

CASE STUDY ON BEST PRACTICES FOR DIGITAL
HEALTHCARE ECOSYSTEMS ACROSS THE WORLD

Dissertation Submitted to



The IIHMR University, Jaipur

for the partial fulfillment for the award of the

degree of Master of Business Administration

(MBA)

in

Hospital and Health Management/Pharmaceutical
Management/Rural Management

by

Dr. Apeksha Nannore

Under the Supervision and Guidance of

Dr. Sheenu Jain

2022

CASE STUDY ON BEST PRACTICES FOR DIGITAL
HEALTHCARE ECOSYSTEMS ACROSS THE WORLD

Dissertation Submitted to



The IIHMR University, Jaipur

for the partial fulfillment for the award of the

degree of Master of Business Administration

(MBA)

in

Hospital and Health Management/Pharmaceutical

Management/Rural Management

by

Dr. Apeksha Nannore

Under the Supervision and Guidance of

Dr. Sheenu Jain

2022

Appendix D

Declaration by Student DECLARATION BY STUDENT

I hereby declare that this dissertation titled **Case Study on Best Practices For Digital Healthcare Ecosystems Across The World** is the Bonafede 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 Information derived from the published or unpublished work of others has been duly acknowledged in the text.

A handwritten signature in blue ink, appearing to read 'Apeksha', is shown on a light blue background.

Name of Student – Dr. Apeksha Nannore

Date – 22st June 2022

Appendix E: Completion Certification



CERTIFICATE

This is to certify that Dr. Apeksha Nannore in partial fulfillment of the requirements for the award of the degree of MBA (Hospital and Health Management) from the IIHMR University, Jaipur has successfully completed her/his internship at (name of the organization) during 11th April , 2022 to 11th July, 2022.

A handwritten signature in blue ink is shown next to a circular purple stamp. The stamp contains the text 'IQVIA Consulting and Information Services India Pvt. Ltd.' around the perimeter and 'New Delhi' in the center.

Signature:

Name: Mr. Anurag Saxena

Designation: Principal, IQVIA Consulting and Information Services India Pvt. Ltd.

Address: 10th Floor, Hindustan Times House, 18-20 Kasturba Gandhi Marg, New Delhi, India

Date: 05/07/2022

**IQVIA Consulting and
Information Services India Pvt. Ltd.**
10th Floor, Hindustan Times House
18-20, Kasturba Gandhi Marg,
New Delhi - 110001

Registered Office
Unit No. 902, 9th Floor, 'B' Wing,
Supreme Business Park, Supreme City,
Behind Lake Castle & Avalon,
Hiranandani Gardens, Powai,
Mumbai - 400076, India

Abstract

While across the world, there are different health care systems and models, wherein challenges are local and unique, there are subtle similarities quite deviation/ differences which can be leveraged as key important inputs while implementing a large and significant program.

This activity is to undertake in-depth research to make a collection of curated country-specific cases from around the world. Drawing inferences and insights from the study provided the key recommendations on digital health systems which will be utilized in a small country.

This digital transformation journey requires a holistic view of the transformation journeys followed across other similar nations. To understand the best practices followed across the world, this report has provided an in-depth understanding of the varied healthcare technology solutions and systems followed by some of the leading countries. These countries have used their technological innovations and architecture to cause a significant change in how healthcare access is provided keeping in place the transparency, efficiency, and efficacy of those health systems.

Acknowledgment

The internship opportunity with National Health Authority, Delhi was a great chance for learning and professional development. I am also grateful for having a chance to meet so many wonderful people and professionals who led me through this dissertation period.

I am highly grateful & would like to express my deepest gratitude and special thanks to Mr. Ankur Gupta, Mr. Mahipal Singh, and Mr. Anurag Saxena who despite of being extraordinarily busy with their duties, took time to guide and keep me on the correct path while arranging all the facilities to make the project fruitful and allowing me to work at this esteemed organization.

I would like to extend my gratitude to Ms. Jaswinder Kaur and Mr. Akshat for being the buddy throughout the project and extending their support at the maximum capacity.

