

**e-HEALTHCARE SERVICE QUALITY of PATH LABS- CUSTOMER
SATISFACTION and its ASSOCIATION with
DEMOGRAPHIC VARIABLES**

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By

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2023

DECLARATION BY STUDENT

I hereby declare that this dissertation titled “e-HEALTHCARE SERVICE QUALITY of PATH LABS- CUSTOMER SATISFACTION and its ASSOCIATION with DEMOGRAPHIC VARIABLES” is the Bonafede record of my original research work. I declare that it has not been submitted to any other university or institution for the award of any degree or diploma. Information derived from the published or unpublished work of others has been duly acknowledged in the text.

(Signature)
Satyam Kumar

May 24, 2023

CERTIFICATE

This is to certify that dissertation titled “e-HEALTHCARE SERVICE QUALITY of PATH LABS-CUSTOMER SATISFACTION and its ASSOCIATION with DEMOGRAPHIC VARIABLES” is a record of the research work undertaken by Satyam Kumar in partial fulfilment of the requirements for the award of the degree of MBA Pharmaceutical Management from the IIHMR University, Jaipur under my guidance and supervision and his approach to the research study has been sincere, scientific, and analytical.

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ABSTRACT

The first stage in managing a condition is diagnosis because accurate treatment cannot be administered without a proper diagnosis. Opportunities abound in India for those who work in the diagnostic services sector. The nation is become a popular location for a range of diagnostic services. Additionally, India's burgeoning middle class and urbanization are being fueled by the country's booming economy, which is creating more disposable income for healthcare.

The introduction application of technology in healthcare and diagnostic e-Health services, also referred to as electronic health records, are a byproduct of these services. Ought to revamp the current healthcare system in developing nations like India. Not only has it affected the availability and method of delivery of these services but has also elevated the consumer to a pivotal position as a whole system.

The primary goal of this continuing project is to discover the key quality parameters that influence customer satisfaction with regard to e-Healthcare services provided by path labs in India. Furthermore, the study intends to investigate the possible relationship between the demographic characteristics of the respondents and the determinants of consumer satisfaction. The study intends to shed light on these issues and provide significant insights by using Zinedine's 5Q model as a framework.

It was discovered healthcare providers must focus on quality of infrastructure, interactional and environmental quality as these are the qualitative parameters which influence overall customer satisfaction mostly. Practices by path labs must establish faith in the patients that these services are reliable and will only make the process easier for them.

ACKNOWLEDGEMENT

As I have come towards the completion of my project report, I would like to seize this Opportunity to acknowledge all the valuable contribution in my study.

It imparts me immense pleasure to take advantage of this once-in-a-lifetime opportunity to express my profound gratitude and humble regards to my esteemed Guide Dr. Sudhinder Singh Chowhan Associate Professor, School of Pharmaceutical Management, IIHMR, Jaipur, for his unparalleled and excellent, continuous encouragement and support which helped me in completion of my course and dissertation. Throughout the course, his discipline, views, simplicity, and tenacious work atmosphere is something what I always admired.

I owe a great deal of gratitude to him as without his cooperation it would have been difficult to shape my project work.

I often wonder if witnessing "GOD" in mortal life is like having parents who always bestow their best blessings on me. To express my gratitude from the bottom of my heart. I prostrate myself at the feet of my adored Parents, sister, and other family members, whose unwavering life principles, love, and affection have always been unshared and showered upon me at all stages of life, giving me more than I deserved in my life, and without whose encouragement, cooperation, and good wishes the work would have been impossible.

Last but not least, I'd want to express my gratitude to "GOD- Almighty," who stipulated me the strength and confidence to pursue my ambition and showered me with his most precious blessings.

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ABBREVIATIONS

FDI	Foreign Direct Investment
CAGR	Compound Annual Growth Rate
PHCs	Primary Healthcare Centers
US	United States
GDP	Gross Domestic Product
FY	Fiscal Year
DIPP	Department of Industrial Policy and Promotion
CHC	Community Health Centers
AI	Artificial Intelligence
LASI	Longitudinal Ageing Study in India
R&D	Research & Development
DPIIT	Directorate of Industry and Internal Trade Promotion
SAL	‘Stand-alone’ laboratory
HAML	Hospital Attached Mobile Laboratories
NABCL	National Accreditation Board for Testing and Calibration Laboratories
IA	India Accelerator
M&A	Merger and Acquisitions
EHR	Digital Health Records
EHR	Digital Health Records
CCI	Competition Commission of India
NBCFDC	Corporate Finance and Development for Nationally Backward Classes

EXECUTIVE SUMMARY

The first stage in managing a condition is diagnosis because accurate treatment cannot be administered without a proper diagnosis. Opportunities abound in India for those who work in the diagnostic services sector. The nation is become a popular location for a range of diagnostic services. Additionally, India's burgeoning middle class and urbanization are being fueled by the country's booming economy, which is creating more disposable income for healthcare.

The introduction application of technology in healthcare and diagnostic e-Health services, also referred to as electronic health records, are a byproduct of these services. Ought to revamp the current healthcare system in developing nations like India. Impacts service availability, delivery methods, consumer importance.

The primary aims of the Project is to identify quality parameters influencing customer satisfaction in e-Healthcare services using Zinedine's 5Q model.

It was discovered healthcare providers must focus on quality of infrastructure, interactional and environmental quality as these are the qualitative parameters which influence overall customer satisfaction mostly. Practices by path labs must establish faith in the patients that these services are reliable and will only make the process easier for them.

1) INTRODUCTION

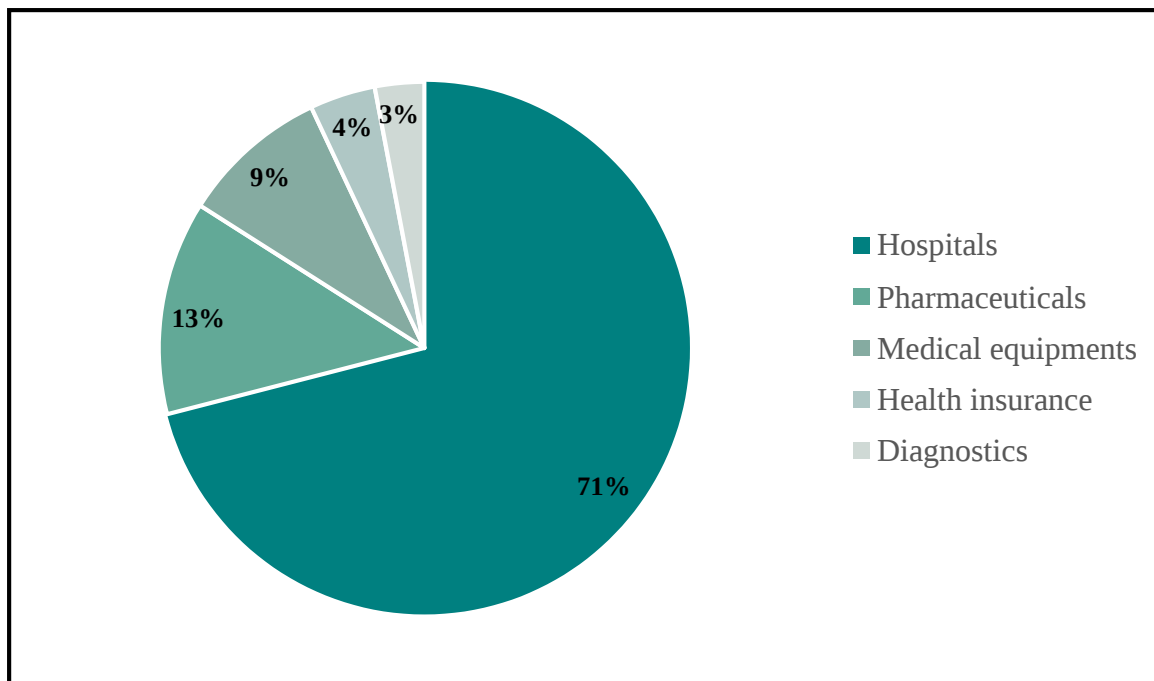
1.1 HEALTH CARE INDUSTRY OVERVIEW:

In India, the healthcare business is extremely important economically and in terms of jobs. Comprehensive coverage of clinical trials, telemedicine, hospitals, medical equipment, insurance, pharmaceuticals. Healthcare industry is divided into various segments.

Figure 1. India's healthcare industry has risen substantially in the last 2-3 years, considerably exceeding previous expectations. This is attributable to a number of factors, including increased coverage, enhanced services, and increased investment from both public and private institutions.

There are two types of healthcare in India: public and private. While some tertiary and secondary care facilities exist in major cities, the government's primary goal in the public healthcare system is to establish primary healthcare centers (PHCs) in rural areas. The private sector, on the other hand, predominantly operates secondary, tertiary, and quaternary care institutions in major cities, tier I cities, and tier II cities.

