

REVIEW PAPER

Economic and Financial Concern of Digital Healthcare Systems for better Governance- An Indian Context

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ABSTRACT

Digital Healthcare Systems bear great promise for better governance in healthcare sector in India. The age of Digitization brought many benefits to many sectors of administrative functions and healthcare remains one of the biggest beneficiaries. Simultaneously there are many issues of economic and financial nature that have emerged during successful implementation of digitization in healthcare. Issues that remain to be resolved are discussed in this research work and the promise that digitization brings for a credible governance of healthcare has also been explained in this work. After getting independence from an exploitative colonial rule India has come a long way to establish her presence in the global arena in terms of agriculture, industry, services and technology sectors. In this research work this long journey of development as a young nation has been refereed. Similarly the challenges that have been successfully faced have also been mentioned. The fact remains that economic and financial aspects being the prime areas of concerns in any developmental work need to need to be addressed properly. Here in this concept paper a detailed analysis has been presented to discover the paradigm of healthcare systems in India and systematic efforts by both public and private sector to resolve the issues in this particular paradigm. Nations change and so does their approach to development. But technology as a key driver in this development process brings many similarities across the world, hence in this paper, this immense applicability of cutting edge technologies that digital world offers to all has been duly acknowledged. India's adoption and proper utilization of digital healthcare to resolve many issues of economic and financial concerns can throw light and inspire many other developing nations in the Indian subcontinent, has been justifiably presented in this research work, citing the limitations of the approach as well.

HIGHLIGHTS

- ① Developing proper medical care facilities needed massive investment of resources by center and state governments and due to lack of resources at initial years India couldn't build medical care facilities for all its citizens.
- ② India built many medical institutions of excellent quality, produced trained manpower in medical field and adopted many healthcare schemes for the benefit of its citizens.
- ③ Economic concerns being a major input in decisions making process of digital healthcare systems, this should be given well thought out inputs.
- ④ Digital healthcare system in India is at the moment quite promising and at the same time challenging given some challenges it is facing while executing the digital health roadmap

Keywords: Healthcare Systems, Digital Healthcare, Healthcare Governance, Health Economics, Health Finance, Healthcare Market, e-Health Governance

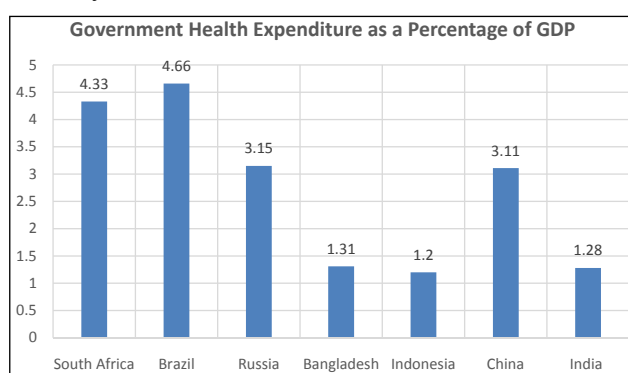
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Digital healthcare technology offers great scope for improving India's healthcare sector. India has come a long way from a newly born nation freed from colonial exploitation in 1947 to a highly progressive nation in science and technology today after a long journey of seven and half decades. The journey was never smooth and it was the nation's planners' dilemma as to how to steer the country towards growth and progress for all the people of India, across linguistic, religious and caste barriers. Governance in healthcare systems like any other development initiatives was always challenging given the low economic status of India's large number of people since the beginning. Developing proper medical care facilities needed massive investment of resources by center and state governments and due to lack of resources at initial years India couldn't build medical care facilities for all its citizens. But the journey continued, planners kept on making feasible plans for development of healthcare infrastructure over the years, and notable differences can now be seen in physical infrastructure in healthcare today. India's healthcare market is growing rapidly and it is expected to reach more than 600 billion US dollars by 2025 (Shanholtzer, M.B. & Ozanich, G., 2015).

Healthcare expenditure is still to increase in India as we can see from the following Fig.. We need to work hard to increase health expenditure by government keeping in mind the sustainability and financial viability (Umezurike, I.S., 2021).



Source: WHO Health Accounts Global Database.

Fig. 1: Government Healthcare Expenditure (Global Data)

India built many medical institutions of excellent quality, produced trained manpower in medical field and adopted many healthcare schemes for the benefit of its citizens. India's medical institutions

and hospitals now attract global customers and made India one of the top global destinations for medical tourism sector. Building many healthcare institutions of global standards was a pressing issue for the governance planners and executives, but continued efforts by successive governments made it possible. With the advent of digital healthcare technologies like e-health, m-health, IT-enabled health information technology, cloud based healthcare solutions, gadgets and wearable devices that make IoT based healthcare systems, machine learning and edge computing, artificial intelligence and other new advancements in digital and healthcare sciences brought some excitingly new opportunities before Indian governance experts today (Kimura, M., Nakaya, J., Watanabe, H., Shimizu, T. & Nakayasu, K. 2014). Now India can improve her healthcare systems much faster, at an excitingly lost cost and with unbelievably good quality. India has no dearth of talents in science and technology today hence it is now possible for India to appear before the world as a progressive nation that adopts best technologies of healthcare to solve the healthcare needs of its massive population effectively and efficiently. Simultaneously India has also before her the scope of becoming a manufacturing hub of medical devices and software that will help her realize her "Make in India" dream fulfilled and bring to the world the benefits of science and technology at an affordable cost and available whenever and wherever required. At this juncture the economic and financial governance concerns in digital healthcare systems are top priority among planners and governance professionals (Umezurike, I. S. ,2021).