I would like to thank all the staff of NHA and IQVIA to make this project a success. I perceive this opportunity as a big milestone in my career development. I will strive to use gained skills and knowledge in the best possible way.

I would also like to thank Dr. Sheenu Jain IIHMR University for her constant supervision and support in completing the project.

Above all, I would like to thank God for giving me the strength to manage the difficulties which I faced during this period.

Sincerely,

Dr. Apeksha Nannore

MBA HM 1073

Table of Contents

Sr. No.	Name	Page Number
1.	INTRODUCTION	1
2.	REVIEW OF LITERATURE	2
3.	MATERIAL AND METHODS	14
4.	RESULTS	17
5.	DISCUSSION	20
6.	CONCLUSION	24
7.	REFERENCES	25

Abbreviations

Sr. No	Abbreviations	Full Form
1.	NHA	National Health Authority
2.	WHO	World Health Organization
3.	ICT	Information and Communication Technology
4.	API	Application Programming Interface
5.	NHS	National Health Service
6.	HIRA	Health Institute Review and Assessment Service
7.	CPOE	Computerized Provider Order Entry
8.	PACS	Picture Archive and Communication Systems
9.	NEHR	The National Electronic Health Record
10.	SNOMED CT	Systematized Nomenclature of Medicine -- Clinical Terms
11.	LOINC	Logical Observation Identifiers Names and Codes
12.	OECD	Organization for Economic Co-operation and Development
13.	EHR	Electronic Health Records

Chapter 1: INTRODUCTION

Building a cohesive digital health eco-system necessitates a few tasks, which can only be completed in stages. A requirement gathering process is used to determine which applications and platform components are required to realize the national objectives when developing a country's health strategy or a similar digital health roadmap.

It is envisaged that to create such health eco-system which would help the country achieve the vision of universal health care, an understanding of the best practices followed across the globe is required.

It has been observed that over the past two decades there have been several digital health initiatives launched by various countries to improve the quality of health care. While some developed countries have used Information and Communication Technology (ICT) infrastructure that are ahead of the curve as compared to some developing nations, it is important to utilize the knowledge and leverage it in building a state-of-the-art health system for any small country.

To understand the best practices followed across the world, this report has provided an in depth understanding of the various healthcare technological solutions and systems followed by some of the leading countries. These countries have used their technological innovations and architecture to bring about a significant change in how the healthcare access is provided keeping in place the transparency, efficiency, and efficacy of these health systems.

Chapter 2: Review of Literature

Authors	Study location	Sample size	Sampling technique / Analysis technique	Salient features
Jee Ae Kim 1https://pubmed.ncbi.nlm.nih.gov/28378543/ , Seokjun Yoon ² , Log Young Kim ¹ , Dong Sook Kim ³	South Korea		Review of HIRA data	• National Health Insurance (NHI) data, commonly known as the HIRA (Health Insurance and Review Assessment) data is a depository of the data of claims gathered while paying healthcare providers • HIRA has extensive information about healthcare services provided like procedures, diagnosis, treatments, & drugs for around 50 million beneficiaries who are under the coverage of universal system, with chargeable services and coverage for everyone in South Korea • HIRA data constitutes a sizable data depository in healthcare industry, which has huge potential to add value in multiple ways, including improving the effectiveness in healthcare delivery system without reducing the standards, adding evidences to support the specific intervention as well as providing the required knowledge.
Chang Bae Chun ¹ •	South Korea		Descriptive (A	• The Republic of Korea's health outcomes have rapidly improved as a result of