Figure 1 Segment-wise break-up of Indian Healthcare Industry 2019



Source: Industry, ICICI Direct Research

Because of a multitude of factors, the Indian healthcare market is quickly developing. For example, the prevalence of lifestyle diseases is rising day by day considerably, increasing demand for healthcare services. Rising healthcare costs have fueled demand for low-cost healthcare delivery alternatives.

Furthermore, the quick adoption of health insurance has played an important role in increasing healthcare availability and affordability. Government programs such as e-health, which promote digital healthcare solutions and services, have also contributed to the development of the healthcare sector.

Furthermore, government tax breaks and incentives have stimulated investment in the healthcare industry, resulting in further expansion and development. These factors are combining to drive the rise of the Indian healthcare market, assuring better healthcare access and improved services for the population.

1.1.1 MARKET SIZE OF INDIAN HEALTHCARE SECTOR

India's healthcare market is expected to expand significantly. It is predicted to triple by 2022, reaching Rs. 8.6 trillion (US\$ 133.44 billion). In the 2021 budget, India's public healthcare spending was 1.2% of GDP, but this is expected to climb to 2.5% by 2025.

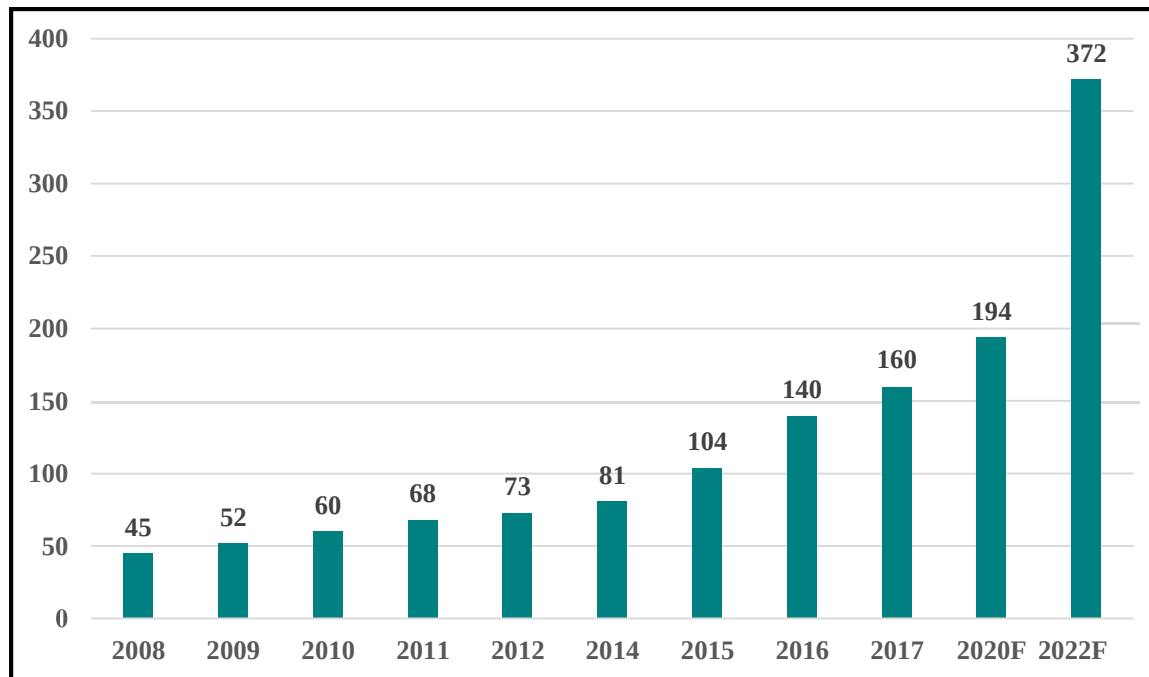
Health insurance is getting more common in India. In FY20, gross direct premium income from health insurance climbed 17.16% year on year to Rs. 51,637.84 crores (US\$ 7.39 billion).

The Indian healthcare sector accounts for 80% of the global healthcare market, attracting significant financial interest both domestically and internationally. The hospital industry is predicted to grow at a 16-17% CAGR, reaching \$132 billion by 2023, up from \$61.8 billion in 2017.

The medical tourism industry in India is expected to grow fast, with an annual growth rate of 18% projected by 2020, making it a \$9 billion market.

Figure 2 shows a graphical representation of the growth trajectory in the Indian healthcare sector.

Figure 2. Growth Trend in the Healthcare Sector in US Billions CAGR – 16.3%



Sources include Deloitte, LSI Financial Services, Aranca Research, and Frost & Sullivan.

1.1.2 RECENT DEVELOPMENTS IN THE HEALTHCARE SECTOR

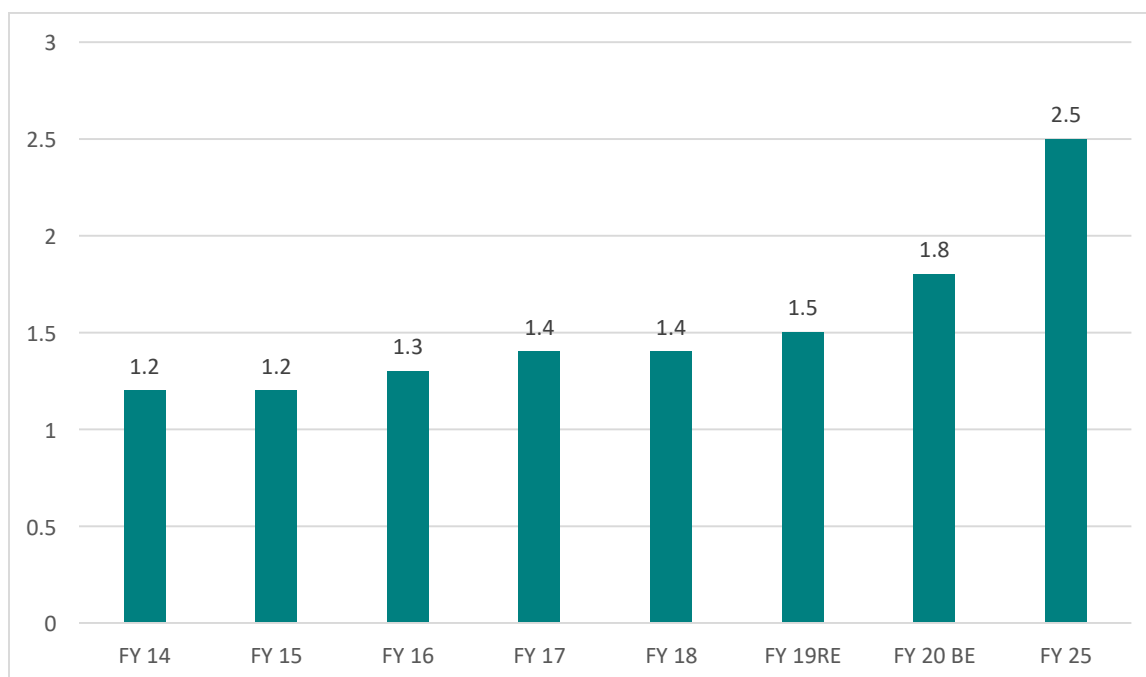
According to DPIIT data, India's medications and pharmaceuticals sector attracted around US\$17.74 billion in FDI from April 2000 to December 2020. This demonstrates a keen interest in and investment in India's healthcare sector. Consider the following noteworthy healthcare undertakings and developments in India:

1. Government of India's Digital Health Initiatives
2. Ayushman Bharat Scheme to benefit poor population of India
3. Priority on Research and Development to take India way ahead in the world
4. Public-Private Partnerships which are becoming quite fruitful.
5. Innovation in HealthTechnology unlocking several potential

1.1.3 PER CAPITA HEALTHCARE EXPENDITURE IS ON THE RISE

On fiscal year 2021, India's public investment on healthcare was 1.2% of GDP. The government, on the other hand, wants to increase public health spending to 2.5% of GDP by 2025. This demonstrates a dedication to improve healthcare infrastructure and services. Furthermore, the share of healthcare in GDP is expected to climb to 19.7% by 2027, highlighting the growing importance of the healthcare sector in the Indian economy.

Figure 3 Government Healthcare expenditure as % of GDP



Source: World Bank, Economic Survey FY20

1.1.4 RECENT TENDS IN HEALTHCARE SECTOR

- The healthcare landscape in India is shifting away from communicable diseases and towards lifestyle diseases. Because of rising urbanization and the limitations of modern urban living, nearly 50% of in-patient bed spending is now devoted to addressing lifestyle diseases. These illnesses are all risk factors for high cholesterol, high blood pressure, obesity, poor diet, and alcohol use.
- The expansion of medical facilities to the lowest-income and tier-III towns is a significant step forward. The government has offered tax exemptions for the first five years to encourage the

private sector to establish hospitals in these cities, thereby improving healthcare access and infrastructure in previously underserved areas.

