Digital Dimension of Indian Healthcare Sector: A Review

Dr Garima Sainger

Assistant Professor, Institute of Business Management, GLA University, Mathura

garima.sainger@gla.ac.in

Abstract

Digitalization has changed the way a business operates, scale up and grow. The world is going through a phase of the information revolution. Information is considered as an asset to create a competitive advantage. In the present dynamic environment with the wave of globalization the organizations are increasingly using digital technology to procure information and use it to take calculated risk. The health care sector is not untouched by it. This sector has increased by 5.3% in the last three years, signifying high potential for ever rising expectations. But since this sector requires looking into patient's history and updating it, it is highly data driven and requires adequate management of scattered data. Improved life expectancy and booming population have undeniably growth opportunities in this sector. It also faces a lot of challenges like accessibility, especially in remote areas, affordability and quality of service.

This paper is based on existing knowledge and discuss how digitalization can provide solutions to these problems. A wide range of digital services like telemedicine, m-health, wearables, and electronic medical records are not only changing customer experience, but also bringing changes in the overall system of the sector. The Paper precisely discusses how digital technology combined with big data analytics can offer better services to patients, healthcare givers and insurance companies.

Keywords: Healthcare Sector, Digitalization, Digital Technology, Digital Transformation, Wearables.

Introduction

Healthcare sector in India has become the fastest growing sector, in terms of employment and revenue both. It consists of medical equipment, hospitals, clinical trials, medical devices, telemedicine, health insurance and medical tourism, etc. The countries healthcare sector is developing rapidly and increase to Rs 8.6 trillion (US$ 133.44 billion) by 2022. What makes. What is making this industry more attractive is, booming population, improved life expectancy and better access to health care services. But the industry has downsides too (Fig:1).
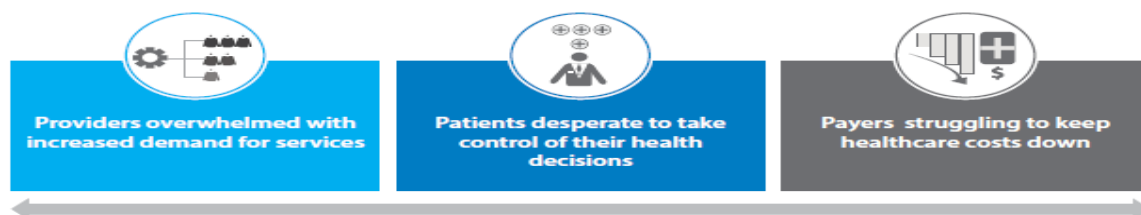

Fig: 1 Downside of Healthcare Sector
Source: Digital Healthcare Ecosystem 2015 Infosys Limited

A boom in population means higher demand for services and pressure on healthcare providers due to shortage of caregivers, infrastructure limitations and scattered patient data. This results

wastage of quality time and energy to cater patient history, clinical data and preliminary evaluation. If the patient-generated data can be obtained directly from a patient in a secured and guided manner, the operational burden on caregivers would be reduced. Along with this rising healthcare cost are also a concern for the payers include the insurance companies and government. To solve these problems patients are equally looking for managing their personal health data. Today patient is aware, tech savvy and ready to accompany with technology, if it would help them in respect of healthcare. In respect of this many experts suggest that in healthcare sector reforms are needed and system could become more effective and efficient with an increasing use digital technologies beyond conventional boundaries (Department of Health, 2008; Christensen et al., 2009).

In 20th century digital technology is one of the best gifts, influencing the way the world used to work. Right from education to job, business, and health, no field are there which is untouched by the digital wave. Digital Revolution has shaped us globally as it provides a solution to Complex problems by increasing collaboration and Information sharing. In early 2020 World Health Organization (WHO) the outbreak of COVID-19 – declared as a pandemic– has influenced all areas of life. Especially the need for social distancing in the scenario of a pandemic has heightened   the dependency on digital technologies in healthcare industry too. Digital technology serves a number of benefits to healthcare professional and patients both.

The healthcare industry acceptance to join the global digital revolution is surprisingly slow. In 2015 the industry ranked in the lower third of digital maturity. Though, the advent of new technologies and tools are already beginning to make changes in the system and looking forward to alter the availability of health services with better patient care and efficiency.

