiary Identification: ARMED lacks a centralized social register for beneficiary identification. Instead, Armenia utilizes a combination of databases to assess social status and potential eligibility.
- Integration with MoLSA: ARMED is integrated with the Ministry of Labor & Social Affairs (MoLSA) to automate beneficiary identification, particularly for verifying disability status before hospital admission.
- Challenges in Integration: The process needs streamlining due to discrepancies and inconsistencies, such as incomplete or unreliable connections between ARMED and MoLSA. Automatic checking of

Basic Benefit Package (BBP) eligibility criteria remains a challenge.

- Role of EKENG: Information from various ministries is consolidated at EKENG and provided to ARMED for benefit assessments. Non-BBP services require out-of-pocket payments.
- Interconnected Health Systems: ARMED incorporates interconnected health systems, including Electronic Medical Records (EMR), Electronic Health Records (EHR), and Personal Health Records (PHR)
- E-Referral Registry: Fully implemented in ARMED to improve patient care by facilitating referrals between healthcare providers.
- E-Prescription Registry: Partially implemented to issue and monitor prescriptions electronically.
- Challenges: Despite functionalities, challenges include lack of real-time data updating, user-friendly interface issues, compliance issues, double data entry, and varying levels of digital literacy among users.
- Reimbursement System: Integrated within ARMED for reviewing and processing reimbursements, including extraction of outstanding payments as needed.
- Future Collaboration: Plans to establish a distinct reimbursement information system in collaboration between SHA, MoH, and NEO, separate from EMR and eHealth services used for patient care.
- Maturity Score: Armenia's digital health system for providers scores 12 out of 18 (67%), indicating good overall functionality despite some identified gaps and challenges.

Scorecard based on the situational analysis :

Parameter	Description	Score
Beneficiary identification system	It is in place through data shared by ministries and integrated into ARMED.	2
Benefit review & automated stop gap/ denial of additional services	This is integrated into ARMED, services which are not a part of BBP and other packages are to be paid out-of-pocket	2
Standardized digital medical documentation/ health records	~2.9 Mn citizens have personal EHRs in the system. Citizens can access their personal page at armed.am website using their ID card and PIN.	2
Interconnected health systems - EMR/ EHR/ PHR	~2.9 Mn citizens have personal EHRs in the system. Prescriptions are floated to Pharmacies which are connected in the ARMED system.	2
Reimbursement review and payment system	Integrated with ARMED, outstanding payments for individual facilities can be extracted from ARMED as and when required	2
Capacity building	"Train the Trainers" program, 576 users of the eHealth system were trained, 43 were trained as trainers (2018)	2
Total score		**12**

Figure 12:Evaluation of Digital Health for providers

5) Digital Health services for citizens :

- E-Marketplaces and M-Health Applications: Designed to enhance patient convenience by offering platforms like Dr. Yan and U Doc.
- Functionality: These applications facilitate discovery and scheduling of appointments online, improving access and convenience for patients.
- Maturity Score: Armenia's digital health system scores 10 out of 18 (56%), indicating functional implementation and acceptance by citizens.

Scorecard based on the situational analysis :

Parameter	Description	Score
Adoption of e-health services such as e-booking, e-prescription, e-consultation etc.	Tele-medicine was in pilot stage in 2019, E booking system is also present under telemedicine. e-prescription is partially implemented and is followed for patients who avail benefits of BBP and other packages which are processed through ARMED.	2
e-Market Place for discovery of health care services	Applications like Dr. Yan & U Doc are present in e-Market place for discovery of healthcare services, ARMED mobile app was also launched.	2
Digital grievance redressal system	Information to be acquired	
Access to patient health records (PHR)	Citizens can access their personal page at armed.am website using their ID card and PIN.	2
Advanced PHR offering with personalized information & services	Citizens may access their personal information via ARMED	2
Availability of m-health application for patients	Applications like Dr. Yan & U Doc are present for patients	2
Total score		**10**

Figure 13: Evaluation of Digital Health services for citizens

6) Health analytics :

- Population-Level Health Management Information Systems: Armenia lacks a comprehensive system within ARMED to provide a complete overview of the health status of the entire population.
- Impact on Monitoring and Evaluation: This gap hampers effective monitoring and evaluation of Key Performance Indicators (KPIs) crucial for policymakers.
- Real-Time Patient Information Dashboard: Developed during COVID-19, but requires further development and refinement to support robust and timely data-driven decision-making.
- Weak Health Analytics: Based on secondary research, Armenia's health analytics capability is lacking, with a maturity score of 2 out of 18 (11%).