REVIEW OF LITERATURE

To make the study on Digital Healthcare Systems in India for Better Governance, it is required to study previous work similar with the topic. Some of them are as follows-

Bandyopadhyay *et al.* (2022) tried to describe the E-Waste Management in Digital Healthcare System in India. It tried to find the problems of e-waste in India and the causes of e- wastes generation. It suggested the ways to minimize e-waste generation. It recommended the adoption of technology in alleviating the e-waste problem. It has shown a Basic conceptual Model on the

E-Waste Management in Digital Healthcare System. It showed different Emerging Technologies used in E-Waste Management in Digital Healthcare System. *Joshi et al.* (2022) made a study on Developing Countries. It attempted to model the conceptual framework for implementing the constraints of AI in public healthcare to improve operational excellence. It tried to find the key barriers and concerns on AI implementation in public healthcare. It tried to find the crucial Artificial Intelligence (AI) implementation barriers in public healthcare from the viewpoint of the society, the economy and the infrastructure. In order to construct a multi-level analysis of AI implementation, the study used the MCDM technique. *Lewis* (2006) studied in Public Health Care Systems focus on Governance and Corruption. It analysed and characterized the Health Care Markets and Public Health Care Systems in respect of governance. It provided a framework on Producing Public Health Care. It tried to find the relationship between corruption indices and health outcomes. It also discussed Government effectiveness, corruption and accountability in Health Care Delivery. It worked on flow of funds, the mismanagement in Health Care Service Delivery and Policy Options for Promoting Better Governance. *Lewis et al.* (2009) analysed the performance on governance in Health Care Delivery. It suggested that good governance is central to performance enhancement providing health care. It was important for standards, information, incentives and high performance responsibilities. It tried to define and gave a framework in good governance in health sector. It discussed the good governance in health service delivery in terms of budget and resource management, individual provider performance, health facility performance, informal payments, and corruption perceptions.

Moro Visconti and Morea (2020) worked on Digitalization of Healthcare sector and Pay-For-Performance Incentives in Smart Hospital Project Financing. It emphasizes public-private partnerships in infrastructure, with public and private players collaborating, typically following the PF pattern. It has innovatively approached the improvement on relationship of stakeholder. It suggested re-engineering around digital platforms that enhance patient-centred satisfaction and sustainability. *Paul and Ganguly* (2013) try to give the brief of Medical

and Health 2.0. It focused on the importance and possibilities in interdisciplinary domain of Information Science. It gave the overview on possibilities, Challenges and Issues of Medical and Health 2.0. It tried to give the overview of web 2.0 and its uses and helped to learn about Web 2.0 technologies, tools and techniques for building Web 2.0 sites. It provided the contemporary strategy required for web 2.0. It analysed the characteristics and features of Health and Medical 2.0. It tried to find out the issues and challenges in the field of Medical 2.0 in Indian Scenario and described the role and utilization of Medical 2.0 in contemporary context. It also tried to give the brief on various contemporary tools and techniques behind Medical 2.0. *Paul et al.* (2023) made a conceptual study on application and emergence of Edge Computing in Healthcare. It discussed the basics of Edge Computing with aspects of foundation and development root. It also discussed the features of Edge Computing with advantages offered by healthcare system. It briefly stated the basic applications of Edge Computing in different areas and applications of Edge Computing in Healthcare and medical sector. It also found the applications and emerging Edge Computing in healthcare and allied areas. It tried to find out the issues and challenges of Edge Computing in Healthcare and medical sector.

Siddiqi et al. (2009) tried to describe the framework for assessing governance of the health system in developing countries to illustrate good governance. It is presented a framework for evaluating health systems governance (HSG) at national and sub-national levels applied in Eastern Mediterranean countries. Ten principles have proposed in HSG assessment framework. The framework relies on a qualitative approach and did not follow any scoring or ranking system. At the heart of this framework it concerned about the improvement of the performance of the Ministry of Health and State Health Departments. The main objective of the framework was to help raise the level of awareness among policy makers about the importance of HSG.

Objective of the Work

Objectives of this work is to study in detail the promise and progress of digitization that led to opening up of opportunities the Indian healthcare sector particularly the digital healthcare systems

that can reap the benefits of digitization and serve the mass of Indian people with good quality, affordable and accessible digital healthcare services and uplift the status of wellbeing of its citizens. This objective has been tried to be achieved by analysis of Indian healthcare sector and its strengths as well as loopholes in the healthcare system followed by the analysis of opportunities the digital healthcare system opens before Indian health governance planners taking help from experiences of other developed countries of the world and suggest a governance plan that Indian policy makers in health sector can adopt. Effort is also given in this work to find out the role played by medical professionals while adopting the benefits of digitization in health. Our objective has also been to find out the proactive role to be played by the end users of digital healthcare technology, particularly the patients whose awareness about digital health is of paramount importance. We have also given our best effort to identify the role of government in this area and the people related to healthcare governance whose practical approach to economic and financial concerns in digital healthcare systems can make this system fruitful to country's people and easy to adopt and apply by the decision makers in this field.

Research Methodology

Research methodology adopted in this work includes the detailed study of the secondary data source collected from different government websites and digital platforms and then analyzing these qualitative and quantitative data to understand the issues related to digital healthcare system. Once analysis has been done we have tried to qualitatively correlate these data in the form of success and failure in the tenure of different healthcare administration and planning periods and finally come to a conclusion as to how the digital healthcare systems can be better managed with the state of the art digitization process. The study is empirical based and more of qualitative in nature although quantitative data has been collected from different sources to understand the digitization process in healthcare system so that a meaningful list of suggestions and recommendations can be given at the end of this research work. Statistical data has been presented after rearrangement as per the needs of this research work and data source

has also been mentioned with the final objective to come to a prescriptive decision making alternative for the benefit of patients, healthcare professionals and government bodies at the helm of the affairs primarily focusing on economic and financial issue related to digital healthcare systems.

