THE ROLE OF DIGITAL MANAGEMENT SYSTEM IN INDIA, TELEHEALTH AND DRUG INFORMATION SYSTEM

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ABSTRACT

Digitizing public services is, at the moment, an essential necessity for numerous governments around the world. An improved government through digitization will not only have a growing effect on businesses, but it will also be able to intensify citizen engagement and push for economic growth. In this study the methodology is quantitative and it is based on a review and a survey made with the main goal being the estimation from several collected data on how the digital transformation process in the Public Administration takes place and what its relationship is with knowledge management. Digitizing public services is, at the moment, an essential necessity for numerous governments around the world. An improved government through digitization will not only have a growing effect on businesses, but it will also be able to intensify citizen engagement and push for economic growth. Therefore, in order to address this development, the purpose of this paper is to analyze the evolution of the digital government literature in order to describe the aspects of digital transformation in the public sector and how it is related to knowledge management. In this study the methodology is quantitative and it is based on a review and a survey made with the main goal being the estimation from several collected data on how the digital transformation process in the Public Administration takes place and what its relationship is with knowledge management.

KEYWORDS: Telemedicine, eHealth, mHealth, Healthcare, Covid-19, Digital Management System

INTRODUCTION

The Global Information Technology Report (GITR) and the Networked Readiness Index (NRI) were created a decade back. The main intension of this was to attract decision makers and investors in adopting business so as to develop in the context of this hastily growing digital world. The State has developed the IT investment Policy with an aim to promote e- governance in the state and also to attract IT Investors. The broad vision of the State Information and Technology Department is to improve the quality of life for its citizens by improving delivery services. COVID-19, a previously unknown respiratory illness caused by the coronavirus SARS-CoV-2 , was declared a pandemic by the World Health Organization (WHO) on 11 March 2020, less than 3 months after cases were first detected. With now over 9.8 million confirmed cases and more than 495,000 deaths3 recorded worldwide, there are grave concerns about the global health, societal and economic effects of this virus, particularly on vulnerable and disadvantaged populations, and in low- and middle-income countries with fragile health systems. At the time of this writing, 7.1 billion people live in countries that have had substantial travel and social restrictions.

LITERATURE REVIEW

Dr. MabunniShaik et.al (2021) Higher Education Institutions may confront a number of challenges, from remarkable shifts in sources of funding resulting from a wide structural change in the economy which demands for a greater responsibility at all levels to the imperative increase in effectiveness and efficiency through the adoption of current technology. The Covid pandemic has posed unprecedented challenges for higher education across the world, and India has no exception. In any country where higher education is still not accessible to many, the pandemic has broken the hopes of a large number of students who were wish to pursue their higher studies in top reputed universities in India and other countries. While online learning is not a innovative concept in India, it has now become a necessity. Over the last few months, the

way of transmitting education has changed drastically. Some universities rapidly adapted the change, others struggled as they lacked the core infrastructure and technical know-how to move to teach online.

DR. SUMITA SINKU (2021) The Covid-19 pandemic that has affected the world's economies has also muffled the education industry. End of March, 2020 recorded the spread of pandemic to over 185 countries and resulted in closure of over 95% of all schools, colleges and universities. The spread of the epidemic was so speedy and quick that there were hardly any plans for transition to online teaching or learning from offline classes and no one could anticipate the associated possible risks and opportunities that a sudden change could bring in the sector. The effect has been radical, as educators expect technological solutions to support remote education and learning. Digital transformation in education sector is, however, not limited to post Covid-19 online education and learning. Although some educational institutions have used technology solutions for the past years, the importance of digital transformation in education environment has now been realized in most schools, colleges and universities during the pandemic. Indian education system is still not mature at both the urban and rural areas. Under these circumstances government imposed nation-wise lockdown on March 25th, 2020, has made severe impact on the education system. Since the Indian education system is dominated by classroom study, the present scenario has made the functioning of the educational institutions go very difficult.

Dheeraj Badam et.al (2020) This study discusses the digitalization and its impact on various sectors of Indian Economy, On July 1st, 2015 under the leadership of honorable Prime Minister Narendra Modi took the very first and crucial step towards "Making India Digital". This is aimed to connect the rural parts of the India with Internet Connection and make them digitally literate to understand the development happening in their own sector and to inculcate them. India is one of the fastest developing nations with a very high young population accounting to (~65%) whose age is less than 35 years. Impact of Digitalization can be clearly observed only when the Individuals are capable of understanding and adopt them, for that every individual have to be financially literate which makes them capable of making judicious decisions, post digitalization financial transactions have to be taken through internet keeping that in view digital financial literacy has become the essential knowledge,through digitalization we can change a business model and provide new revenue and value producing opportunities. This paper focusses on how Digitalization has impacted the MSME and service sectors and how implementation of industry 4.0 has not done in larger scale. Why digitalization is so important and what are the sectors got impacted and how can we as emerge 3rd largest economy in the near future and how digitalization helped in bringing the transparency in the financial transactions and raise of usage of E Wallets.