- The use of artificial intelligence (AI) in healthcare is increasing. Individuals can consult with doctors, physicians, and specialists directly using AI-based applications for personalised and efficient treatment. It contributes to the resolution of issues confronting patients, doctors, hospitals, and the healthcare industry as a whole, resulting in better outcomes.
- Telemedicine has emerged as a rapidly growing sector in India. Several well-known hospitals, have established telemedicine services and public-private collaborations. This technology bridges the rural-urban divide by providing low-cost consultation and diagnosis services in remote locations using high-speed internet and connectivity. The Health Ministry's e-Sanjeevani telemedicine initiative has permitted nearly 3 million teleconsultations since its start, Patients can visit with doctors from the convenience of their own homes.

1.1.5 GROWTH DRIVERS

Several reasons are contributing to increased demand in the Indian healthcare business. Rising salaries and affordability have boosted demand for healthcare services. In addition, the country's ageing population and altering disease patterns have boosted need for specialised care. Medical tourism has also contributed significantly to the growth of demand for healthcare services. Furthermore, there is a greater emphasis on wellness, preventive care, and early detection, which is driving up demand for healthcare facilities.

The government has made substantial policy investments in healthcare. Private-sector foreign direct investment (FDI) policies have drawn money and promoted industry

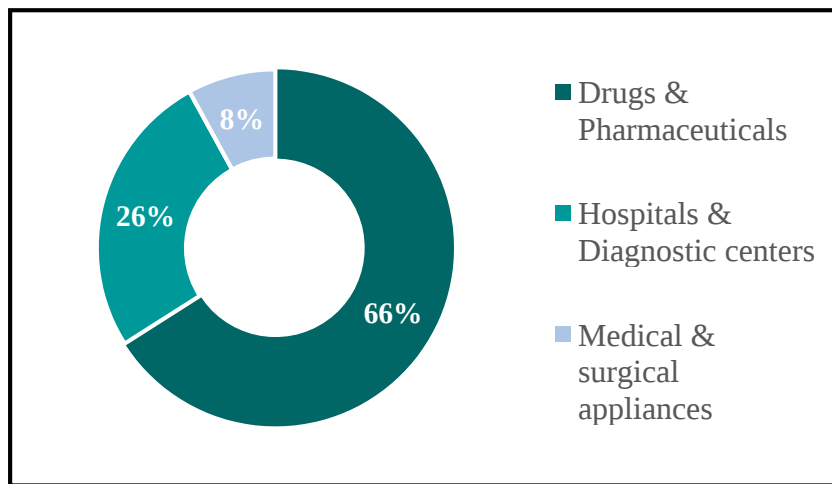
growth. Customs and taxation on life-saving equipment have been cut, making healthcare more affordable. The National Rural Health Mission (NRHM) has set aside \$10 billion for enhancements to healthcare facilities. The National Health Insurance Mission, which aims to cover the entire population, has aided the growth of the sector.

The Indian healthcare business has been focusing on strengthening R&D capabilities and distribution facilities within the country. There is a focus on implementing modern technology to improve healthcare delivery and patient outcomes. India is also lending its knowledge and resources to global projects, contributing to global healthcare initiatives.

Mergers and acquisitions (M&A) have increased in the sector as a result of rising FDI and private sector investments. This has resulted in profitable investment opportunities. Foreign businesses are creating research and development centers and hospitals in India, which is fueling the industry's expansion.

The Indian healthcare sector has experienced tremendous investment in terms of FDI inflows. The automatic method allows for 100% FDI in Greenfield projects, while the government route allows for up to 100% FDI in brownfield projects. Between April 2000 and December 2020, FDI inflows into the medicines and pharmaceuticals sector totaled US\$ 17.74 billion. Inflows into hospitals and diagnostic centers, as well as medical and surgical appliances, reached US\$ 7.03 billion and US\$ 2.17 billion, respectively, during the same period. These figures demonstrate the appeal of Indian healthcare business to foreign investors.

Figure 4 FDI inflows from April 2000 to December 2020 into the healthcare sector



Source: Department of Industrial Policy and Promotion

1.1.6 OPPORTUNITIES IN HEALTHCARE INDUSTRY

Health Infrastructure	• 1.54 million doctors are required by 2025 for growing demand • Over \$500 billion planned for infrastructure investment by 2025.
Research	• LASI Wave-1 report utilized for elderly and vulnerable patients.
Health Tech	• India Accelerator (IA) announced its plan in December 2020 to accelerate Indian Healthcare systems through startups • e- Healthcare services on the rise majorly due to the pandemic
Medical Devices	• Due to an ageing population, more knowledge, and lower medical care costs, this business is predicted to grow and reach US\$ 11 billion by 2022.

1.2 INDIAN DIAGNOSTIC INDUSTRY

The laboratory diagnostics industry in India, currently valued at around USD 6 billion, is experiencing robust growth at an annual rate of 13-14%. With over 100,000 labs spread across the country, this industry remains highly fragmented, with the largest organized players holding less than a 5% market share. Its significance extends throughout the care continuum, encompassing diagnosis, prevention, monitoring, and treatment. In fact, a substantial 70% of medical decisions worldwide are influenced by laboratory results.

Over the years, the industry has evolved from being a mere investigation provider to becoming a customer-centric solution provider. This industry's value chain is made up of three main components: clinical, retail, and logistical. In terms of clinical testing, the business has matured and now provides a wide range of tests, with roughly 4,500 possibilities accessible. India presently provides the majority of medical testing performed internationally. In terms of the retail component, large laboratories have effectively built collection centers across India, even in the most rural and poorest regions, ensuring these populations' access to healthcare services.

Finally, in terms of logistics, firms have devised effective procedures for collecting frequent samples from these remote places and transporting them to their reference labs located several kilometers away. This method offers quick turnarounds while simultaneously protecting sample integrity by preventing contamination.

The diagnostic segment is a critical component of the healthcare system, accounting for nearly 80% of physician diagnoses worldwide. It consists of three types of tests: routine, clinical lab, and specialty tests.

- Routine tests: These are common tests that are widely performed, including measurements such as sugar levels, cholesterol levels, HIV screening, pap smears, and pregnancy tests, among others. Routine tests are essential for general health check-ups and the early detection of certain conditions.
- Clinical lab tests: these tests are specifically designed to monitor diseases and the effectiveness of drug treatments. They provide valuable insights into the progress of a disease, its severity, and the response to various therapies. Clinical lab tests cover a wide range of conditions and play a crucial role in managing and treating diseases.
- Specialty tests: This category includes tests that focus on specific areas of study within the field

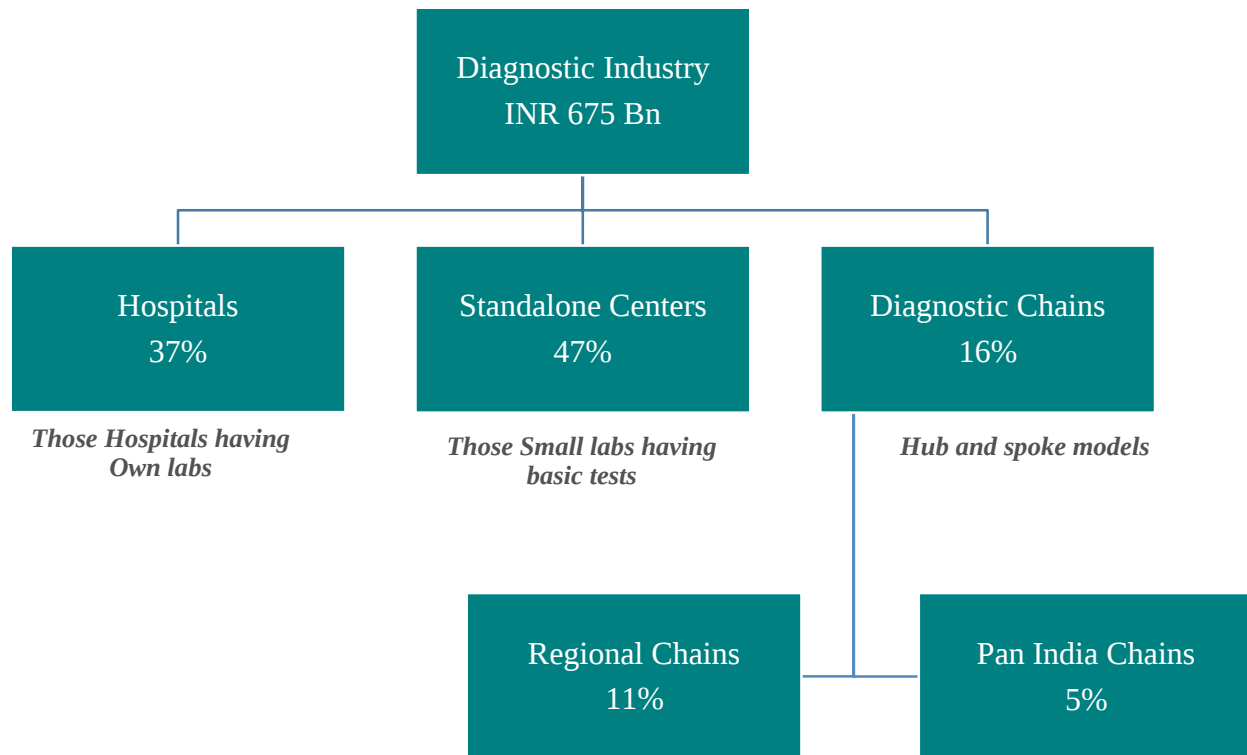
of laboratory diagnostics. Specialty tests encompass various disciplines such as genetics, immunology, oncology (cancer-related tests), endocrinology (hormone-related tests), and other critical segments. These tests require specialized expertise and advanced techniques to provide accurate and detailed information about specific diseases or conditions.

