



# INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

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## A COMPREHENSIVE PROJECT REPORT ON

“A STUDY ON DIGITAL TRANSFORMATION IN HEALTHCARE SECTOR OF GUJARAT”

*Submitted in partial fulfilment of the requirement for the award of the degree of*

## MASTER OF BUSINESS ADMINISTRATION

BATCH (2022-24)

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## Students' Declaration

We Hemaliben Chaudhari and Hetal Vaghela, hereby declare that the report for Comprehensive project entitled "Study on digital Transformation in healthcare sector in Gujarat" is a result of our own work and our indebtedness to other work publication, references, if any, have been duly acknowledged.



“Certified that this Comprehensive Project Report Titled “A study on digital transformation in healthcare sector in Gujarat” is the bonafide work of Ms.Hemaliben Chaudhari (Enrollment No 2206172000179) AND Ms . Hetal vaghela (Enrollment No 2206172000181), who carried out the research under my Supervision. I also certify further, that to the best of my knowledge the work reported here in does not form part of any other project report or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

**Signature of the Students**

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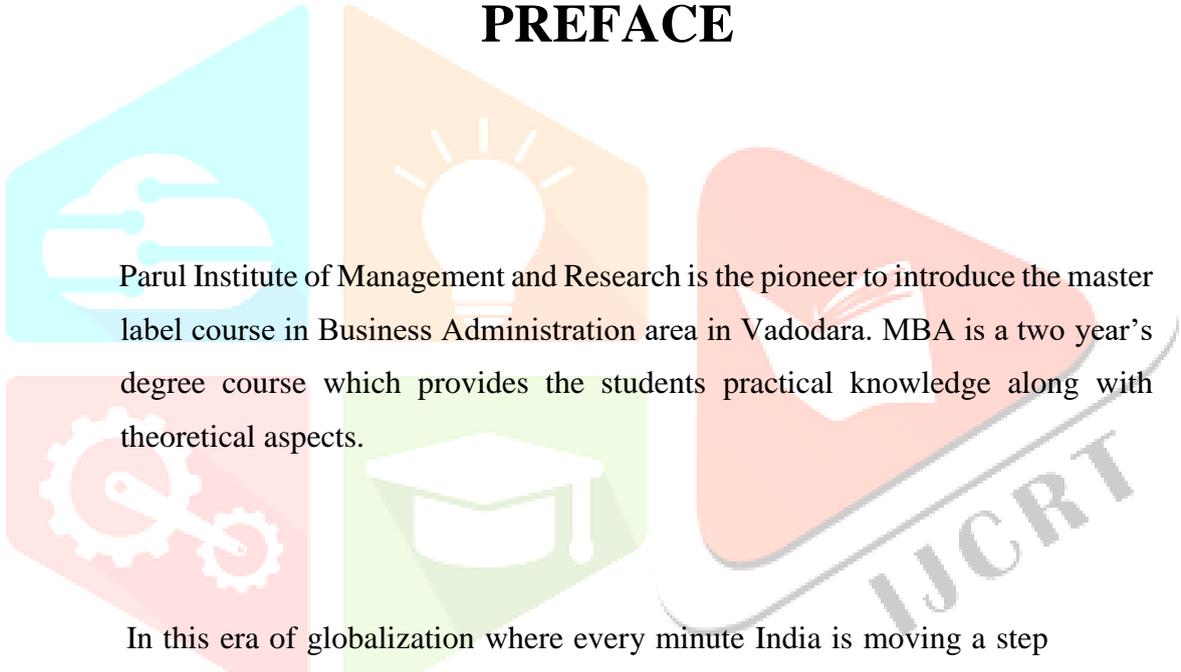
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**Signature of the Director**

DR. Bijal Zaveri

## PREFACE



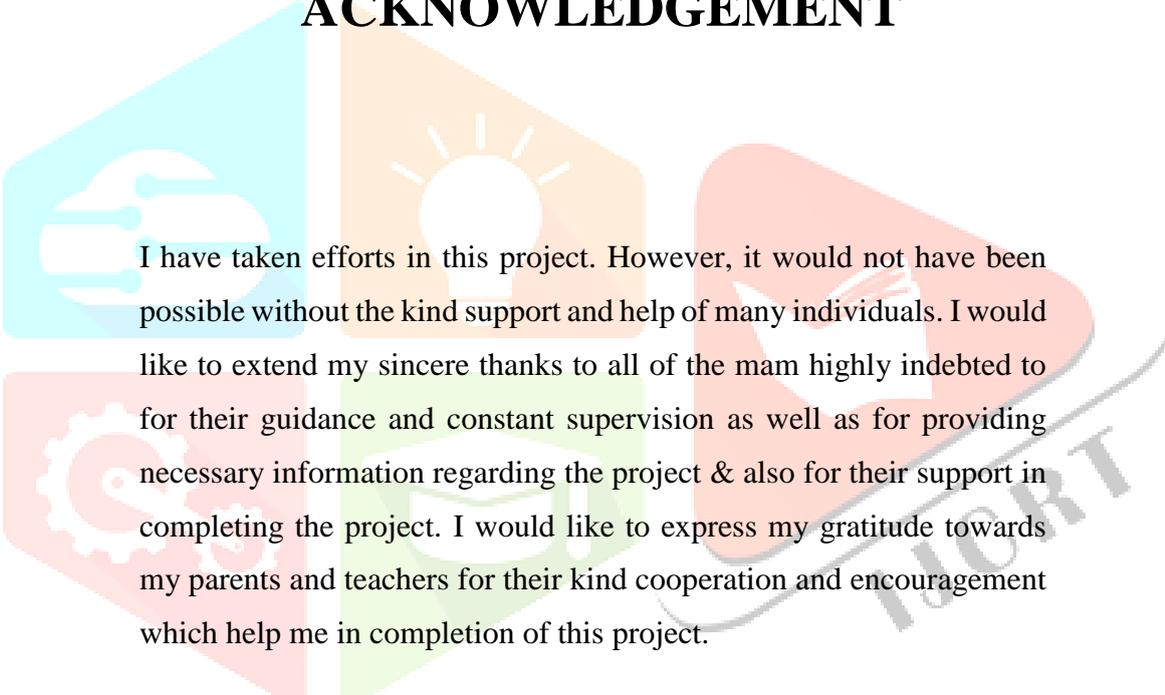
Parul Institute of Management and Research is the pioneer to introduce the master label course in Business Administration area in Vadodara. MBA is a two year's degree course which provides the students practical knowledge along with theoretical aspects.

In this era of globalization where every minute India is moving a step ahead and expanding it horizontally, management in India is heading towards a profession. The demand for management's professionals is increasing day by day. In such competitive surroundings, it becomes a requirement to have an edge over others and MBA is such a course, which helps and assists students in doing that.

The practical studies are treated as a different subject in MBA which helps the students in practically applying their theoretical knowledge. It helps us to face competition, builds up our confidence and also add something to our personality. Over and above in this fast-moving economy, here practical studies play an important role in our carriers.

This project report has been prepared in partial fulfilment of the requirement for the comprehensive project of the MBA in Human Resource Management Semester III in the academic year 2022-2024.