Governance

Governance refers to the processes and structures through which decisions are made and authority is exercised in an organization, institution, or society. It involves the establishment of rules, policies and procedures that guide the actions and behaviors of individuals and groups in achieving collective goals and objectives. Governance can apply to various contexts, including government institutions, corporations, non-profit organizations and even online communities. Effective governance is essential for ensuring transparency, accountability and the proper functioning of any entity. It helps in managing conflicts, allocating resources, and making decisions that impact stakeholders and the overall well-being of the organization or society (Keping, Y., 2018 & Siddiqi, S., Masud, T.I., Nishtar, S., Peters, D.H., Sabri, B., Bile, K.M. & Jama, M.A. 2009).

Governance structures can vary significantly depending on the context. For instance, in a democratic government, governance involves elected representatives making decisions on behalf of the citizens. In a corporation, the board of directors oversees the company's management.

Good Governance

Good governance refers to a set of principles and practices that guide the effective, transparent, accountable and responsible management of an organization, institution or government. It involves the establishment of systems, processes and structures that promote ethical behavior, ensure the rule of law and prioritize the interests of all stakeholders (Keping, Y., 2018 & Siddiqi, S., Masud, T.I., Nishtar, S., Peters, D.H., Sabri, B., Bile, K.M. & Jama, M.A., 2009).

The concept of good governance is applicable to various sectors, including public governance(government institutions), corporate governance, non-profit organizations and

even informal groups or communities. When organizations and governments adhere to principles of good governance, they are more likely to achieve their objectives, gain public trust and contribute to the well-being of society (Keping, Y., 2018 & Siddiqi, S., Masud, T.I., Nishtar, S., Peters, D.H., Sabri, B., Bile, K.M. & Jama, M.A. 2009).

e-Governance in support of Good Governance

e-Governance or electronic governance, refers to the use of information and communication technologies (ICT) to enhance the efficiency, effectiveness, transparency, and accountability of government processes and services. It plays a crucial role in supporting good governance, which is a system of governance that is characterized by responsiveness, inclusiveness, participation, rule of law, and accountability (Kalsi, N.S., Kiran, R. & Vaidya, S.C. 2009). Here are some ways in which e-Governance supports good governance:

Transparency and Accountability: E-Governance tools facilitate the open and transparent exchange of information between the government and its citizens. Online portals, dashboards, and data repositories enable citizens to access information about government policies, budgets, projects, and performance.

Citizen Participation: E-Governance platforms provide opportunities for citizens to actively engage in the policymaking process.

Reduced Corruption: E-Governance can help reduce opportunities for corruption by automating processes and eliminating the need for face-to-face interactions between citizens and officials.

Better Communication: E-Governance tools enable governments to communicate more effectively with citizens, businesses, and other stakeholders.

Security and Privacy: To maintain public trust, e-Governance initiatives must prioritize data security and privacy.

Digital Inclusion: While e-Governance offers numerous benefits, ensuring digital inclusion is essential to prevent marginalized populations from being excluded from government services and information (Kalsi, N.S., Kiran, R. & Vaidya, S.C. 2009).

e-Governance plays a pivotal role in promoting good governance by enhancing transparency,

citizen participation, efficiency and accountability in government operations.

Financial issues in Healthcare e-Governance

Implementing e-Governance in healthcare can offer numerous benefits, but it also comes with several financial challenges that need to be addressed. Some of the key financial issues in healthcare e-Governance include:

Initial Investment: Developing and implementing robust e-Governance systems in healthcare requires a significant initial investment.

Maintenance and Upgrades: E-Governance systems need to be regularly maintained and updated to ensure their optimal functioning and security.

Data Security: Healthcare data is sensitive and confidential, making data security a top priority. Robust cybersecurity measures and adherence to data protection regulations are essential, and investing in these measures can be expensive.

Digital Divide: Healthcare e-Governance initiatives should ensure that all segments of the population can access and benefit from digital healthcare services.

Training and Capacity Building: Healthcare professionals and staff need adequate training to effectively use e-Governance tools.

Vendor and Licensing Costs: Healthcare organizations often rely on third-party vendors and software providers for e-Governance solutions. The costs associated with licensing, maintenance, and support services can add to the financial burden.

Interoperability: In many healthcare systems, various electronic systems and platforms are used by different departments and healthcare providers. Ensuring interoperability among these systems can be complex and costly, as it requires integration and data exchange capabilities.

Addressing these financial issues requires careful planning and a strategic approach to healthcare e-Governance implementation. Governments and healthcare organizations should conduct thorough cost-benefit analyses and consider long-term benefits when investing in e-Governance solutions. Collaborating with private sector partners, leveraging existing infrastructure, and seeking funding from grants and development agencies can

also help alleviate some of the financial challenges. Additionally, a phased approach to implementation, focusing on priority areas, can make the process more manageable and cost-effective.

