

Wadhwa, Manisha

Working Paper

E-Governance in the Health Sector in India: A Review of the Current Scenario

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e-Governance in healthcare sector in India

ICT India Working Paper #28

Manisha Wadhwa

March 2020

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Abbreviations

AEBAS	Aadhaar Enabled Biometric Attendance System
ANM	Auxiliary Nurse Midwife
ANMOL	ANM on Line
ASHA	Accredited Social Health Activist
BADEA	Birth and Death Entry Application
BBMS	Blood Bank Management System
CGHS	Central Government Health Services
CGMSC	Chhattisgarh Medical Services Corporation
CHRIS	Computerized Human Resource Information System
CPHC	Comprehensive Primary Healthcare
CR	Central Registration
CSC	Common Services Centre
DARPAN	Dashboard for Analytical Review of Projects Across Nation
DARPG	Department of Administrative Reforms and Public Grievances
DGRC	Digital Government Research Centre
DIP	Digitize India Platform
DISHA	Digital Saksharta Abhiyan
DLIMS	Drug Logistics Information & Management System
DPDMIS	Drug Procurement and Distribution Management Information System
DPICS	Drug Procurement & Inventory Control System
DVDMS	Drugs and Vaccines Distribution Management System
e-Governance	electronic Governance
e-HMIS	electronic -Health Management Information System
EHR	Electronic Health Record
ePHC	electronic Primary Health Centre
ETB	Electronic Tender Box
G2B	Government to Business
G2C	Government to Citizen
G2E	Government to Employees
G2G	Government to Government
GHMIS	Gujarat Hospital Management Information System
GoI	Government of India
HEALING	Health Information System for Government
HIMIS	Health Infrastructure Management Information System
HIS	Hospital Information System
HMIS	Hospital Management Information System
HMS	Hospital Management System
HRMS	Human Resource Management System
HWC	Health and Wellness Centre
ICT	Information and Communications Technology
IDSP	Integrated Disease Surveillance Programme
IEC	Information Education Communication
IT	Information Technology
ITU	International Telecommunication Union

MCTS	Mother and Child Tracking System
MDDS	Metadata & Data Standards
MGNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
MHU	Mobile Health Unit
MMA	Mukhya Mantri Amrutam
MMP	Mission Mode Project
MMU	Mobile Medical Unit
MoHFW	Ministry of Health and Family Welfare
MRMBS	Muthulakshmi Reddy Maternity Benefit Scheme
NCD	Non-Communicable Disease
NDLM	National Digital Literacy Mission
NDSAP	National Data Sharing and Accessibility Policy
NeGP	National electronic Governance Plan
NGO	Non-Government Organisation
NHP	National Health Portal
NHS	National Health Stack
NICNET	National Informatics Centre Network
NIN	National Identification Number
NITI	National Institution for Transforming India
NMCN	National Medical College Network
NRuM	National Rurban Mission
NSDG	National Service Delivery Gateway
NTN	National Telemedicine Network
OGD	Open Government Data
OPD	Out Patient Department
PC	Pre-Conception
PCT-HSM	Pregnancy, Child Tracking and Health Services Management System
PFMS	Public Finance Management System
PHRMS	Personal Health Record Management System
PMAY	Pradhan Mantri Awas Yojana
PMRSSM	Pradhan Mantri Rashtriya Swasthya Suraksha Mission
PMSMA	Pradhan Mantri Surakshit Matritva Abhiyan
PNDT	Pre-Natal Diagnostic Techniques
PRAGATI	Pro-Active Governance And Timely Implementation
PwD	Person with Disability
RAS	Rapid Assessment System
RBSK	Rashtriya Bal Swasthya Karyakram
RCH	Reproductive Child Health
RMNCH	Reproductive Maternal Newborn and Child Health
SATCOM	Satellite Communication
SBM	Swachh Bharat Mission
SHDRS	State Health Data Resource Centre
SHP	School Health Program
SMART	Simple, Moral, Accountable, Responsive and Transparent
TB	Tuberculosis
TMIS	Training Management Information System

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UIDAI	Unique Identity Authority of India
UMANG	Unified Mobile Application for New-Age Governance
WHO	World Health Organization
WIS	Warehouse Information System

Abstract

The Information and Communications Technology (ICT) has a huge potential of changing the landscape of service delivery across the globe. It acts as a catalyst for the speedy delivery of services. The Government of India is in the transition phase, moving from traditional paper mode to using Information and Communications Technology (ICT) in the governance process. The use of ICT in the governance process is called e-Governance. The Government of India has been increasingly focusing on the use of Information and Communications Technology (ICT) to overcome issues like red-tapism, lack of accountability and transparency in public services, lack of access to information, slow movement of files and other documents, ineffective delivery of public services etc.