Soon Yang Kim2 Jun Young Lee3 • Sang Yi Lee 4			Country-based report providing detailed description of health systems & policy initiatives during the progress or under development)	economic growth and national health insurance's provision of universal health coverage. ● Only 12 years after social health insurance was established, it attained population-wide coverage in 1989. By combining all insurance program in 2000, a single payer system with a standard contribution schedule and benefits coverage was created. ● Despite population-wide coverage, financial protection and large OOP payments have remained a major policy concern. Private companies play a significant role in healthcare delivery. ● This approach stimulates demand for novel services and technology which are not yet part of the national health insurance benefit package, that they are not always cost-effective. ● The referral system does not function properly in the private-sector-controlled delivery system. ● The significant tension between commercial providers and the government has hampered health care reforms such as the future payment system. Inequality has risen since the 1990s, despite strong economic growth and declining inequality prior to the 1980s. ● The government should prioritize policies
--	--	--	--	--

				that would lessen disparities in access to healthcare and health outcomes. ● The health care system is challenged by the population's rapid ageing, and older individuals now have better access to long-term care thanks to the new long-term care insurance. ● The continuum of care can benefit from coordination between hospitals and the facilities providing long term care, along with better primary healthcare.
NHS Digital (NHS Digital Fit for 2020 report)	United Kingdom		Capability review report - NHS Digital	● To assess data for clinical decision-making, healthcare providers employ CDSS. Doctors and nurses can make and review diagnoses using the clinical decision support system to improve the results ● Making decisions in a clinical setting can be challenging. It needs a skilled practitioner, a welcoming environment, and trustworthy information inputs. ● The difficulties healthcare organizations encounter with clinical decision-making can be solved with CDSS as a supportive tool. ● It is acknowledged that CDSS is a crucial instrument that can be utilized to enhance and streamline the delivery of healthcare. The rising need for high-quality care is what's driving market expansion.

				● The rising demand for high-quality healthcare and technologically integrated solutions is propelling market expansion ● The industry is showing a rise in the implementation of information systems by hospitals and other healthcare facilities, as well as encouraging global government initiatives. Clinical decision-support systems are subject to severe FDA regulation.
Young-Taek Park, Dongwoon Han	Korea	A total of 2,093 clinics and hospitals, including the long-term care hospitals. Amongst them, 554 hospitals and 906 clinics	This study was a part of a nationwide survey collected for OECD benchmarking the ICT study.	● Healthcare information and communication technology has attracted interest of numerous healthcare organizations and professionals (ICT). ● Both clinics and Hospitals had implementation rate of Electronic Medical Record systems of 96.3 & 95.7 percent, respectively ● Healthcare information exchange (HIE) rates were generally high within hospitals and clinics, but they were incredibly low among outside institutions. The majority of hospitals and clinics had Electronic Medical Record systems with features that supported clinical decisions. ● A feature for checking contraindications of drugs (interactions with other drugs and drug-age), like reminders, was included in EMR systems in 96 percent of hospitals and 89.2 percent of clinics. ●

		were included in the study for the generalization of results.		
<u>HIMSS</u> Global Enterprise Task Force on HER (Electronic Health Records: A Global Perspective)	Global study		Analysis of local and nationwide efforts to realize EHR system	● IT in the healthcare industry is a sleeping behemoth. Healthcare IT is considerably behind the technological prowess of other major international corporations, such as those in finance, telecommunications, and the media, even though healthcare budgets make up most of the global industrialized governments' spending. ● The electronic health record (EHR) is being implemented in several nations throughout the world, and the HIMSS Task Force (GETF) was invited to investigate these efforts. ● GETF examined a number of electronic health record (EHR) elements in each nation, including security, quality, funding sources, and adoption hurdles. The following four factors were found to be universal to all global efforts and have an impact on EHR implementation:

				Funding, governance, standardization & interoperability, and communication. ● In all the nations we reviewed, there were sporadic reports of regional and national efforts to implement EHR systems ● The similar themes mentioned above provided an explanation for the successes, obstacles, or implementation failures observed in each nation when examining these attempts. ● It is clear why this examination is necessary. It enables us to take advantage of the information's power and then distribute it amongst important decision-makers in any of researched countries in order to support their efforts to develop a successful EHR system. ● It is possible to forecast the future success of U.S. attempts to integrate IT into the healthcare industry, whether these efforts are local, regional, national, or international, using the data gathered here over many months from some of each country's top specialists. ● In the end, we discuss how the U.S. might gain from its relative being behind in the adoption of standardized and interoperable EHRs and how we can learn from other nations' triumphs while avoiding some of their faults.
	United			● UK is a global leader in a wide variety of