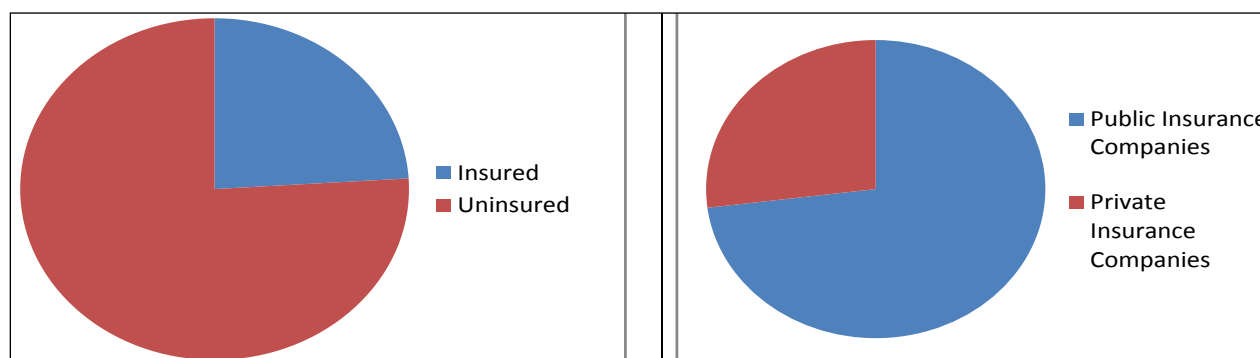
Findings

Our in depth analysis of the progress of digitization in India and the application of digital healthcare systems related to economic and financial concern has observed the following findings based on which our suggestions for governance paradigm in healthcare will be put forward for adoption in decision making process.

Healthcare Systems in India

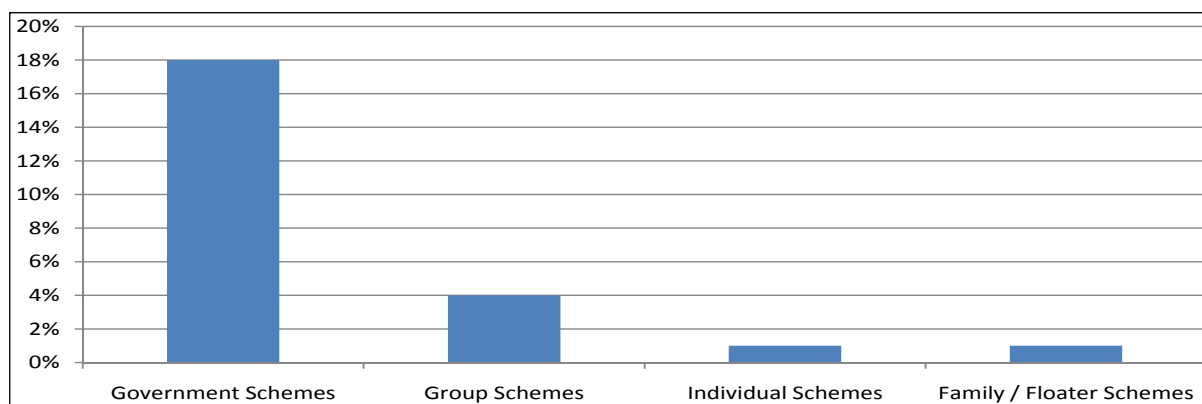
India's healthcare system is varied and age old. While it practices the modern western system of medicine, like allopathic system, it equally allows practice of traditional systems like Homeopathy, Siddha, Unani and Ayurveda. Even present day introduction of Chinese system of medicine and India's very own tribal medicine systems are also

practiced among India's different segments of population (Paul, P.K. 2022). This vast system of integrated medical practices makes India one of the most diversified medical services providers among the medical tourists coming to India from different parts of Indian subcontinent and even western countries. Peter Drucker, the famous American management expert once remarked that the "hospital in New Delhi" is one of the best in the world. He actually mentioned about AIIMS New Delhi. Now government of India has launched a host of branches of AIIMS in different parts of India to leverage the brand AIIMS to offer quality medical services to its population situated at far flung areas of the country. One of the key areas of medical services is the availability of health insurance facility and here India scores better than many developing nations of the world. About 24% of India's population is insured and the composition of health insurance companies leans heavily towards public sector that makes about 73% of the India's population insured (Fig. 2).



Health Insurance Coverage in India; Insured = 24%, Uninsured = 76%

Composition of Health Insurance Companies; Public: 73%, Private: 27%



Composition of Types of Schemes among Insured People [Total = 24%] [Govt. = 18%, Group = 4%, Individual = 1%, Family/ Floater = 1%]

Fig. 2: India's Great Healthcare Challenge—and Opportunity

Here lies the great opportunity before the private sector to enter to the India's promising health insurance sector. Insurance is a subject of important control and supervision hence the central government insisted on restricted entry to private players in insurance sector (Campbell, E.M., Sittig, D.F., Ash, J.S., Guappone, K.P. & Dykstra, R.H. 2007).

But governance in India's healthcare systems regarding penetration of insurance companies in the country needs to refocus itself for a more wide coverage of insurance. The need of the hour is allowing more and more players both global and local, to allow to operate on Indian health insurance sector. The devastating pandemic of Covid-19 compelled us to think that insurance should be more market oriented and wider coverage is needed most (Bates, D.W., 2005). The governance concerns on this should be well thought out keeping in mind the economic and financial matters. There is an urgent need to develop a mass insurance model in line with western policies like Obama care in USA. Private insurance payers should be encouraged to issue policies based on patients' diverse needs and at the same time they should be incentivized for steady returns in the long run (Paul, P.K., Chatterjee, D. & Ghosh, M. 2012). The public private partnership for risk mitigation can be an approach and the best results will follow and better the availability of insurance facilities for each and every Indian which in turn will make a strong digital healthcare ecosystem for the benefit of both the masses and the corporates offering this important healthcare service. Government sector is still predominant but there is an urgent need for well governed private sector in health insurance so that more and people are covered under health insurance and patients in India gettimely medical care without worrying about out-of-pocket expenses and related challenges (Litton, J.S. 2012).

Global Perspective in Healthcare Infrastructure

Globally there is inadequate levels of application of digital healthcare technologies like Artificial Intelligence (AI), m-Health, Wearable devices, Cloud based healthcare, Robotics and 3D (Three dimensional) Printing, although these have immense promises to improve our healthcare system (refer the figure below) (Umezurike, I.S. 2021).