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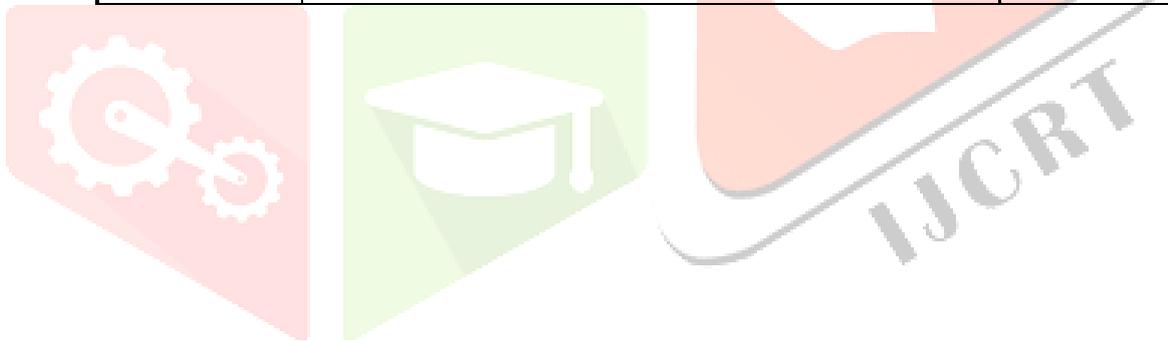
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## PART 1

### GENERAL INFORMATION

#### 1. About the Healthcare Industry in Gujarat

As of my last knowledge update in September 2021, Gujarat, a state in western India, has been making significant strides in the healthcare sector. However, please note that I do not have access to real-time information beyond September 2021.

Here are some key points about the healthcare sector in Gujarat up until that time:

- **Infrastructure and Facilities:** Gujarat has been investing in improving healthcare infrastructure. The state has a network of government and private hospitals, clinics, and healthcare centers. Major cities like Ahmedabad, Vadodara, Surat, and Rajkot have well-developed healthcare facilities.
- **Medical Education and Research:** Gujarat is home to several prestigious medical colleges and institutions, including BJ Medical College in Ahmedabad, M.P. Shah Government Medical College in Jamnagar, and Baroda Medical College in Vadodara. These institutions contribute to medical education and research.
- **Government Initiatives:** The state government has implemented various healthcare schemes and initiatives to improve access to quality healthcare services. These schemes often target marginalized and economically weaker sections of the population.
- **COVID-19 Response:** Like the rest of the world, Gujarat has been grappling with the COVID-19 pandemic. The state has been actively involved in vaccination drives and implementing measures to contain the spread of the virus.
- **Medical Tourism:** Gujarat has been gaining popularity as a destination for medical tourism, particularly for procedures like medical check-ups, surgeries, and wellness treatments. This is partly due to the presence of high-quality healthcare facilities and skilled medical professionals.
- **Traditional Medicine:** Alongside modern healthcare facilities, Gujarat also has a strong tradition of Ayurveda and other alternative forms of medicine. These traditional practices are integrated into the healthcare system.

- **Healthcare Challenges:** Despite progress, there are still challenges in the healthcare sector. These may include issues related to accessibility, especially in remote and rural areas, as well as disparities in healthcare quality between urban and rural areas.
- **Public-Private Partnership (PPP):** The state has been exploring public-private partnerships to enhance the delivery of healthcare services. This involves collaboration between government agencies and private healthcare providers.
- **Healthcare Industries:** Gujarat is home to a number of pharmaceutical and healthcare industries. The state is known for its contribution to the pharmaceutical sector in India.

### GROWTH OF HEALTHCARE SECTOR IN GUJART

The health sector of Gujarat has hit several new milestones in the last 20 years.

Unprecedented work has been done for health infrastructure in Gujarat. Work has been done at every level from cities to rural areas. Thousands of health centres and first-aid centres were set up in rural areas. In urban areas, about 600 Deen Dayal Aushadhalayas were also built.”

1. -Prime Minister, Narendra Modi The Government of India is dedicated towards ensuring health security for every citizen in the country. The aim of the Government is to provide affordable and accessible healthcare for all. It is focusing on primary, secondary and tertiary healthcare fronts with various initiatives like Health and Wellness Centres and strengthening of district hospitals under the National Health Mission. In the last eight years, the Central Government has accorded great priority to Health and a new beginning has been made to transform the health infrastructure right from the block level in the country
2. New India: Making Healthcare Accessible for all

- Government of India launched Ayushman Bharat Pradhan Mantri Jan Arogya Yojana on

September 23, 2018 to achieve the vision of Universal Health Coverage (UHC). As on July 22, 2022, 10.74 crore poor and vulnerable families were identified on the basis of SECC 2011 data are entitled to receive free treatment under the scheme.

- e-Sanjeevani (National Telemedicine Service) is a first of its kind online OPD service offered by a Government of India to its citizens. e-Sanjeevani OPD has been rolled out in 36 states/UTs. As on June 09,

2022, 1.8 lakh doctors have been trained to attend e-Sanjeevani

3. PM Bhartiya Jan Aushdhi Kendra playing key role in providing affordable medicines. A total of Rs. 5360 crores was saved by the people in the year 2021-22 through this Scheme.

4. Matru Vandana Yojana: The Pradhan Mantri Matru Vandana Yojana(PMMVY) scheme was launched formally on September 01,2017. Under PMMVY, a cash incentive of Rs. 5000, in three installments, is provided directly to the Bank/ post office account of Pregnant women and lactating Mothers (PW&LM) for the first living child of the family subject to fulfilling specific conditions relating to Maternal and Child Health.

5. The world's largest vaccination Campaign against COVID-19 is operational in the country. As on September 21, 2022, over 216 crore vaccine doses have been administered under the nationwide Vaccination drive.

6. Central Government formed the ministry of AYUSH in 2014 to promote Indian systems of medicine, including Ayurveda, Yoga and Naturopathy, Unani, siddha and Homeopath, in healthcare.

7. This state has been successfully establishing and maintaining good health infrastructure at various levels. The efforts made by the Central government to improve the health facilities can clearly be seen in Gujarat.

### **Some of the significant achievements of the State's health sector are as follows:**

- Gujarat is set to achieve 100 per cent institutional delivery as it increased from 55. percent in 2003-04 to 99.6 percent in 2020-21.

- The death rate has decreased from 7.8 (2001) to 5.6 (SRS 2019).
- The Maternal Mortality Ratio (MMR) has been decreased significantly from 202 (SRS 1999-01) to 75 (SRS 2016-18).
- Infant Mortality Rate (IMR) has come down from 60 (2001) to 25 (SRS 2019).
- A total of 345 Community Health Centers, 1477 Primary Health Centers and 9231 Sub Centers were functioning in the State at the end of October, 2021.
- Gujarat Government hospitals are at the forefront in treating cancer. Impact of Central Government's health related schemes in Gujarat
- Under Ayushman Bharat, 41 lakh patients have availed of free treatment in Gujarat, many of these were women, deprived and tribal people. The scheme has saved more than Rs. 7000 crores for the patients. (As on June 10, 2022)

\*As on September 19, 2022, under "Pradhan Mantri Jan Arogya Yojana", a total of 1.55 crore Ayushman cards have been created and total 2,756 hospitals have been empaneled in Gujarat.

\* In 2001, there were only nine medical colleges in Gujarat as compared to 30 medical colleges in 2022. 12 further MBBS seats have increased from 1100 to 5700 and PG seats have gone up from just 800 to more than 2000.

\* In the year 2020-21, about Two lakh pregnant women had been covered under the scheme, "Janani Suraksha Yojana". In the year 2021-22 (up to October 2021), over 84,000 pregnant women have been covered under the scheme.

## **Challenges in healthcare industry**

**Rising Costs:** One of the most significant challenges in the healthcare industry is the escalating cost of medical services, medications, and insurance. The financial burden limits access to care and poses challenges for governments and individuals alike.

**Aging Population:** The global population is rapidly aging, leading to an increased demand for healthcare services. This demographic shift places additional pressure on healthcare systems, requiring innovative approaches to meet the needs of elderly populations effectively.

**Technological Integration:** While technology has revolutionized healthcare, integrating it into existing systems poses challenges. Issues such as data privacy, interoperability, and the digital divide need to be addressed to harness the full potential of technology in healthcare.



**Health Disparities:** Inequalities in healthcare access and outcomes persist globally, disproportionately affecting marginalized communities. Addressing these disparities

is essential to ensure equitable healthcare for all.