Today, more and more people are using smartphones with internet. India's growing population (Fig:2), rising mobile class, an increase in GDP at a CAGR of 3%, offers opportunities for digitalization.
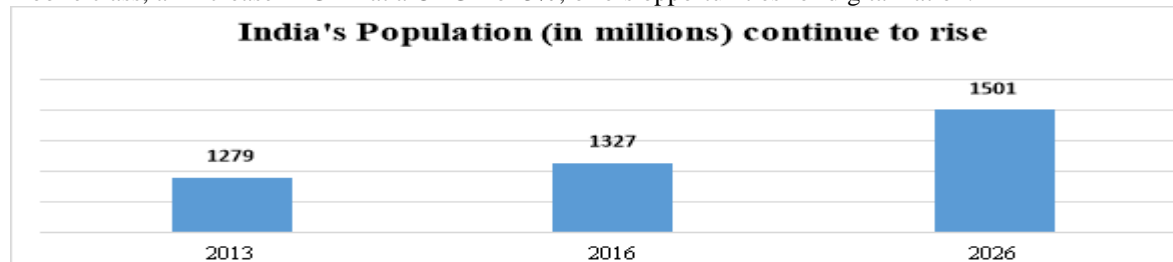

Fig:2 India's rising population

Source: World Bank

The countries GDP is looking forward to watch the highest growth in share of GDP by 2050 (2% to 13%), which makes a tremendous opportunity for ROI growth. India has a second highest CAGR (11%) in health care after China among all the BRIC countries, making it a prime candidate for investment (Fig:3). The rapidly growing economy and population of the country raise vast scope for digitalization in different sectors including healthcare as well.
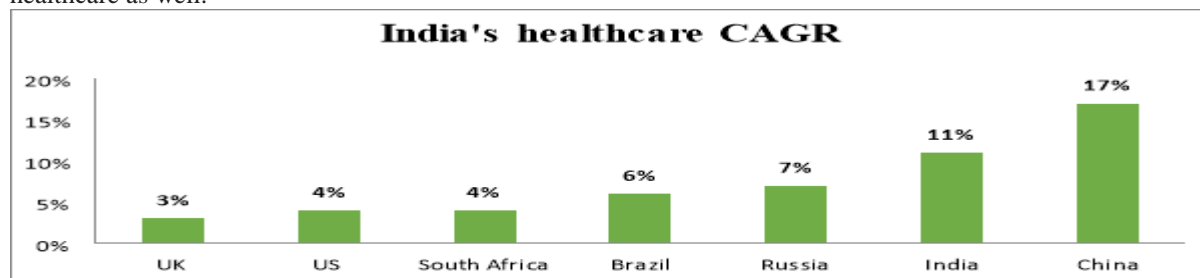

Fig:3 India's healthcare CAGR

Source: World Bank

India's Healthcare sector- Birds eye view

The healthcare industry is one of the major areas for investment, mainly through the mediation of digital accessibility, quality and affordability. But the sector is also witnessing major challenges due to increasing geriatric population, a change in the disease pressure, rural inaccessibility to healthcare, healthcare giver shortage, inadequate public sector Investment and poor standard of quality. Digitalization has potential to change the game in this sector.
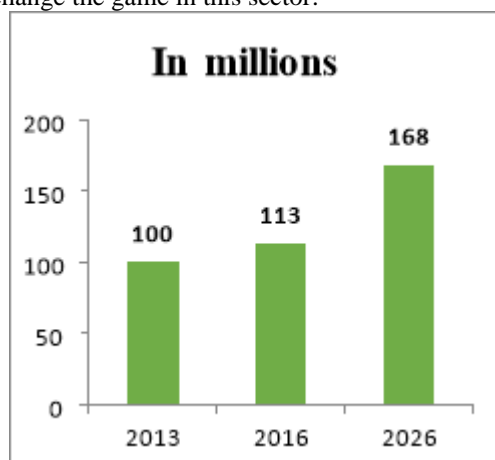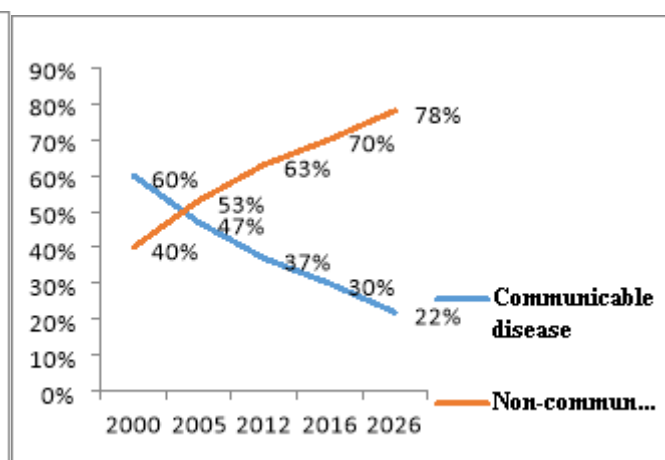