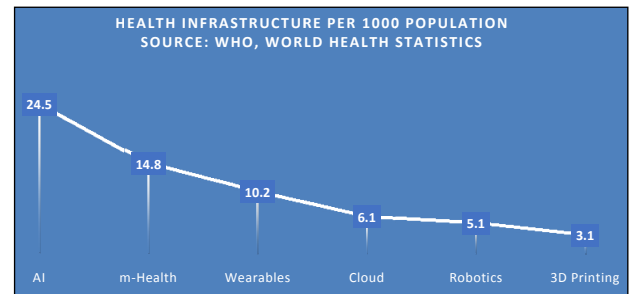


Fig. 3: Health Technology Infrastructure (WHO Statistics)

In India it is no exception that we lag behind in adopting these cutting edge technologies as well. The growth of digital technologies and their use in digital healthcare systems has been increasing over time but governance issues related to financing and economizing the manufacturing process and building of startups is a major area of concern in India Government must take proactive steps in universalizing these technologies for betterment of digital healthcare delivery system.

Dependency on wearable gadgets is very significant globally as we can see from the following Fig.. This is a great mover of good health for all (Bates, D. 2005).



Fig. 4: Wearable Gadget Dependency of Global Digital Healthcare

From financial and economic perspective this sector is also promising for more revenue by government and for creating jobs, which should be considered thoughtfully by governance planners while making decisions (Chaudhry, B., Wang, J. & Wu, S. 2006).

Progress of Digital Health in India

Digital health is an extension of digital revolution that shaped the modern world. Telemedicine is one of the key components in digital healthcare delivery systems (Paul, P.K. & Ganguly, J. 2013). Telemedicine refers to use of telephone and internet to connect with the patients by the doctors and other medical professionals so that distance can't be a barrier to healthcare delivery. This particularly

helps in treatment of perennially ill patients who suffer from diseases like ambulatory disabilities, Parkinson's disease, Alzheimer's, and Psychiatric illnesses where patients become immobile and accessibility of brick and mortar hospitals is nearly impossible for them (Kim, K.K., Sankar, P., Wilson, M.D. & Haynes, S.C. 2017). The Fig. below describes growth of Telemedicine over the years (Paul, P.K. 2021).

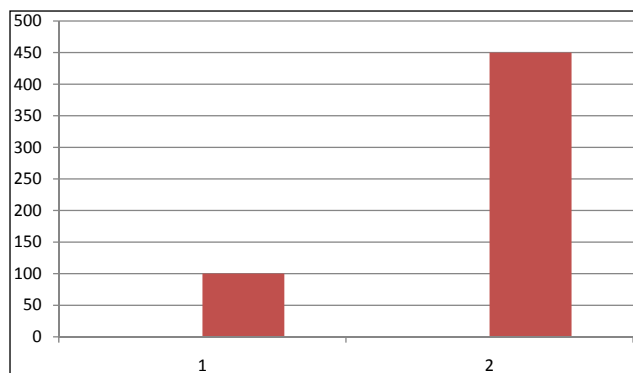


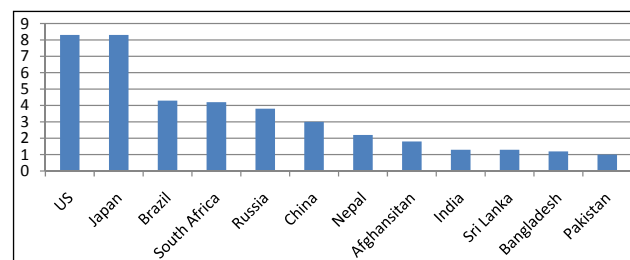
Fig. 5: India Telemedicine Market (Million US Dollars):1 = 2012, 2 = 2016

There is a huge growth and hence there is immense possibility of growth in this sector. Government's earning from these initiatives can be multiplied by developing more and more telemedicine start-ups by giving them tax holidays for initial years so that after a certain period of time a host of them are built and can contribute a substantial amount of tax revenue that can be used by governance executive to better the digital healthcare systems in India. Patients being the largest beneficiaries in Telemedicine and pharmaceuticals companies and druggists and online medicine retailers earning huge profits should be taxed appropriately to compensate the start-ups tax collection in the short run so that telemedicine can become a huge revenue earner to help governance of digital healthcare systems run smoothly by managing financial and economic concerns effectively.

Governance Issues in Healthcare

Government spending in healthcare has been minimal in India for long years. If we look at the data Fig. below we can observe dismal status of public healthcare spending in India vis-à-vis other developed countries. Even some Asian countries that are not so progressive economically, say Afghanistan and Nepal, are contributing more

public spending in Healthcare. Developed nations like US, Japan, Russia and China are far more advanced in this parameter. India needs to rethink on this dismal spending on healthcare (Chaudhry, B., Wang, J. & Wu, S. 2006).



Public Health Foundation of India, Budget Documents, RBI; WHO India's Ailing Health Sector

Fig. 6: Public Health Spending as Percentage of GDP Compared to Select Countries

This reason behind this dismal status of public health spending in India is poor revenue collection from healthcare industries and thereby poor allocation on healthcare by government in this sector. Public Private Partnership in healthcare industry is an option that can work, and more and more patients and healthcare facility providers need to be brought under tax ambit, but they should not be jeopardized financially (Ross, K. & Cohen, A. 2005). A rational and broad based revenue generation methods should be developed where incentivizing the tax payers for their loyalty in tax payment can also be thought over. In the end Telemedicine is a promising and revenue generating sector that should be harnessed appropriately for better governance of digital healthcare systems, both economically and financially.