Despite operating at a relatively small fraction of the total healthcare expenditure, which is approximately 4-5%, the medical diagnostics industry holds significant influence over the remaining 95% of healthcare costs. This industry has a significant impact on medical decisions because laboratory diagnostic results are used in approximately 70% of early illness diagnosis, patient prognosis, and treatment selection decisions. Diagnostic tests not only aid in selecting appropriate treatment regimens but also contribute to monitoring patient conditions during recovery and follow-up.

Laboratory tests supply roughly 80% of the objective data available in clinical records due to their various touch points throughout the healthcare process. With the introduction of data analytics and artificial intelligence (AI) in modern medicine, these clinical records are primed to become critical in predictive analysis and disease preventive initiatives. The integration of advanced technologies allows for the extraction of valuable insights from these records, leading to proactive measures aimed at predicting and preventing diseases.

By leveraging the wealth of information contained within clinical records, healthcare professionals can enhance their understanding of disease patterns, risk factors, and potential interventions. This evolving landscape of data-driven medicine holds great promise for improving patient outcomes, optimizing resource allocation, and driving evidence-based decision-making in the field of healthcare.

1.2.1 STRUCTURE OF INDIAN DIAGNOSTIC INDUSTRY



1.2.2 BUSINESS MODEL OF DIAGNOSTIC CENTERS

In India, laboratories are classified as either public or private sector diagnostic laboratories, with further subcategories of 'Hospital-attached' laboratories (HAL) or 'Stand-alone' laboratories (SAL). HALs can be located on hospital grounds as 'Hospital-attached fixed' laboratories (HAFL), or they can be attached to the hospital as 'Hospital-attached mobile' laboratories (HAML). SALs, on the other hand, are independent laboratories that are not affiliated with hospitals and can be run by the government, individuals, or corporations.

HAFLs might be owned by the hospital or have a contract with private laboratories that are given facilities on the hospital grounds. Public HAFLs can be found at all levels of care, including primary, secondary, and tertiary care. Laboratory services are available in sub-centers (SC), primary health care centers (PHC), community health centers (CHC) in rural areas, and dispensaries in urban areas. These laboratories largely serve the population's primary healthcare requirements.

Secondary-level laboratories can be found in urban sub-district hospitals (SDH), maternity and child hospitals (MCH), and district hospitals (DH). These laboratories are designed to meet both urban and rural populations' secondary healthcare needs. Tertiary diagnostic laboratories can be found in tertiary care hospitals that are affiliated with medical schools. These laboratories are outfitted with advanced diagnostic equipment and are linked to specialized medical care.

Smaller hospitals and clinics, on the other hand, may not have their own laboratories and must rely on the services of SALs. These independent laboratories are critical in serving the diagnostic needs of healthcare facilities that lack in-house laboratory capabilities.

The existence of several laboratory settings throughout the country guarantees that diagnostic services are offered at various levels of healthcare, meeting the demands of both rural and urban populations.

Hub and Spoke Model

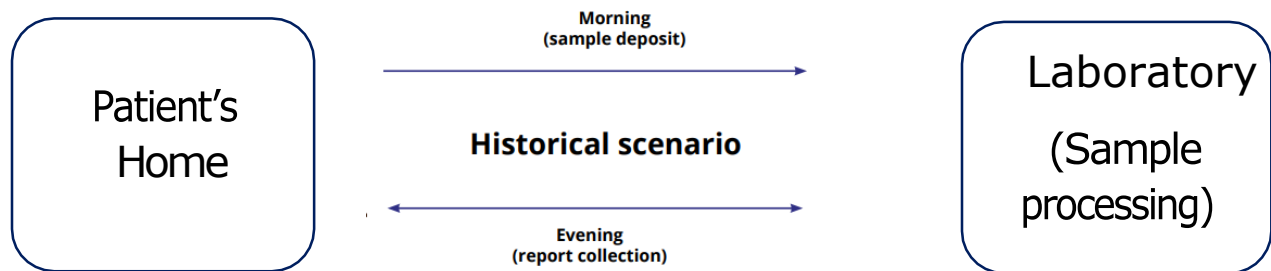
Improved healthcare infrastructure is in high need in Tier II and Tier III cities. It is proposed that a state-wide network of radiology centers and pathology centers on a hub and spoke model would be an effective model to ensure an adequate diagnostic facility across the state.

Hub will have high end equipment like MRI & CT Scan. Spoke will have equipment such as X-ray and ECG machines which perform routine tests such as blood sugar test, blood pressure check and also act as collection centers.

- The proposed model will have 1 reference lab with state-of-the-art technology to conduct routine, specialized pathology and radiology tests
- A number of satellite labs will offer only a limited test types such as X-ray and sonography, and will feed the reference lab. The satellite labs will be existing labs set up by the Government
- Collection centers that will be located in PHCs, CHCs, clinics and nursing homes.
- The samples collected here will be sent to either the reference lab or the satellite labs
- Under the hub-and-spoke model, specimens / samples will be collected across multiple locations within a catchment area for delivery to a reference lab where diagnosis will be done.

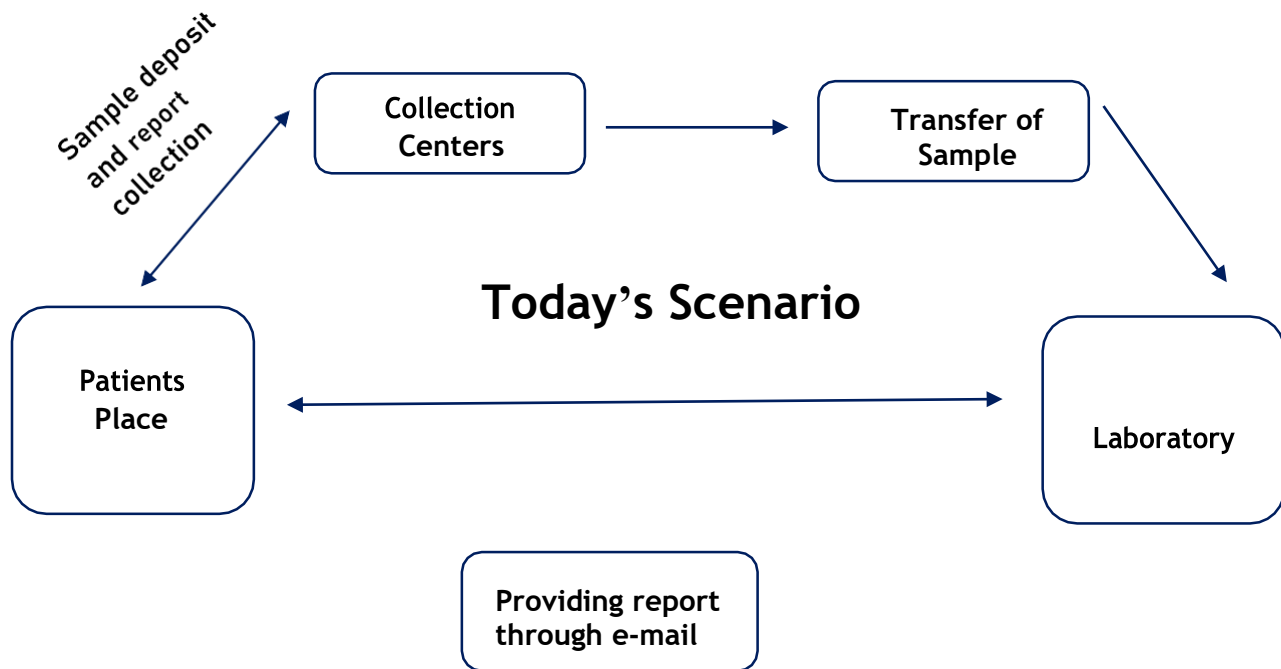
1.2.3 FOCUS ON SERVICE DELIVERY AND QUALITY

A few years ago, a patient had to spend considerable time and money to get a laboratory test performed. He used to visit the laboratory twice a day, once in the morning to drop off the sample and again in the evening or the following day to pick up his report.