Raj Kishor Kustwar et.al (2020) We have reached far ahead today when it comes to the telemedicine technology which was first installed in Boston in 1967 that made a regular interaction between physicians and patients at distant locations. Being a developing and lower-middle income country, currently India faces shortage of doctors, nurses & midwives, and healthcare infrastructure. Around 70% of Indian population lives in remote and rural villages lacking access to basic healthcare facilities. In such situations telemedicine plays a great role in providing quality and affordable healthcare to India's poorest people, and is expected to bridge the rural-urban health divide. Whether telemedicine technology meets its objective to provide adequate healthcare services to the poor remote and rural population is matter of great concern. This article aims to provide an overview on this issue.

Vinoth G. Chellaiyan et.al (2019) Telemedicine is considered to be the remote diagnosis and treatment of patients by means of telecommunications technology, thereby providing substantial healthcare to low income regions. Earliest published record of telemedicine is in the first half if the 20th century when ECG was transmitted over telephone lines. From then to today, telemedicine has come a long way in terms of both healthcare delivery and technology. A major role in this was played by NASA and ISRO. The setting up of the National Telemedicine Taskforce by the Health Ministry of India, in 2005, paved way for the success of various projects like the ICMR-AROGYASREE, NeHA and VRCs. Telemedicine also helps family physicians by giving them easy acess to speciality doctors and helping them in close monitoring of patients. Different types of telemedicine services like store and forward, real-time and remote or self-monitoring provides various educational, healthcare delivery and management, disease screening and disaster management services all over the globe. Even though telemedicine cannot be a solution to all the problems, it can surely help decrease the burden of the healthcare system to a large extent.

THE ROLE OF TECHNOLOGY IN TELEHEALTH

Technology strongly influences the way we work and is creating opportunities and new demands for a range of different approaches to telehealth. Telecommunications have evolved and have been accompanied by an evolution in attitudes to information and communications technologies. Previously, only companies owned computers and it was the IT specialists, rather than ordinary users, who determined their use and application. Today's response to technological change is profoundly different. On average, around 1 in 4 European households already owns a personal computer; in some countries this rises to more than 50% and in some local communities it is even higher.

A recent study confirms this trend and predicts that, in two years time, it is expected that the use of information communication technology will increase markedly. The ease with which we use them and the take-up of remote working in the European Union continues at a rapid pace. Recent estimates show that approximately 6.7 million Europeans (4.5% of the workforce) were practicing remote working in one form or another at the beginning of 1999.

Social, cultural, economic and regulatory factors determine how we organise our business, our work and, hence, our lives. Technology-led change opens up opportunities for new working methods in three main ways: allowing existing activities to be carried out more rapidly, with more consistency and at a lower cost than could previously be achieved. Today, the explosive growth of the Internet has promoted the trend for investment in information and communication devices and the healthcare industry is an active participant in this trend. It would be fair to state that advances in communications technology are dramatically changing the delivery of healthcare services.

Our stand is validated when we see that modern healthcare is the largest sector of the US economy. However, IT expenditure in healthcare organisations, as a portion of revenues, is in the region of 2%, far below the 7-10% mark in other information-intensive industries.

Analysts are confident that the above situation is about to undergo a sea change. Investor confidence in technology growth in healthcare is so strong that, between 1992 to 1996, there was a quintuple leap in the number of publicly traded health information technology companies. In 1998, the top 35 companies had market capitalization of over $25 billion. Today, about 43% of US-based Internet users use the Web to locate healthcare related information. This clearly indicates that E-healthcare and its applications (such as telemedicine) are here to stay.

DIGITAL HEALTH INITIATIVES GLOBALLY DURING THE PANDEMIC

Digital technologies are being harnessed to support public-health response and in medical diagnosis and provision of healthcare services. See figure below.
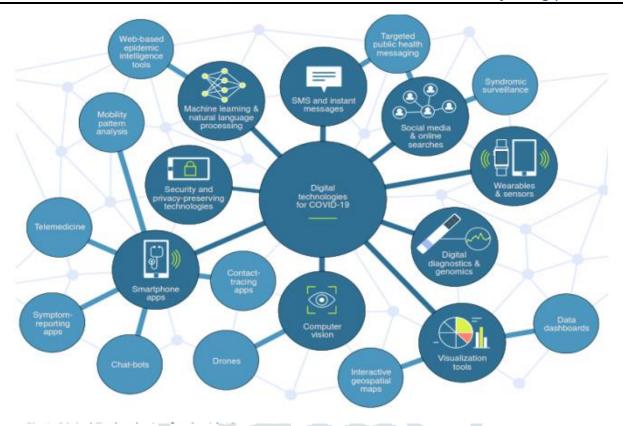
Fig 1: Digital Technologies for Covid-19