	Kingdom			internationally famous academic, public and business organizations, the UK is a global leader in all three areas. ● The United Kingdom is a global leader in finding solutions to pressing issues such as food security, aging societies, climate change, and the universal healthcare. ● In order to encourage international trade, the UK is positioned as a global leader in cutting-edge developments and initiatives like genomics, digital health, individualized medicine, battery technology, artificial intelligence (AI), precision agriculture, and the shift away from the plastic. ● . Furthermore, our industries are assisted in maximizing potential from upcoming free trade agreements, preparing for the UK's exit from the European Union, and assisting the government in creating and implementing policies as successfully as possible. ● By concentrating primarily on the healthcare sector, the team not only met the goal of export wins but significantly increased them from 2018 to 2019. The 13 domestic and 9 international missions that made up our successful international engagement program included significant occasions like the NHS Expo, Confed, and Arab Health.
--	---------	--	--	--

				● In addition to engaging important regional stakeholders, we convened a number of high-level government-to-government discussions to discuss new United Kingdom offers methods in the areas of women's health, diagnostics, and healthy aging as well as current UK strengths.
Business Bliss Consultants FZE		4 countries (United States of America, Russia, Algeria and Bangladesh)	Analysis of health care plan for selected countries	● Every nation's healthcare system must include health care plans as essential elements. A health care plan essentially makes things easier to deliver healthcare to people of a nation or territory ● Around the world, there are masses of people without access to healthcare. In many nations, like the United States, where population's 15 % lacks access to health-related insurance, this issue exists ● . In many countries, weak healthcare systems may be blamed for inaccessibility to healthcare to the population. ● It is crucial to measure the benefits and drawbacks of several healthcare plans from around the world to maximize their benefits while minimizing their drawbacks. ● The results will show that developed nations like Russia and the US face issues like citizens' lack of access to health insurance, whereas in developing nations like Algeria and Bangladesh, the biggest

				issues like insufficient funds for healthcare, a deficiency of healthcare infrastructure, and a scarcity of healthcare workers to meet the population's needs. ● Ensuring universal healthcare access in an accessible and affordable manner, governments around the world are advised to allocate more funding to healthcare, be it personnel and infrastructure, public private partnerships, and preventive medicine to reduce mortality due to preventable illnesses. ● Lastly, investigation into alternative medicine, (including traditional medicine), ensures better access to healthcare services. Newer medical technology, like telemedicine, enables people to get healthcare regardless of where they live. ●
Lucia Kossarova, Ian Blunt and Martin Bardsley	UK		Comparative analysis of healthcare quality	● Comparing the effectiveness of healthcare systems across nations has grown to be a popular method for proving or disproving claims for healthcare reform. ● Comparing the UK to other nations has actually influenced important policy decisions, most particularly in the year 2000, when Tony Blair (Then- prime minister) decided to raise UK's health spending up to average European by 2006. (Blair, 2000).

				● The NHS Mandate and the Five Year Forward View both state that England's healthcare system should be among the best healthcare systems in Europe, if not the entire world (Department of Health, 2015). (NHS England, 2014). ● This goal should be viewed why the United Kingdom continues to spend comparatively less on healthcare when compared to other OECD member nations (OECD). ●
<u>Jenny Yang</u>			Comparative analysis of global healthcare systems	● A nation's health is crucial to its overall prosperity. The majority of developed, high-income nations offer or require universal medical coverage for their citizens ● This frequently means that majority (99 %) of population is covered under health insurance. Some of these countries, such as the UK's NHS (National Health Service), provides this coverage free of charge at a point of service, with no copayments. ● In most cases, cost-sharing is a component of the insurance to deter misuse and needless medical care. However, out-of-pocket medical expenses are typically constrained, like the 385 Euro (429 Dollar) annually deducted in the Netherlands.