This is a concept paper based on secondary data collected from government websites and documents, various national and international Journals and private websites. The present paper discusses the concept of e-Governance, pillars of e-Governance, objectives of e-Governance, types of interaction in e-Governance, guiding principles for e-Governance and benefits of e-Governance. The paper presents a review of evolution of e-Governance in India. It gives a detailed account of e-Governance initiatives in India. The document lays specific emphasis on e-Governance initiatives in healthcare in India, both at the National and State level. Further, the key challenges related e-Governance in India are discussed. The paper also put forward some recommendations which may help in the implementation of e-Governance in the Indian context.

Keywords: e-Governance, Information and Communication Technology, ICT, India

Introduction

The last decade has seen a massive explosion of Information and Communications Technology (ICT) all over the world. India is also gearing up towards to an era of digitalization. It intends to nurture digital ecosystems across all the sectors including health, education, agriculture, resources, financial services etc. The concept of e-governance is to involve IT in all the government processes. “e-Governance or electronic Governance is understood as the use of Information and Communications Technology (ICT) at all the level of Government in order to provide services to the citizens, interaction with business enterprises and communication and exchange of information between different agencies of the Government in a speedy, convenient, efficient and transparent manner”(Ministry of Electronics & Information Technology, Government of India 2015a). “e-Governance, in essence, is the application of Information and Communications Technology to government functioning in order to create ‘Simple, Moral, Accountable, Responsive and Transparent (SMART)’ governance”(Ministry of Electronics & Information Technology, Government of India 2015b).

Pillars of e-Governance

e-Governance is a holistic initiative with four key pillars: people, technology, process and resources (see figure 1)(Ministry of Electronics & Information Technology, Government of India 2015b).

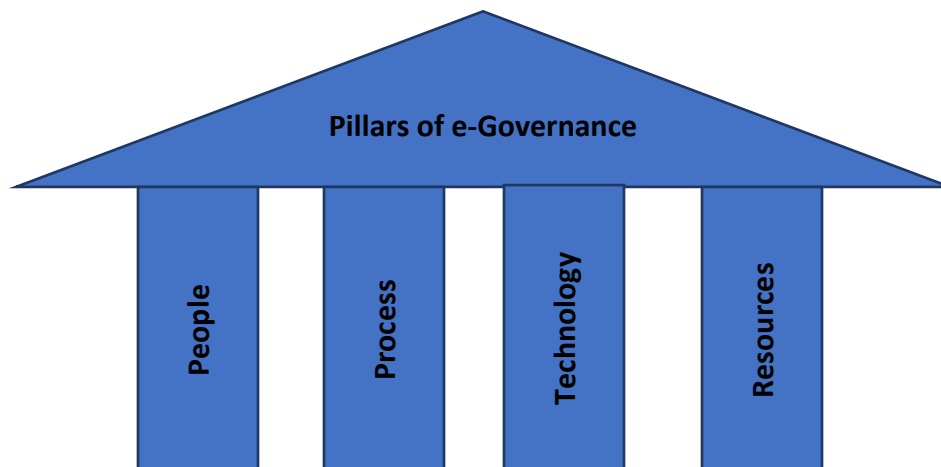


Figure 1: Pillars of e-Governance

Shivakumar in his paper explained basic structure of e-Governance as having four pillars (Kolachalam Shivakumar 2002):

Leadership/Vision: A clear vision and commitment among the leadership at the top of the government is needed.

Governance/Administration: Clearly defined policies around e-Governance and its implementation plan should be in place.

Integration/Collaboration: An efficient and effective collaboration among the key players is needed. These include government entities, private sector, academic institutions, businesses, Non-governmental Organisations (NGOs) etc.

Technology/Infrastructure: Right infrastructure and technological developments should be made available and accessible to all the citizens.

Objectives of e-Governance

The objectives of the e-Governance are:

- ❖ To exchange information with citizens, businesses, or other government departments
- ❖ To provide efficient delivery of public services
- ❖ To enhance internal efficiency of the government system
- ❖ To reduce cost/increase the revenue
- ❖ To re-structure the administrative processes and improve quality of services

Types of interaction in e-Governance

There are four types of interaction in the e-Governance (see Figure 2)(Ministry of Electronics & Information Technology, Government of India 2015b).