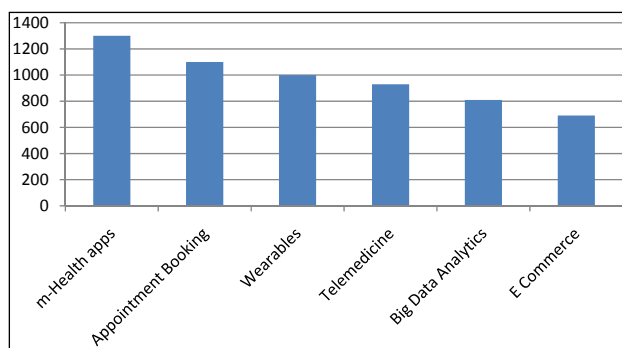
Digital Health for Better Governance

The best part of digital healthcare systems in India is that India's healthcare market is growing rapidly over the years. This is a major revenue booster for government of India. Efforts should be continued to maintain this growth so that public healthcare spending becomes no longer a pressing issue, rather mopping up taxes from this sector effectively can better the healthcare delivery in India and even this sector can turn out to be major revenue earner to financially support other government projects like education, sanitation and environment that are directly related to maintenance of good health.

Hence it is needed by the government and governance professionals involved in government to consider these data effectively so that revenue generation initiatives can be taken to collect resources and make the decision making process faster and effective in relation to economic and financial concerns of digital healthcare systems delivery and implementation.

Resolution of Economic Concerns

Economic concerns being a major input in decisions making process of digital healthcare systems, this should be given well thought out inputs (Paul, P.K., Chatterjee, R., Tiwary, K.S., Aithal, P.S. & Saavedra, R. 2023). If we look at the following Fig. that deals with health segment funding in India we find 7 key market segments have been spotted, namely, m-Health apps, appointment booking, wearable devices, telemedicine, big data analytics and e-Commerce. Funding behind m-Health apps being the largest while e-Commerce being the smallest, others like wearable devices manufacturing and big data analytics are equally important. The major policy decisions by healthcare planners in health governance sector should be to rope in more and more m-Health start-ups and integrate them with wearable manufacturing facilities with the use of cutting edge digital health providers (Paul, P.K. 2021).



Health Segment Funding 2010-2015 (million US Dollars).

Fig. 7: 7 key market segments of digital health in India-2017

More and more start-ups will contribute in revenue generation and allow more and more patients to use wearable devices and this will penetrate the Artificial Intelligence and Big data more effectively (Furukawa M.F., Raghu T.S., Spaulding T.J., Vinze A. 2008). Better governance of e-Health largely depends on incentivizing service providers as

well as minimizing out-of-pocket expenditures by patients who remain the end users as well as sufferers in financial terms. Hence integrating all these fields with proper planning and decision making is a must-do activity by development executives, healthcare policy administrators as well economic and finance governance departments.

Resolution of Financial Concerns

Financial concerns are a major concern in decision making process of healthcare governance in India. Financing the government always remains a priority by governments. But collecting finance for government projects is a major problem for many countries in India. The question of “who pays for whom” is a basic issue in financial planning. The financial department of government of India prepares Union budget in which allocations in healthcare sector remains a top apriority. But government spending is always tax-collection dependent, which should be very rational and wide based covering most of its population. Use of FDI (Foreign Direct Investment) is also considered sometimes but depending on foreign funds may be risky as we have seen in many debt-trapped countries recently like Sri Lanka and Pakistan and some African nations (Shanholtzer, M.B. & Ozanich, G., 2015).

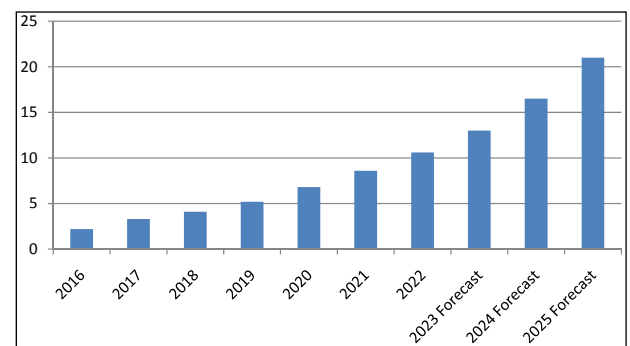


Fig. 8: India's Health Tech Market Statistics Over a Decade (in Billion US Dollars)

Hence, mopping up own tax by a country's financial department should be a better and viable option. But taxes collected by various means are also needed to spent in various sectors of development as well, health being only one among them. Hence it's better if this sector can collect its own tax and investment in crucial projects for development of better healthcare facilities for all. Hence financial

aspects of digital healthcare systems need to be a well thought out process where revenue generation matches healthcare expenditure and if possible some extra revenue can be mopped up so that new development projects in digital healthcare systems can be started. The Fig. 8 sums up this aspect of healthcare market where healthcare technology industry being a major revenue generator is growing in good pace over the years (Umezurike, I.S. 2021).

It's a highly promising sector and government needs to support this sector by giving incentives and introducing more private sector investment and also developing PPP model in crucial segments in health tech manufacturing, in the end it remains a major driver in India's journey to be a good healthcare services destination in the world, inspiring more medical tourists to come to India and develop other sectors like tourism and hospitality, that are major revenue earners for many European countries (Furukawa M.F., Raghu T.S., Spaulding T.J., Vinze A. 2008). The issue of centre vs. state in healthcare is a matter of grave concern. The Fig. below describes the difference among states in healthcare initiatives. As financial concerns related to government spending on health are a matter of great concern, it is also imperative that states pursue their own mode as far as possible to generate revenue so that healthcare projects are carried out effectively (Paul, P.K. 2022).