				● For an employer-sponsored (single coverage) plan, the average deductible in the US as of 2021 was 1,670 dollars, which is a noteworthy difference from the above-mentioned amount. ● The average person must spend that amount over the course of a year before their insurance begins to pay off, in addition to the hefty premium they have paid for health insurance. It is understandable why the American population thinks that the largest issue with the country's healthcare system is the expense of receiving care. ●
				● Government financing and support are necessary for the social sectors of health and education. This is particularly true in developing nations, where the vast bulk of the populace lacks the financial means to pay for pricey and prohibitive medical care. ● This is the rationale behind the existence of publicly funded, social welfare-focused healthcare systems in many developing nations. ● Naturally, the developed west also offers publicly funded healthcare, which is standard in the UK and Europe. Particularly noteworthy is Cuba's healthcare system, which serves as a

				template for all emerging nations in terms of how the government offers its inhabitants access to top-notch medical care. ● Contrarily, the public's image of the healthcare systems in India and South Asia has deteriorated despite government backing, leading many people to turn to private medical treatments that are effective but also pricey ● The Health Care Reform Act, popularly known as Obamacare, was passed in 2010 and completely changed the country's previously privatized healthcare system. ● The health care law, which is considered as the first step towards implementing the kind of social welfare-oriented healthcare systems in the Scandinavian countries, was passed by President Obama against strong resistance from the Republican Party and many private healthcare providers.
--	--	--	--	---

Chapter 3: MATERIAL AND METHODS

While across the globe, there are different health care systems and models, wherein challenges are local and unique, but there are subtle similarities more than deviation/ differences which can be leveraged as key important inputs while implementing a large and significant program.

This activity is to undertake in-depth research to create a collection of curated country specific cases from around the world. Drawing inferences and insights from the study, provided the key recommendations on digital health-systems that can be utilized for a small country.

RESEARCH QUESTION

What are the best practices in terms of Health Systems followed by several countries such as United Kingdom, South Korea, Canada and Singapore in digital healthcare ecosystem?

OBJECTIVES

- To study the systems or functions impacted within the health system such as the supply chain management, health workforce management & health facilities.
- To study the health system stakeholders impacted
- To understand deployed technologies relevant for the context of healthcare; this would include existing ICT applications and systems.
- To study the data and technology architecture adopted by such best practices
- To study standards adopted for interoperability of health data and consent management methodology and tools
- To identify the strategies to address the emerging issues and challenges in implementing such practices.

Secondary research

Extensive secondary research was carried out to find the best practices across the shortlisted countries for the purpose of this document.

Study design- Cross sectional study

Study Parameters-

Inclusion criteria: Countries with developed healthcare eco system

Exclusion criteria: Countries with not so significant healthcare ecosystem

Study tools: MS word, Microsoft edge

SAMPLE SIZE: 4 countries

SAMPLING TECHNIQUE: Convenience sampling

IMPLICATIONS OF RESEARCH: This study will help in developing in planning and implementing in the national level healthcare ecosystem for a small country.

HYPOTHESIS

Though the importance of strategies for national digital health has been recognized by many countries, many regions around the world still have significant gaps. According to the WHO 2015 survey of eHealth policies, fifty eight percent countries (72) of the 125 countries that responded, have distinct national digital health strategies and analogous plans for their implementation.

But understanding digitization journeys of successful countries can provide some unique insights and nuances which may prove beneficial for implementation, transitioning, advancing and further scale up of digital healthcare ecosystem.

Chapter 4: RESULTS

After going through some of the digital healthcare model of various geographies, certain recommendations have been made, which could be referred while developing the scope of work for Management service providers.