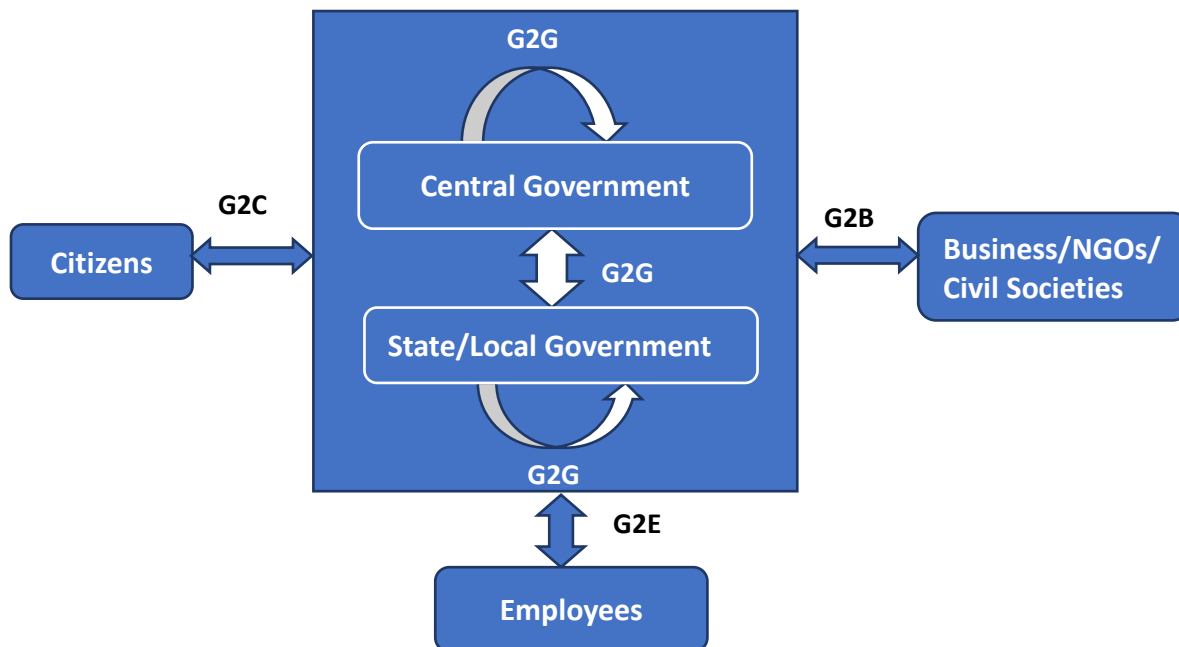


Figure 2: Types of Interaction in e-Governance

G2G i.e. Government to Government: This type of interaction includes exchange of information electronically between the government bodies i.e. between national (central), state and local government and within the government entities at various levels. This type of interface helps in smooth and transparent functioning of the government processes along with saving time and being cost-effective as well. Examples of G2G services include inter-office teleconferencing, Online Budget System, Electronic stamping of bills etc.

G2C i.e. Government to Citizen: This type of interaction includes exchange of information electronically between the government bodies and the citizens. This type of interface helps general public to access government services, information and provide feedback electronically. The aim is to make government services citizen-friendly. Examples of G2C services include passport/visa, property registration, birth and death certificate, marriage certificate, municipality services, death certificate etc.

G2B i.e. Government to Business: This type of interaction includes exchange of information electronically between the government bodies and business entities, Non-governmental Organisations (NGOs) and civil societies. This type of interface helps cut down red-tapism and establishing business environment which is transparent, cost-effective and saves time. Examples of G2B services include e-Tender Box (ETB) system, e-Procurement Programme etc.

G2E i.e. Government to Employees: This type of interaction includes exchange of information electronically between the government bodies and employees. This type of interface aims to

make interaction between employees and government fast, efficient and employee-satisfactory. Examples of G2E services include E-payroll, E-training etc.

Guiding Principles for e-Governance

There are four guiding principles for reforming Government through technology (Ministry of Electronics & Information Technology, Government of India 2017).

Form simplification and field reduction: The forms used should be simplified and should be structured in a way to capture minimum essential information.

Online applications and tracking: Online applications with proper tracking mechanism should be developed.

Online repositories: Online repositories e.g. for educational certificates, employment documents etc. should be used for improving convenience to the citizens.

Integration of services and platform: Integrated and interoperable services should be provided to the citizens and businesses by mandating sharing of data between the online services and platforms like Unique Identity Authority of India (UIDAI), Mobile Seva platform etc.

Benefits of e-Governance

The benefits of e-Governance are manifold. Some of them are enlisted below:

- Increase in transparency and accountability of the government administration
- Cost reduction and growth in the revenue
- Improved convenience to the citizens and businesses
- Expansion in government outreach
- Reduce red-tapism
- Improved coordination between the government bodies at various levels
- Enhanced efficiency of the government system
- Improvement in satisfaction level of the general public with the government services
- Empowerment of citizens through information access
- Improved interaction with the business entities
- Improved quality of citizen services
- Better enforcement of law
- Reducing digital divide and providing equal access to information
- Creation and linkage of local and global online communities
- Encourage innovative leadership styles
- Promotes economic development by creating an enabling environment

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 Gol(Kumar, Kumar, and Kumar 2014). In Feb 2002, subsequent to the constitution 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(Suri and Sushil 2017).