Scorecard based on the situational analysis:

Parameter	Description	Score
Population level HMIS	Reports from ARMED are not comprehensive as they do not cover the entire population	1
Anonymized health data available for research	Information to be acquired	
Dashboards for Monitoring & Evaluation of KPIs	Some reports are available in ARMED but dashboards need to be developed	1
Population health risk stratification systems for preventive care	Information to be acquired	
Health big data & AI analytics connecting with non-health sectors	Information to be acquired	
Annual report on digital health	Information to be acquired	
Total score		**2**

Figure 14: Evaluation of Health analytics

IDENTIFIED GAPS:

- **Claim Processing System:** ARMED allows manual claim submission without required documents, increasing risk of errors and fraud.Lack of automated segregation by priority and absence of claim history complicate the process.

- **Beneficiary Verification System:** Poor integration between ARMED and MoLSA hinders automated disability status retrieval.Providers resort to time-consuming manual checks due to these integration issues.

- **Anti-Fraud System:** ARMED lacks efficient anti-fraud mechanisms like automatic detection of suspicious pre-authorizations.Current methods rely on sampling, lacking uniform assessment of filed claims for errors.
- **E-Prescription System:** Pilot e-prescription system initiated by MoH with mandatory pharmacy connection to ARMED.Inadequate integration increases risk of medication errors, especially with hospital pharmacies linked.

- **E-Referral System:** Referral module in ARMED suffers from incomplete or outdated information entry.Lack of feedback mechanism impacts continuity of care, affecting patient perspective on completed referrals.

- **Monitoring and Evaluation System:** ARMED provides data entry and reporting interfaces but faces challenges with data inconsistency. Absence of consistent financial monitoring at facility level hampers informed decision-making

PROPOSED INTERVENTIONS:

Armenia is actively working to strengthen its digital health financing ecosystem, to make it efficient & resilient, stakeholders may focus on scaling up digital technologies for insurers (score: 10 (out of 21)), providers (score: 10 (out of 18)), and health analytics (score: 2 (out of 18)). Following are the six key intervention areas; one of these may be shortlisted by SHA, MoH.

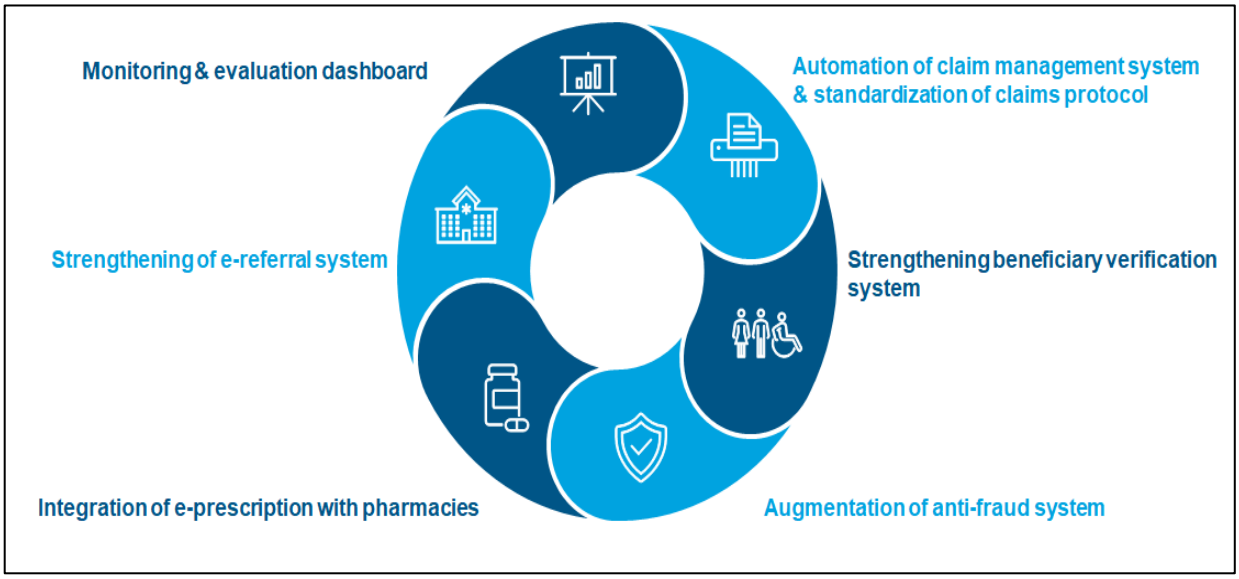

Figure 15:PROPOSED INTERVENTIONS

WAY FORWARD:

- Basis this gap analysis, it is proposed that SHA, MoH may shortlist on one of the recommended mature digital technologies for implementation.

- IQVIA shall set-up a discussion between SHA, MoH to facilitate shortlisting of mature digital technology.

- Once the technology has been shortlisted IQVIA shall furnish Terms of Reference pertaining to implementation of technology, along with a detailed action plan.

- Based on the final workplan agreed by ADB, and SHA, MoH; IQVIA will involve its project team of international and national experts for execution.

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