**Digital Health:** The healthcare industry is experiencing a digital revolution with the advent of telemedicine, wearable devices, health apps, and electronic health records. These technologies enhance accessibility, enable remote monitoring, and empower individuals to take control of their health.

**Personalized Medicine:** Advances in genomics and precision medicine allow for tailored treatments based on an individual's genetic profile. Personalized medicine holds great promise in improving treatment outcomes and minimizing adverse effects.

**Artificial Intelligence (AI) and Machine Learning (ML):** AI and ML are transforming healthcare by enabling accurate diagnoses, predicting disease progression, and identifying effective treatment strategies. These technologies have the potential to revolutionize healthcare delivery and improve patient outcomes.

**Focus on Preventive Care:** Healthcare is increasingly shifting its focus from reactive treatment to proactive preventive care. Emphasizing early detection, lifestyle interventions, and public health campaigns can lead to significant reductions

Healthcare providers and professionals

A healthcare provider is an institution (such as a hospital or clinic) or person (such as a physician, nurse, allied health professional or community health worker) that provides preventive, curative, promotional, rehabilitative or palliative care services in a systematic way to individuals, families or communities.

The World Health Organization estimates there are 9.2 million physicians, 19.4 million nurses and midwives, 1.9 million dentists and other dentistry personnel, 2.6 million pharmacists and other pharmaceutical personnel, and over 1.3 million community health workers worldwide,<sup>[9]</sup> making the health care industry one of the largest segments of the workforce.

## 2.About major companies in the healthcare industry

As of my last knowledge update in September 2021, some major companies in the healthcare sector include:

1. Johnson & Johnson: A multinational corporation that produces pharmaceuticals, medical devices, and consumer packaged goods.
2. Pfizer: A global pharmaceutical company known for its vaccines, including the COVID- 19 vaccine developed in collaboration with BioNTech.
3. Roche: A Swiss multinational healthcare company that operates worldwide under two divisions: Pharmaceuticals and Diagnostics.
4. Novartis: Another Swiss multinational pharmaceutical company, known for producing drugs for a variety of medical conditions.
5. Merck & Co. (known as MSD outside the United States and Canada): An American multinational pharmaceutical company known for its prescription drugs.
6. Abbott Laboratories: An American multinational medical devices and health care company with a broad range of products, including diagnostic equipment.
7. Amgen: An American biotechnology company that focuses on the discovery, development, and commercialization of innovative treatments.
8. Gilead Sciences: An American biopharmaceutical company known for its antiviral drugs, including treatments for HIV and Hepatitis C.
9. Medtronic: An Irish-domiciled American medical device company that develops and manufactures devices related to cardiovascular, diabetes, and other healthcare needs.
10. Siemens Healthineers: A German multinational medical technology company that provides medical imaging, laboratory diagnostics, and other healthcare solutions.

11. Bristol Myers Squibb: A global biopharmaceutical company that focuses on discovering, developing, and delivering innovative medicines.
12. AstraZeneca: A British-Swedish multinational pharmaceutical company known for its focus on cardiovascular, renal, and metabolic diseases, oncology, and respiratory conditions.

### **SOME PROMINENT HEALTHCARE COMPANIES IN GUJARAT**

1. Cadila Healthcare (Zydus Cadila): Headquartered in Ahmedabad, Cadila Healthcare is one of the largest pharmaceutical companies in India. It has a significant presence in Gujarat.
2. Torrent Pharmaceuticals: Based in Ahmedabad, Torrent Pharmaceuticals is a leading pharmaceutical company in India with a strong international presence.
3. Intas Pharmaceuticals: Located in Ahmedabad, Intas Pharmaceuticals is a growing pharmaceutical company with a wide range of products.
4. Liva Pharmaceuticals: A division of Liva Healthcare, Liva Pharmaceuticals is based in Vadodara and specializes in the development and manufacturing of high-quality generic pharmaceuticals.
5. Sun Pharmaceutical Industries: Although headquartered in Mumbai, Sun Pharma has a substantial presence in Gujarat. It is one of the largest pharmaceutical companies in India.
6. Wockhardt: While the corporate office is in Mumbai, Wockhardt has manufacturing facilities in Ankleshwar, Gujarat. It is a global pharmaceutical and biotechnology company.
7. Claris Lifesciences: Based in Ahmedabad, Claris Lifesciences focuses on sterile injectables and has a strong presence in the global market.
8. Lincoln Pharmaceuticals: Lincoln Pharmaceuticals is based in Ahmedabad and is involved in the manufacturing and marketing of pharmaceutical formulations.

9. Salius Pharma: Located in Gandhinagar, Salius Pharma is a growing pharmaceutical company engaged in the production and marketing of a wide range of healthcare products.
  
10. Eris Lifesciences: Eris is headquartered in Ahmedabad and is known for its focus on chronic therapies. It operates in various therapeutic areas.



## INTRODUCTION OF SIP COMPANY

Spandan Multi Speciality Hospital is one of the established and expanding Multi

Speciality hospital with NABH accredited hospital located in the heart of the city. Hospital is working closely with local population and corporate world in and within Baroda.

Spandan multispeciality hospital is the well-established centre in the healthcare sector, located in the southern part of Vadodara. Located in the peaceful Manjalpur area. It was started in 2009 with the aim of providing best and latest treatment modalities with affordable price. Also, it was established to give personal touch in the era of the corporate culture.

Initially, it was started with 40 beds and presently upgraded facility with 100+ bed strength.

Hospital beds includes facilities for the considered mainly as medicine (physician), cardiology, Nephrology, Urology (OPD) and pulmonology, neurosurgery, Gastroenterology, and oncology as visiting specialists.

Hospital is 24x7, in-house pathology service, radiology service, and pharmacy service, which helps for rapid diagnosis and emergency care. The hospital have back of 20 bedded ICU, which is run by highly skilled Critical care team with trained staff, which can take care of any sick patient at any time.

All medical facility is backed up by experienced administrative staff, who takes care of TPAs, corporates and health check-ups.

### 3. HEALTHCARE SERVICES

Healthcare encompasses a wide range of services aimed at maintaining and improving the health of individuals. Here are some of the key services provided in healthcare:

1. Primary Care: This is typically the first point of contact for individuals seeking healthcare. Primary care providers (PCPs) include family

physicians, internists, pediatricians, and nurse practitioners. They are responsible for general health assessments, preventive care, and managing common illnesses.

2. **Specialty Care:** Specialty care involves services provided by healthcare professionals who have expertise in specific areas of medicine. This includes cardiologists (heart specialists), dermatologists (skin specialists), oncologists (cancer specialists), and many others.
3. **Emergency Care:** Emergency care is provided for acute and lifethreatening conditions. This includes services provided in emergency rooms, ambulances, and urgent care centers.
4. **Surgical Services:** This encompasses a wide range of procedures performed by surgeons. This can include anything from minor outpatient procedures to complex surgeries.
5. **Diagnostic Services:** This involves the use of various tests and procedures to diagnose health conditions. This includes blood tests, imaging studies (like X- rays, MRI, CT scans), and other diagnostic techniques.
6. **Mental Health Services:** Mental health services cover a range of treatments and support for mental health conditions. This includes counseling, therapy, psychiatric evaluations, and in some cases, medication management.
7. **Rehabilitative Services:** These services are aimed at helping individuals recover and regain function after an injury, surgery, or illness. This includes physical therapy, occupational therapy, and speech therapy.
8. **Maternal and Child Health Services:** This includes prenatal care, childbirth services, and pediatric care for infants, children, and adolescents.
9. **Long-term Care:** This involves services provided to individuals with chronic or long-lasting conditions who require ongoing support. This can take place in nursing homes, assisted living facilities, or through home health care.