Finally in the year 2006, Government of India (Gol) 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 e-Governance 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 Gol 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)"e-Governance: 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 e-Governance for Transforming Governance”(Ministry of Electronics & Information Technology, Government of India 2020a). Annexure 2 outlines the 9 pillars of the Digital India Programme. 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

Ref: (Ministry of Electronics & Information Technology, Government of India 2019)

Union Budget 2020-2021 aims “to achieve seamless delivery of services through Digital governance”(Ministry of Finance, Government of India 2020). Union Budget 2020-2021 proposed various new e-Governance initiatives. These include Government e-Marketplace (GeM) for procurement of goods, services and works, single window e-logistics market, policy

for data centre parks throughout the country etc. The vision of Union Budget 2020-2021 is that “all “public institutions” at Gram Panchayat level such as Anganwadis, health and wellness centres, government schools, PDS outlets, post offices and police stations will be provided with digital connectivity”(Ministry of Finance, Government of India 2020).

e-Governance Initiatives in healthcare

National level Initiatives

The idea of introduction of electronic communication in the health sector was first supported by the National Health Policy, which was approved by the Parliament of India in the year 1983 and later updated in the year 2002. The National Health Policy 2017 further emphasized the role of digital technology in the delivery of healthcare services(Ministry of Health and Family Welfare, Government of India 2017). The policy recommended the use of “Aadhaar” as a unique identification number for the beneficiaries, use of smartphones and National Optical fibre network for building the National health Information Architecture.

In the year 2015, the MoHFW, GoI proposed setting up of the National E-Health Authority (NeHA) with the vision to make use of information and communication technologies (ICT) in the delivery of high quality health care services to the citizens of India(Ministry of Health & Family Welfare, Government of India 2017a). MoHFW has started numerous e-Governance initiatives in health care sector in India under the division called eHealth division. Table 2 outlines some of the National-level e-Governance Initiatives in healthcare in India.

Table 2: National level e-Governance Initiatives in Healthcare

Initiative	Description
Office Automation	
e-Office	MoHFW,GoI has started implementation of e-Office which includes creation of e-files, e-sign etc. to improve the efficiency of the government processes(Ministry of Health & Family Welfare 2018)
Video Conference facility	MoHFW,GoI has started video conferencing facility in the offices(Ministry of Health & Family Welfare 2018)
Digital Payments	Under Digital India Programme, digitization of payments has been initiated in the health sector(Ministry of Health & Family Welfare 2018)
Online Services	
Government Services Portal of India	Single window access to 40 Health services provided by GoI(Ministry of Electronics & Information Technology, Government of India 2005)
National Health Portal	Web based portal that acts as a single point of access to authentic health related information for citizens of India(Ministry of Health and Family Welfare, Government of India 2016d)
e-Hospital	Hospital Management System for delivery of services like patient care, diagnostics etc. in Government Hospitals in India(Ministry of Health and Family Welfare, Government of India 2019b)

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Online registration system	Aadhaar based online registration system for booking an OPD appointment, availing services like online diagnostic reports, enquire availability of blood in any government hospital in India(Ministry of Electronics & Information Technology, Government of India 2015d)
Central Government Health Services (CGHS) portal	Web application implemented in all the wellness centres across the nation since 2007 for the delivery of Central Government Health Services (CGHS)(Ministry of Health and Family Welfare, Government of India 2015c)
Food Safety and Standards Authority of India	Gol website for providing services like issuance of licence, product approval etc. to food business operators(Ministry of Health and Family Welfare, Government of India 2020a)
National Organ & Tissue Transplant Organisation	Gol web portal for registration and retrieval for organ/ tissue transplantation (Ministry of Health and Family Welfare, Government of India 2019b)
Central Drugs Standards Control Organisation, "SUGAM"	Single window access to various stakeholders like Pharmaceutical Industry, Citizens, Regulators etc. for applications and approvals of drugs, vaccines, cosmetic products, medical devices, clinical trials and ethics committee(Ministry of Health and Family Welfare, Government of India 2019b)
Mera Aspataal	Gol initiative to capture patient feedback for the services received at the hospital(Ministry of Health and Family Welfare, Government of India 2020b)
'Hum Do' Website	Gol website providing information related to family planning and guidance on family planning methods(Ministry of Health and Family Welfare, Government of India 2017)
PMSMA portal	Web and android based system with help desk to facilitate Pradhan Mantri Surakshit Matritva Abhiyan (PMSMA) programme by (MoHFW), Government of India under which free of cost ANC care is given to pregnant women on 9 th of each month (Ministry of Health and Family Welfare, Government of India 2018)
Online Medical Counseling & Admission Project	Online Counselling service by Gol for admission into Under Graduate and Post Graduate Medical colleges(Ministry of Health and Family Welfare, Government of India 2015c)
Ayushman Bharat- Pradhan Mantri Jan Arogya Yojna Portal	Gol portal providing information and services related to Pradhan Mantri Jan Arogya Yojna(National Health Authority, Government of India 2018)
Mobile Applications and Services	
Swasth Bharat (Disease, Lifestyle, First Aid)	Android based mobile application that provide reliable information related to disease conditions, symptoms, available treatment options, public health alerts, healthy lifestyle, first aid etc. (Ministry of Health and Family Welfare, Government of India 2016h)
NHP Indradhanush : Vaccine Tracker	Gol android based mobile application to help parents register and track immunisations of their children under 16 years of age(Ministry of Health and Family Welfare, Government of India 2016g)
National Health Portal Directory Services	Mobile application providing information related to hospitals and blood banks across India(Ministry of Health and Family Welfare, Government of India 2016g)