UK NHS:

- Compliance based digital health solution need to be develop since inception of the projects by all digital partners, as it is not feasible to integrate the standards with solutions in digital ecosystem at later stage.
- A communication plan is to be prepared to keep trusts, clinical staffs, suppliers, and the general public aware of what is going on and what is expected from them.
- A strategic workforce is to be organized in order to plan support digital transformation at the start of the implementation process.
- Make preparations for defining specific national level requirements for quality of data, clinical records, and privacy, as well as how to meet them, prior to implementation.
- The service provider should be able to develop an interoperable prescription services, like electron prescription in UK.
- Basic data place holders should be created across the EHR system to develop health records minimum details, like Summary Care Records modules developed by UK NHS.
- Open APIs should be invented to help in delivery of patient care in order to make the information and data held across various clinical care settings available.
- Standards contracts with organizations to ensure that their emergency care, inpatient, mental health discharges, and outpatient letters are confirmed by nationally published specifications. Staff should make sure that its majority of clinical information system enable the clinical data which should be accessible as information to those other providers of service to Users via open APIs in accordance with data sharing guidelines.

South Korea:

Despite of highly advanced technology advancement Korea is still struggling to make

interoperable health records, uniform standards and health information exchange but at the same time they have managed to build outstanding health insurance review and reimbursement system which is a model for other countries to adopt. Following are some of factors which need to be aligned designing implementation plan for MSPs:

- The model for health information exchange should be develop using interoperable standards and make available in the ecosystem before implementation.
- Standardization of longitudinal health records across the nations should be applied in the ecosystem so exchange of information can happen smoothly.
- Capacity building and awareness for adoption should be defined in the system to encourage better participation by stakeholders.
- Standards operating process of HIRA-S Korea should be adopted to create rule based electronic claim management ecosystem through e claim portal.

Canada:

- Multiple HIE at regional and national level should be adopted with EHR locator services
- EHR solutions interact with all the blocks should route through HIE to record every incident of data exchange
- Feature of Withdrawal/Revoke the consent by user should be available first-hand
- Multiple consent manager model should be adopted at regional level complied by privacy law
- Sharing of information among multiple consent Manager through standard consortium
- A Repository of consent should be developed to record every consent incident like accept, reject, withdrawal or revoke the permission for sharing the records.
- Anonymization or data masking at state level.
- Provision of keeping basic details of Substitute decision maker of consent.

Singapore:

- An electronic health record system should be capable of aggregating clinical relevance of data from each interaction that a patient has with the system of healthcare.
- The master index that must match the patient records from different sources and

which includes an unique code of identification as well as other patients personal data; a summary of care record for each of the patient that provides an overview of their recent medical activities and has an access to summaries of specific events, like hospital admissions.

Chapter 5: DISCUSSION

UK

UK NHS is one of best healthcare system across the world in terms of health outcome but despite of technology advancement and guidelines, they are struggling to adopt digital transformation which is necessary to scale, quality improvement and clinical decision support through interoperable EHR. In Indian context, following steps could be added in strategic implementation of NDHE for better adoption of tools and technology.

- Ensure that the anticipated health and care technology plan includes an execution plan having specific goals and observable actions. That plan must include implementation milestones of various standards required for connectivity. The plan should be accurate in terms of its time and money requirement. It must also be evident about the roles and responsibilities of local organizations, as well as the resources available.
- More data to be collected to gain an understanding of total cost of digital transformation delivery and to prioritize the programmed work. Before investing in newer technologies, it is critical to lay the groundwork for digitization and interoperability (including data standardization).
- There should be a thorough evaluation of the long-term costs and benefits of various approaches to incorporating electronic patient record systems.
- Establish specific resources and plans for greater issues alongside the implementation plan:
 - o Create a communication plan in order to keep the trusts, suppliers, clinical staff, and the general public informed of what is going on and what is expected out of them.
 - o Increasing the incentives and levers available for local organizations to invest adequately in their digital transformation journey.
 - o By Creating a strategy to support digital transformation in workforce.
 - o Developing plans to determine specific full criteria for, quality of data, clinical

records and privacy, as well as how to meet them.