Fig:4 India's geriatric population   **Fig:5 communicable and non-communicable disease**
Source: NCBI, IBEF   **Source: PWC analysis**

In India geriatric population is expected to rise to 168 million by 2026 as shown in fig (4). In the country, a higher ratio of disease pressure is due to non-communicable disease (Fig:5). In India, only 33% of doctors are working in rural areas, though more than half of the population, i.e. 71% as per population census 2011 lives in Rural India.
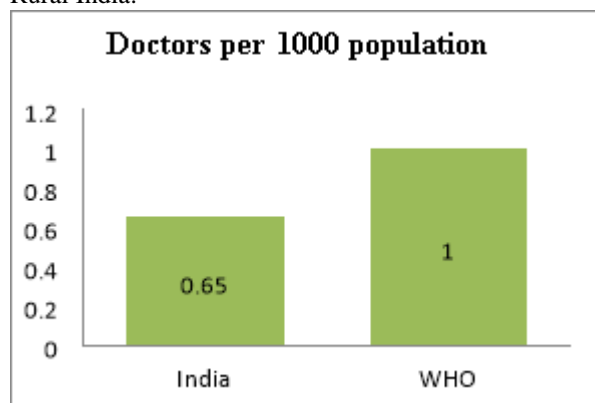

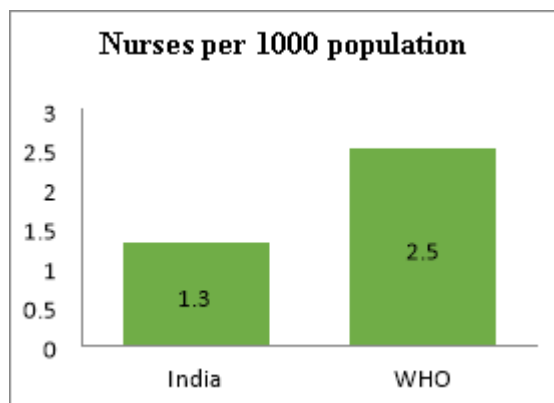
Fig:6 Doctors per 1000 population   **Fig:7 Nurses per 1000 population**   **Source:**

PwC analysis

WHO recommendations are not met by India for Healthcare workforce (Fig: 6 & 7. Spending of India on Healthcare is 4.7 % of its GDP, 1.4% of the public sector, lowest as compared to other countries. Expenditure in private Enterprises is higher.

As per the statistics discussed, it is clear that the need to address the challenges, the Indian healthcare sector facing has become urgent now. Today patients are more aware, tech-savvy and ready to embrace emerging technology. They are ready to adopt new ways of care and want more control on their health. Traditional models of healthcare are not appealing to them anymore. Digitalization has the scope of changing the Dynamics of this Industry. Though many healthcare professionals have started looking more on how to use digital technologies for the monitoring of patient located remotely, like telemonitoring, internet of thing and wearables etc. This enhances convenience and diminish healthcare costs for the provider. While the healthcare industry in the country has started showing early signs of disruption, digitalization will increase affordability, accessibility and quality of health care solutions thus reshaping healthcare delivery across the patient pathway as suggested by EY in a recent report titled "Life Sciences 4.0: transforming health care in India". The Government is also realising the far-reaching impact of digitalization in respect of the healthcare sector and started looking forward in this regard.