	India 2016f)
TB Missed Call Initiative	Mobile health service by Gol for providing counselling and treatment to Tuberculosis (TB) patients (Ministry of Health and Family Welfare, Government of India 2016b)
Kilkari	Gol mobile initiative that delivers free weekly 72 messages related to pregnancy care, delivery and child care to pregnant women from 2 nd trimester upto when child is 1 year of age (Ministry of Health and Family Welfare, Government of India 2016b)
M-Cessation mobile app	Gol android based mobile application to help people quit tobacco for life (Ministry of Health and Family Welfare, Government of India 2016b)
No More Tension Mobile app	“Stress Reliever Application” launched by MoHFW, Gol for providing information related to stress and its management techniques (Ministry of Health and Family Welfare, Government of India 2016i)
Mera Aspataal Mobile App	Gol mobile app to capture patient feedback for the services received at the hospital (Ministry of Health and Family Welfare, Government of India 2020b)
PMSMA App	Pradhan Mantri Surakshit Matritva Abhiyan mobile app provides opportunity to medical practitioners who are in voluntary sector or in private sector or are retired to provide free ANC care to the pregnant women at Government healthcare facilities on 9 th of every month (Ministry of Health and Family Welfare, Government of India 2016j)
National Health Helpline (Doctor on Call)	MoHFW initiative to provide free on call healthcare consultation to patients across India by a qualified doctor (Ministry of Health & Family Welfare 2018)
mDiabetes	Mobile initiative by MoHFW in collaboration with the WHO and other partners for the prevention and care of diabetes (Ministry of Health and Family Welfare, Government of India 2015a)
Health Information Dissemination	
NHP Health Information Kiosks	Health information Kiosks are being established in hospitals (so far done in 17 hospitals) for the purpose of disseminating authentic and reliable health related information to the citizens (Ministry of Health & Family Welfare 2018)
NHP Voice Web	National Health Portal developed a 24x7 Toll free Voice Web service for sharing authentic health information with the citizens (Ministry of Health and Family Welfare, Government of India 2016c)
Campaigns organized on Social Media (Twitter, You Tube)	For instance: Intensified Diarrhoea Control Fortnight, National Breast-feeding Week, National Nutrition Week etc. (Ministry of Health and Family Welfare, Government of India 2015c)
Process Automation	
Hospital Information System (HIS)	HIS helps in automation of hospital processes like patient registration, diagnostics, drugs, treatment, discharge, follow-up etc. It is functional in public health facilities upto CHC level (Ministry of Health and Family Welfare, Government of India 2019b)
Drugs and Vaccines Distribution Management System (DVDMS)	DVDMS helps in automation of purchase, inventory management and supply of drugs, surgical items and sutures to warehouses of DH, CHC, PHC (Ministry of Health and Family Welfare, Government of India 2019b)

(‘eAushidhi’)	
eRakt Kosh	Online system for connecting and streamlining the workflow of all the licensed blood banks across the nation(Ministry of Health and Family Welfare, Government of India 2019b)
Personal Health Record Management System (PHRMS)	PHRMS provides a platform for patients to upload their health data for the purpose of storage, easy access and sharing with doctors for seeking medical advise(Centre for Development of Advanced Computing (C-DAC) 2019)
ANM on Line (ANMOL)	ANMOL is a tablet based application used by ANMs to enter data related to the RCH programme (Ministry of Health and Family Welfare, Government of India 2019b)
Service Delivery and Tracking	
e-HMIS	electronic-Health Management Information System (e-HMIS) is a web based portal functioning across the nation to monitor programmes under National Health Mission(Ministry of Health and Family Welfare, Government of India 2019b)
Nikshay	Web based portal by GoI for tracking TB patients and monitoring National TB programme(Ministry of Health and Family Welfare, Government of India 2019b)
Mother and Child Tracking System (MCTS)	Web based portal by for tracking pregnant women and children under 5 years of age(Ministry of Health and Family Welfare, Government of India 2019b)
Ayushman Bharat – Health and Wellness Centre (HWC) portal	Web portal launched by MoHFW to monitor the delivery of comprehensive primary healthcare (CPHC) services through the health and wellness centres across the nation(Ministry of Health and Family Welfare, Government of India 2019a)
CPHC NCD Solution	MoHFW, GoI under the Ayushman Bharat Comprehensive Primary Healthcare (CPHC) program is undertaking a population-based Non-communicable diseases (NCDs) program which aims to screen all individuals above 30 at population level for five noncommunicable diseases: hypertension, diabetes, oral, breast and cervical cancers. CPHC NCD Solution helps digitize all the paper records related to the screening conducted for women and men above 30 years of age(Ministry of Health and Family Welfare, Government of India 2018a)
Surveillance and Monitoring	
Integrated Disease Surveillance Programme (IDSP) Portal	Web based portal by GoI for disease surveillance in the country under National Health Mission(Ministry of Health and Family Welfare, Government of India 2009)
Central Dashboard	Central dashboard is being developed to help monitor key indicators related to various existing and upcoming National health programmes(Ministry of Health and Family Welfare, Government of India 2019)
Regulations and Standards	
National Identification Number (NIN) to Health Facilities	Web portal for registration of health facilities in India and assigning them a unique permanent National Identification Number (NIN)(Ministry of Health and Family Welfare, Government of India 2016e)