Governments are conducting epidemiological surveillance, case identification and contact tracing, and predicting the waves of infection in specific geographies. They are making use of telecommunication technologies, advanced data analytics and machine learning, and data visualization techniques for these purposes. They are making use of social-media platforms for public communications.1 The pandemic forcefully brought out the need for national IT infrastructure – to generate accurate and real-time estimates of disease incidence which will help in efficient allocation of scarce medical resources, and to track, trace, and quarantine affected individuals during times of public health emergencies.

One study finds that healthcare providers are leveraging clinical informatics to COVID-19 response, mostly for projects like telemedicine, which includes training providers on existing telehealth tools and building new workflows for video triage of COVID-19 patients, and reporting and analytics, which includes creating dashboards and developing digital contact tracing tools.

Innovative digital health solutions for Covid-19 diagnosis are emerging, especially by leveraging AI and information from wearable IoT devices. Some examples include cough recordings for diagnosis with 98% sensitivity and 94% specificity, pre-symptomatic detection from highly elevated heart rate from smartwatch data, and SARS-CoV-2 detection with CRISPR-Cas13a and mobile phone. 4 Examples of AI in action include solutions from Babylon Health and its symptom-checking app with a specific COVID-19 decision algorithm, and a deep-learning neural network solution to analyse chest X-rays, identify and distinguish COVID-19 from other forms of pneumonia.

E-AUSHADHI: DRUG SUPPLY CHAIN MANAGEMENT SOLUTION

C-DAC's e-Aushadhi solution deals with the purchase, inventory management and distribution of various drugs, sutures and surgical items to various District Drug Warehouses (DDWs), Medical Colleges, District Hospitals, Community Health Centres (CHCs), Primary Health Centres (PHCs) and Drug Distribution Centres (DDCs) from where the drugs are issued to the patients in an entire state, who are the final consumers in the chain.

Telemedicine

As part of Digital India Initiative of Govt. of India, C-DAC is carrying out development and customization of Telemedicine solution for Pan-India and abroad implementation. Telemedicine sites including Tele-Consultation Centres (TCCs) and specialist hospitals are being identified to provide specialized healthcare services to the people residing in remote and rural population of India as well as the urban populace using telemedicine.

e-Sushrut, Hospital Management and Information Solution

"e-Sushrut", C-DAC's Hospital Management Information System is a major step towards adapting technology to improve healthcare. C-DAC has developed Hospital Information Management Systems (HIMS) based on SaaS (Software-as-a-Service) model. The primary objectives of this project are to ease the management, monitoring and functioning of patients, staff, reports and other related entities in hospitals throughout the state.

Blood Bank Management System (BBMS)

The BBMS system is designed and developed as per NACO and NABH guidelines for management of blood banks. It is a comprehensive online Inventory Management System that gives detailed information about blood components from collection to its consumption by end user. BBMS system is both a standalone solution as well as it can be integrated with Megh Sushrut solution for integrated management. The solution is being deployed this year in Rajasthan over a one year period.

- 2,800+ Blood Banks and Blood Storage Units with geographic coordinates

- Stock Availability (portal and application users)

1. Number of States and UTs: 32

2. Number of Blood Banks: 1,468

3. Information on more than 3 Lakh units

- Live Blood Banks

1. Number of States: 11

2. Number of Blood Banks: 65

- 6,800 camps organized with e-Raktkosh

- More than 1,50,000 Portal visitors

- More than 1,35,000 registered blood donors

EVOLUTION OF E-GOVERNANCE IN INDIA

The origin of e-Governance in India dates back in 1970's with the initiation of in-house e applications in the government areas like elections, census, defence and monitoring of economic situation of the country (Drishti The Vision Foundation 2019). One of the early steps towards e-Governance in India was the establishment of the Department of Electronics in the year 1970(Drishti The Vision Foundation 2019). Following this, the National Informatics Centre was established in the year 1977(Drishti The Vision Foundation 2019). By 1980 most of the Indian government offices were equipped with computers (Kumar, Kumar, and Kumar 2014). In the year 1987, Government of India took the first remarkable step towards e-Governance by launching the National Satellite-based computer network NICNET (Drishti The Vision Foundation 2019). Following this, District Information System program was launched by the National