Government orientation towards Digitalization of healthcare

The Govt of India is aiming to enhance healthcare facilities across the country and under its "National Digital Health Blueprint" targeting to use technology to ease healthcare delivery system like getting registrations done at hospitals, booking appointments and making payments etc. The basic objectives behind the mission are to develop a database for core digital health, on the basis of international standards creating a system of electronic health records, establish pathways for data ownership so that the patient can own their health records, and promoting health medical research and data analytics.

Coronavirus disease (Covid-19) have brought health sector into focus. The Prime Minister Narendra Modi announced in his speech on the occasion of 74th Independence day that "National Digital Health Mission" will commence on from today. The mission will prove revolutionary for Indian healthcare sector. The mission aims to issue a health ID to every Indian, that will act like a healthcare account and store all the details of patient like existing disease, test done, diagnosis, prescribed medicines etc.

Literature Review

Digital transformation of Healthcare sector is a fairly recent topic. Research on Digital transformation of Healthcare and its current status discussed that future of Health Care sector will be guided by technology (Agarwal, R., Gao, G., DesRoches, C., & Jha, A. K., 2010). It will change the way these services are offered—both in respect of quality and cost (Borzekowski, 2009). Research also proposed a next generation of insights and proposed different strategic models focusing on the implications of digital technology (Bharadwaj, A., El Sawy, O. A., Pavlou, P. A., & Venkatraman, N., 2013).

In reality, if digital technologies implemented properly, it can empower patients, quality of life, communication between patients and healthcare professional and shorten length of hospitalization (European Commission, 2014). A proper implementation of digital technologies, develops opportunities to re-model

process of healthcare services (Kim et al., 2013); and reduce exploitatory efforts (Gastaldi and Corso, 2013). A wide range of available mobile health applications are empowering people to watch and control their health status (Lupton, 2014).

As digitalization of health sector is increasing and researches conducted in this direction are providing more insights to the sector. Nowadays it is characterizing the healthcare sector and also offering opportunities for further research (Kaushal and Blumenthal, 2014; Lin et al., 2014; McAlearney et al., 2015; Andreassen et al., 2015; Arvanitis and Loukis, 2016; Antonacci et al., 2017). This is also the main aspect of discussion for practitioners and policy makers in respect of quality improvement and cost reduction both (OECD, 2016). Over the past six years digitalization in healthcare sector gathered more than $14bn in investment and funding (World Economic Forum, 2016) and to transform the industry structurally concrete actions are the real need of the hour. For individuals and organizations these technologies are important for healthcare management (Van Velthoven and Cordon, 2019). It improves the quality of life and reduce the variation in the healthcare status of individuals (Nayak et al., 2019)

Technologies Transforming Healthcare solutions

The Indian healthcare sector is already gaining prominence in digital technology adoption. In support of the private sector, Govt launched many programme such as digital India, Aadhaar, telemedicine centres, etc. The private sector has designed mobile apps, adopted telemedicine and also established innovation centres all over the country along with other solutions. Some of the digital technologies used in the Indian healthcare sector are:

1. **Telemedicine:** It is a technology used for diagnosis, monitoring and education of patience located remotely. It is a two-way communication process with the help of audio or video equipment between the Healthcare provider and patient who are at a distance for giving health assessments and consultations. It not only provides medical assistants to remote areas but also reduces the cost of accessing it. Ex- Karnataka state medicine network project with ISRO has already opened 60,000 telemedicine centres. In India the market of telemedicine is expected to reach $5.4 Billion by 2025 with a CAGR of 31%. It has the highest market share in the India Health tech market.
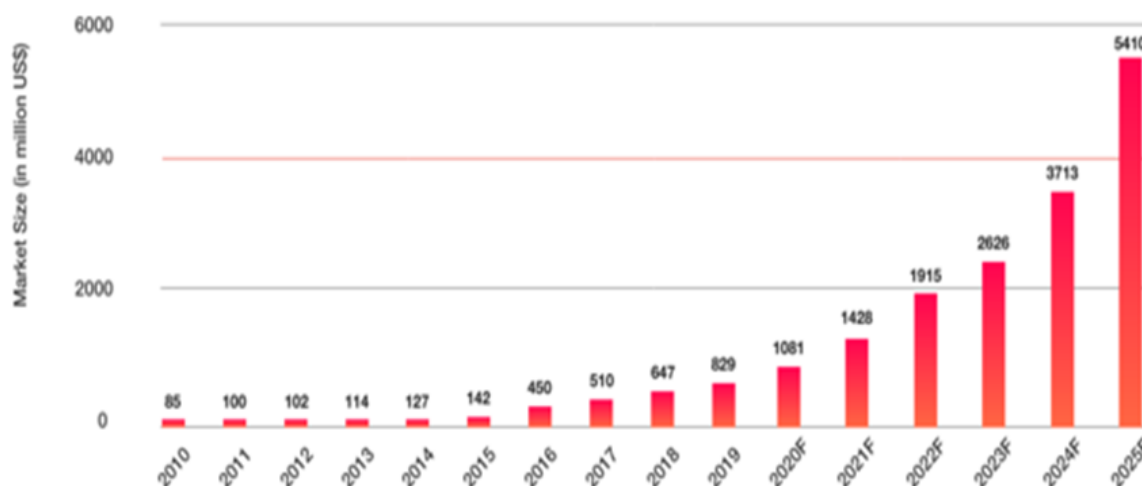