This journey has evolved over time because the emphasis earlier was on clinical competence for high-end diagnostics, with patient centricity taking a second seat. Patients used to have to travel vast distances to receive high-end testing, which resulted in expensive travel costs, the loss of an entire day (loss of pay), and lengthier wait times for these diagnostic procedures. Diagnostics chains have changed their business strategy and turned their focus to patient comfort by utilizing technology. In the current circumstance, a patient's route has changed.

Patients can now get the same tests done with simplicity and comfort thanks to the expansion of this business.



In India, the medical diagnostics business has seen a tremendous transition towards patient-centricity, encouraging innovation in service delivery and providing quality services. Several developments and activities have aided in this change.

One major innovation is the creation of collection centers, which make it easier for patients to get diagnostic services. These centers are strategically positioned in various locales, including isolated regions, allowing people living in those areas easier access to contemporary diagnostic facilities. Furthermore, home sample collection services have grown in popularity, allowing patients to deliver samples from the convenience of their own homes.

Efforts were additionally taken to reduce report generation turnaround time. Laboratories are able to provide test results quicker because of advanced technologies and optimized techniques. Rapid alerts to customers have become commonplace, ensuring early communication of important details regarding their test findings.

The growth of the sector has resulted in considerable time savings for patients as well as greater convenience and efficiency. Individuals can avoid losing money owing to the necessity for many

appointments by reducing the number of visits required for laboratory tests.

Recognizing the importance of the pre-analytical stage in diagnostic accuracy, diagnostics chains have made significant expenditures in R&D, new technologies, and IT infrastructure. These efforts are intended to improve overall service quality and eliminate errors. Furthermore, diagnostics chains are actively testing and implementing enhanced modalities, new technologies, and novel systems in order to pave the way for preventive and personalized diagnostics.

The Indian medical diagnostics business has made enormous strides in providing patient-centered care, increasing access to high-quality diagnostic facilities, and aiming for ongoing development through research and technical advancements. These efforts are propelling the sector ahead and improving healthcare results for patients across the country.

1.2.4 PRICE TRENDS IN THE INDUSTRY

India has some of the lowest lab diagnostic test prices in the world. The modern diagnostics business has not only made high-end testing available in the nation as a whole, but it has additionally rendered these tests cheap to the general people.

The industry has one of the lowest pricing in the world. Unsecured testing costs in the United States and New Zealand are around eight and two times more, respectively than test prices in India. Furthermore, when compared to developing countries, testing prices within India are far lower.

Prices for lab tests in Kenya and Rwanda is more than four and a half multiple times more than in India. While improving the service paradigm and emphasizing patient-centricity, the industry has kept pricing low.

Table 1 Indexed laboratory prices in India vs the USA, New Zealand, Kenya and Rwanda

	INDIA	USA	NEW ZEALAND	KENYA	RAWANDA
Urine Culture	1	5.7	1.9	2.6	1.6
T3 (free)	1	9.5	3.1	10.4	3.5
T4 (free)	1	9.5	3.1	10.4	3.5
HIV I and II AB screening	1	13.6	2.2	1.1	3.3
Prolactin		74	2.8	3.3	3.0
QUANTITATIVE HcG	1	9	1.9	2.5	2.3
PSA (total)	1	5.1	1.1	2.6	2.3
LFT	1	4.8	3.0	3.5	3.3
Lipid profile	1	14.9	1.5	1.5	1.2
HCV Ab	1	2.8	0.8	1.3	1.3

Source: FairHealthConsumer.org (USD 1 = INR 68)

1.3 OVERVIEW OF E-HEALTHCARE SERVICE QUALITY AND CUSTOMER SATISFACTION

India is one of the few nations that has come out as one of the most rapidly developing technological economies in recent years, with a 90% increase in the adoption of technology index from 2014 and 2017. In order to improve quality and accessibility, the Indian healthcare sector adopted the digital revolution. In 2018, the digital healthcare sector in India was valued at US\$116.61 billion, at a CAGR of 27.41% expected to reach US\$485.43 billion by 2024.

Telehealth, eHealth, health information documents/electronic medical records (EHR/EMR), as well as others (remote diagnoses and healthcare analytics), are all part of the digital healthcare business. As more individuals use fitness and health applications to keep tabs on what they do every day, the health sector is expected to dominate (with a forty percent share) the market by 2024, fueling the market growth.

Consumers confront numerous issues as part of their typical outpatient care journey that includes pharmacies, doctors (for consultation), and diagnostics centres, due to inefficient processes, greater expenses, and poor service quality. However, with the advent of eHealth, it has considerably alleviated the challenges associated with the traditional outpatient care journey by offering healthcare customers with convenient, efficient, less expensive, and high-quality services via modern-day technology.

The use of technology in medical care has led in the emergence of a sector known as electronic health care services, which are expected to transform the current system of healthcare in developing nations such as India. Aside from competence, the obvious reasons for the growing popularity of this service are the reduction in time and expenses. It has influenced not just the accessibility and way of delivery of medical care, but also the role of the consumer in the system that provides healthcare. As a result of these advantages, Indian customers are gradually turning away from traditional medical care and towards e-Healthcare services.

1.3.1 PERCEIVED SERVICE QUALITY

Quality is subjective, and different stakeholders define it differently. Every stakeholder may view quality via a distinct lens, context, and interest. Customers, managers, suppliers, accreditation agencies, policymakers, and others may have various definitions. Service quality influences a customer's perception of a company. High-quality products contribute to the organization's excellent reputation, which leads to increased customer satisfaction.

To satisfy clients, providers must focus on four important service characteristics:

- Intangibility: The inability to be felt, touched, or seen.
- Perishability: Produced and consumed concurrently; cannot be stored like products.
- Inseparability: Cannot be separated from the service provider, and their creation and consumption occur concurrently.
- Heterogeneity: Services cannot be similar, and their quality varies according to circumstances such as provider, time, and location of service

1.3.2 PERCEIVED SERVICE QUALITY IN HEALTHCARE

Healthcare is critical to an individual's overall well-being. Healthcare service quality is crucial for health facilities across the world. With rising awareness of patients and hospital competitiveness, patient impression of healthcare quality has become increasingly important. The service industry is an important contributor to a country's GDP. It contributes significantly to the creation of job and investment opportunities, both of which are vital to a country's overall growth. Over fifty percent of global GDP is accounted for by the service sector.

With so many options accessible across all products and services, quality is one of the most important factors that distinguishes one offering from another. People are constantly on the search for high-quality goods and services. This goal has driven enterprises all over the world to strive for a competitive advantage through the delivery of high-quality products and services. The quality of services provided by an organisation determines its long-term profitability. The repurchase intentions of present and potential consumers are directly affected by service quality. The life of a patient who is reliant on healthcare services is at considerable risk. Even minor mistakes might have fatal repercussions. As a result, paying attention to the quality of healthcare services becomes critical.

1.3.3 ROLE OF DEMOGRAPHICS

Because the services vary from patient to patient, providing e-Healthcare services entails complex processes with several steps. Indian customers vary according to both urban & rural communities, wealth, schooling, caste, and religion. Age, gender, and level of education all have a role in healthcare service choices. Patients from all over the world, of all ages, social backgrounds, educational levels, & occupations seek treatment at various hospitals.