10. Home Health Care: This includes a range of healthcare services provided in a patient's home.

This can include nursing care, therapy, and assistance with daily activities.

11. Pharmacy Services: Pharmacists provide medication-related services, including dispensing prescription medications, providing advice on medication usage, and sometimes even administering vaccinations.

12. Dental and Oral Health Services: This encompasses services provided by dentists and oral health specialists for the prevention and treatment of oral health conditions.

13. Preventive Care: This involves services focused on preventing illness or detecting it at an early, treatable stage. This includes vaccinations, screenings, and lifestyle counseling.

14. Health Education and Promotion: This involves providing information and resources to promote healthy behaviors and lifestyles.

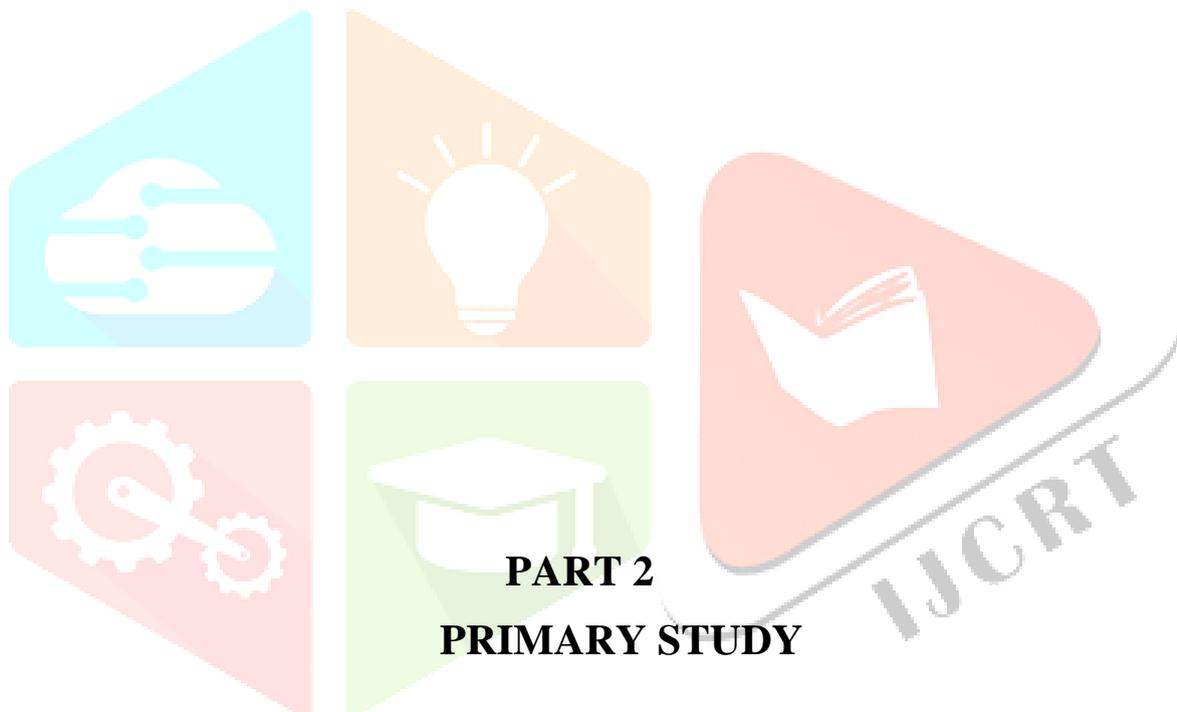
15. Telehealth and Telemedicine: These services involve using technology to provide remote healthcare consultations, diagnosis, and treatment.

16. Health Insurance and Billing Services: This encompasses services related to healthcare financing, including insurance coverage, billing, and claims processing.

17. Public Health Services: These services are provided by government agencies and organizations to promote and protect the health of communities.

This includes disease surveillance, vaccination campaigns, and health education programs.

18. Alternative and Complementary Medicine: These services encompass practices and treatments that are not considered conventional medicine, such as acupuncture, chiropractic care, and herbal medicine.



#### 4. INTRODUCTION OF THE STUDY

Over the past two decades, many hospitals and health systems adopted digital technologies in their various functional areas. In many cases, however, they took a piecemeal approach to numerous initiatives—from installing electronic health record (EHR) systems to building apps to trying disruptive technologies such as artificial intelligence (AI)—while remaining largely focused on the same business and customer models.<sup>2</sup>

The COVID-19 pandemic significantly altered this status quo for the health care industry. Virtual health and care delivered in the home became the model of not only necessity but also preference. But this change was not as sudden as it might look. The pandemic was an

accelerator of several trends, including shifting consumer preferences, rapidly evolving technologies, newer talent models, and clinical innovation. In the face of these trends, as hospitals and health systems work toward adapting their businesses, a well-defined approach toward digital technologies will likely be at the core of this transformation strategy.

## 4.1 LITERATURE REVIEW

The rising relevance of DT in this industry became evident to both scholars and practitioners

(Reis, Amorim, Melão, & Matos, 2018). A recent systematic literature review about DT in HC

(Marques & Ferreira, 2020) shows how much research on this topic has increased over the last 20 years and highlights the most common technology-related research themes within this domain.

1. (Nudurupati, Bhattacharya, Lascelles, & Caton, 2015).

However, due to the strict focus on technology, it does not adequately highlight the various management applications and business impacts of DT on the multiple stakeholders of this industry.

2. (Verhoef et al., 2019, Vial, 2019).

A multi-stakeholder perspective is critical to understanding properly how, in practice, the various players of a HC ecosystem (patients, pharmaceutical companies, hospitals, public agencies, and many more) exploit DT technologies and means to quality of care, value creation, and many more managerial issues. Mainstream literature about DT scarcely analyzes the stakeholder perspective, in which it is generically reported that a heterogeneous set of network stakeholders is a crucial condition for the organization of value creation, growth, digitalization and DT.

Drawing on these assumptions, the research question of the present article is: how should the industry's multiple stakeholders implement DT technologies for management and business purposes? To answer this question, we perform a systematic literature review (SLR) about the state of the art of DT in HC. This article contributes, first, to the general stream of literature about DT (Verhoef et al., 2019, Vial, 2019) by illustrating clearly the

roles and activities of more and heterogeneous (employees, customers, services providers and so on...) stakeholders during this process.

3. ( Marques & Ferreira, 2020) Second, our findings contribute to the rising body of knowledge about DT in HC by showing, via a stakeholder-based perspective, how health service providers should gain operational efficiency and strategize via digitalization. The findings of our SLR show prior research about DT in HC falls into five clusters: operational efficiency by HC providers; patient-centered approaches; organizational factors and managerial implications; workforce practices; and socioeconomic aspects. These clusters are linked together into a model showing how these various forms of technology implementation lead to operational efficiencies by HC services providers. Various directions for future research and management implications are offered.

4. ( Kivimaa, Boon, Hyysalo, & Klerkx, 2019) To provide an overview of the current state of academic literature, a SLR was conducted in the first semester of 2019, with a focus on publications in the field of Management, Business and other related areas such as Information Systems. In recent years, this research methodology became very popular within the field of innovation and entrepreneurship studies.

5. (Kraus, Breier, & Dasí-Rodríguez, 2020, p. 4).

A SLR “is a review of an existing body of literature that follows a transparent and reproducible methodology in searching, assessing its quality and synthesizing it, with a high level of objectivity”.