Fig: 8 Telemedicine market share
Source: DataLabs

2. **M- health**: Mobile technology is becoming more powerful and pervasive. Mobile health includes wireless monitors, videoconferencing, online consultation personal Healthcare devices, wireless access to patient records and prescriptions. There are various mobile Health apps that provide on-line video consultations and also book online test.

3. **Remote diagnosis**: Portable innovations like wireless health monitor, oxygen saturation monitor, glucometer, total haemoglobin count, cholesterol level, etc. these devices have a wide market in rural and remote areas.

4. **Digital and social connectivity**: Medical Health providers provide services like sharing knowledge and providing help by connecting with various communities of patients through social networking sites.

5. **Wearables:** These are gadgets like wristwatches and bands which measures pulse rate and heart beat rate blood pressure blood sugar etc.

6. **Electronic Medical Records (EMR):** IT systems like cloud computing and health information systems save, share and retrieve large amount of data and even have access of remote data.

From reactive model to preventive model

This model (Fig:9) reflects a digital Healthcare ecosystem. A consumer who is busy with his daily life activities is sometimes unaware or indifferent to the serious changes happening in the body. Generally, people have the last minute attitude of getting diagnosed only when the problem becomes severe or unavoidable. Hence a gap exists for a personal Healthcare giver who will get signals about the body changes and alert the patient to take immediate actions. The personal Healthcare giver is residing very far away from the target patient. This gap is filled with the help of body worn wireless sensors which measures Heartbeat or blood pressure. Ex-A woman working in office feels uneasy and giddy but due to work pressure she chooses to ignore it. She is wearing a wristwatch which measures pulse rate, blood pressure, blood sugar and many other parameters. These signals get saved in cloud storage from where it is received by personal health provider. He checks the information and immediately contact the lady to inform her that her health situation requires immediate diagnosis or medical attention. The data is also sent to the health insurance company which monitors it and prescribe the appropriate insurance plans with minimum plans according to the current situation. The old traditional curative model of Healthcare providers is converted into a model that prevents further damage by providing timely information to patient for taking corrective action. In this preventive ecosystem, various stakeholders participate like the insurance companies, the caretaker, experts managing cloud data, physician, etc.
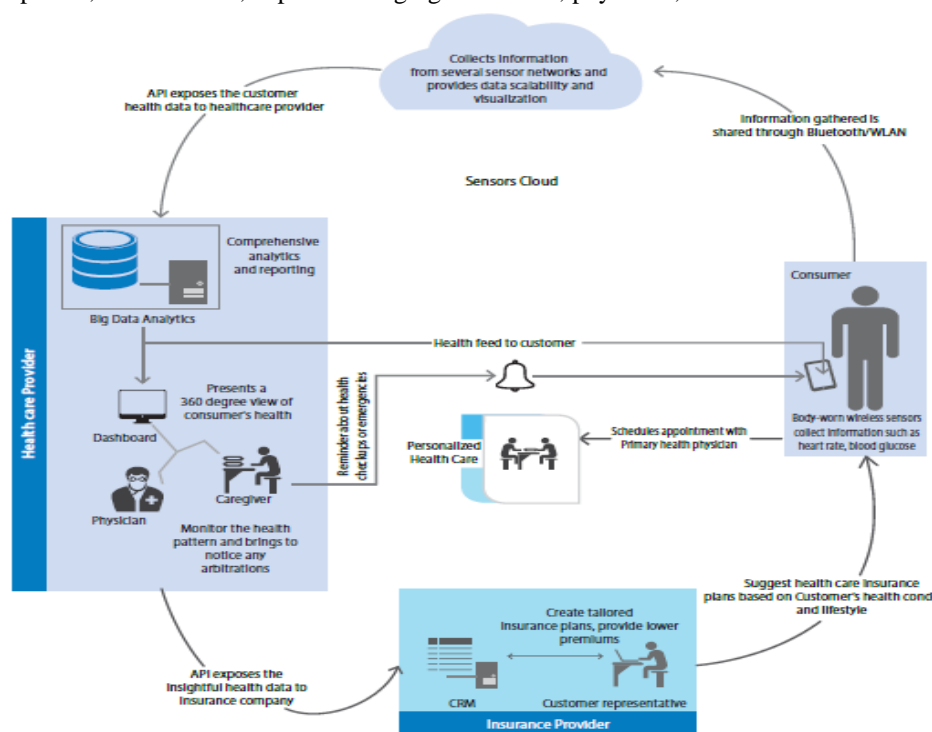