Metadata & Data Standards (MDDS)	Health domain MDDS (Metadata & Data Standards) have been developed for bringing interoperability between various health IT applications(Ministry of Health and Family Welfare, Government of India 2019)
EHR Standards	EHR (Electronic Health Record) Standards notified in the year 2016 by Gol include 35 set of standards for clinical terminology, E-prescription, data encryption, coding etc. (Vikaspedia 2019)
Online Registry of Clinical Establishments	Web portal for registration of all types of clinical establishments except for armed forces(Ministry of Health and Family Welfare, Government of India 2015b)
Capacity Building	
Mobile Academy	Gol Mobile initiative to provide free audio courses to train ASHAs on healthcare service delivery particularly intended to improve their knowledge base and communication skills (Ministry of Health and Family Welfare, Government of India 2019)
Training Management Information System (TMIS)	This system helps in the building capacities of healthcare professionals(Ministry of Health and Family Welfare, Government of India 2019)
NDLM (National digital Literacy Mission) – DISHA	Under this initiative IT training will be provided to 52.5 lakh persons, which includes ASHA, Anganwadi workers and authorized ration dealers across the nation(National Institute of Electronics & Information Technology 2015)
Online Consultation-Telemedicine	
National Medical College Network (NMCN)	NMCN is being established to link all the medical colleges of the nation for the purpose of establishing e-classrooms, providing teleeducation, Continuous Medical Education (CME) and building capacities(Ministry of Health and Family Welfare, Government of India 2019)
National Telemedicine Network (NTN)	NTN is being established across the nation connecting health facilities in rural areas (SC, PHC, CHC) with the district hospitals and medical college for providing telemedicine services(Ministry of Health and Family Welfare, Government of India 2019)
SATCOM based Telemedicine Nodes	Telemedicine nodes are being established at the pilgrimage places for the pupose of providing speciality consultation, screening of diseases and providing preventive care to the devotees(Ministry of Health and Family Welfare, Government of India 2019)

In July 2018, NITI Aayog, Gol proposed the development of “National Health Stack (NHS)” in the context of Pradhan Mantri Rashtriya Swasthya Suraksha Mission (PMRSSM) under Ayushman Bharat Yojna(NITI Aayog 2018). NHS would integrate all the health verticals at national and state levels and intend to create digital health records for Indian citizens by the year 2022. Union budget 2020-2021 proposed the use of Artificial Intelligence and machine learning in the Ayushman Bharat scheme for targeting disease by designing an appropriate preventive regime(Ministry of Finance, Government of India 2020).

State Level Initiatives

Some of the state level e-Governance Initiatives in Healthcare are given in Table 3.

Table 3 : State level e-Governance Initiatives in Healthcare

Initiative	Description
Gujarat	
E-Mamta	Mother and child tracking system
E-Aushadhi	Web based application for purchase, inventory management and supply of drugs, sutures and surgical items
E-Olakh	Civil Registration system
Ability Gujarat	Web based portal for identification and registration of all the PwDs (Person with Disability). PwDs are issued "Disability Certificate" with a unique identification code
School Health Program (SHP)	Web based portal which maintains child and adolescent health records
Drug Logistics Information & Management System (DLIMS)	Database of drug and medical equipment stock
Gujarat Hospital Management Information System (GHMIS)	Web based portal for monitoring the delivery of health care services in the government hospitals across the state (District hospitals, Sub-district hospitals, medical college hospitals)
Blood Bank Management System (BBMS)	The system provide details of blood banks across the state including details related to stock, donor etc.
Mukhya Mantri Amrutam(MA)	Online government health care plan for poor and low middle class families
Beti Vadhaao	Web based system to monitor child sex ratio and the related issues in the state
GPS based MHU / MMU Tracking System	Track and monitor vehicles (MHU/MMU) which provide healthcare services in hard to reach areas
Birth & Death Entry Application System (BADEA)	This system helps maintain database of births and deaths in the state
Rajasthan	
HEALING	Health Information system for Government
E-Aushadhi	Web based application for purchase, inventory management and supply of drugs, sutures and surgical items
Asha Soft	Online system to monitor ASHA programme and make payment to ASHAs
PCT-HSM	Pregnancy, Child Tracking and Health Services Management System
E-Mitra	e-Governance initiative to deliver services to the people via CSC (Common Service Center)
CHRIS	Computerized Human Resource Information System manages employee data in the organisation
Saghan Nirikshan Abhiyaan	Intensive technology based inspection of all Government hospitals in the state (DH/SDH/CHC/PHC)
Andhra Pradesh	