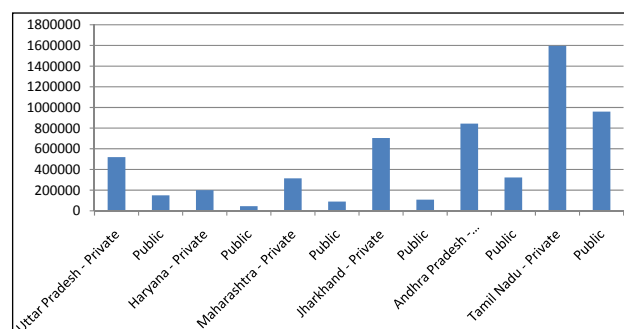


Fig. 9: States having more number of admissions in Private Hospitals than in Public Hospitals Most of Ayushman Bharat spend goes to private healthcare. 2021

The Ayushman Bharat scheme has been aptly managed by some states although through more private hospitals' presence there (Paul, P.K. 2022). Probably an optimistic view about private participation in health is needed and mindless political debate should be avoided among state-

centre conflicts because healthcare is utmost priority and states must take proactive states to perform better and healthcare governance becomes easier if economic and financial issues are partially managed by proactive state governments.

The Road Ahead for Digital Health

The road to digital health is extremely promising for all. What India could not achieve in healthcare for many years due to lack of physical infrastructure, like hospitals, trained medical professionals and lack of domestic pharmaceutical manufactures, digital wave in healthcare proved that possible and "health for all" is not a distant dream now. The growth of computer science, information technology and cutting edge healthcare information system around the world made India also a beneficiary. In addition to that, India's consistent investment in higher education over the years made India develop a pool of trained software professionals who are assets not only to India but also the entire world. Being the "Software Capital of the world" India is poised to reap huge benefits now to improve its healthcare sector by adopting digital healthcare systems rapidly. But there are certain negative sides of this growth story a well, like the poor response of illnesses by economically poor section of its population, as we can see from this Fig. 10 (Paul, P. K. 2021).

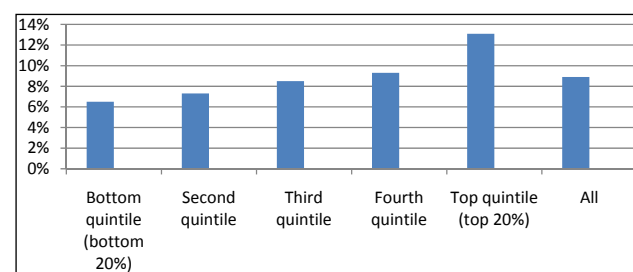


Fig. 10: Poor respondents tend to report illnesses less than rich (% ailing persons in Rural India)

As digitization of healthcare is mostly data-dependent, an accurate collection and compilation of data is the need of the hour for proper analysis and treatment of patients. Moreover healthcare finance largely depends on allocation of funds but we must know which segment needs it most. Hence generation and reporting of data is of paramount importance to development planners. It should be advertised over social media and other platforms

to motivate patients to report and upload accurate patient data. Hospitals need to be truthful in reporting data to government (Brailer, D. 2004). At the same time government also needs to be truthful to report and upload accurate data needed for proper planning and decision making process.

Suggestions and Recommendations

Digital healthcare system in India is at the moment quite promising and at the same time challenging given some challenges it is facing while executing the digital health roadmap. Following suggestions and recommendations can be made out of this investigative research work.

Immediate actions needed: It's immediately needed to bridge the gap the healthcare expenses and incomes since any strong economic basis demands strong sense of commercial viability to ensure smooth flow of all developmental projects in digital healthcare systems.

Proposed medium term actions: Expansion of health insurance opportunities for citizens should be given priority because quality healthcare delivery demands strong support by health insurance options to run the healthcare smoothly in the long run, hence every effort should be given by government and private sectors to allow expansion of health insurance schemes, often by incentivizing the insurance companies for long term business success.

Long term visionary steps: Capacity building in physical and intellectual infrastructure should be a vision for the governance planners and there should not be any barrier for the plans to get executed in the event of change in political leaderships. This demands strong business model in healthcare to be set up and that should be remunerative for the successive stakeholders.

Commitment by government: Commitments made during election campaign need to be maintained and executed by government and this will establish strong confidence in the governance process, challenges may come but that need to be addressed by giving priority to fulfill commitments made.

Governance on private sector investment: Private sector companies should be encouraged to invest in India's digital healthcare initiatives so that valuable resources can be gainfully used and at the same

time there should be surveillance in the governance process that patients receive benefits and their out of pocket expenditures on health are minimized.

Public sector investment on health infrastructure: Public sector is the major builder of health infrastructure since independence and it should continue to remain so, for this prioritization of allocation in healthcare budgets should be done properly and this brings better outcomes in the financial governance of digital healthcare systems.

Supply of trained medical professionals: Meeting requirements for trained medical professionals should be major governance effort and setting up quality medical education institutions often through public private partnerships should be done and monitoring should be also be strict to ensure smooth supply of good quality healthcare professionals on a regular basis for this increasing population that includes elderly patients needing care more often.

Pricing of medical devices and supplies: Pricing control is a major objective in the financial governance process since it controls revenue for the government as well as affordability to patients. Hence there should be cautious approach to maintain a balance in healthcare governance that both objectives are fulfilled.

Incentivizing investment by start-ups: Start-ups play a major role in developing good quality yet affordable medical devices, wearable gadgets and healthcare software, hence there should be incentives for the start-ups to execute their production process smoothly and there is immense scope for government to earn substantial revenue in the long run by using India's software and engineering talents and making India a manufacturing hub for healthcare devices that can be marketed in the Indian subcontinent and other developing countries of the world and possibly even in the developed Western countries.

Developing e-Health technology incubation centers: Initiatives should be given in the governance planning and execution process that incubation centers and built and maintained for development of cutting edge technologies on e-Health, this may demand developing Indian universities and research institutions and allocating research funding for the researchers in this field.