Fig: 9 Intersection of wearable, big data and healthcare providers
Source: digital health care ecosystem 2015 Infosys Limited

Conclusion

The healthcare sector has immense growth opportunities and digitalization, can act as a lever to raise it high. This sector has a high human impact, be it diagnosis, treatment or medical care. To bring a revolutionary change in such a place, it is essential that the change should be accepted, adopted and functioned by its stakeholders. The paper is an attempt to enlighten the Indian healthcare scenario and digital practices adopted by the sector to provide better healthcare services to all concerned. The paper discussed the programmes and practices introduced by the government to help the sector to access better means of services. The study also narrated, how different digital technology is helping the patient to watch and control their health. At last a model based on the intersection of wearable, big data and healthcare providers has suggested as a way to improve the overall functioning of the sector.

This new amalgamation of healthcare and digitalization can provide a new experience of health treatment to its customers, which is more quality conscious, cost effective and customer centric. It has led to an invasion of a new ecosystem which is providing preventive care which is ahead of curative care. This will be highly

demanded in the near future as people will have more complex and materialistic life styles with less manual work. Hence it is the need of the hour to help people manage their body effectively, in lesser time, cost and more convenience. This amalgamation will cover the gap of this hidden need. The world is looking up at India, which is already having a core competency in this sector to adopt this revolutionary change.

References:

[1]. Kotla kiran Uday, Jain Ginni "Digital health care Eco system" 2018 Infosys Limited. Report available on https://www.infosys.com/digital/white-papers/documents/digital-healthcare-ecosystem.pdf

[2]. Department of Health (2008), "High Quality Care for All: NHS Next Stage Review Final Report", available at:http://webarchive.nationalarchives.gov.uk/20130107105354/http:/www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/@dh/@en/documents/digitalasset/dh_085828.pdf

[3]. Kleinke, J. D., Christensen, C. M., Grossman, J. H., & Hwang, J. (2009). The Innovator's Prescription: A Disruptive Solution for Health Care.

[4]. Rolling updates on coronavirus disease (COVID-19) retrieved at: https://www.who.int/emergencies/diseases/novel-coronavirus-2019/events-as-they-happen

[5]. Fox B et al. McKinsey & Company. (2016) Report available from https://www.mckinsey.com/~/media/McKinsey/Industries/Pharmaceuticals%20and%20Medical%20Products/Our%20Insights/Closing%20the%20digital%20gap%20in%20pharma/Closing-the-digital-gap-in-pharma.ashx

[6]. World Bank data: http://databank.worldbank.org/data/home.aspx

[7]. IBEF. (2015). Healthcare industry in India. Retrieved from http://www.ibef.org/industry/healthcare-india.aspx

[8]. PwC. (2016). The digital healthcare leap. Retrieved from http://www.pwc.com/gx/en/issues/high-growth-markets/assets/the-digitalhealthcare-leap.pdf

[9]. Life Sciences 4.0: transforming health care in India. (2019) Ernst & Young LLP Report available at https://www.medicalbuyer.co.in/wp-content/uploads/2019/03/ey-transforming-health-care-in-india.pdf

[10]. Agarwal, R., Gao, G., DesRoches, C., & Jha, A. K. (2010). Research commentary—The digital transformation of healthcare: Current status and the road ahead. *Information Systems Research*, *21*(4), 796-809.