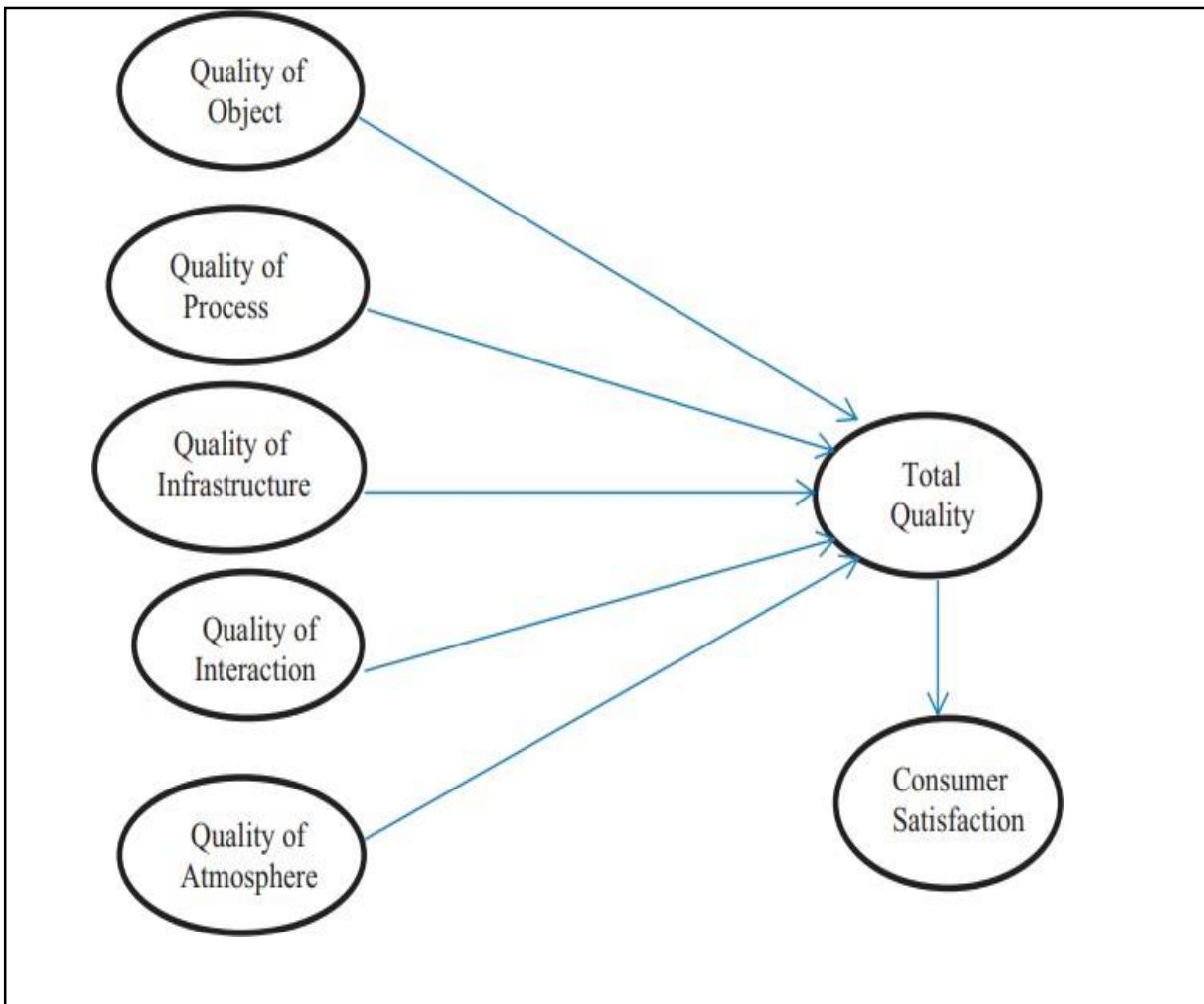
1.3.4 SERVICE QUALITY MEASUREMENT

The healthcare industry in populous emerging countries such as India is expanding. Patient satisfaction and loyalty are two strategic components that must be monitored and maintained at a higher level in order for success to be sustained throughout time. Consumer pleasure is the primary motivator when a product or service outperforms expectations. Satisfaction is a buyer's post-purchase mental state that reflects how much the client likes or dislikes the service after experiencing it.

Path laboratories must find critical characteristics that will influence future service improvements because their primary purpose is to provide high-quality care while enhancing consumer contentment. As a result of their favorable recommendations, a satisfied customer is more likely to return to a certain lab and refer new patients.

Two characteristics that are frequently associated with service quality are technical and functional quality. Technical excellence refers to both the workmanship of the service's product, or what a customer purchases, as well as whether the service satisfies its technical requirements and standards, while functional excellence covers how the service or good is provided and the company's connection with its customers.

Figure 6 Adapted from Zineldin(2006)



LITERATURE REVIEW

1) Importance of Quality in Health Care Sector: A Review

Gupta S khushboo, Rokade Varsha et al, 2018

In this article, various tools given by distinct authors and customer satisfaction and quality indicators given by health organizations to measure quality in the health care sector were studied. Customer satisfaction is the most important parameter for judging the quality of service being provided by a service provider to the customer. Positive feedback from the customer leads to the goodwill of service providers in the market, which indirectly expands their business, whereas negative feedback makes it shrink. This theory is also applicable to health care providers. Nowadays, patients are aware of their rights in terms of health care services and the quality of health care services being delivered to them. There are various tools or indicators which are set to provide the quality of services for patients without any acquired infection

2) Development and validation of an instrument to measure user perceived service quality of mHealth

Akter, S., D'Ambra, J. and Ray, P. et al, 2013

The aim of this study was to addresses the limitations in service quality models by theoretically conceptualizing and empirically validating a multidimensional service quality scale in the mHealth context The role of service quality in fostering the growth of mHealth services has gained much attention in the academic and practitioner communities. However, empirical research in this area has been beset by inadequate conceptualization and the lack of a validated scale. The findings show that mHealth service quality is a hierarchical, multidimensional, and reflective construct, which consists of three primary dimensions and eight subdimensions. The results also confirm that the mHealth service quality scale is more effective at predicting satisfaction and continuance in a nomological network.

3) Exploring the Perspective of Service Quality in mHealth Services during the COVID-19 Pandemic

Wan-I Lee, Nelio Mendoza Figueredo et al, 2021

This research aims at contributing to the understanding of service quality issues in mHealth services during the COVID-19 pandemic. The impact of COVID-19 has a significant effect on all sectors of society globally. Health information technology (HIT) has become an effective health strategy in this age of distancing. In this regard, Mobile Health (mHealth) plays a critical role in managing patient and provider workflows during the COVID-19 pandemic. Therefore, the users' perception of service quality about mHealth services plays a significant role in shaping confidence and subsequent behaviors regarding the mHealth users' intention of use. This study's objective was to explore levels of user attributes analysed by a qualitative method of how health practitioners and patients are satisfied or dissatisfied with using mHealth services; and analysed the users' intention in the context of Taiwan during the COVID-19 pandemic. This research explores the experienced usability of a mHealth services during the Covid-19 pandemic. This study uses qualitative methods that include in-depth and semi structured interviews that investigate participants' perceptions and experiences and the meanings they attribute to them. The five cases consisted of health practitioners, clinic staff, and patients' experiences using mHealth services. This study encourages participants to discuss issues related to the research question by asking open-ended questions, usually in one-to-one interviews. The findings show the positive and negative attributes of mHealth service quality. Hence, the significant importance of patients' and health practitioners' issues on several dimensions of perceived service quality is system quality, information quality, and interaction quality. A concept map for perceptions regards to emergency uses' intention of mHealth services process is depicted. The findings revealed that users pay more attention to "Medical care", "ease of use" and "utilitarian benefits" and have less importance for "Admissions and Convenience" and "Social influence". To improve mHealth services, the mHealth providers and health practitioners should better manage users' experiences to enhance mHealth services

4) Diagnostic Services and Healthcare: Strategies for Effective Performance

Jain, Rajnish; Alex, Aney; Jain, Sangeeta et al, 2008

This paper discusses the features, benefits, contributions and grave areas of diagnostic services, and proposes performance-oriented strategies to turn them into strategic business units. The healthscape never had it so easy before. Thanks to the modern diagnostic services equipped with latest technology, the medical fraternity has every reason to smile. The state-of-the-art diagnostic centres have done more than just providing high end diagnostic solutions making recuperation easy, quick, hassle-free and accurate. Ranging from basic pathological investigations to refined imaging, the diagnostic centres offer a gamut of healthcare solutions. The advantages of such services are manifold and undeniable. Diagnostic services are presently in the nascent stage in India. This industry has its own share of limitations-from being organized to running on professionalism, it has a long way to go.

5) Service Quality and Patient Satisfaction: An Exploratory Study of Pathology Laboratories in Jaipur

Agarwal Anuradha, Singh R.P Maithili et al, 2016

The purpose of this study was to develop a scale to measure the service quality at pathology laboratory. One of the most important parts of healthcare system is diagnostics. Nowadays, Indians have become more aware of their health, due to improved and better availability of health related information, increase in medical tourism, and expanding health insurance. The demand for better diagnostic facilities have increased with the increase in lifestyle related diseases, excesses use of chemicals in agriculture practices and change in food habits. It is expected that the Indian diagnostic market will grow from USD \$5 billion in the year 2012 to USD \$32 billion by the year 2020 with 20% CAGR (India Brand Equity Foundation 2015). Today patients have easy access of information regarding the health services and they have become more concerned about it as they look forward to receiving the maximum value for their money. To win the confidence of the patients and to maintain that trust, it is required to deliver the right services to the right person at the right time. A thorough review of literature revealed that there are studies related to healthcare service quality but there is no such established scale to measure service quality of pathology laboratory. Thus, the authors strived to develop a reliable and valid instrument to measure the patients' perception toward pathology laboratory service quality. For this exploratory study was conducted on the sample of 80 patients of the laboratories in Jaipur city. The reliability and factor structures were tested to purify the scale. The findings revealed 13 items, comprising of three dimensions of service quality: responsiveness, tangibility, and reliability.