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eVaidya	State telemedicine pilot project in two urban health centres, a tele, ePHC concept
Rashtriya Bal Swasthya Karyakram (RBSK)	e-healthcare project for monitoring of 4Ds (Defects at birth, Diseases, Deficiencies and Development Delays including Disabilities) in children
MCTS & RCH	This initiative entails Tablet PC based MCTS & RCH programme
Mahila Master Health Checkup (MMHC)/ Mee Arogyam	Under this initiative women above the age of 35 years will be screened for Non-Communicable Diseases (NCDs). The software solution for this programme comprises of a tablet application for the health workers, the web application for the doctors at secondary and tertiary levels, and dashboards for the health officials. MMHC is the next version of Mee Arogyam – Primary Health Solution from EMC.
e-Health	This is world bank funded project. As a pre-cursor to eHealth project, eHospital Management System with Supply Chain Management (eHMS with SCM) has been conceived. This project cover healthcare services for end to end Hospital Management System and generates a unique patient identifier called “CR – Central Registration”
Tamil Nadu	
Hospital Management System (HMS)	Web based portal for monitoring the delivery of health care services in the hospitals across the state
State Health Data Resource Centre (SHDRC)	Central repository of healthcare data in the state
Cash Assistance to Pregnant and delivered mothers	e-health programme for online implementation of Dr. Muthulakshmi Reddy Maternity Benefit Scheme (MRMBS) in the state
Pregnancy and Infant Cohort Monitoring and Evaluation (PICME)	This system helps monitoring of pregnant women from the time of their registration until the child is 1 year of age
Chhattisgarh	
HRMIS	Human Resource Management Information System maintains information related to health department’s employee
Mitaan	Tablet based application given to ANMs for monitoring their work plan, activities and service delivery related to RCH
Jagaar	Tablet based application with IEC content available for training of ANMs and ASHAs
Kayakalp	To promote cleanliness and improve hygiene status and quality of healthcare facilities
Nearest Health Facility	e-health initiative to locate and navigate to nearest health facility
e-Drug Indenting System	Online system for upholding requirements related to drugs by healthcare facilities, monitors monthly drug stock, and equipment maintenance
DPDMIS	Drug Procurement and Distribution Management Information System for monitoring and control of procurement & distribution of drugs, medicines, vaccines
CGMSC-Drug Info	Mobile app that gives information on drug stock, expiry, etc.

Warehouse Information System (WIS)	Information system to monitor the receipts, returns, transfer, expiry, and ensure quality of batches etc.
Health Infrastructure Management Information System (HIMIS)	Web based application giving information on ongoing work related to health infrastructure eg. sanctioned amount, administrative approval, physical work progress of building etc.
Sachet	Web and android based system for reporting of infectious diseases
Uttar Pradesh	
Drugs & Vaccine Distribution Management system (DVDMS)	Drug Procurement & Inventory Control System (DPICS) which is currently running across Uttar Pradesh district hospitals will migrate to DVDMS for end to end supply chain management
Uttar Pradesh HMIS	Web based portal for monitoring the delivery of health care services in the government hospitals across the state (District hospitals, Sub-district hospitals, medical college hospitals)
Human Resource Management System – HRMS	Human Resource Management System maintains information related to health department’s employee
ASHA Mobile Application	Mobile application that help ASHAs do case management, counsel and referrals
Sangini Supportive Supervision	This application helps ASHA sangini in supporting and improving their interaction with ASHA workers
M-Sehat	Mobile application that helps record maternal and infant data in real time and thus facilitate client based tracking, reinforcing learning, and strengthening counselling efforts during home visits by ASHA workers
Hospital Information System - Gorakhpur	Web based portal for monitoring the delivery of health care services in the hospitals
Mobile Kunji – academy	Audio-visual aid to deliver key health messages to the masses for better understanding and to improve communication between the government and public
RMNCH Dashboard	This contains data from various Indicators related to RMNCH Programme for decision making purposes
Pyaribitiya – PC & PNDT Website	Website managed by the Department of Medical, Health and Family Welfare, Uttar Pradesh in support of Pre-Conception and Pre-Natal Diagnostic Techniques (Sex Selection Prohibited) Act
RBSK - Resource Planning System for Ghaziabad District	This system maintains Rashtriya Bal Swasthya Karyakram (RBSK) health checkup records
Hosla Sajheedari	An initiative to engage private healthcare providers in government family planning services