Informatics Centre. Railways office automation also began prior to 1990(International Telecommunication Union (ITU) 2018). By 1990, the extent of NICNET expanded from state headquarters to district headquarters (Kumar, Kumar, and Kumar 2014). Between 1990-2006, various state and individual department level e-initiatives were taken (International Telecommunication Union (ITU) 2018). In 1998, National task Force on IT was constituted (Suri and Sushil 2017). In the year 2000, Ministry of Information Technology was established under the GoI (Kumar, Kumar, and Kumar 2014). In Feb 2002, subsequent to the consitution of High Power committee related to promotion of IT, the Department of Administrative Reforms and Public Grievances (DARPG) put forward 12 point 'Minimum Agenda for e-Governance' to be implemented by all government departments.

Finally in the year 2006, Government of India (GoI) approved National e-Governance Plan (NeGP)(Ministry of Electronics & Information Technology, Government of India 2018). The vision of NeGP is to "make all Government services accessible to the common man in his locality, through Common Service Delivery Outlets and ensure efficiency, transparency & reliability of such services at affordable costs to realise the basic needs of the common man"(Ministry of Electronics & Information Technology, Government of India 2018). National eGovernance Plan comprises of 31 Mission Mode Projects (MMPs), each of which focus on specific area like agriculture, health, education etc. Annexure 1 outlines the Mission Mode Projects (MMPs) under NeGP. The National Portal of India, one of the MMPs under NeGP, provides single window access to information and services provided by the government organisations (Ministry of Electronics & Information Technology, Government of India 2020b). Under National e-Governance Plan, National e-Governance Services Delivery Gateway (NSDG) was made operational in April, 2008(Ministry of Electronics & Information Technology, Government of India 2015c).

In July 2011, Government of India started using mobile platform for the delivery of public services(Ministry of Communications, Government of India 2015). National Policy on Information Technology (IT) was approved by the GoI in the year 2012(Ministry of Communications, Government of India 2012). In the year 2015, Prime Minister Shri Narendra Modi launched Digital India Programme(Ministry of Electronics & Information Technology, Government of India 2020a). "Digital India is a flagship programme of the Government of India with a vision to transform India into a digitally empowered society and knowledge economy"(Ministry of Electronics & Information Technology, Government of India 2020a)"eGovernance: Reforming Government through Technology" is one of the nine pillars of Digital India Programme(Ministry of Electronics & Information Technology, Government of India 2020a). e-Kranti is another pillar under Digital India initiative with a vision of "Transforming eGovernance for Transforming Governance"(Ministry of Electronics & Information Technology, Government of India 2020a). Annexure 2 outlines the 9 pillars of the Digital India Porgramme. Table 1 outlines some of the e-Governance initiatives taken under Digital India programme. Annexure 3 outlines some of the policies related to e-Governance in India.

Table 1: e-Governance Initiatives under Digital India

S.No	e-Governance Initiative
1	MyGov: A platform for citizen Engagement towards Good Governance
2	Aadhaar Authentication Services for E-governance Applications
3	Common Services Centres (CSCs)
4	e-Gov App Store
5	Unified Mobile Application for New-Age Governance (UMANG)
6	National Scholarships Portal
7	Open Government Data (OGD) platform for National Data Sharing and Accessibility Policy (NDSAP)
8	PRAGATI (Pro-Active Governance And Timely Implementation)
9	Digitize India Platform (DIP)
10	Collaborative Digital Diagnosis System
11	DARPAN (Dashboard for Analytical Review of Projects Across Nation)
12	e-Office
13	eProcurement Project
14	Digital Locker System
15	India Portal
16	National Data Centre
17	Public Finance Management System (PFMS)
18	DigiDhan - Digital Payments
19	eCourts
20	e-Way Bill
21	Aadhaar Enabled Biometric Attendance System (AEBAS)
22	Rapid Assessment System (RAS)
23	Digital Government Research Centre (DGRC)
24	Pradhan Mantri Awas Yojana (Urban)- PMAY(U) portal
25	NREGASoft: Portal for Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA)
26	National Rurban Mission (NRuM) portal
27	Swachh Bharat Mission (Urban)-SBM(U) portal

CONCLUSION

The Covid-19 pandemic has catalysed adoption of digital health worldwide and in India, especially in public health response, and healthcare diagnosis and provision. Lack of resources – India's public expenditure on health has been consistently low and has translated into lower per-capita availability of doctors and other healthcare professionals. The Covid-19 pandemic initiated an extensive, sudden and dramatic digital transformation in the society. The pandemic forced us to take an extraordinary digital leap in our everyday life and practices, including education.

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