Building IT infrastructure on war footing: Information Technology (IT) being the major driver in the

digital healthcare systems, building strong IT infrastructure should be top priority in governance. Next generation technologies should be adopted for faster internet connectivity to realize the full potential of digital healthcare opportunities, and there should be proper governance about its applicability and adaptability among the patients and healthcare practitioners.

Raising consumer awareness on use of Digital Health: Consumer awareness is very important to be built because it is consumers who need to use technology and receive the benefits of technology, hence governance approach should be there to popularize the e-Health technologies in schools, colleges and universities as well as adult education centers to build education consumer base.

Strengthening consumer protection forums: Consumers should also be protected from fraudulent operators that may dupe the patients, hence it's a major responsibility of the digital healthcare planners to save the patients from cyber-crimes committed by fraudsters so that confidence is built among all the users and beneficiaries of e-Health technologies so that good governance can be preached and practiced at the same spirit.

Completion of healthcare projects on a fast track basis: Many projects including healthcare projects are often stuck due to problems like funding, change of political leadership etc. Hence there should be priority in the governance planners and executives in government sector to see that all ongoing e-Health projects are completed in anticipated time, which may need creating a win-win financial model for government exchequer and private project developers.

Cooperation between center and state governments: Governments can change in federal structure through political process and it's a sign of healthy democracy but there should not be any conflict of interest between government at center and at states and political leaderships of various political parties at center and states should rise above the petty politics and cooperate among themselves for the best interest of the country and the people of India.

Limitations of the Work

The limitations of this work are related to qualitative and quantitative analysis of data received during

the studies. As secondary data source are collected and analyzed, there are some limitations as to opinion of the data generators regarding to digital; healthcare delivery approach by them. We have done systematic compilation of the data although qualitatively that fixes the analysis limited to some digital technologies in healthcare. May other technologies are being built recently around the world which can be contributing more towards our realization of "health for all". Efforts have been given to remain optimistic all through the research but inadequacies in different levels of government can never be ignored. Our research is based pan India data but state wise differences may be there which can be a subject of research in another similar study. This is India-centric study hence it might miss some global perspectives whereby India might have scored better than some countries whereas it has done worse than many other countries. This comparative study between different countries may be different topic of research that can throw light to our existing work on digital healthcare systems to become effective in Indian perspective.

Challenges in Digital Healthcare System and Its Implementation

In India, Healthcare system transform into a new shape at present due to technological impact. There are still some challenges and issues in implementation of digital healthcare system transformation.

Following are the Issues and challenges of conversion of digital healthcare system:

1. Healthcare cost increases due to the technological and present economic effects in digital healthcare.
2. Increased population, economic conditions, unemployment issues impede the development of digital healthcare system in India.
3. Technology implementation such as Information Technology and Artificial Intelligence are the challenges in digital healthcare system.
4. Enhancement of digital healthcare system is not up to the mark according to economic growth of the country.

5. Lack in Infrastructural development in digital healthcare system.
6. Funding is the challenging issue in digital healthcare system.
7. Lack in initiative to improve the quality in digital healthcare system.
8. Security and privacy of information is the concern in digital healthcare system.
9. There are various issues in expertise.
10. Digital Illiteracy is barrier in digital healthcare system
11. Lack of technology Infrastructure in rural areas
12. Development of digital healthcare is most challenging issue in rural areas.
13. Lack of expert in health sector and doctors in rural areas.

According to all the challenges implementation of digital healthcare in rural areas is very difficult. Therefore, all the digital healthcare facilities provide through the urban areas in India. Urban areas economic conditions are far better than the rural areas. Another big issue is digital literacy in rural areas. Therefore, there are potentialities to develop digital healthcare infrastructure in urban areas but in rural areas is not possible.

Future Scope of Research

There is immense scope of future research in this field some of which are mentioned below. Future researchers can carry out research in this field for continued learning and investigation on digital healthcare systems to work better for every country including India.

1. Demographic comparison of India with other countries of Indian subcontinent and its effect on healthcare planning.
2. Advent of latest technology in healthcare and issues relating their effective adoption keeping in mind their economic and financial viability in different conflicting economic policies of governments.
3. Management of business fundamentals in establishment of startups in a mixed economy country like India vis-à-vis other economic models like Socialism, Communism and Capitalism.

4. The importance of FDI in digital healthcare systems in India in present economic scenario where many developing countries of the world are facing debt trap due to ineffective FDI policies.
5. Emergence of new economic and political world order that considers healthcare as a global priority in the perspective of cross border movement of medical professionals.

We sincerely hope that our work will throw light on the above issues as well but time-taking and quality research on these issues are important for each and every citizen of world in a new world order that believes development for all is not just a dream but an utmost priority.

CONCLUSION

It can be conclude that this research has thrown light on digital healthcare systems delivery in India and the financial and economic concerns before governance of health. It has been observed that health being a subject of great importance for country's development there is an urgent need for the country's governance system to consider it and give it a priority. We just can't stay quiet when some developing and developed countries have gone far away than us in term of Human Development Index. Our investment in education, sanitation, social security and political stability will era more fruits if also give healthcare invest a priority. Here both the states and the center should join to hands to improve healthcare systems better. The use of digital technologies should be done extensively and internet connectivity for application of Internet of Things technology in health should be maximized. The issue of governance of healthcare in terms of economic and financial concerns should be dealt with strong economic sense as to how more tax revenue can be moped up from this sector and in turn pump the same resources so collected in healthcare for continued betterment in future as well. Given the technological breakthroughs available and political will desired to uplift the nation, it is a vision for a modern India that is at par with global standards in digital healthcare. The sooner the vision is accomplished the better.

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