Korea:

In the last ten years, healthcare institutions in Korea are becoming increasingly digitized. Using electronic data interchange, all the hospitals have implemented the computer-based provider purchase entry (CPOE) system, patient record systems (HMIS), and insurance claim systems (EDI). More than 80% of tertiary hospitals have implemented EMRs, as well as PACSs. While the government of Korea strongly encourages the exchange of health information systems amongst several leading hospitals and government agencies, which includes KHWIS and HIRA, they are actively investigating the possibility of exchange of their healthcare systems. While the health information systems of Korea have strong technological brilliance and a wide range of functions, there have several shortcomings that must be addressed before they could claim to be a leading product in competitive global healthcare market.

Many Korean health information systems depends on EMR for treating patients instead of Electronic Health Records (EHRs) for individuals' lifetime health support. Result being, they are deficient in EHR functionality and interoperability.

Singapore: National Electronic Health Record System

Strong government backing and slow, methodical application with one of the world's fastest growing aging populations, or over a fifth of the country's population is expected to get over 65 by the end of 2030. With increased chronic diseases and rising demand in healthcare services, eHealth considered to meet future healthcare challenges in Singapore. Singapore is constructing an advanced national EHR system. The system is supposed to collect, report, and analyze the data to facilitate policy formulation, implementation monitoring, and patient's record sharing. Singapore's National Electronic Health Record system (NEHR) collects the clinically relevant data from each

encounter a patient will have with the system. Immunization, diagnoses, investigations, allergies, current medicines, procedures administered, care plans and referrals, are all recorded in the NEHR system. An index that matches patients records from different sources and involve a special code as well as other information to identify the patient; a summary of record for each patient that provides a review of recent medical activity; availability to view particular events, like previous health insurance, hospital admissions; and an access to healthcare data in Singapore's registries for immunization, allergies and medical alerts are among the system capabilities. 15 As of September 2014, NEHR was available in all the public hospitals, centers, polyclinics, a few community hospitals, a few nursing homes, and 230 general practitioners. NEHR is accessible to 280 healthcare institutions and 14,000 clinicians.

With time, expense, and scope of goals, the NEHR implementation is currently viewed as a success. Once fully developed, this healthcare system will let medical professionals, researchers, and patients, to view the data in suitable formats. There is also plan for patients to access and potentially contribute to their personal health records. Patient's demand, a clear government push, an intent for greater transparency amongst healthcare organizations and payers, and a desired increased access for driving system implementation. The government push is also in line with the urgency of healthcare organizations focused on reducing the growing healthcare burden.

Furthermore, support of the government for the project includes a reluctance to fasten up its implementation. Completion of this project is expected in 5-10 years. In each phase lessons learned; IT training provided for healthcare providers along with clinician feedback will be included. This is an incremental, multi-stakeholder technique, which was crucial factor in the success of the Danish model.

Canada

A source of Canada's national pride and a leading example of universal health coverage is Canada's publicly funded, universal healthcare system, known as Medicare. Through 13 provincial and territorial tax-funded public insurance programs, it offers comparatively egalitarian access to medical and hospital services.

The government is accountable for:

- Establishment of national healthcare standards and enforcing it through the Canada Health Act.
- Providing financial support for the provincial as well as territorial healthcare services
- Assisting in the healthcare service delivery to specific groups; and
- Carrying out the other health related duties.

In Canada various HIE at regional and national level should be adopted with EHR locator services.

EHR solutions interact with all the blocks should route through HIE to record every incident of data exchange. The Feature of Withdrawal/Revoke the consent by user should be available first-hand. There are Multiple consent manager model should be adopted at regional level complied by privacy law. Sharing of information among multiple consent Manager through standard consortium.

Canada has a Repository of consent developed, to record every consent incident like accept, reject, withdrawal or revoke the permission for sharing the records (Anonymization or data masking at state level). There is provision of keeping basic details of Substitute decision maker of consent.

Chapter 7: CONCLUSION

Building a successful digital health eco-system for a country entails significant planning efforts. Not only does it require a country to understand its administrative dimensions, but it needs political support to bring in the reforms planned, it is advisable that the Centre devises such strategy that would not only help the overall architecture of the country but also support and complement the States in their effort. This digital transformation journey that the Country aims to pursue, requires a holistic view of the transformation journeys followed across other similar nations.