6) Disparities in earnings and education in India

Geetha Rani, P. et al, 2014

This paper studies the impact of different levels of education, religion, caste as well as the impact of living in urban and rural communities on earnings in India. Besides these conventional stratification, yet another academic caste which influence earnings—the English language ability, is also examined. The paper uses a large cross-section sample of India Human Development Survey to estimate Mincer and augmented Mincer equations. The rates of return estimates obtained in these data and method confirm that returns to education increase with the level of education across location, caste-religion and English language ability. Returns to lower levels of education are low across different groups, indicating the low quality of basic schooling in the country. Returns to higher education vary at a great deal ranging between 4.9% among the rural workers and 38.2% among fluent English ability group. This is in contrast to Duraisamy reporting the highest returns to secondary education in India, between the period 1983 and 1993–1994. In a decade's time, with changes in the economy and in the labour market, higher education especially the English language ability along with higher education brings in the highest wage premium.

7) Medical diagnostic laboratories provisioning of services in India

Rahul Jain et al, Bakul Rao et al, 2015

This study focused on understanding the functioning of provision of diagnostic services by Indian diagnostic laboratories. Indian diagnostic laboratory can be classified into various categories based on the type of services provided and governance. Diagnostic services have a very important role to play in medical decision-making, which have an impact on the nation's health status. The understanding of Indian diagnostic services provisioning has certain literature gaps. The difference in their financing, resources, quality assurance of services and patient access to services was found in these different laboratories. It was concluded from the study that patient's access to laboratory services is affected by the functioning of laboratories in terms of governance, financing, resources, quality assurance of services and patient services.

8) India's focus on medical diagnostic laboratories: Indian planning and programs

Rahul Jain et al, Bakul Rao et al, 2016

This study focuses on understanding the government past Five-year health plans and current national health programs to understand the focus given to the laboratory systems both historically and in present. Healthy lives and well-being for all is one of the goals in Sustainable Development Goals 2030 (SDG) that is strongly dependent on a nation's healthcare system. In any modern healthcare system, laboratory diagnostics play a crucial

role for effective system's functioning as it helps in evidence based decision-making but the focus on laboratory diagnostics system is inadequate especially nationally. However, globally and nationally problems in laboratory diagnostic systems have been raised, but more focus is demanded. This will allow in filling the gap of linking the current status of laboratory systems with the historical approaches of India. This linkage will enable a more comprehensive understanding of the India's current state of laboratory diagnostic system and will help current and future planners and decision makers like Niti Aayog in better decision-making.

9) Designing primary healthcare systems for future in India

Pavitra Mohan, Himani Sethi, Kadarpetra Rahul Reddy, and Maharaj K. Bhan et al, 2019

Changing epidemiology, rapid urbanization, and rising expectations of populations are creating new challenges and opportunities for India's primary healthcare system. A group of primary care experts, practitioners, and researchers got together to design key elements of primary healthcare models for the future that would address these challenges and make use of emergent opportunities in rural and urban India. Based on experiences and evidence from India and across the globe shared in the consultation, the article lays out a vision and components of India's primary healthcare for future. It provides answers to questions such as how will healthcare be financed and organized, what mechanisms will assure quality of services, who will provide primary healthcare, and what role will technology have. Finally, it provides an agenda for primary healthcare practitioners and researchers to translate this vision into actions.

10) Measuring patient's satisfaction of healthcare services in the UAE hospitals: Using SERVQUAL

Hamda S. Al-Neyadi, Salam Abdallah et al, 2016

The purpose of this paper is to evaluate the quality of healthcare services by investigating the factors affecting patient satisfaction in private and public hospitals in the UAE based on five service quality dimensions of the SERVQUAL namely; tangibles, reliability, responsiveness,

assurance, and empathy. A modified SERVQUAL questionnaire was used to gather the research data. The respondents of the study consisted of 127 patients who have been admitted within the last 6 months prior to the onset of the investigation. The results of the study revealed that the perceived healthcare services in private hospitals and public hospitals do not significantly vary. Although patients were more satisfied with nursing care, the perceived satisfaction of patients with the quality of services provided by physicians and nurses as well as the quality of the hospital environment do not significantly vary in both public and private hospitals. The dimension of assurance was rated the highest while responsiveness was perceived as the least important of the five SERVQUAL dimensions. The five dimensions of the SERVQUAL appeared to be a consistent and reliable scale for measuring healthcare service quality in the United Arab Emirates context. The modified SERVQUAL may be used to contribute in enhancing the quality of healthcare services in UAE and in other similar environments.

11) The quality of health care and patient satisfaction: an exploratory investigation of the 5Qs model at some Egyptian and Jordanian medical clinics

Zineldin, M. et al, (2006)

In this research a study is described involving a new instrument and a new method which assure a reasonable level of relevance, validity and reliability, while being explicitly change-oriented. This study argues that a patient's satisfaction is a cumulative construct, summing satisfaction with five different qualities (5Qs) of the hospital: quality of object, processes, infrastructure, interaction, and atmosphere. A conceptual model including behavioural dimensions of patient-physician relationships and patient satisfaction has been developed. As the empirical research setting, this study concerns three hospitals in Egypt and Jordan. The survey instrument in a questionnaire form was designed to achieve the research objectives. A total of 48 items (attributes) of the newly developed five quality dimensions were identified to be the most relevant. A total of 224 complete and usable questionnaires were received from the in-patients. The result can be used by the hospitals to reengineer and redesign creatively their quality management processes and the future direction of their more effective health-care quality strategies.

3) OVERVIEW OF STUDY

3.1 PROBLEM STATEMENT

Diagnostics plays a crucial role in any healthcare system, as it contributes to the detection of diseases and health risks at an early stage, enabling timely and appropriate treatments. Diagnostic centers, often known as clinical labs, are facilities that perform tests on human specimens to help with disease diagnosis, treatment, and prevention. Diagnostic laboratories are spreading in India's tiers II and III cities in response to rising demand for better healthcare infrastructure. Large diagnostic companies such as SRL, the city, and Dr. Lal's Path labs have benefited greatly from this expansion.

These vital diagnostic facilities and pathology laboratories have high-quality, fully automated technology that delivers consistent and trustworthy test results. With the rise of e-Healthcare, healthcare providers are increasingly evaluating service quality in terms of customer satisfaction.

The type of engagement with patients has also changed in the current world, particularly in the context of consumers choosing to use e-Healthcare services related to pathology labs. The service delivery process has several stages, and it is critical to understand how these stages contribute to overall consumer satisfaction.

At every stage, including online appointment booking, sample collection, result delivery, and post-service assistance, healthcare practitioners strive to give patients with a streamlined and delightful experience. Consumer satisfaction is determined by aspects such as how easily appointments can be arranged, how quickly samples are obtained, the accuracy and timeliness of test results, and how effectively findings are communicated to patients.

By providing high-quality services, embracing technology, and prioritizing patient input, diagnostic laboratories strive to improve their customers' entire experience and pleasure. As a result, trust is developed, healthcare results improve, and the healthcare system as a whole is reinforced.

3.2 NEED FOR THE STUDY

Healthcare organizations strive to provide high-quality care while increasing customer satisfaction. To attain these objectives, it is critical to assess consumer perception and responsiveness. Patient satisfaction surveys are critical for identifying consumer needs, formulating strategic goals for high-quality services, and encouraging patients to follow treatment and appointment recommendations.

The goal of this research is to identify the key quality variables that contribute to client happiness in the setting of path lab e-Healthcare services. By defining these quality criteria, the study hopes to facilitate the creation of better e-Healthcare products and impact policy design. Furthermore, the research will look into the association between demographic factors and critical quality measures.

The purpose of the present study, which uses Zineldin's 5Qs strategy, is to identify the major quality determinants that have a significant impact on how satisfied customers are using e-Healthcare services. Understanding these factors allows healthcare organizations to priorities and solve the important issues influencing consumer satisfaction. Furthermore, the study attempts to examine the strength of the relationship between the elements of customer happiness and the demographic characteristics of the respondents. This study gives light on how different demographic factors may influence customer assessments regarding excellence in e-Healthcare services.