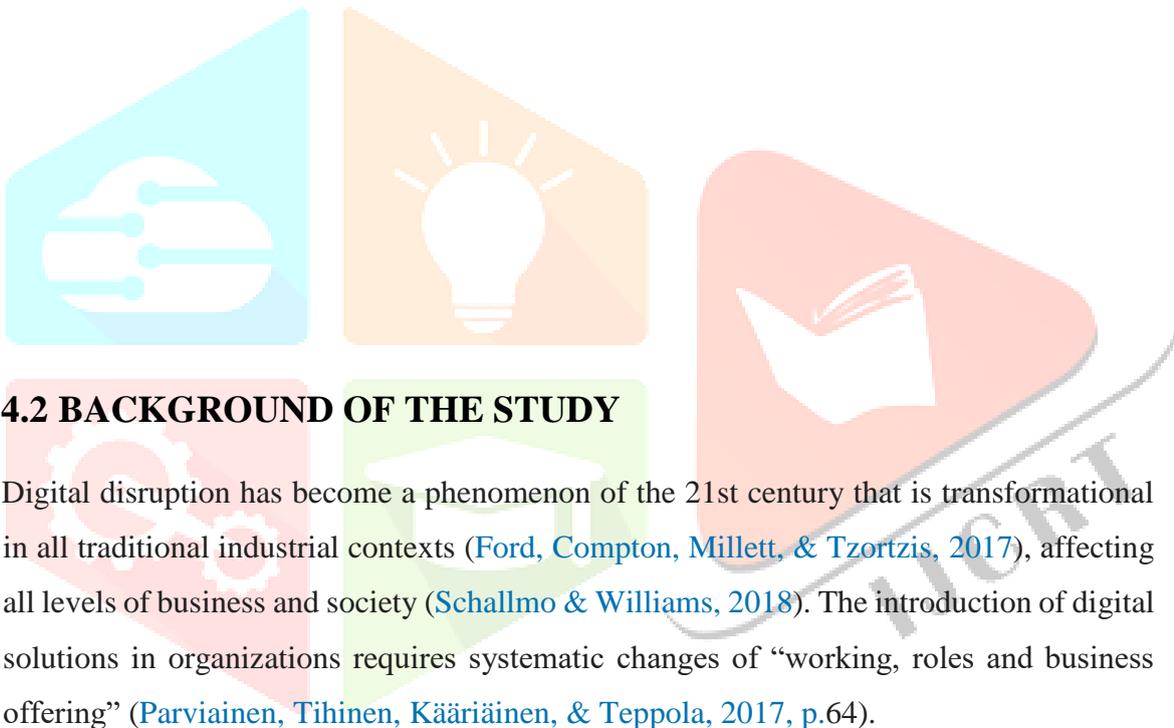
A stepwise research approach has been undertaken to ascertain a broad perspective for an in- depth understanding of the context (Cook & West, 2012) and linkages between DT and HC.

The first step was the literature search through the EBSCO host databases ‘Business Source

Ultimate’ and ‘Business Source Complete’ (see e.g., Mas-Tur, Kraus, Brandtner, Ewert, & Kürsten, 2020). Since digitalization in HC, understood as the use of information technology for processing and managing data, information, and processes, started to become popular in the early 2000s (Agarwal et al., 2010), the 2000–2019 time frame was

set. Non-refereed articles, conference papers and book chapters have been excluded from the search.

An initial search included the keyword combinations ‘digital AND ‘healthcare’ both in titles only to ensure that publications covering both core areas could be identified. This first search yielded 31 articles. With the intent to increase the breadth of the SLR, a further broader search should produce a more significant number of articles: Hence, even if many were less relevant to the present topic, the combination ‘digital\*’ in titles AND ‘healthcare’ in abstracts was applied.



## 4.2 BACKGROUND OF THE STUDY

Digital disruption has become a phenomenon of the 21st century that is transformational in all traditional industrial contexts (Ford, Compton, Millett, & Tzortzis, 2017), affecting all levels of business and society (Schallmo & Williams, 2018). The introduction of digital solutions in organizations requires systematic changes of “working, roles and business offering” (Parviainen, Tihinen, Kääriäinen, & Teppola, 2017, p.64).

The performance of a company is affected by new technologies and connectivity of all stakeholders across the value-added chain (Schallmo & Williams, 2018). The concept of DT incorporates digital trends at different levels, including technology, processes, organizational aspects, especially business model disruption and society (Klewes, Popp, & Rost-Hein, 2017).

Four disruptive digital-enabled concepts currently are supporting the DT of organizations:

- 1) The fourth industrial revolution, or Industry 4.0 (I4.0), which relates to “the systematic connection of technical components and processes [...], supply and [...] business relationships including all logistical elements” (Klewes et al., 2017, p.11).

It is based on the concept of I4.0, the Internet of Things (IoT), which describes the interconnection of computing power and data flows of smart objects that enable the autonomous control of daily life processes (Klewes et al., 2017); 2) Artificial Intelligence (A.I.), understood as the transformation of service processes into automated processes that rely on intelligent computer systems or computer-controlled robots that do not require human intervention to execute tasks associated with intelligence (Copeland, 2019).

The concept of Big Data was used to describe the “volume, velocity and variety of data” (Manogaran et al., 2017, p. 264) that becomes increasingly difficult to analyze through conventional data processing tools. Currently, digital technologies enable homogenization and storing of significant amounts of data using big data analytics, or “advanced tools and techniques to store, process, and analyze the large volume of data” (Manogaran et al., 2017, p. 264).

The adoption of ICT has been affecting the HC sector since the mid-20th century (Ford et al., 2017). On example of this is improved research and care delivery. The introduction of the Internet in the mid-1990s has strongly impacted the way in which stakeholders communicate (Arni and Laddha, 2017, Suggs, 2006).

The paradigm shift in HC organizations has only incrementally changed the HC industry over the last 20 years (Tuzii, 2017). ‘DT in HC’ refers to the adoption of new technologies that enables the shift towards secure, high-quality care (Haggerty, 2017).

Belliger and Krieger (2018, p. 311) add the aspects of “new developments as selftracking, big data and predictive analytics, e-health, mobile health, participative medical research, e-patient communities, [...] and shared decision making in diagnosis and e-therapy”.

Such connotations makes DT in HC a concept that overlaps with digital health, which refers to the “use of information and communications technologies to improve human health, healthcare services, and wellness for individuals and across populations” (Kostkova, 2015).

Recently, Marques and Ferreira (2020), in their review of 45 years of literature about DT in HC, found seven technology-related areas of research: 1) Integrated Management of Information Technology in Health; 2) Medical Images; 3) Electronic

Medical Records; 4) Information Technology and Portable Devices in Health; 5) Access to E- Health; 6) Telemedicine; and 7) Privacy of Medical Data.

Big data in HC is rooted in clinical research results, Electronic Health Records (EHR), as well as consumers' personal data retrieved from self-tracking devices, e.g. wearables for work- monitoring or sports (Belliger & Krieger, 2018). Patient data typically includes all treatment- related documentation, such as written and visual medical records, doctors' letters, e- prescriptions, insurance claims (Haggerty, 2017). Siemens, (2016) specifies four main HC data generators: HC providers, ancillary service providers (e.g. pharma companies), public and private institutions, and patients.

Given the fact that population is on the rise in the developing parts of the world, health data analytics are driving global changes in medical treatment models. This, among other things, is driving the untapped potential of data from today's HC models is relevant (Reddy & Brahm, 2016).

Proper use of medical big data requires accurate data gathering and analysis, including health records, genomics, and information retrieved from different applications. Big Data analytics can promote personalized individual care to predictive models for big population groups.

Big data and data analytics in HC establish a basis for electronic health records (EHR), "[A] repository of patient data in digital form, stored and exchanged securely, and accessible by multiple users" (Häyrinen, Saranto, & Nykänen, 2008, p. 293). By 2015, 'Electronic Medical

Records' (EMR) were implemented and used throughout many independent entities including HC providing institutions, insurers, and patients (Evans, 2016).

EMR are "digitalized systems which functionally provide patient history, patient demographics and registration details" (Chakravorty, Jha, and Barthwal (2018, p. 9) for professionals' use, often based on telemedicine approaches. The concept of telemedicine traces back to the 19th century (Arni & Laddha, 2017).