Source: (Ministry of Health and Family Welfare, Government of India 2016a; Sidhu Jasvinder 2018)

Challenges to e-Governance

Implementation of e-Governance is quite challenging in India because of the various social, political, operational and technological issues. Some of the key challenges are outlined below:

- Huge population of India with majority residing in rural areas

- Use of local language: India is a multi-lingual nation with 22 official languages
- Lack of Infrastructure facilities like electricity, internet etc. especially in the rural areas
- High cost of e-Governance initiatives
- Digital Divide: between urban-rural, rich-poor, male-female, users and non-users of e-govt. services
- Multi-party and Multi-tiered Government
- Issues related to privacy and security of data
- Issues related to awareness of e-Governance
- Issues related to accessibility and affordability of e-Governance

“e-Governance has to be citizen-friendly. Delivery of services to citizens is considered a primary function of the government. In a democratic nation of over one billion people like India, e-Governance should enable seamless access to information and seamless flow of information across the state and central government in the federal set up. No country has so far implemented an e-Governance system for one billion people. It is a big challenge before us”

Dr APJ Abdul Kalam, Former President of India

Conclusion and recommendations

The government of India has taken remarkable steps towards implementation of e-Governance in India. However, the deployment of e-Governance on scale and especially at the grass root level needs careful strategic approach. It is recommended: 1) to identify and analyse grass root realities before implementation of e-Governance initiatives in rural areas; 2) to develop citizen-centric approach in implementation of e-Governance; 3) to build effective mechanisms to train and build capacities of the involved stakeholders; 4) build strategic alliances across organizations to tackle the challenges related to digital divide; 5) to follow centralized initiative and decentralized implementation approach; 6) use cloud computing for e-Governance applications; 7) to conduct sensitization workshops to promote e-Governance initiatives; 8) to implement e-Governance initiatives through regional languages; 9) to promote partnerships between public sector, private sector, donors and civil society; and 10) to make public aware of the benefits of the e-Governance initiatives.

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Annexures

Annexure 1: Mission Mode Projects under National e-Governance Plan

Mission Mode Projects (MMPs) under National e-Governance Plan		
Central MMPs	State MMPs	Integrated MMPs
Banking	Agriculture	CSC
Central Excise & Customs	Commercial Taxes	e-Biz
Income Tax (IT)	e-District	e-Courts
Insurance	Employment Exchange	e-Procurement
MCA21	Land Records(NLRMP)	EDI For eTrade
Passport	Municipalities	National e-governance Service
Immigration, Visa and	e-Panchayats	Delivery Gateway
Foreigners Registration&	Police(CCTNS)	India Portal
Tracking	Road Transport	
Pension	Treasuries Computerization	
e-Office	PDS	
Posts	Education	
UID	Health	

Source: Ministry of Electronics & Information Technology, Government of India. 2018. "National E-Governance Plan." 2018. <https://meity.gov.in/divisions/national-e-governance-plan>.

Annexure 2: Nine Pillars of Digital India

Nine Pillars of Digital India	
1	Broadband Highways
2	Universal Access to Mobile Connectivity
3	Public Internet Access Programme
4	e-Governance- Reforming Governance through technology
5	e-Kranti- electronic delivery of services
6	Information for all
7	Electronics manufacturing
8	IT for jobs
9	Early Harvest Programmes

Source: Ministry of Electronics & Information Technology, Government of India. 2020a. "About Digital India." 2020. <https://www.digitalindia.gov.in/>.

Annexure 3: Policies for e-Governance in India

Policies for e-Governance in India	
Legal Framework	<ul style="list-style-type: none"> • IT Act, 2000
Program Level Framework	<ul style="list-style-type: none"> • National e-Governance Plan (2006) • Policy on Open Standards (2010) • National Policy on IT (2012) • Digital India (2014) • e-Kranti Framework (2015) • Policy on adoption of Open Source Software for GoI (2015) • Framework for Adoption of Open Source Software in e-Governance Systems (2015) • Policy on Open Application Interface (API) for GoI (2015) • Policy on use of IT Resources of GoI
Domain Level Policies	<ul style="list-style-type: none"> • Standards for e-Governance • Framework for Mobile Governance (2012) • Framework for Social Media (2012) • Citizen Engagement Framework (2012) • e-Pramaan: Framework for e-Authentication (2012) • Open Data (2012) • GI Cloud (2013) • e-Kranti Principles • Policy on Collaborative Application Development by opening the source code of Govt. Applications • Application Development & Re-Engineering Guidelines for cloud Ready Applications

Source:

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