[11]. Borzekowski, R. (2009). Measuring the cost impact of hospital information systems: 1987–1994. *Journal of health economics*, *28*(5), 938-949.48.

[12]. Bharadwaj, A., El Sawy, O. A., Pavlou, P. A., & Venkatraman, N. (2013). Digital business strategy: toward a next generation of insights. *MIS quarterly*, 471-482.

[13]. Assessing the impact of digital transformation of health services. (2014). Report available at: https://ec.europa.eu/health/sites/health/files/expert_panel/docs/022_digitaltransformation_en.pdf.

[14]. Kim, Y.S. and Marsick, V.J. (2013), "Using the DLOQ to support learning in Republic of Korea SMEs", Advances in Developing Human Resources, Vol. 15 No. 2, pp. 207-221.

[15]. Gastaldi, L., & Corso, M. (2013). Academics as Orchestrators of Continuous Innovation Ecosystems. In *14th International Continuous Innovation Network (CINet) Conference "Business Development and Cocreation* (pp. 8-11).

[16]. Lupton, D. (2014), "Health promotion in the digital era: a critical commentary", Health Promotion International, Vol. 30 No. 1, pp. 174-183.

[17]. Kaushal, R. and Blumenthal, D. (2014), "*Introduction and commentary for special issue on health information technology*", Health Service Research, Vol. 49 No. 1, pp. 319-324

[18]. Lin, H.C.K., Chuang, T.Y., Lin, I.L. and Chen, H.Y. (2014), "*Elucidating the role of IT/IS assessment and resource allocation in it/is performance in hospitals*", Information and Management, Vol. 51 No. 1, pp. 104-112

[19]. McAlearney, A.S., Hefner, J.L., Sieck, C.J. and Huerta, T.R. (2015), "*The journey through grief: insights from a qualitative study of electronic health record implementation*", Health Service Research, Vol. 50 No. 2, pp. 462-488

[20]. Andreassen, H.K., Kjekshus, L.E. and Tjora, A. (2015), "*Survival of the project: a case study of ICT innovation in health care*", Social Science & Medicine, Vol. 132, pp. 62-69.

[21]. Arvanitis, S. and Loukis, E.N. (2016), "*Investigating the effects of ICT on innovation and performance of European hospitals: an exploratory study*", The European Journal of Health Economics, Vol. 17 No. 4, pp. 403-418.

[22]. Antonacci, G., Colladon, A. F., Stefanini, A., & Gloor, P. (2017). It is rotating leaders who build the swarm: Social network determinants of growth for healthcare virtual communities of practice. *Journal of Knowledge Management*.

[23]. OECD (2016), "*Health at a glance: Europe 2016 – state of health in the EU cycle*", available at: www.oecd.org/health/health-systems/health-at-a-glance-europe-23056088.htm.

[24]. World Economic Forum (2016), "*World economic forum white paper digital transformation of industries: healthcare industry*", available at: http://reports.weforum.org/digital-transformation/wp-content/blogs.dir/94/mp/files/pages/files/wef-dti-healthcarewhitepaper-final-january-2016.pdf

[25]. Van Velthoven, M.H. and Cordon, C. (2019), "Sustainable adoption of digital health innovations: perspectives from a stakeholder workshop", Journal of Medical Internet Research, Vol. 21 No. 3, pp. e11922(1)-e11922(8)

[26]. Nayak, B., Bhattacharyya, S.S. and Krishnamoorthy, B. (2019), "Integrating wearable technology products and big data analytics in business strategy: a study of health insurance firms", Journal of Systems and Information Technology, Vol. 21 No. 2, pp. 255-275.

[27]. https://inc42.com/datalab/telemedicine-market-opportunity-in-indian-healthtech/