Telemedicine is "the delivery of [HC] services, where distance is a critical factor, by [...] using [ICT] for [...] treatment and prevention of disease and injuries, research and evaluation, and for continuing education of [HC] providers, all in the interests of advancing

the health of individuals and their communities” (World Health Organization (2010), 2010, p. 8). Related functional branches of telemedicine encompass teleconsultation, telecare, telemonitoring or telehealth, and tele diagnoses (Arni and Laddha, 2017, Ford et al., 2017, Tuzii, 2017).

### 4.3 PROBLEM STATEMENT OF THE STUDY

STUDY ON DIGITAL TRANSFORMATION IN HEALTHCARE SECTOR

### 4.4 OBJECTIVES OF THE STUDY

- Assessment Of technological adoption
- Improvement of patient care and outcomes
- Staff adoption and satisfaction
- Cyber security and data privacy



## 5. RESEARCH METHODOLOGY

Conducting a study on digital transformation in the healthcare industry requires a well-structured research methodology to ensure the validity and reliability of the findings. The primary data were collected by conducting interview and distributing questionnaires with the help of Google forms among healthcare workers. Secondary data were collected from published sources like journals, articles and websites. Sample sizes of 300 were taken.

Sampling units chosen are the healthcare workers including nurses, doctors and others.

Here is a suggested research methodology

### 5.1 RESEARCH DESIGN

Choose between qualitative, quantitative, or mixed methods approach based on the research questions and available resources.

## 5.2 SOURCES OF DATA

### 1. Academic Journals and Publications:

Journals like the Journal of Medical Internet Research (JMIR) and the International Journal of Medical Informatics often publish studies on digital transformation in healthcare.

### 2. Healthcare organizations and providers:

Hospitals, clinics and healthcare systems often publish reports or case studies on their own digital transformation efforts

### 3. Questionnaire

Circulating a google form to the patients and healthcare providers. To get the data for the study

## 5.3 DATA COLLECTION METHOD

### 1. Questionnaire:

The questionnaire will be distributed electronically using online survey platforms. The sample will be selected using a convenience sampling method, targeting The patients, medical students, IT students and healthcare providers working in diverse settings (e.g., hospitals, clinics, long-term care facilities). The survey will include informed consent, confidentiality assurances, and contact information for the research team for any queries or concerns.

### 2. Semi-Structured Interviews:

For the interviews, a purposive sampling strategy will be employed to ensure a diverse range of healthcare providers in terms of profession, experience, and geographic location. Participants will be recruited through professional networks, healthcare organizations, and snowball sampling. Interviews will be conducted either in person or via video conferencing platforms, audiorecorded with consent, and transcribed for analysis.

## 5.4 POPULATION

The population for digital transformation in healthcare sector survey in the Inpatient Department (IPD) typically consists of all the patients who have received care or treatment in that department during a specific period of time. For this research I will collect around 300 responses, that includes:

1. All inpatients admitted to the department during a certain time frame.
2. Patients who were discharged from the IPD during the survey period.
3. It may also include family members or caregivers of the patients, depending on the survey's design and objectives.
4. Healthcare employee

## 5.5 SAMPLING METHOD

When designing a questionnaire for a study on digital transformation in the healthcare sector, it's important to carefully consider your sampling method to ensure that it accurately represents the population you're interested in studying. Here we have used the random sampling method to study on digital transformation in healthcare sector in Gujarat.

## 5.6 SAMPLING FRAME

The sampling frame is study focused on the particular state like Gujarat.

## 5.7 DATA COLLECTION INSTRUMENTS

Data collection tools used are questionnaires. The primary data was collected using semi-structured questionnaire which comprised of both open and closed ended questions. The survey will be developed using a standard survey design process. The questions will be pre-tested with a small sample of to ensure that they are clear and understandable. The interviews will be semi- structured, allowing the interviewer to explore the condition experiences in depth. The interviews will be recorded and transcribed for analysis.

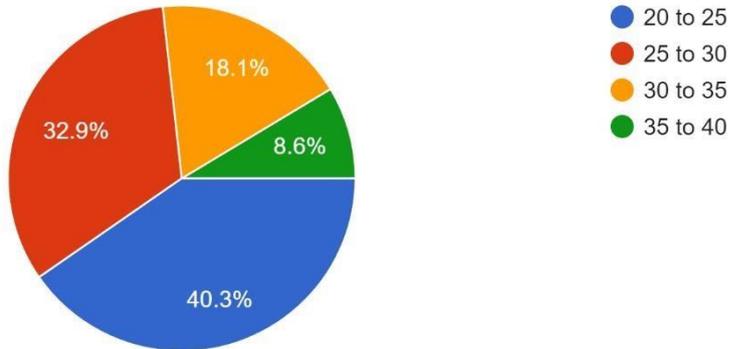
## DATA ANALYSIS AND INTERPRETATION

According to google form questionnaire I got some data and information for research purpose.

After analysed the data and information I got result as per mentioned below:

### Age

243 responses

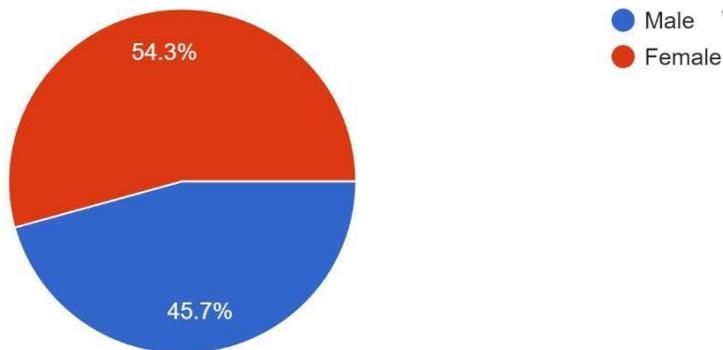


I collect total 243 respondents from questionnaire.

As per the data there are 40.3% people are in the age of 20 to 25 years, 32.9% people are in the age of 25 to 30 years, 18.1% people are in the age of 30 to 35 years and 8.6% people are in the age of 35 to 40 years.

### Gender

243 responses

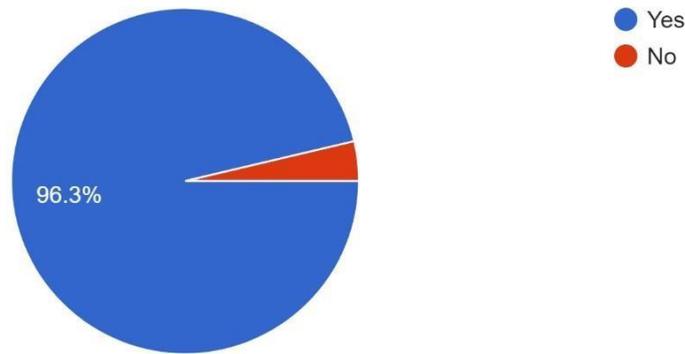


As per the gender data total 45.7% male have respond and 54.3% women have responded.

This shows that in Gujarat region as per my sample size male respondents are more as compared to female respondents.

Are you familiar with the concept of "digital transformation " in the healthcare sector?