The overall purpose of this research is to improve e-Healthcare solutions by identifying quality characteristics that influence customer happiness and investigating the connection between these features and demographic demographics. The outcomes of this study can assist healthcare organizations in developing and providing high-quality e-Healthcare solutions that are tailored to consumers' various needs and preferences.

3.3 OBJECTIVES OF THE STUDY

This research looks at the many quality attributes of Route lbs' e-Healthcare offerings in the nation of India, as well as how different demographic characteristics of respondents are associated with quality qualities. Based on previous research, this study recommends using the 5Qs model to evaluate the efficacy of e-Healthcare operations and identify those that are most relevant quality traits for e-Healthcare services. Examining service quality aspects can assist managers and healthcare professionals in identifying flaws and implementing corrective measures.

The study's primary goal is further subdivided into the subsidiary goals listed below-

- Identifying which is the most relevant element in each of the 5Qs model's quality dimensions that leads to the greatest degree of client satisfaction
- Look at the link between demographics and essential quality factors, as well as consumer satisfaction

3.4 RESEARCH METHODOLOGY

To achieve the research aims, a standardized closed-ended questionnaire was developed, building on Zineldin's 2006 work. The questionnaire assertions were rewritten and categorized into five categories to be more pertinent to e-Healthcare services: the quality of the object (4 statements), the functionality of procedure (4 statements), excellence of facilities (7 statements), the functionality of environment (5 statements), and the level of communication (7 statements). The questionnaire asked respondents to assess 27 statements on a 1-5 rating scale.

The demographic criteria studied in the study included geographical area, work, age, level of education, gender, and monthly earnings per responder. These parameters were chosen to investigate how various demographic factors influence the perception of quality in e-Healthcare services.

An online survey utilising Google Forms was used to collect data for the study. Individuals with prior experience with e-Healthcare services were the target responders. The survey's sample size was set at 300 participants.

After collecting the data, it was analyzed using statistical software tools such as SPSS version 24 and AMOS. These methods were utilized to investigate the relationship between demographic data and quality criteria, as well as to evaluate the model's goodness of fit. The statistical research sought to discover any significant correlations between the respondents' demographic features and their evaluations of key quality factors in e-Healthcare services.

The study aimed to provide insights into the relationships between demographics and consumer perceptions of quality in e-Healthcare services by applying these analytical tools. The analysis also attempted to assess the overall fit of the proposed model, ensuring that it adequately captured the relationships between the variables under consideration.

4) DATA ANALYSIS AND INTERPRETATION

4.1 DEMOGRAPHIC ANALYSIS

Demographic analysis entails categorizing respondents based on their age, gender, educational level, and monthly income. The following tables give the frequencies and percentages of the 300 survey respondents separated into the specific characteristics of age, gender, qualification, and monthly income.

1) Gender of respondent (N= 300)

GENDER					
		Frequency	Percent	Valid Percent	Cumulati ve Percent
Valid	Female	151	50.3	50.3	50.3
	Male	149	49.7	49.7	100.0
	Total	300	100.0	100.0	

RESIDENT					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Rural	54	18.0	18.0	18.0
	Urban	246	82.0	82.0	100.0
	Total	300	100.0	100.0	

2) Age of respondent (N= 300)

AGE GROUP (YEARS)					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	20-30 years	269	89.7	89.7	89.7
	31-40 years	19	6.3	6.3	96.0
	above 51 years	12	4.0	4.0	100.0
	Total	300	100.0	100.0	

3) Region of respondent (N= 300)

4) Qualification of respondent (N= 300)

EDUCATION QUALIFICATION					
		Frequency	Percent	Valid Percent	Cumulati ve Percent
Valid	Graduate	115	38.3	38.3	38.3
	Matriculate	10	3.3	3.3	41.7
	Post graduate	175	58.3	58.3	100.0
	Total	300	100.0	100.0	

5) Occupation of respondent (N= 300)

OCCUPATION					
		Frequency	Percent	Valid Percent	Cumulati ve Percent
Valid	Businessman	23	7.7	7.7	7.7
	Student	73	24.3	24.3	32.0
	Employed	204	68.0	68.0	100.0
	Total	300	100.0	100.0	

6) Monthly Income of respondent (N= 300)

INCOME					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	above Rs. 50000	50	16.7	16.7	16.7
	Rs. 26000 - 50000	57	19.0	19.0	35.7
	up to Rs. 25000	193	64.3	64.3	100.0
	Total	300	100.0	100.0	

So, according to the demographic study, out of 300 responses-

- 82% of respondents lived in cities, whereas 18% lived in rural areas
- Males made up 50.3% of responses, while females made up 49.7%
- 89.7% of respondents were between the ages of 21 and 30, 4.3% were between the ages of 31 and 40, and 6% were over the age of 51
- 58.3% were postgraduates, 38.3% were graduates, and 3.3% were matriculates
- 68% were working, 24.3% were students, and 7.7% were business owners
- 64.3% earned less than 25,000 rupees per month, 19% made around Rs. 26,000 and 50,000 rupees per every month. and 16.7% made over Rs. 50,000 per month

As a result, the majority of participants in this study were young, resided in an urban area, had previous experience visiting a path lab, and were well aware of the e-Healthcare services offered by path labs.

FINDINGS AND RECOMMENDATIONS

5.1 KEY FINDINGS

Following the analysis, it is obvious that the 5Qs idea is acceptable for defining path labs in e-Healthcare systems. Furthermore, the data show that the state of a path lab's facilities the level of contact between facility providers, and the standard for the environment at route labs are all important elements in determining how satisfied consumers are with e-health solutions.

Analysis of Demographics

It presents an interesting view towards adoption of electronic medical solutions. This exhibits how Both males and females use e-Healthcare services, indicating that gender plays no influence in technology adoption

- The majority of respondents are between the ages of 20 and 30, indicating that adoption increases in e-Healthcare solutions. common and broadly accepted among the younger generation
- It can be seen that more educated people are more comfortable with technology and are less hesitant to utilize e-Healthcare services because educated people are more aware of the requirements of the use of e-Healthcare offerings, the process the delivering electronic medical facilities
- When it comes to the effect of region on choosing e-Healthcare services, it cannot be overlooked that these services are generally offered in urban areas, so only those who have access to them are more likely to utilize them, and awareness also plays a part here

5.2 RECOMMENDATIONS

The ultimate goal of this study was to discover significant quality aspects that lead to overall consumer satisfaction when using e-Healthcare services from path labs. It will assist service providers in working on those aspects and developing customer-

centered initiatives, which will ultimately lead to improved wellness and superior results. In terms of demographic factors, their relationship with quality dimensions will aid in more precisely identifying client segments and delivering e-Healthcare services to them.

- According to the study, healthcare providers should priorities Construction and development work excellence contact, with the environment's nature because these are the quality aspects that have the greatest influence on broad purchaser contentment
- For delivering electronic medical facilities online presence is must and path labs should focus on developing user friendly website and apps that renders seamless services to the customers
- Also convenience of location is also an important parameter while choosing these services so labs should design the overall process of testing starting from sample collection to delivering results keeping these factors in mind
- Path labs should increase their focus on establishing interactive communication with the customers, keeping in mind their needs while being reactive and responsive in nature
- Also staff should be well versed and confident with the use of technology and efficient customer support systems might be designed
- Focus should be more on educating customers regarding the process so that they can have adequate information at their disposal
- Path labs should look to obtain certifications from accredited agencies like NABL, CAP and ISO to establish faith in the consumers

Although adoption of e-Healthcare services has made the whole process much seamless and fast but there are many prospects which needs to be implemented in a better way. Practices by path labs must establish faith in the patients that these services are reliable and will only make the process easier for them.

Customer satisfaction should match the price that customers pay for availing these services and these recommendations can be utilized to add value to the patients. This will not only help in increased adoption of these services but will also improve the customer's loyalty towards the service providers.

5) LIMITATIONS AND FURTHER SCOPE OF THE STUDY

6.2 LIMITATIONS

This study has certain limitations too. This study focuses on e-Healthcare services but these are still in early stage of adoption in our country and are not used uniformly throughout the country. Also the sample only represented a small section of the population so variations may arise due to different geographic region and technology feasibility of a particular place. Customer satisfaction and related quality dimensions may differ while choosing different forms of services.

Also there are many more elements under these quality dimensions which may be developed and considered but this study consists of mentioned ones only.

6.2 FURTHER SCOPE OF THE STUDY

- To improve results, this study can be expanded to a bigger sample pool and demographic parameters investigated in depth
- Various studies can be undertaken in various geographical regions to better understand the penetration and e-Healthcare solutions' widespread use throughout various sections of our country.
- A differentiating factor can be established for comparative study between difference in customer experience at public and private labs
- More Study will benefit lawmakers & healthcare professionals. understand providing products according to needs for the Indian "e-Healthcare client"

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