To understand the best practices followed across the world, this report has provided an in depth understanding of the various healthcare technological solutions and systems followed by some of the leading countries. These countries have used their technological innovations and architecture to bring about a significant change in how the healthcare access is provided keeping in place the transparency, efficiency, and efficacy of these health systems. The solutions provided by the National Health System of United Kingdom has provided an outlook, of how implementation plan and proper standards implementation is necessary for interoperable eco system. Despite of being an early adopter of ICT systems, UK NHS could not leverage the opportunity to revamp the entire structure with specific guidelines over architecture, processes and standards in order to make comprehensive health records. Similarly, South Korea has provided an example of how a nation can develop payer provider system for electronic claim processing but at the same time, due to the lack of national consensus over standards and HIE, its health care system could not achieve the interoperable EHR for better clinical decision support and healthcare access. These examples have shown the critical pathways to achieve universal healthcare for a nation and if adopted with the right approach and methodology would further help our country in building a much more robust digital health architecture for the world to see.

Thus, for a nation to be successful in its approach, it needs to have the right set of technology architecture, guided by several country based digital health frameworks or State based eHealth architecture. Furthermore, the Country would have to take the right

step of adopting the best practices that would be the technical feasibility and administrative challenges that lie ahead. The path to a more comprehensive and state-of-the-art healthcare ecosystem lies in front of us and with careful preparation and planning,

REFERENCES

1. Kim J, Yoon S, Kim L, Kim D. Towards Actualizing the Value Potential of Korea Health Insurance Review and Assessment (HIRA) Data as a Resource for Health Research: Strengths, Limitations, Applications, and Strategies for Optimal Use of HIRA Data. 2022.
2. Europe W, Policies E, Chun C, Kim S, Lee J, Lee S. Republic of Korea: health system review [Internet]. Apps.who.int. 2022 [cited 27 June 2022]. Available from: <https://apps.who.int/iris/handle/10665/330337>
3. Europe W, Policies E, Chun C, Kim S, Lee J, Lee S. Republic of Korea: health system review [Internet]. Apps.who.int. 2022 [cited 27 June 2022]. Available from: <https://apps.who.int/iris/handle/10665/330337>
4. Europe W, Policies E, Chun C, Kim S, Lee J, Lee S. Republic of Korea: health system review [Internet]. Apps.who.int. 2022 [cited 27 June 2022]. Available from: <https://apps.who.int/iris/handle/10665/330337>
5. [Internet]. 2022 [cited 27 June 2022]. Available from: <https://www.digitalhealthnews.eu/>
6. Lee M, Heo E, Lim H, Lee J, Weon S, Chae H et al. Developing a Common Health Information Exchange Platform to Implement a Nationwide Health Information Network in South Korea. 2022.
7. Healthcare UK annual review 2019 to 2020 [Internet]. GOV.UK. 2022 [cited 27 June 2022]. Available from: <https://www.gov.uk/government/publications/healthcare-uk-annual-review-2019-to-2020>
8. Comparison and Analysis of Healthcare Systems [Internet]. NursingAnswers.net. 2022 [cited 27 June 2022]. Available from: <https://nursinganswers.net/essays/strengths-and-weakness-of-four-countries-healthcare-plan-health-essay.php>
9. Summary: International comparisons of healthcare quality [Internet]. The Nuffield Trust. 2022 [cited 27 June 2022]. Available from: <https://www.nuffieldtrust.org.uk/qualitywatch/summary-international-comparisons-of->

healthcare-quality

10. Topic: Global health care systems comparison [Internet]. Statista. 2022 [cited 27 June 2022]. Available from: <https://www.statista.com/topics/9017/global-health-care-systems-comparison/>
11. A Comparison of Healthcare Systems around the World [Internet]. Managementstudyguide.com. 2022 [cited 27 June 2022]. Available from: <https://www.managementstudyguide.com/comparison-of-healthcare-systems-around-the-world.htm>