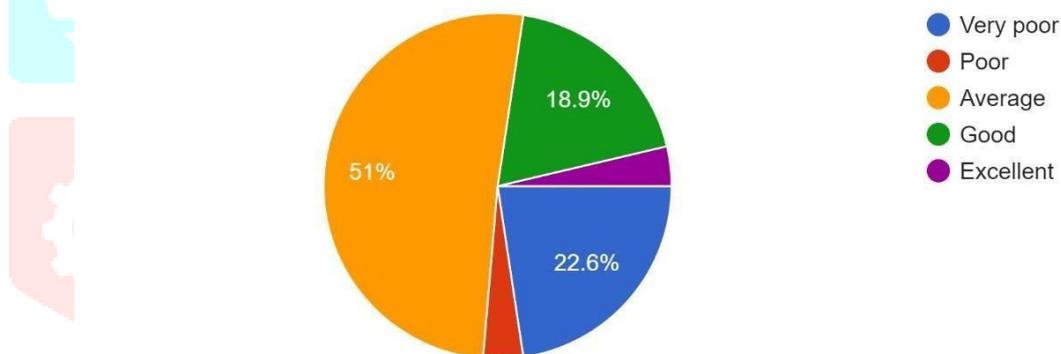
243 responses



According to data there are 96.3% people are familiar with the concept of digital transformation in healthcare sector.

How would you rate your understanding of digital transformation in Healthcare?

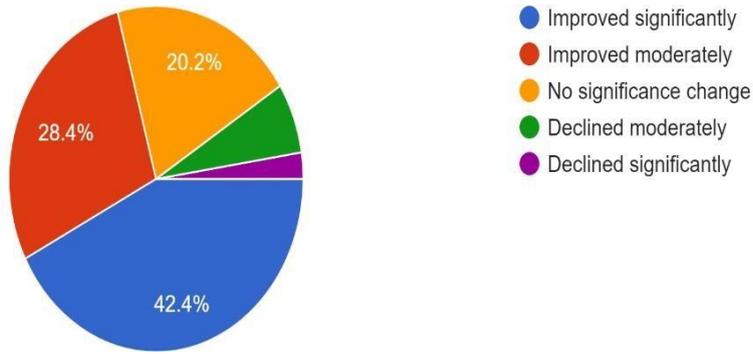
243 responses



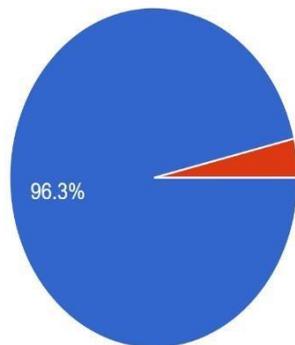
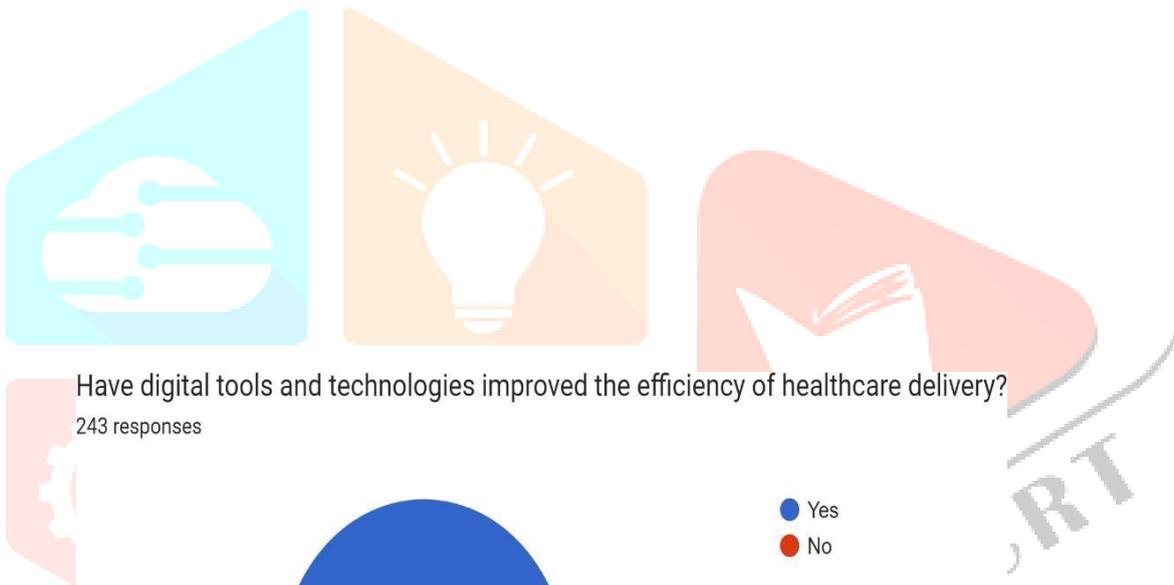
22.6% people understand the concept of digital transformation in healthcare is very poor, 18.9% people understand this concept good and 51% people understand this concept on average level.

In your opinion, how has digital transformation affected the quality of patient care?

243 responses



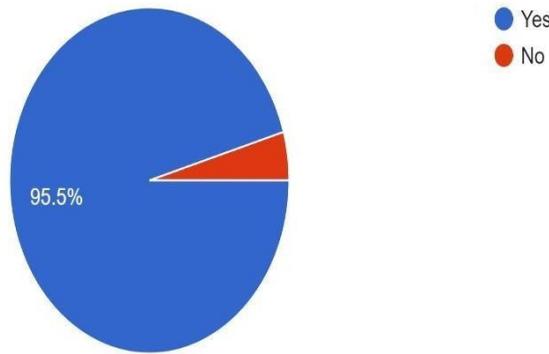
As per the collected data it can be seen that 42.4% people believe that digital transformation has improved significantly while 28.4% believe that it is improved moderately and 20.2% finds that there are no changes even due to digital transformation.



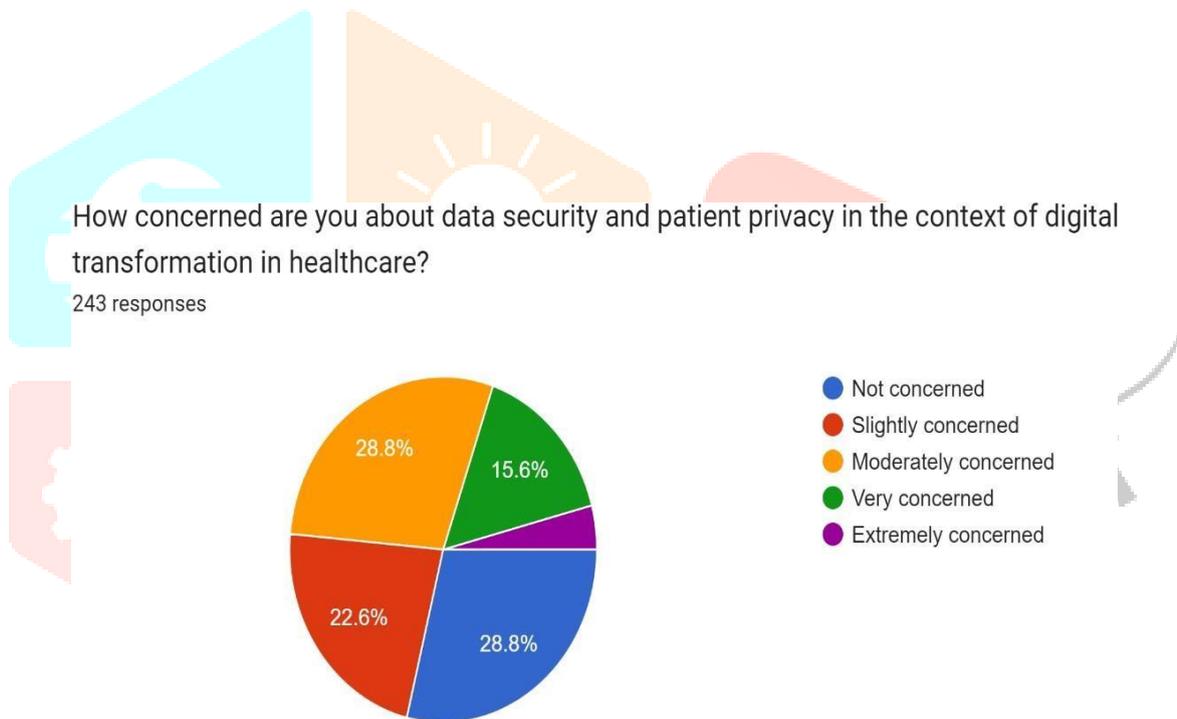
According to the data collected it is found that 96.3% people believe that digital tools and technologies improved the efficiency of healthcare delivery.

Have patients expressed satisfaction with the digital aspects?

243 responses



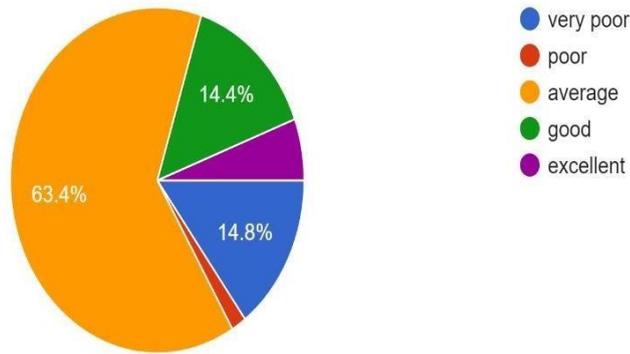
The collected data shows that 95.5% people expressed satisfaction with the digital aspects.



The data shows data 28.8% people are not concerned about data security and patient privacy in the context of digital transformation in healthcare while 22.6% are slightly concerned, 28.8% are moderately concerned and 15.6% people are very concerned.

How much the healthcare workers are satisfy with the digitalization in healthcare sector?

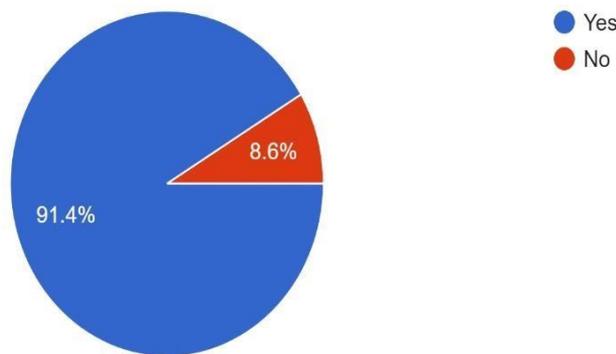
243 responses



As per the responses it is find out that 63.4% healthcare workers are average satisfy while 14.8% are not really satisfied and 14.4% are more than average satisfied.

Have you ever used digital healthcare services (e.g., telemedicine, health apps, online consultations, etc.)?

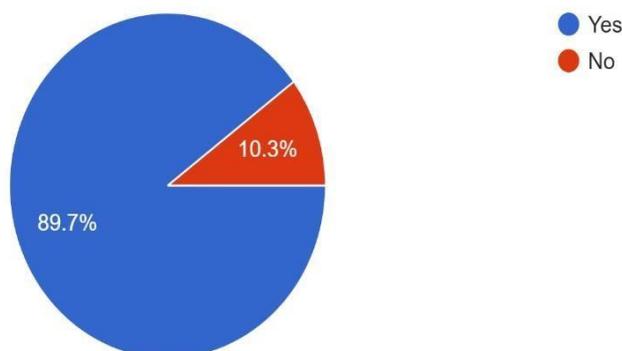
243 responses



The collected data shows that 91.4% have used the digital healthcare services while others have not used.

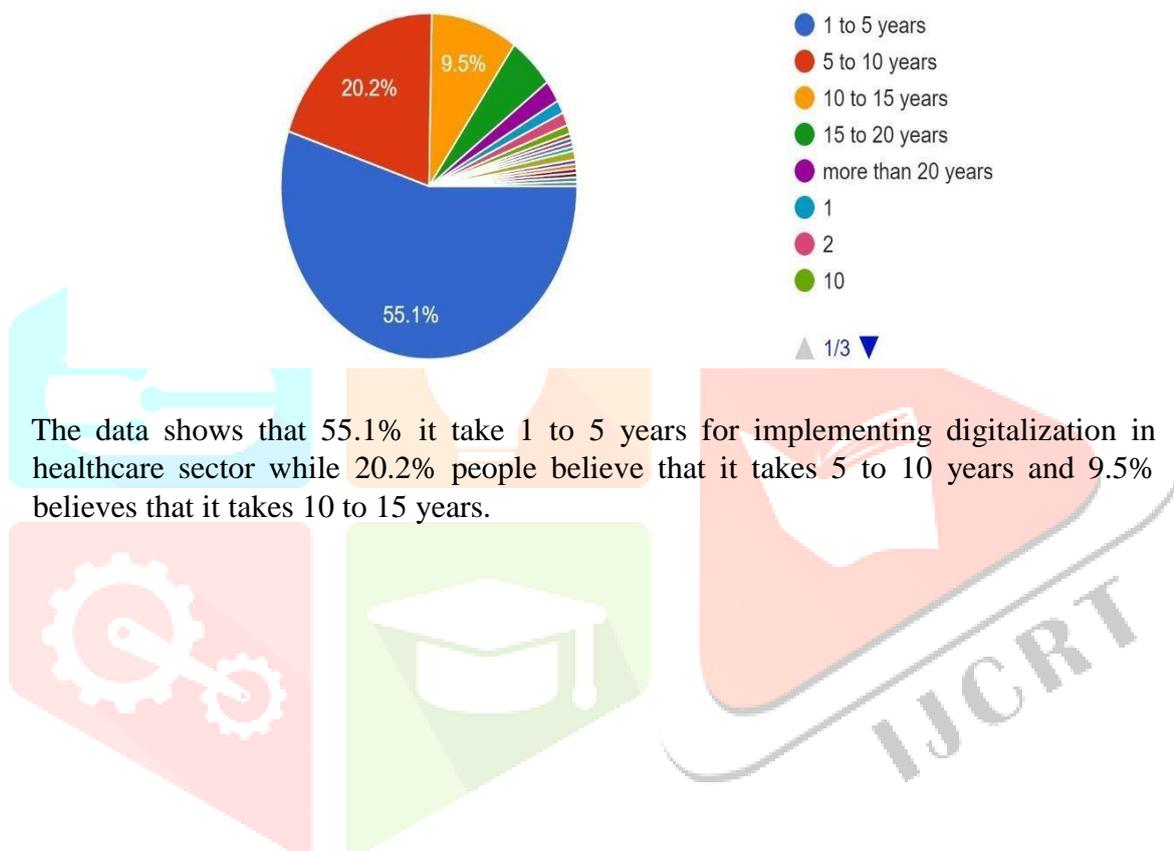
Do you use any health apps or wearable devices to monitor your health (e.g., fitness tracker, diet tracker, etc.)?

243 responses



The collected responses shows that 89.7% have used digital apps to monitor health while rests have not.

In your opinion, how much time it can take to implement the digitalization in healthcare sector  
243 responses



## 7. Findings

According to the data it is find out that majority of the people are very much familiar with the concept of digital transformation.

It is also found out from the research that average number of people are able to understand the concept of digital transformation which shows the neutral response.

The research also find the digital transformation affected the quality of patient care moderately.

The study also shows that patients are higly satisfied with the digital aspects.

It also shows that average number of workers are satisfies with the digitalization in healthcare sector.

It also find the most of the people have used the digital healthcare services.

It is also found that majority have use the digital apps.

The study finds that it will take years for implementing the digitalization in healthcare sector.



## Suggestions:

- It is suggested to the government provide proper training sessions to the healthcare providers.
- It is also suggested to the hospitals to conduct campaign so that healthcare workers can get more knowledge about digitalization in healthcare sector.
- It is also suggested to make people too to get aware about the digital healthcare services. It is also suggested to provide benefits to the people of digital services.
- It is suggested to the hospitals for initiating the digitalization services.



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